ASME 2011 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference

PROGRAM

August 28–31, 2011  Washington, DC

- 23rd Biennial Conference on Mechanical Vibration and Noise (VIB)
- 31st Computers and Information in Engineering Conference (CIE)
- 8th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)
- 37th Design Automation Conference (DAC)
- 11th ASME International Power Transmission and Gearing Conference (PTG)
- 21st Reliability, Stress Analysis, and Failure Prevention Conference (RSAFP)
- 35th Mechanisms and Robotics Conference (MECH)
- 5th International Conference on Micro- and Nanosystems (MNS)
- 8th International Conference on Design and Design Education (DEC)
- 23rd International Conference on Design Theory and Methodology (DTM)
- 16th Design for Manufacturing and the Life Cycle Conference (DFMLC)
- 13th International Conference on Advanced Vehicle and Tire Technologies (AVTT)
On behalf of the ASME Design Engineering Division and the Computers and Information in Engineering Division, we are happy to welcome you warmly to the 2011 ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC/CIE) meeting in Washington DC.

The 2011 IDETC/CIE consists of thirteen conferences, of which twelve are organized by various technical committees in the ASME Design Engineering Division and the Computers and Information in Engineering Division, and one is cooperatively organized with IEEE. These thirteen technical conferences are:

- 13th International Conference on Advanced Vehicle and Tire Technologies (AVTT)
- 31st Computers and Information in Engineering Conference (CIE)
- 37th Design Automation Conference (DAC)
- 8th International Conference on Design and Design Education (DEC)
- 16th Design for Manufacturing and the Life Cycle Conference (DFMLC)
- 23rd International Conference on Design Theory and Methodology (DTM)
- 35th Mechanisms and Robotics Conference (MECH)
- 5th International Conference on Micro- and Nanosystems (MNS)
- 8th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)
- 11th ASME International Power Transmission and Gearing Conference (PTG)
- 21st Reliability, Stress Analysis, and Failure Prevention Conference (RSAFP)
- 23rd Biennial Conference on Mechanical Vibration and Noise (VIB)

Of the 1465 draft papers originally submitted to the conference, 1209 have been included in the final technical program. In addition, the conference contains 15 conference-specific and 4 symposium-specific keynote lectures, 13 conference-specific panel sessions (including a Q&A session with Design Engineering Division journal editors-in-chief, and a session on funding opportunities for research with participation from several federal funding sources and research labs) and 10 workshops sponsored by various technical committees and conferences.

We believe that this year’s technical program is faithful to the multidisciplinary and multifaceted nature of engineering design research, education, and outreach. The conference truly represents a premier international forum where leading experts with various design backgrounds and experiences can effectively showcase and share their newest ideas, cutting-edge research results, and developing methodologies and tools with their peers.
A successful technical program depends on many dedicated conference chairs, program chairs, technical committee chairs, members of advisory and international committees, symposium organizers, authors, and reviewers. We would like to extend our sincerest appreciation to these members of our community, who make this landmark 2011 IDETC/CIE a reality, and hope that you will take the opportunity to do the same. We would also like to express our appreciation for the diligent efforts of the ASME staff, whose hard work behind the scenes and in support of this conference often goes unnoticed.

In addition to the excellent technical program, the 2011 IDETC/CIE will offer a number of receptions and social events on all three days of the conference. A University of Maryland (UMD) Tour and Reception is scheduled for Sunday, where we will welcome all old and new friends and all participating students at the UMD’s reception with a number of attractive technical and social tours. On Monday night, a conference-wide reception will be held at the Hyatt Regency on Capitol Hill. The program also includes a number of events, including a conference-wide breakfast for all attendees each morning, a Student Networking Reception, and a 2012 / 2013 Kickoff Social on Wednesday evening. Please refer to this program or Web information for more details about any of these programs and plans.

We hope that you will enjoy the technical and social content of this year’s conference and that you will also find time to enjoy the sights of the nation’s capital, including the Smithsonian Institution, only a short distance from the conference site.

Best wishes for an enjoyable conference experience.
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ACKNOWLEDGEMENT

ASME was founded in 1880 as the American Society of Mechanical Engineers. Today’s ASME is a 120,000-member professional organization focused on technical educational and research issues of the engineering and technology community. ASME conducts one of the world’s largest technical publishing operations, holds numerous technical conferences worldwide, and offers hundreds of professional development courses each year. ASME sets internationally recognized industrial and manufacturing codes and standards that enhance public welfare and safety. The work of the Society is performed by its member-elected board of governors and through its various sectors, boards and hundreds of committees in districts throughout the world. There are over 400 sections and student sections serving ASME’s worldwide membership.

The Design Engineering Division was founded in 1945 as the Machine Design Division, part of the General Engineering Department of ASME. The objectives and function of this division are to promote the art and science of mechanical engineering design in the conception, evolution, and design of machinery and products, as well as mechanical design aspects of other phases of engineering. The division encourages and provides a forum for the interchange of ideas relative to design engineering through publications, presentations, discussion of technical papers, technical conferences and awards for outstanding achievement by individuals in the field of design engineering.

The Computers and Information in Engineering Division covers a broad spectrum of resources relating directly to the use of computers, computing methods, software and information management in engineering by providing a forum for understanding the application of emerging technologies that impact critical engineering issues of representation, product design and product development, exchange, management and integration of information throughout the entire engineering product and process life-cycle.

EXHIBITS

Exhibits are displayed during the registration hours in the Hall of Battles Foyer on the Ballroom Level.

CONFERENCE PROCEEDINGS

The official 2011 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference proceedings on DVD are included as part of the full, student, life and one-day conference participant registration fees. Vouchers (included with the registration material) can be turned in at the ASME publications booth to obtain a copy of the proceedings.

REGISTRATION

Registration is located outside of the Regency Ballroom on the Ballroom Level of the hotel. The hours are as follows:

- **Sunday, August 28**: 7:30am–6:00pm
- **Monday, August 29**: 7:00am–6:00pm
- **Tuesday, August 30**: 7:00am–5:00pm
- **Wednesday, August 31**: 7:00am–12:00pm

AUTHORS PRACTICE ROOM

The Grand Canyon Room on the 2nd floor serves as the author practice room 8:00am–4:00pm on Monday, Tuesday and Wednesday. An LCD projector and screen are available for authors to practice their presentations.
NAME BADGES
Please wear your name badge at all times. Admission to all conference functions is by a code on your badge or a ticket. Your badge also provides a helpful introduction to other attendees.

TICKETED FUNCTIONS/ITEMS
Access to certain conference functions such as receptions, workshops, and luncheons may be by a code on your registration badge or a ticket. If you wish to bring a guest, you must purchase a ticket in advance. If you have questions about any ticketed items, ask a conference representative located in the registration area on the Ballroom Level.

HANDICAPPED REGISTRANTS
Whenever possible, we are pleased to make arrangements for handicapped registrants. Advance notice may be required for certain requests. For on-site assistance, please visit the registration area on the Ballroom Level and ask to speak with a conference representative.

HAVE QUESTIONS ABOUT THE MEETING?
If you have any questions or need assistance, an ASME representative is located at the registration area on the Ballroom Level.

HOTEL
Enjoy easy access to all the attractions of the nation's capital. The Hyatt Regency on Capitol Hill, located in the heart of downtown Washington DC, is the venue for this year’s IDETC/CIE Conference.

Hyatt Regency on Capitol Hill
400 New Jersey Ave., NW
Washington, DC  20001
Phone Number:  1-202-737-1234
Website:  www.washingtonregency.hyatt.com

WASHINGTON DC
Formerly the District of Columbia, Washington DC is the capital of the United States and was founded on July 16, 1790. The US Constitution allows for the creation of a special district to serve as the permanent national capital. The District is therefore not part of any US state and is instead directly overseen by the federal government. Within the District, a new capital city was founded in 1791 and named in honor of George Washington. The City of Washington along with Georgetown, and outlying areas within the federal district, were placed under a single, unified government following an act of Congress in 1871. It is for this reason that the city, while legally named the District of Columbia, is known as Washington DC. The city shares its name with the US state of Washington located on the country's Pacific coast.

The District is located on the north bank of the Potomac River and is bordered by the states of Virginia to the southwest and Maryland on the other sides. The city has a resident population of 601,723; because of commuters from the surrounding suburbs, its population rises to over one million during the work week. The Washington Metropolitan Area, of which the District is a part, has a population of nearly 5.6 million, the seventh-largest metropolitan area in the country.
CONFERENCE-WIDE BREAKFAST

Breakfast is available to ALL attendees each morning. Please join your 2011 conference organizers in the Regency A Ballroom at 7:30am. There will be a variety of breakfast goods to choose from including, breads, muffins, fruit, yogurt, coffee, tea and juice.

COFFEE BREAKS

Morning and afternoon coffee breaks are scheduled each day on each meeting floor (Ballroom Level, Lobby Level, 2nd Floor and 11th Floor). The morning coffee break is held at 10:20am each day and the afternoon coffee break is held at 3:20pm each day. Coffee, tea, lemonade and iced tea is available.

AWARDS LUNCHEONS

CIE
Tuesday, August 30, 2011
12:00pm–1:40pm Location: Regency A Ballroom

DED (including the following conferences: AVTT, DAC, DEC, DFMLC, DTM, MNS & RSAFP)
Monday, August 29, 2011
12:00pm–1:40pm Location: Regency A Ballroom

MECH
Wednesday, August 31, 2011
12:00pm–1:40pm Location: Regency A Ballroom

MESA
Monday, August 29, 2011
12:00pm–1:40pm Location: Thornton Lounge

MSNDC
Tuesday, August 30, 2011
12:00pm–1:40pm Location: Regency B Ballroom

PTG
Tuesday, August 30, 2011
12:00pm–1:40pm Location: Thornton Lounge

VIB
Tuesday, August 30, 2011
12:00pm–1:40pm Location: Regency C Ballroom

CONFERENCE RECEPTION*

Monday, August 29, 2011
Time: 6:00pm–8:00pm Location: Regency A Ballroom

Join your conference organizers and celebrate this year’s conference in the nation’s capital. You’ll have the opportunity to socialize with fellow attendees (and former presidents and historians).

*Note this function is included in the registration fee for Full, Student and Life Registrants. One Day Registrants and guests will need to purchase a ticket for $50.

STUDENT NETWORKING RECEPTION

Tuesday, August 30, 2011
6:30pm–8:30pm Location: Regency A Ballroom

Be sure to check out this exciting event. Fun and entertainment will be on hand. Free food and drinks to students and prizes will be awarded to winners of the scavenger hunt.

UNIVERSITY OF MARYLAND LAB AND CENTERS TOUR AND RECEPTION

Sunday, August 28, 2011
2:00pm Location: University of Maryland (meet in the lobby of the hotel)

This year’s Technical Tour and University Reception is sponsored by the A. James Clark School of Engineering. Attendees will have the opportunity to tour the following laboratories and centers:

- Center For Advanced Lifecycle Engineering
- Space Systems Laboratory
- Maryland Nanocenter
- Robotics, Automation, and Medical Systems (RAMS) Laboratory
- Maryland Robotics Center
- Terps Racing Club

Buses depart the hotel at 2:00pm and proceed to the College Park campus of the University of Maryland. Only those attendees who have pre-registered for the tour may participate. Refreshments will be provided following the tours of the above mentioned engineering facilities.
The Vehicle Design Committee (VDC) promotes innovative analytical, computational, and experimental investigations in control, dynamics, and design of full vehicle (including conventional IC engine powered platform as well as hybrid EV platform) systems and their subassemblies. With the ever-rising demands on passenger safety, human-vehicle interface and human behavior modeling/simulation are also embedded into the technical spectrum of VDC. Our members perform fundamental research, applied research, and successful technology implementations for light and heavy vehicle design, modeling, and validation.

VDC is pleased to welcome you to the 13th International Conference on Advanced Vehicle and Tire Technologies (AVTT) under the 2011 ASME IDETC. This year AVTT will consist of seven sessions in the areas of: vehicle systems design; vehicle systems product development; vehicle design tools to enhance safety, health, and ergonomics; multibody systems modeling and validation for vehicle dynamics applications; vehicle systems dynamics and control; and nonconventional, energy efficient and environmental friendly vehicles. An AVTT Best Paper Award will be awarded, and the presenting author will receive a registration waiver. This year we are also glad to have two invited keynote speakers. The first invited speaker is Dr. Mihai Dorobantu, head of the Vehicle Technologies and Innovation team for Eaton Corporation, in Southfield, Michigan, who is also responsible for the advanced R&D portfolio for Eaton's Vehicle Group. The second speaker is Dr. Huei Peng, professor in the Department of Mechanical Engineering, and executive director of Interdisciplinary and Professional Engineering, University of Michigan, Ann Arbor.
The CIE organizers are delighted to welcome you to the 31st Computers and Information in Engineering Conference (CIE) in Washington DC. This year we continued our steady growth, exceeding the previous record with 254 submissions, 184 scheduled for presentation in over 44 technical sessions. Our sustained growth is a testimony to the hard work of our technical committees and associated topic and symposia organizers. We are indebted to them for their outstanding service and leadership. We feel strongly, that the plethora of disciplines and the creativity and innovation emanating from the presentations will satisfy both your intellectual and professional appetite and curiosity.

Many exciting events are planned for this conference. On Sunday, there will be several excellent tutorials and workshops. On Monday we will hold technical committee meetings during the lunch break. These meetings are open to you and we invite your participation. During Tuesday’s luncheon we will be presenting several division-level awards. This year we have introduced a new award — the Excellence in Research Award – to recognize notable contributions of researchers in their mid-career. This is in addition to the Lifetime Achievement, Young Investigator, Leadership, Distinguished Service, and Best Paper awards that recognize various contributions to computers and information in engineering. We are also pleased to note that Prof. Charbel Farhat, chairman of the Department of Aeronautics and Astronautics at Stanford University, will be giving the keynote presentation, which we anticipate will stimulate discussion throughout the week. We will hold our annual graduate student poster reception with light refreshments provided, followed by our division general assembly meeting, on Tuesday evening.

On Tuesday and Wednesday, there will be several panels which should be of considerable interest to the CIE community: 1) Addressing the National Academy of Engineering Grand Challenges through Research in CIE, 2) Energy Systems and Energy Efficient Manufacturing, and 3) Funding Opportunities for Research. We appreciate the time taken by the panelists and the organizers of these panels.

We would like to express our deep appreciation to the following topic organizers, review coordinators and session chairs: Krishnan Suresh, Brian H. Dennis, Gregory Mocko, Richard Malak, Yan Wang, Derek Yip-Hoi, Cameron Turner, Charlie C.L. Wang, Jitesh Panchal, Paul Witherell, Anantha Narayanan, Doug McCorkle, Matt Bohn, Richard Crowder, Ying Liu, Abhishek Seth, Hai-Jun Su, Sven Kreft, George Dulikravich, Rajeev Kumar, Valeria Krzhizhanovskaya, Ashok Kumar, Sara McMains, Dan Negrut, Roshan M. D’Souza, Ilias Kotsireas, P. Venkataraman, Tomonari Furukawa, John Hermanson, Yoshitaka Wada, Kevin Lyons, Wenwu Zhang, Heidi-Lynn Ploeg, Jill Schmidt, Shuichi Fukuda, Hideki Aoyama, Hideyoshi Yanagisawa, Monica Bordegoni, Shana Smith, Tamotsu Murakami, Yong Zeng, Gaurav Ameta, Mahesh Mani, Anantha Narayanan, Sundar Krishnamurty, Abe Zeld, Tolga Kurtoglu, Virginia DeGiorgi, Chris McMahon, Dirk Schaefer, Karthik Ramani and Robert Ivester.

Finally, we would like to express our thanks to you for attending the 31st CIE Conference. Let us make this conference a very productive and rewarding experience through active participation and lively discussions. Enjoy Washington DC!
Welcome to the 37th ASME Design Automation Conference (DAC)! ASME's DAC serves the important function of promoting research and disseminating knowledge in areas dealing with Design Automation. This year, 156 papers were submitted to the conference, and 118 papers were accepted after a rigorous peer review process. These accepted papers cover about 30 topics spanning DAC's four major thrust areas: Design Representation, Design Optimization, Design Evaluation, and Design Integration, and will be presented in 25 technical sessions, running in three parallel tracks. New in this year, among the submitted final papers, 10 best papers were selected and will be denoted in conference program. One of these 10 outstanding papers will be selected for the Best Paper Award sponsored by the Ford Motor Company and will be announced and presented at the DED Lunch on Tuesday. These top 10 papers are listed as below:

- DETC2011-47922 A Function Based Approach for Product Integration, by Vishwa Kalyanasundaram and Kemper Lewis (pg 131)
- DETC2011-48196 Multidisciplinary Design Optimization of Modular Industrial Robots, by Mehdi Tarkian, Johan Persson, Johan Ölvander, and Xiaolong Feng (pg 165)
- DETC2011-48318 Sequential Sampling with Kernel-based Bayesian Network Classifiers for Set-based Design, by David Shahan and Carolyn Seepersad (pg 165)
- DETC2011-48319 Random Field Characterization with Insufficient Data Sets for Probability Analysis and Design, by Zhimin Xi, Byungchang Jung, and Byeng D. Youn (pg 97)
- DETC2011-48532 Optimizing the Shear Beam of a Non-pneumatic Wheel for Low Rolling Resistance, Niranjan Thyagaraja, Prabhu Shankar, Georges Fadel, and Paolo Guarnieri (pg 76)
- DETC2011-48566 Convex Estimators for Optimization of Kriging Model Problems, by Karim Hamza and Mohammed Shalaby (pg 122)

We also have an exciting joint Plenary Speaker scheduled on Monday morning. Dr. Sridhar Kota from University of Michigan, who is also an ASME White House Office of Science and Technology Policy Fellow, will speak on “Innovation and US-based Manufacturing.” In addition, we have three special panel sessions this year, i.e., 1) Environmental Policy in Vehicle Design, organized by Dr. Jeremy Michalek, 2) Interdisciplinary Design Research and Education: The New Frontier, organized by Drs. Tim Simpson and Panos Papalambros, and 3) Q&A with Design Engineering Divisions Journal Editors, organized by Dr. Shapour Azarm. Please check the conference program for their schedules.

We would like to take this occasion to thank all of the authors for submitting their papers, paper reviewers for sharing their time and expertise, and session chairs/co-chairs for running a smooth conference. Also, we would like to thank the special session organizers and review coordinators and co-coordinators for soliciting and managing papers: James, Allison, Shapour Azarm, Gwenola Bertoluci, Mark Bryden, Matthew Campbell, Wei Chen, Yong Chen, Souma Chowdhury, Srikanth Devanathan, Joe Donndelinger, Xiaoping Du, Scott Ferguson, Asma Ghaffari, Karim Hamza, Horea Ilies, Levent Burak Kara, Ritesh Khire, Harrison, Kim, NamHo Kim, Michael Kokkolaras, Ikjin Lee, Yann, Leroy, Kemper Lewis, Mian Li, Frank Liou, Anil Maddulapalli, Chris Mattson, Jeremy Michalek, Zissimos Mourelatos, Ahsraf Nassef, Andrew, Olewnik, Damiano Pasini, Rahul Rai, Kartik Ramani, Sirisha Rangavajhala, David Romero, Carolyn Seepersad, Mohamed Shalaby, Tim Simpson, Mohamed, Trabia, Arda Vanli, Charlie Wang, Gary Wang, Yan Wang, Bernard Yannou, Byeng Dong Youn, Yong Zeng, and Jie Zhang. Without all of your hard work, we would not have a successful conference.

Thank you for attending the 37th ASME DAC, and we hope you have a productive and enjoyable time with us in Washington D.C.!
Welcome to the 8th Symposium on International Design and Design Education. The traditional focus of the conference is on educational practices and methodology in the design education field. These issues are addressed in sessions on: innovation and entrepreneurship in design; best practices and lessons learned; and design across the curriculum.

More recently, our companion focus has been on design education in collaborative design environments. To these ends, sessions are offered on design education methodologies used in distance learning as well as cyber learning environments.

At this 8th Conference, we are particularly focusing on scholarship in design education as well as industrial and outreach collaboration-related aspects that impact design and design education. For both topics corresponding panel sessions are offered.

Thank you for joining us in Washington D.C., and thank you for attending the 8th Conference!
The Design for Manufacturing Committee of the Design Engineering Division of ASME is pleased to welcome all IDETC participants to the 16th Annual Design for Manufacturing and Life Cycle Conference. This conference brings together researchers, practitioners and educators from academia, government organizations, and industry in the design for manufacturing and the life cycle areas to share latest results in the field and define new challenges. The ASME Design for Manufacturing and Life Cycle Conference is the main international forum for the exchange of technical and scientific information on the theory and practice of DFX and product life-cycle management (PLM).

We are happy to report that the DFMLC community continues to have a solid participation in IDETC. While many new and exciting results and methods will be presented as part of the conference technical sessions, we will hear the voice of the industry in our panel sessions. Two keynote speakers will address the divide between design and manufacturing in a joint keynote session.

This year’s DFMLC conference includes 58 technical papers organized in 12 technical sessions:

- Theoretical Foundations for Design and Manufacturing Integration
- Integrated Product and Process Development Processes I, II, III (3 sessions)
- Sustainable Design
- Life Cycle Decision Making I, II (2 sessions)
- Design for Mass Customization, Design for Service, Design for Layered Manufacturing & Design I, II (2 sessions)
- Design for Supply Chain
- Integrated Assembly Design and Planning
- Manufacturing Cost Estimation and Total Cost of Ownership

We would like to thank all the authors for submitting papers, paper reviewers for sharing their time and expertise, and the session chairs /co-chairs for their participation. Special thanks go to the following review coordinators for managing the papers through the review process: Derrick Tate, Harrison Kim, Qing Wang, Rahul Rai, Karl Haapala, Fu Zhao, Mey Goh, Takai Shun, Ming-Chuan Chiu, Linda Newnes, Gül Kremer, Alper Murat, Iraj Mantegh, Karthik Ramani and Qingjin Peng. Your participation and hard work has made DFMLC a very successful conference.

With the two planned panel sessions, John W. Wesner will take us to the world of entertainment engineering. His guests (Michael Aikens, Butler County Community College; David Huber, Columbus McKinnon; Thomas Mackin, Cal Poly; Tanner Rinke, Walt Disney Imagineering; Stephen Sywak, McLaren Engineering Group) will not only discuss what is special about entertainment engineering but also they will show the complexities of designing in this domain, where creativity meets engineering.

Drs. Christina L. Bloebaum and Russell Barton will focus on sustaining the connection between manufacturing and design in their joint keynote. While they will attest to the interdependence of design and manufacturing, they will also point to the fact that design and manufacturing communities have grown and developed independently. Given this, they will explore the needs and benefits of maintaining a connection between design and manufacturing, the history of previous attempts, and initiatives that are currently underway at the National Science Foundation and elsewhere to promote and explore these connections.

Finally, we are very pleased to present the inaugural Kos Ishii-Toshiba Award recipient, Dr. Satyandra K. Gupta. With sponsorship by Toshiba, this award was established in honor of the late Professor Kos Ishii, who was an internationally distinguished and influential researcher and educator in the field of design for manufacturing and the life cycle. We invite all of the IDETC community to the Kos Ishii-Toshiba Award ceremony.
Welcome to the 23rd International Conference on Design Theory and Methodology (DTM). Our conference is focused on fundamental design theories and the methodologies that emerge to apply them, with contributions provided by both researchers and practitioners. This year’s DTM conference offers topical and thought-provoking presentations across a broad range of topics related to this focus.

We have scheduled 11 sessions:

- Design Representations and Formalisms
- Function Based Methods
- User Centric Design
- Product Family and Architecture Design
- Quantitative Assessment Methods
- Creativity Methods and Studies
- Design Behavior and Analogical Design
- Uncertainty and Risk in Design
- Complexity and Adaptability in Design
- Understanding Innovation
- Challenges in Complex and Sustainable Design

This year, 104 papers were submitted to the DTM conference for peer review, a significant increase from last year, of which 50 were selected for publication and presentation, at an acceptance rate of 48%. Of the 50 papers that were accepted, 16 papers are from authors at institutions outside of the U.S., making up 32% of the accepted papers.

The Best Paper Award will be given to the paper entitled “Understanding of Emotions and Reasoning During Consumer Tradeoff Between Function and Aesthetics in Product Design” by Brian Sylcott, Jonathan Cagan, and Golnaz Tabibnia of Carnegie Mellon University.

Year by year, we are working to streamline and improve the DTM session design and paper submission and review processes. We welcome your comments and suggestions for improving all aspects of the DTM Conference. You are invited to attend our DTM Committee meeting (held Tuesday at 6:00 PM) as this gives all members of the DTM community a chance to provide input on next year's conference. In 2012, Irem Tumer of Oregon State University will be the conference chair of the 24th DTM Conference.

The process of selecting papers is at the heart of a successful conference. This year, we had an excellent group of reviewers who generously offered their time and expertise and assisted with selection decisions. As always, this peer review process was successfully managed by an exceptional group of DTM Review Coordinators: Sofiane Achiche, Eric Coatanéa, Claudia Eckert, Wei Chen, Scott Ferguson, Dan Frey, Katja Holtta-Otto, Christopher Hoyle, Levent Burak Kara, Sun Kim, Tolga Kurtoglu, Julie Linsey, Richard Malak, Jay McCormack, Gregory Mocko, Jacquelyn K. Strobble Nagel, Rahul Rai, Michael Scott, Carolyn Conner Seepersad, Kristina Shea, Robert B. Stone, Joshua Summers, Maria Yang, David C. Wynn. We greatly appreciate the time and effort these individuals contributed to maintaining the high quality of this DTM conference.

We look forward to welcoming you to DC!
Welcome to the 35th ASME Mechanisms and Robotics Conference. The conference has its origin in 1953, as The Conference on Mechanisms, hosted biennially by Purdue University. In 1964, ASME took it over and formed the ASME Biennial Mechanisms Conference. The conference was renamed the ASME Biennial Mechanisms and Robotics Conference in 2000, and in 2005, it became an annual event as the ASME Mechanisms and Robotics Conference. Today the conference is a recognized international forum for the exchange of new ideas and the presentation of recent advances in the theory, design and application of mechanisms and robotic systems.

This year, the conference presents 142 peer-reviewed technical papers organized into the following eight technical symposia, along with the Student Mechanism and Robot Design Competition. We thank the listed organizers for coordinating the reviews associated with each symposium.

- MR-1 Compliant Mechanisms (Hai-Jun Su, Craig Lusk)
- MR-2 Tensegrity and Cable Driven Systems (Phil Voglewede, Philippe Cardou)
- MR-3 Mechanisms and Robots in Medicine (Carl Nelson, Joo Kim)
- MR-4 Mobile Robots (Dennis Hong, Venkat Krovi)
- MR-5 Parallel Manipulators (Andreas Müller, Dan Zhang)
- MR-6 Mechanism Analysis and Synthesis (David Myszka, Xianwen Kong)
- MR-7 Robot Dynamics and Control (Anurag Purwar, Nilesh Mankame)
- MR-8 Mechanisms and Robotics Education (Robert Freeman, Alba Perez-Garcia)
- MR-9 Student Mechanism and Robot Design Competition (David Cappelleri, Brian Trease)

We would like to thank Stephen Canfield, chair of the Awards Committee, for coordinating the selection of the M&R Best Paper Award, the GM/Freudenstein Young Investigator Award, the AT Yang Award for Best Paper in Theoretical Kinematics and the Compliant Mechanisms Theory and Application Awards. Please attend our Wednesday Luncheon for the presentation of these and the awards to the winners of the Student Mechanism and Robot Design Competition.

On Monday, our keynote address will be given by Dr. Sridhar Kota, professor of Mechanical Engineering at the University of Michigan. Dr. Kota, the recipient of numerous awards and honors, is currently on leave from Michigan serving as the Assistant Director for Advanced Manufacturing at the White House Office of Science and Technology Policy. Dr. Kota coordinates Federal advanced manufacturing R&D and addresses issues related to innovation, manufacturing competitiveness and technology commercialization.

A special thanks is owed to all the authors, reviewers, presenters, symposium organizers, session chairs and all the other volunteers who have contributed their efforts to the overall success of the conference. We hope that you enjoy the conference, and we look forward to your continued support and participation in future Mechanisms and Robotics Conferences.
Welcome to the 7th ASME/IEEE International Conference on Mechatronics and Embedded Systems and Applications (MESA 2011). The MESA conferences organized by the MESA executive committee are primarily co-sponsored by

- ASME Design Engineering Division (DED)
- IEEE Intelligent Transportation Systems Society (IEEE ITSS)
- IEEE Control Systems Society (IEEE CSS)

and technically co-sponsored by other organizations. The MESA conference is organized by ASME and IEEE alternately every other year.

The objectives of the conference are mechanical and electrical systems that show an increasing integration of mechanics with electronics and information processing. This integration is between the components (hardware) and the information-driven functions (software), resulting in integrated systems called mechatronic systems. The development of mechatronic systems involves finding an optimal balance between the basic mechanical structure, sensor and actuators, automatic digital information processing and control in which embedded systems play a key role.

It is our pleasure to report that this year we have received a total of 179 full papers that were submitted to the 16 MESA symposia covering the fields of interest of the conference. The large number of submissions has provided the Program Committee a good foundation to build a high-quality technical program for this three-day conference along with four prominent keynote speeches and 135 accepted papers.

The organization work of MESA is the effort of many people and organizations, in particular the Advisory Committee, the Symposium Chairs, the Technical Program Committee, and the ASME/DED staff. We would like to acknowledge the excellent voluntary work of these individuals and the support of ASME and IEEE.
On behalf of the ASME-DED Technical Committee on Micro- and Nano-Systems (MNS) we welcome you to the Fifth International Conference on Micro- and Nano-Systems (MNS) at the 2011 ASME IDETC, held here in Washington DC. This conference is a unique venue for presenting and exchanging ideas on the design, applied mechanics, dynamic systems, and controls aspects of micro- and nanosystems and follows the successful first four years of the conference at the IDETC’07 (Las Vegas), IDETC’08 (New York), IDETC’09 (San Diego), and IDETC’10 (Montreal). This year, following a thorough peer review process, we have accepted 69 papers for technical presentation. The accepted papers have been grouped under six single-track and five parallel-track sessions (total of 16 sessions) with specific themes. These sessions cover basic areas such as applied mechanics, surface and contact mechanics, dynamics, measurement and control. The sessions also cover application areas such as bio-MEMS, micro/nano mechanisms and robotics, and nanomanufacturing.

We are honored to have a keynote lecture by Prof. Thomas Kenny from the Department of Mechanical Engineering at Stanford University. Prof. Kenny’s keynote session has been scheduled for Wednesday, August 31 from 10:40 am-12:00 noon. His talk is entitled “Encapsulation for MEMS Resonators: How Packaging Enabled a Technology.” We encourage anyone interested in micro and nanosystems to join us for this keynote session, which we believe will be both informative and stimulating.

We will have a MNS Special Reception with snacks and drinks on Tuesday, August 30 from 6:00 to 7:00pm. This gathering will allow the MNS community to network and to view the MEMS/NEMS Photo Contest entries. This photo contest has been organized as a forum to display really interesting photos of novel creations. The photo contest entries will be displayed in the main MNS single-track session room from the first day with the opportunity for MNS Conference attendees to vote on who has the best photography. We will announce the winners at the close of Tuesday’s MNS special reception.

The MNS Committee Meeting (open to all MNS participants) will immediately follow the MNS Special Reception starting at 7:00pm. In this meeting, we will report on recent activities and discuss the future directions that are being considered by the MNS Committee. This meeting provides a great opportunity for anyone wanting to get directly involved in shaping the future of the MNS community.

We expect the 5th MNS conference to be an exciting forum on new ideas in micro- and nanosystems. As always, the conference owes its success to the authors for submitting quality papers, to the paper reviewers for their diligent efforts, and to the symposia organizers for their efforts to advertise the conference and for their management of the review process to ensure high quality. We would like to sincerely thank all these people that have contributed their time to the success of this conference.

Welcome to Washington DC, and thank you for your participation in the MNS Conference!
On behalf of the members of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics (MSND), we would like to welcome the attendees of the 8th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC). The conference this year has a total of 141 accepted papers and presentations that cover traditional and new emerging topics across the multibody systems and nonlinear dynamics fields of inquiry. A total of 11 different technical symposia have been organized on topics ranging from computation, modeling, analysis, control, and optimization to applications in device and system design, vehicle dynamics, biological systems, and industrial tools.

New for this year is a panel session that seeks to reflect on the personal perspectives of representatives from the industry and federal research communities on opportunities in the area of multibody systems and nonlinear dynamics. Following past tradition, we will also feature a student paper competition session in which the finalists get to present their work to the award selection committee. In addition, and also new for this year, are two rapid-fire oral presentation sessions, in which a select group of papers will be competing for the best poster award. We look forward to seeing you at these events and hope you will also visit the posters displayed at the conference venue to learn more about the work of these authors.

The ASME Technical Committee on Multibody Systems and Nonlinear Dynamics selected Professor Earl Dowell of Duke University as the recipient of the 2011 Lyapunov Award and Professor Javier García de Jalón de la Fuente of the Universidad Politécnica de Madrid, Spain as the recipient of the 2011 d’Alembert Award. These two awards, which will be presented at the MSNDC lunch on Tuesday, August 30, 2011, are meant to recognize significant lifetime contributions made by the awardees to the fields of multibody systems and nonlinear dynamics, respectively. In addition, at this lunch, we will be honoring Professor Eusebius (Sebius) Doedel of Concordia University, Montréal, Québec, Canada to recognize his significant contributions to computational dynamics. The conference will have two keynote lectures, the d’Alembert and the Lyapunov lectures. The Lyapunov lecture will be given by Professor Dowell in the second technical session slot on Tuesday, August 30, 2011. The d’Alembert lecture will be given by Professor de Jalón in the second technical session slot on Wednesday August 31, 2011.

We would like to thank the authors for submitting their work to the conference, the reviewers for their time and efforts in evaluating the papers, and the distinguished keynote speakers for accepting our invitation. We would also like to express our appreciation to the symposium organizers (listed below) for their tremendous organizational efforts and cooperation.


Thanks are also due to the members of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics who selected the d’Alembert and Lyapunov award recipients.

This conference represents a unique opportunity for researchers, educators and students to present their new research results, exchange ideas, and become familiar with new trends and directions in the fields of multibody systems and nonlinear dynamics. We look forward to having a successful conference and we hope that all the attendees will enjoy their stay in Washington DC.
Welcome to the 11th International Power Transmission and Gearing Conference. We would like to thank all the authors for choosing this forum to disseminate their latest research findings, and all the practitioners who chose to attend this conference. It is the presence of this perfect mix of leading researchers and engineers from around the world that makes this conference an ideal forum for enhancing power transmission and gearing engineering. We hope you make full use of this unique opportunity to learn about the latest research works and their applications to address critical engineering issues, and to network and engage with your peers from across the globe.

This is a truly global conference and there are a total of 70 technical papers from researchers in North America, Europe, and Asia. In all, authors from twenty different countries will present their work in all aspects of gearing and power transmission fundamentals and application. Topics that are covered include:

- Gear System Design and Analysis
- Gear Strength and Durability
- Gear System Dynamics and Noise
- Gear Manufacturing
- Power Loss in Gear Systems
- Surface Engineering and Tribology
- Bearings
- Special Applications – Wind Turbine Gears, Plastic Gears

In addition to the technical sessions, we would like to welcome you to several special sessions. On Tuesday, August 30, please join us for the plenary Buckingham Lecture. Our guest speaker this year is Dr. Ahmet Kahraman, Professor of Mechanical Engineering at The Ohio State University. Dr. Kahraman will share his views on the “Current Gaps and Future Directions in Gear Research”. We thank Dr. Kahraman for sharing his thought-provoking ideas with the conference attendees.

On Tuesday afternoon, we will host our Conference Luncheon and Award Ceremony. Please join us as we honor the lifetime achievements of Dr. Aizoh Kubo, professor emeritus at Kyoto University, Japan. Dr. Kubo will be presented with the second Darle W. Dudley Award for outstanding contributions to the power transmission and gearing community. This award recognizes those who have made significant lifelong contributions to the art and science of gear and power transmission technology.

A special panel discussion is planned for Wednesday, August 31. Please attend this interesting session where leading industry experts discuss the needs of their industry, and the fundamental and applied research work that is needed to solve these issues.

Finally, we would like to thank the following individuals for their dedicated service to the PTG Committee and for their tireless efforts in organizing this conference:

Neil Anderson, Pratt & Whitney
Vance Brown, Minnesota State University
Richard Dippery, Kettering University
Qi Fan, The Gleason Works
Bob Handschuh, NASA
Jonny Harianto, Ohio State University
Don Houser, Ohio State University
Al Karvelis, Exponent
Mohsen Kolivant, The Gleason Works
Sheng Li, Ohio State University
Dave Lewicki, NASA
Jacob Lin, John Deere
Alfred Pettinger, Engineering Systems, Inc.
Steve Siegert, Borg Warner
Jeremy Wagner, John Deere
Brian Wilson, Romax Technology, Inc.

We hope that you enjoy this conference, and please come back for the next PTG Conference in 2013. We would also like to invite you to provide us with some feedback on your experience, and suggestions of what we can do to make your experience more meaningful.
Prof. Toshiyuki Sawa (Conference Chair) and Prof. Erol Sancaktar (Program Chair) would like to welcome you to the 21st Reliability, Stress Analysis, and Failure Prevention Conference (RSAFP), sponsored by the RSAFP Technical Committee of the Design Engineering Division. We have 15 papers to be presented in three sessions entitled:

- RSAFP-1-1 RSAFP Considerations in Design Process and Computer-Based Analysis for RSAFP
- RSAFP-2-1 Stress Analysis
- RSAFP-3-1 Failure Analyses and Modeling

These sessions cover reliability, stress analysis, failure prevention and material considerations and integration in design process and computer based analyses for RSAFP, as well as stress analyses and failure analyses and modeling as they relate to the design process, safety and reliability.

Please join us at our sessions to participate in discussions of the papers to be presented and possibly to become a member of our Technical Committee; we look forward to seeing you there.
On behalf of the ASME Technical Committee on Vibration and Sound (TCVS), it is our honor and privilege to welcome you to the 23rd Biennial Conference on Mechanical Vibration and Noise inaugurated in 1967 and usually held biannually on odd years. This year’s conference consists of 14 symposia arranged in 36 technical sessions contributing to a total of 173 papers, selected and peer-reviewed from the original 187 draft papers. These symposia cover topics from traditional subjects to emerging technologies, e.g., active/passive vibration control, continuous systems, wave propagation and acoustics, nonlinear dynamics, optimization and reliability of mechanical systems, system identification, smart material systems, smart structures and structronics, biomedical applications, engineering management, rotor dynamics, engine and powertrain dynamics, vibration damping treatments, dynamics of MEMS and NEMS, vibration and control of manufacturing systems, vibration-based sensing and energy harvesting, etc. This is a golden opportunity to showcase research results, exchange ideas, rejuvenate research methodologies, and also meet old and new friends around the globe. We believe that you will find the final technical program and keynote lectures appealing, informative and of high quality.

The TCVS selected Professor Chieh-Su Hsu from University of California at Berkeley as the recipient of the 2011 Jacob P. Den Hartog Award. The J.P. Den Hartog award, established in 1987, is presented in recognition of lifetime contributions to the teaching and practice of vibration engineering. The TCVS also selected Professor Noel Perkins from University of Michigan as the recipient of the 2011 N.O. Myklestad Award. The N.O. Myklestad award, established in 1991, is presented in recognition of a major innovative contribution to vibration engineering. Both awards will be presented at the TCVS/VIB Luncheon on Tuesday, August 30, 2011. On behalf of Professor Hsu, Prof. Dan Mote from University of Maryland will deliver the Den Hartog Keynote Lecture to the IDETC/CIE audience on Monday morning, August 29. In addition, Professor Perkins will deliver the Myklestad Keynote Lecture on Tuesday morning, August 30.

We would like to sincerely thank the support of the TCVS, symposium organizers, authors, and paper reviewers who all contribute to the excellent technical program and to the success of the conference. These dedicated symposium organizers are (in alphabetical order): Mehdi Ahmadian, Marco Amabili, Katia Bertoldi, Dumitru Caruntu, Chiara Daraio, Mohammad Elahinia, Bogdan Epureanu, Ebrahim Esmailzadeh, Brian Feeny, Henryk Flashner, Hamid R. Hamidzadeh, Mahmoud Husein, Yukio Ishida, Nader Jalili, Gaetan Kerschen, Jay Lee, Albert Luo, J. A. Tenreiro Machado, Nima Mahmoodi, Brian Mann, Chris Mechefske, C. ‘Nat’ Nataraj, Min-Chun Pan, Paolo Pennacchi, Dane Quinn, Massimo Ruzzene, Jeffrey Scruggs, Yimin Shao, Rifat Sipahi, Michael Starr, Steve Suh, Jian-Qiao Sun, Jiong Tang, Qian Tang, Peter W. Tse, Steve Wilcox, Weidong Zhu, and Lei Zuo.

All these symposium organizers will be recognized for their dedication and service with ASME Service Awards presented at the TCVS/VIB Luncheon on Tuesday. Again, we would like to welcome you to the 23rd Biennial Conference on Mechanical Vibration and Noise, the 42nd anniversary of the conference, in Washington DC and look forward to our next meeting in 2013.
Design and Control of Electrified Vehicles for Improved Fuel Economy

Modern vehicles provide personal and freight mobility that are essential to the convenience, welfare and economic activities of the society. The sustainability of existing transportation solutions faces serious challenges. The availability, security and diversity of traditional liquid fossil fuels are being questioned. In addition, effort to mitigate CO2 emission from ground vehicles is firming up in both US and EU. Designing next generation vehicles to meet the transportation demands of society while dramatically reducing their environmental impacts require innovative technical and socio-economic solutions. The goal of this talk is to present current development trend and effort of electrified vehicles, as well as to the application of modern modeling, design and control techniques on the design of electrified vehicles, as well as their integration into the future transportation and grid energy solution. We will first explain how modeling and control techniques enable the fast and exhaustive search of large number of hybrid powertrain configurations, and how optimization techniques such as dynamic programming and Sequential Quadratic Programming are applied to ensure all design concepts are assessed on equal footings. Design case studies on both civilian vehicles and a military vehicle will be presented.

Biographical Description: Huei Peng received his Ph.D. from the University of California, Berkeley in 1992. He is currently a Professor at the Department of Mechanical Engineering, and the Executive Director of Interdisciplinary and Professional Engineering, at the University of Michigan, Ann Arbor. His research interests include adaptive control and optimal control, with emphasis on their applications to vehicular and transportation systems. His current research focuses include design and control of hybrid electric vehicles and vehicle active safety systems. He is a leading researcher at the University of Michigan Automotive Research Center, and was involved in the design of several military and civilian concept vehicles, including FTTS, FMTV, and Super-HUMMWV. His team designed the power management algorithm for a prototype hybrid electric vehicle designed by Eaton, which later becomes the basis for their commercial hybrid buses and trucks. Thousands of units have been sold worldwide. He has more than 190 technical publications, including 80 in referred journals and transactions. Prof. Huei Peng has been an active member of the Society of Automotive Engineers (SAE) and the ASME Dynamic System and Control Division (DSCD). He served as the chair of the ASME DSCD Transportation Panel from 1995 to 1997, and is a member of the Executive Committee of ASME DSCD. He served as an Associate Editor for the IEEE/ASME Transactions on Mechatronics from 1998-2004 and for the ASME Journal of Dynamic Systems, Measurement and Control from 2004-2009. He received the National Science Foundation (NSF) Career award in 1998. He is an ASME Fellow.

Next Generation Hybrids for Commercial Vehicles: Challenges and Opportunities

We discuss issues driving the adoption of hybrid technologies in the commercial vehicle space. We need to learn the lessons of the first generation hybrids as well as understand what is really changing in the industry. Drivers such as new greenhouse gas regulations and the economy of scales are shaping the next generation hybrids. The changing landscape presents new challenges to the industry, but also opens new opportunities, that in turn define the technology roadmaps and the research agendas of the industry.

Biographical Description: Dr. Mihai “Mike” Dorobantu has been with Eaton Corporation since 2005. He heads the Vehicle Technologies and Innovation team in Southfield, MI, and is responsible for the advanced R&D portfolio for Eaton’s Vehicle Group. Before that he was Technology Manager, Controls, Systems & Solutions in Eaton’s Corporate R&D center and held various positions at the United Technologies Research Center. His area of technical expertise spans gas turbines, vapor compression systems, vehicle powertrains, discrete-event systems and numerical solvers for differential equations. He holds a Ph.D. from the Royal Institute of Technology and Stockholm University in Sweden.
Game-Changing Computational Engineering Technology

During the last two decades, giant strides have been achieved in many aspects of Computational Engineering. Higher-fidelity mathematical models, better approximation methods, and faster algorithms have been developed for many time-dependent applications. SIMD, SPMD, MIMD, coarse-grain, and fine-grain parallel processors have come and gone. Linux clusters are now ubiquitous, cores have replaced CEs, and GPUs have shattered computing speed barriers. Most importantly, the potential of high-fidelity physics-based simulations for providing deeper understanding of complex engineering systems and enhancing system performance has been recognized in almost every field of engineering. Yet, in many engineering applications, high-fidelity time-dependent numerical simulations are not performed as often as needed, or are more often performed in special circumstances than routinely. The reason is very simple: despite all aforementioned evolutions, these simulations remain too computationally intensive for time-critical operations such as design, design optimization, and active control. Consequently, the impact of computational sciences on such operations has yet to materialize. Achieving this objective demands a game-changing computational technology that bridges both ends of the computing spectrum: supercomputers and desktops. This talk will attempt to make the case for this pressing need. It will also outline a candidate real-time computational technology based on model reduction methods, machine learning concepts, trained data bases, and interpolation on manifolds. It will also illustrate this computational technology with preliminary results obtained from its application to the support of the flutter flight testing of an F-16 aircraft and the aerodynamic optimization of a Formula 1 car. The talk will conclude with the demonstration of real-time, CFD-based, flutter analysis of a wing-store configuration parameterized by the Mach number, altitude, and fuel fill level on an … iPhone.

Biographical Description: Charbel Farhat is the Vivian Church Hoff Professor of Aircraft Structures at Stanford University where he is also Chairman of the Department of Aeronautics and Astronautics, Professor of Mechanical Engineering, Professor in the Institute for Computational and Mathematical Engineering, and Director of the Army High Performance Computing Research Center. He is designated by the Institute for Science Information (ISI) as a highly cited researcher in engineering. He is also the recipient of several prestigious awards including the AIAA Structures, Structural Dynamics and Materials Award (2010), USACM John von Neumann Medal (2009), IEEE Computer Society Gordon Bell Award (2002), IACM Computational Mechanics Award (2002), Department of Defense Modeling and Simulation Award (2001), USACM Computational and Applied Sciences Award (2001), and IEEE Computer Society Sidney Fernbach Award (1997). He is a Fellow of the ASME (2003), IACM (2002), World Innovation Foundation (2001), USACM (2001), and AIAA (1999). He is an Editor of both the International Journal for Numerical Methods in Engineering and the International Journal for Numerical Methods in Fluids. He currently serves on the United States Bureau of Industry and Security’s Emerging Technology and Research Advisory Committee (ETRAC) at the United States Department of Commerce, and on the technical assessment boards of several national research councils and foundations.
Biographical Description: Dr. Sridhar Kota is currently on leave from the University of Michigan serving as the Assistant Director for Advanced Manufacturing at the White House Office of Science and Technology Policy. OSTP advises the President and others within the Executive Office on science and technology policies and their effects on domestic and international affairs. The OSTP also leads interagency efforts to develop and implement science and technology policies and budgets. In his current role at OSTP which began in Sept 2009, Dr. Kota coordinates Federal advanced manufacturing R&D and addresses issues related to innovation, manufacturing competitiveness and technology commercialization. He identifies gaps in current Federal R&D in advanced manufacturing, develops policy recommendations and implementation strategies to enhance U.S. manufacturing competitiveness, foster commercialization and U.S.-based manufacturing of emerging technologies. Dr. Kota is a Professor of Mechanical Engineering at the University of Michigan-Ann Arbor where he has been involved in teaching and research in Design and Manufacturing area for 23 years. His teaching and research interests include synthesis of bio-inspired engineering systems, shape-adaptive compliant structures, and electromechanical systems design with applications to manufacturing, automotive, aerospace and MEMS. He has authored over 200 technical papers including several Best Paper awards, holds over 25 patents and served as an engineering consultant to numerous organizations. He is the recipient of the ASME Machine Design Award, ASME Leonardo da Vinci Award and ASME Ruth and Joel Spira Outstanding Educator Award. He is the founding President and CEO of FlexSys Inc. – a small business engaged in bio-inspired design of aircraft wings, wind turbine blades and automotive systems.

DFMLC Keynote Lecture
Christina L. Bloebaum
University of Buffalo

Wednesday, August 31, 2011 Session: DFMLC 10-1
10:40am–11:20pm Location: Columbia B

Design and Manufacturing – Sustaining the Connection

Product design is intimately connected with available technology and associated manufacturing processes. This inherent interdependency is even more critical in the design of complex systems. Cost over-runs and time delays for development and delivery of products across scales is often driven by unanticipated influences from downstream manufacturing issues that were not adequately captured during product design. Despite the interdependence of design and manufacturing, however, these communities have largely grown and developed independently, beginning with the separation of the first industrial engineering department from mechanical engineering in 1908. We will explore the needs and benefits of maintaining a connection between design and manufacturing, the history of previous attempts, and initiatives that are currently underway at the National Science Foundation and elsewhere to promote and explore these connections. We will also speculate on both shorter term and longer term initiatives on the horizon that might provide opportunities for both communities.

Biographical Description: Dr. Christina L. Bloebaum is a Professor of Mechanical and Aerospace Engineering at the University at Buffalo and is presently serving as the Director of the Engineering Design and Innovation (EDI) Program at NSF. She also serves on the Office of Science and Technology Policy (OSTP) Aeronautics Science and Technology Subcommittee. At the University of Buffalo, she teaches courses in Design, Engineering Optimization, and Heuristic Optimization. She has supervised the doctoral research of 13 students and the master's research of over 65 students. She has served UB in the capacity of Undergraduate Director, Graduate Director, Department Chair, and Chair of the President's Review Board for Promotion and Tenure. She directs the Multidisciplinary Optimization and Design Engineering Laboratory (MODEL), in which key areas of research include Multidisciplinary Design Optimization (MDO) method development, innovative use of visualization to enable improved decision-making (particularly for large-scale systems), and modeling and simulation of evacuation scenarios in emergency situations. Dr. Bloebaum is the recipient of the SUNY Chancellor's Award for Excellence in Teaching, and was recognized by the SUNY Research Foundation for Excellence in Research, and was named a Visionary Innovator by UB's office of technology transfer. She was the recipient of the first UB Chair for Competitive Product and Process Design while establishing the New York State Center for Engineering Design and Industrial Innovation (NYSCEDII), for which she was the Executive Director. Dr. Bloebaum was a recipient of an NSF Research Initiation Award and a Presidential Faculty Fellow Award.
**Design and Manufacturing - Sustaining the Connection**

Product design is intimately connected with available technology and associated manufacturing processes. This inherent interdependency is even more critical in the design of complex systems. Cost over-runs and time delays for development and delivery of products across scales is often driven by unanticipated influences from downstream manufacturing issues that were not adequately captured during product design. Despite the interdependence of design and manufacturing, however, these communities have largely grown and developed independently, beginning with the separation of the first industrial engineering department from mechanical engineering in 1908. We will explore the needs and benefits of maintaining a connection between design and manufacturing, the history of previous attempts, and initiatives that are currently underway at the National Science Foundation and elsewhere to promote and explore these connections. We will also speculate on both shorter term and longer term initiatives on the horizon that might provide opportunities for both communities.

**Biographical Description:** Dr. Russell Barton is Professor of Supply Chain and Information Systems in the Smeal College of Business at Penn State. He is on assignment from Penn State as Program Director for Manufacturing Enterprise Systems and Service Enterprise Systems at NSF. He is also the Smeal College liaison for graduate curricula for interdisciplinary design. Prior to accepting his NSF appointment, he was Associate Director of the Center for the Management of Technological and Organizational Change, and Co-Director of the Master of Manufacturing Management degree program. From 2002-2005 he served as associate dean for research and Ph.D./M.S. programs. He was a professor in the Department of Industrial and Manufacturing Engineering at Penn State for eleven years prior to joining Smeal, and was professeur invité in the product development and innovation laboratory at École Centrale Paris. He spent eleven years in industry and consulting before entering academia. Dr. Barton's research has focused on the interface between applied statistics and simulation, applied to product design and manufacturing. He has published over 70 refereed papers in applied statistics, engineering design/new product development, optimization and simulation. He has taught courses in statistics and quality, operations management, new product development, optimization, and simulation at the undergraduate and graduate levels, and co-authored continuing education statistics courses used at RCA and GE. He has received seven awards for teaching and curriculum development and ten NSF grants. He holds a B.S.E.E. from Princeton and M.S. and Ph.D. degrees in Operations Research from Cornell.

**MESA Keynote Lecture**

**Alberto Broggi**

*University of Parma in Italy*

Monday, August 29, 2011

Session: MESA 5-1

10:40am–12:00pm Location: Columbia A

**From Italy to China, Driverless!**

The presentation will describe the latest challenge in autonomous driving: a 13,000 km test from Parma, Italy, to Shanghai, China, during summer 2010. Four electric and driverless vehicles marked the history in vehicular robotics after successfully reaching Shanghai after 3 months of autonomous operation, on an intercontinental route from Europe to Asia. The talk will describe the vehicles technical details, the travel experience of this 13,000 km unique trip in history, and some results obtained by the analysis of the whole data set acquired during the trip.

**Biographical Description:** Dr. Alberto Broggi is a professor of Computer Engineering at the University of Parma in Italy, and CEO of the VisLab spinoff company. As a pioneer of machine vision applied to driverless cars and unmanned vehicles, he is the principal investigator of many projects involving autonomous vehicles, like the ARGO prototype vehicle, the TerraMax entry at the DARPA Grand Challenge and Urban Challenge, and BRAiVE. Under his leadership VisLab organized the first intercontinental driverless trip in history, named VIAC - VisLab Intercontinental Autonomous Challenge. He acted as Editor in Chief of the IEEE Transactions on Intelligent Transportation Systems from 2004 to 2008. For the term 2010-2011 he is serving the IEEE Intelligent Transportation Systems Society as President.
Decentralized Vibration Control for Large Flexible Structures with Smart Embedded Devices

Large flexible structures have been widely employed on spacecrafts, such as solar panel, antenna, etc.. This kind of structural system is extremely large in dimension. It is a dilemma to use the traditional centralized control schemes which can only provide seldom controllers to control such a large system. It is also very difficult to apply those vibration control devices which are too heavy and too big to be mounted on the flexible structures. In the speech, a decentralized vibration control method is presented to solve this problem theoretically. And then, it will be explained that how to take advantage of the mechanic-electronic properties of piezoelectric ceramics to design the embedded devices for the decentralized vibration control of large flexible structures. One flexible structure is taken as an illustrated example. Both digital simulation results and experimental results show that the theory and the techniques proposed in the speech are effective and reliable in controlling the vibration of large flexible structures.

Biographical Description: Dr. Dong-Xu Li received her PhD in solid mechanics from National University of Defense Technology in 1993. She is currently a professor and a PhD supervisor of aerospace science and technology in the College of Aerospace and Materials Engineering, National University of Defense Technology, P. R. China. She is an executive member of the Sound and Vibration Control Society of China, also a member of the IEEE and the ASME. Her research interests mainly include structural dynamics, vibration control, smart structure design, ergonomics, human-computer interaction, and so on. She has been taking charge of many important research projects, such as China High-Tech Program, National Science Foundation and so on. She has published more than 100 academic papers. She has won many awards for science and technology progress of China. Specially, she received the National Technological Invention Awards in 2010.
symposium to bring together at one place many people from different fields (engineering, science, economics and finance, mathematics, bioengineering, etc.) working on the application of Fractional Derivatives. In the last 9 years, Professor Agrawal has organized several symposia and conferences and has been a member of all major conferences in the field. Along with Prof. Tenreiro Machado and Dr. Sabatier, Professor Agrawal has co-edited a special issue of Nonlinear Dynamics and a book on Recent Advances in Fractional Calculus. Currently, Professor Agrawal is an associate editor of the Journal of Computational and Nonlinear Dynamics and the Indian Journal of Theoretical Physics. He is also a member of the editorial board of the International Journal of Differential Equations and Fractional Dynamic Systems.

MESA Keynote Lecture
Bruce West
Army Research Laboratory

Wednesday, August 31, 2011    Session: MESA 1-8
11:20am–12:00pm    Location: Everglades

Fractional Diffusion and the Origin of Allometry Relations

The theoretical allometry relation (AR) between the size of an organism Y and that of an organ within the organism X is of the form \( X = a Y^b \) and has been known for nearly two centuries. The allometry coefficient a and allometry exponent b have been fit by various data sets over that time. In the last century the phenomenological field of allometry has found its way into almost every scientific discipline and the ARs have been reinterpreted with Y still being the size of a host network and X a function of the network. For example, in biology the measure of size is often taken to be the total body mass and the function is the metabolic rate, or heart rate, breathing rate, or longevity of animals. Most theories purporting to explain the origin of ARs focus on establishing the proper value of b entailed by reductionist models, whereas a few others use statistical arguments to emphasize the importance of a. On the other hand, statistical data analysis indicates that empirical ARs are obtained with the replacements \( X \rightarrow \overline{X} \) and \( Y \rightarrow \overline{Y} \) and the brackets denote an average over an ensemble of realizations of the network and its function. Networks in which these empirical ARs are established include the metabolism of animals, the growth of plants, species abundance in econetworks, the geomorphology of rivers, and many more. The resulting empirical AR can only be derived from the theoretical one by averaging under conditions that are incompatible with real data. Consequently another strategy for finding the origin of ARs is required and for this we turn to the probability calculus and fractional derivatives. We assume that the statistics of living networks can be described by fractional diffusion equations (FDEs) and hypothesize that FDEs can explain the origin of ARs. We obtain the Fourier-Laplace transform of the general solution to the FDE that contains both historical information and nonlocal influences on the dynamic variables, that is, fractional derivatives in both time and phase space, complexity commonly found in living networks. The scaling properties of the resulting solution to the FDE enable us to interrelate the network’s size and function by means of the mechanism of strong anticipation. The analysis shows that strong anticipation and scaling taken together support the hypothesis and is sufficient to explain the origin of empirical ARs.

Biographical Description: Dr. Bruce J. West is a Career Scientific Professional (ST) in the Information Sciences Directorate of the Army Research Office, which is part of the Army Research Laboratory. Dr. West conducts fundamental research into applied mathematics as an enabler of the physical, social and life sciences with the intent of overcoming technical barriers of particular importance to the Army. He has sustained record of exceptional scientific and technical leadership achievements: his advice is sought at the highest level of the government, both nationally and internationally, and he serves as a mentor to your scientists. Dr. West has worked with the US Army Research Office from 1999 to the present. Prior to the Army, Dr. West was a Professor of Physics at the University of North Texas for 10 years, where he also served as Chair Department of Physics for four of those ten years. He worked at La Jolla Institute for many years, serving as a staff scientist, associate director and director. Dr. West has authored ten books and has published over 300 journal publications.
MEMS Resonators have been studied for more than 40 years, with continuous interest in their use as frequency references. Unfortunately, the promise of MEMS resonators for these applications has always been limited by observations of drift in frequency, which has been understood to arise from the temperature coefficient of the modulus of Silicon, as well as the role of adsorbed molecules from the environment of the resonator and other nefarious effects. The temperature coefficient of the modulus of Silicon is a well-known parameter, giving rise to a ~30 ppm/C error in frequency. This error can be reduced by temperature control of the resonator, and by use of compensating materials, such as SiO2, or by electronic compensation methods. The adsorbate-induced drift in MEMS resonators can only be addressed by the development of ultra-clean, hermetic packaging for the resonators. Our group has developed a wafer-scale MEMS encapsulation process that enables a solution to many of these problems with MEMS resonators. In this presentation, we will discuss the encapsulation process, and the opportunities for implementation of temperature compensation and control. The encapsulation process is inherently clean, and directly enables long-term stability. Taken together, we believe we have a pathway to the development of high-performance frequency sources that feature excellent long-term stability and temperature stability, and which can be considered for commercial and defense applications.

Biographical Description: Thomas W. Kenny received the B.S. degree in physics from the University of Minnesota, Minneapolis, in 1983, and the M.S. and Ph.D. degrees in physics from the University of California, Berkeley, in 1987 and 1989, respectively. From 1989 to 1993, he was with the Jet Propulsion Laboratory, National Aeronautics and Space Administration, Pasadena, CA, where his research focused on the development of electron-tunneling high-resolution microsensors. In 1994, he joined the Department of Mechanical Engineering, Stanford University, Stanford, CA, where he directs Microsensor-based research in a variety of areas, including resonators, wafer-scale packaging, cantilever beam force sensors, microfluidics, and novel fabrication techniques for micro-mechanical structures. He is the Founder and CTO of Cooligy, Sunnyvale, CA, a microfluidics chip cooling component manufacturer, and the Founder and a Board Member of SiTime Corporation, a developer of CMOS timing references using MEMS resonators. He is currently a Stanford Bosch Faculty Development Scholar and was the General Chairman of the 2006 Hilton Head Solid State Sensor, Actuator, and Microsystems Workshop. From October 2006 through September 2010, he was on leave to serve as Program Manager in the Microsystems Technology Office at the Defense Advanced Research Projects Agency, starting and managing programs in thermal management, nanomanufacturing, manipulation of Casimir forces, and the Young Faculty Award. He has authored or coauthored over 250 scientific papers and is a holder of 48 issued patents.
Aeroelasticity is the field that examines, models and seeks to understand the linear and nonlinear dynamic interaction of the aerodynamic forces from a fluid flow and the deformation of an elastic structure. The aerodynamic forces produce deformation, but the structural deformation in turn changes the aerodynamic forces. This feedback between forces and deformation leads to a variety of dynamic phenomena including flutter (Hopf bifurcation) and limit cycle oscillations (LCO) and sometimes chaos. This keynote presentation reviews selected recent advances in nonlinear aeroelasticity and fluid-structure interaction in order to identify and model the fundamental elements that they share. Topics to be discussed include the following.

- Transonic and Subsonic Plate Flutter
- Freeplay Induced Flutter and LCO
- Reduced Order Modeling (ROM) of Unsteady Aerodynamic Flow Fields
- Eigenmodes and Proper Orthogonal Decomposition (POD) Modes
- High Dimensional Harmonic Balance (HDHB)
- Nonlinear ROM Based Upon POD and HDHB
- Transonic Flutter and LCO of Lifting Surfaces (Wings)
- Flight Experience
- Efficient and Accurate Computation of Aerodynamic Forces
- Experimental/Theoretical Correlations
- Aerodynamic LCO: Buffet, Abrupt Wing Stall and Non-Synchronous Vibration
- Energy Harvesting from Aeroelastic LCO

Biographical Description: Prof. Earl H. Dowell received his B.S. degree from the University of Illinois and his S.M. and Sc.D. degrees from the Massachusetts Institute of Technology. Before coming to Duke as Dean of the School of Engineering, serving from 1983-1999, he taught at M.I.T. and Princeton. He has also worked with the Boeing Company. Currently he serves on boards of visitors of Carnegie Mellon University, Georgia Institute of Technology, Princeton University, University of Illinois and the University of Rochester. He is a consultant to government, industry and universities in science and technology policy and engineering education as well as on the topics of his research. Dr. Dowell is an elected member of the National Academy of Engineering, an Honorary Fellow the American Institute of Aeronautics and Astronautics (AIAA) and a Fellow of the American Academy of Mechanics and the American Society of Mechanical Engineers. He has also served as Vice President for Publications and member of the Executive Committee of the Board of Directors of the AIAA, as a member of the United States Air Force Scientific Advisory Board, the Air Force Studies Board, the AGARD (NATO) advisory panel for aerospace engineering, as President of the American Academy of Mechanics, Chair of the US National Committee on Theoretical and Applied Mechanics and as Chairman of the National Council of Deans of Engineering. From the AIAA he has received the Structure, Structural Dynamics and Materials Award, the Von Karman Lectureship and the Crichlow Prize; from the ASME he has received the Spirit of St. Louis Medal and Den Hartog Award; and he has also received the Guggenheim Medal which is awarded jointly by the AIAA, ASME, AHS and SAE. Dr. Dowell research ranges over the topics of aeroelasticity, nonsteady aerodynamics and nonlinear dynamics. In addition to being author of over two hundred research articles, Dr. Dowell is the author or co-author of four books, “Aeroelasticity of Plates and Shells”, “A Modern Course in Aeroelasticity”, “Studies in Nonlinear Aeroelasticity” and “Dynamics of Very High Dimensional Systems”. His teaching spans the disciplines of acoustics, aerodynamics, and dynamics.
The first part of this presentation reviews the origin and initial development of natural or fully Cartesian coordinates. These coordinates allow the description of position and orientation of 3-D multibody systems in a straightforward way, with the constraint equations formulated in terms of dot and cross products of vectors. The simplicity of these constraint equations promotes some developments in dynamic formulations based on the use of both dependent and independent coordinates. Redundant constraints and singular mass matrices can be set out and solved in a direct and simple way. The second part of this presentation deals with the application of natural coordinates in three important areas: flexible multibody systems, the capture and reconstruction of the human body motion, and optimization. Finally the evolution of global formulations based on natural coordinates to semi-recursive topological formulations using relative coordinates is described in detail. Such evolution allows a higher level of efficiency while retaining the simplicity of the mathematical development, the numerical algorithms, and the implementation in current computers. The different issues included in this presentation are illustrated with classical and modern examples, such as small and large systems or academic and practical cases. Some theoretical contributions from other authors are also mentioned in the context of natural coordinates and their evolution.

Biographical Description: Professor Javier Garcia de Jalón was born in Zaragoza (Spain) in 1949. He graduated in Mechanical Engineering from the University of Navarre at San Sebastián (Spain) in 1971, and received his Ph.D. in September 1977 in Computational Mechanics. In 1977 he moved to the School of Engineering of Bilbao, where he started his work in kinematics and dynamics of multibody systems, becoming a full professor on Mechanisms and Machines in 1980. In 1979 he started the development of the so-called “natural coordinates”, a system of generalized coordinates that bypasses the use of angles to describe the configuration of a multibody system. These coordinates seamlessly connect the kinematics and dynamics of multibody systems with finite-element models and optical motion-capture systems. Since their initial formulation, these coordinates have found numerous applications, including the study of flexible bodies and biomechanics. In 1981 Prof. García de Jalón returned to San Sebastián and until 2000 he worked in the Applied Mechanics Department of the University of Navarre and CEIT (Centre of Technical and Research Studies of Gipuzkoa), where he served as Professor, senior Researcher, and Head of the Department. In 2000 he moved to the Universidad Politécnica de Madrid, where he is Professor of Applied Mathematics in the Mechanical Engineering School. He also works for INSIA (University Institute for Automobile Research), where he develops methods and software for real-time simulation, design, and parameter identification of vehicles. Prof. García de Jalón has authored over 80 papers in international Journal and Conferences. In 1994 he co-authored with Prof. Bayo the book “Kinematic and Dynamic Simulation of Multibody Systems - The Real Time Challenge-”, that mostly summarizes the theory on natural coordinates and penalty methods as a way to enforce kinematic constraints. He has supervised 19 doctoral dissertations, among them seven university professors. In a 1987 talk at the VIIth IFTóMM World Congress on the Theory of Machines and Mechanisms, in Seville (Spain), he presented a multibody kinematic and dynamic program that ran interactively with realistic CAD models on one of the first 3-D graphic workstations. This was the starting point for a large activity of research and consulting work for many institutions, including the ESA (European Space Agency), Mechanical Dynamics, Inc., and other Spanish and European institutions.
Ahmet Kahraman
Ohio State University

PTG Keynote Lecture

Current Gaps and Future Directions in Gear Research

In this talk, the current state of gear research will be assessed. For each main gear research area including design and analysis, gear lubrication and tribology, power losses and efficiency, surface wear, fatigue, dynamics and noise, and manufacturing, the shortcomings and research needs will be identified. Interdisciplinary nature of some of the basic gear problems will be highlighted. Several areas for future gear research activities will be identified.

Biographical Description: Ahmet Kahraman is a Professor of Mechanical Engineering at the Ohio State University. He is the Director of Gleason Gear and Power Transmission Research Laboratory. He also directs Pratt & Whitney Center of Excellence in Gearbox Technology. Dr. Kahraman received his Ph.D. degree in Mechanical Engineering from Ohio State in 1990. From 1990 to 1999, he worked for General Motors as a senior research scientist, staff project engineer and Manager of Advanced Gear Systems Group. In 1999, Dr. Kahraman moved to academia and formed Center for Gear Research at the University of Toledo, before moving to the Ohio State University in 2003. His research focuses on several areas of power transmission and gearing including gear system design and analysis, gear and transmission dynamics, gear lubrication and efficiency, wear and fatigue life prediction, and test methodologies. His current research program is funded by an industrial consortium of more than 55 companies as well as individual grants from various companies and government agencies including Pratt & Whitney, GM, Sikorsky, Mazda, Hyundai, Honda, Department of Energy, Xerox and Army Research Laboratory. He authored more than 130 papers on gear research. Dr. Kahraman is a past chairman of the ASME Power Transmission of Gearing (PTG) Committee and chairman of the 2007 and 2009 ASME PTG Conferences. He is also a former associate Editor of ASME Journal of Mechanical Design. He serves at the editorial boards of Journal of Sound and Vibration, Journal of Multi-body Dynamics, and Mechanics Based Design of Structures and Machines. He is a fellow of ASME and member of SAE and STLE.

C.D. (Dan) Mote, Jr.
University of Maryland

VIB Keynote Lecture

The 21st Century Global Innovation Environment

The U.S. ‘national innovation environment’ was created through a partnership between government, industry and universities following the famed Vannevar Bush report, Science the Endless Frontier, delivered to President Truman in 1945. The report delineated responsibilities to government, industry and universities for the national health, welfare and security. This partnership was remarkably successful until it broke down in the decade of the nineties. The world has changed substantially since the beginning of the Cold War. Where the government-industry-university partnership initiated sixty years ago resided entirely on a national platform, today those partnerships sit on a global platform. For instance, there is essentially no national industry today; science and engineering for industry are global. Strong national interest clearly remains in industry, but other issues dominate industry’s decisions on where science and engineering investments should be made. Governments’ major issues are global too. Currency valuation, climate change, alternative energy, pandemics, food supply and safety, environment, terrorism, nuclear proliferation and security, and so forth mandate partnerships between governments to address. With industry and government already finding it essential to work on the global platform, the world’s principal research universities must also operate there if they are to fulfill their missions along with industry and government. This lecture will address the transition to the global innovation environment that is underway and its implications.

Biographical Description: C. D. (Dan) Mote, Jr. is Regents Professor and Glenn L. Martin Institute Professor of Engineering and past President, at the University of Maryland over the last thirteen years. He serves as an officer of the National Academy of Engineering, on the National Research Council Governing Board and on NRC committees concerned with issues of innovation and national competitiveness in engineering and science. His research focuses on dynamic and gyroscopic systems, and on biomechanics. Prior to his arrival at University of Maryland, he was a member of the faculty at University of California, Berkeley for more than 30 years. He served as chair of the mechanical engineering department and vice chancellor from 1988 to 1998. He received his undergraduate and graduate degrees in mechanical engineering from the University of California, Berkeley. He is an Honorary Member of ASME.
Computing the Twisted Mechanics of Your DNA

DNA encodes the genetic information required for synthesizing life-sustaining proteins within your cells. While the chemical composition of DNA has been known for over 50 years, many unresolved questions remain regarding how the structure of DNA affects its biological functions. By ‘structure’ we refer to the shape and stress of the molecule and how these control DNA’s primary functions including transcription, replication and gene repair. This long and highly flexible bio-polymer readily twists and bends to form “long-length” scale structures including loops and supercoils that can regulate transcription, replication and repair. How these loops and supercoils form, the energy required for their formation, and the dynamics and thermal stability of these structures are among the issues we probe using both theoretical and experimental methods. This talk provides an overview of a computational rod model that simulates the twisting/bending dynamics of DNA during large conformational changes of the molecule. The rod model, which captures the dynamics on length scales of a helical turn and longer (>3nm), incorporates the physics of arbitrarily-large twisting/bending of the helical axis, DNA-protein interactions, electrostatic interactions, and the hydrodynamics of the surrounding buffer. These effects will be highlighted in a series of example systems that include the looping of DNA by a gene-regulatory protein, the twisting of DNA in forming supercoils, the dynamic relaxation of these supercoils by enzymes, and the dynamic ejection of DNA from a viral capsid. A multi-scale modeling approach will also be described that combines a molecular dynamics description of proteins (atomistic length/time scales) interacting with a continuum description of DNA (long length/time scales).

Biographical Description: Noel Perkins is the Donald T. Greenwood Collegiate Professor of Engineering and an Arthur F. Thurnau Professor in Mechanical Engineering at the University of Michigan. He earned his Ph.D at U. C. Berkeley in 1986 (Mechanical Engineering) prior to joining the faculty at Michigan. His research interests draw from the fields of computational, nonlinear and structural dynamics with applications to the mechanics of single molecule DNA and DNA/protein complexes, wireless inertial sensors for analyzing human motion, and the dynamics of cable structures, vehicle systems, and axially moving materials. He presently serves as the Editor of the ASME J. Vibration and Acoustics and has previously served in editorial capacities for the ASME J. Applied Mechanics (Associate Editor), the Journal of Vibration and Control (Member, Editorial Board), the International Journal of Non-linear Mechanics (Guest Editor), and the Journal of Sound and Vibration (Member, Editorial Board). He is a Fellow of the American Society of Mechanical Engineers, a recipient of the General Motors Outstanding Distance Learning Faculty Award (twice), the Academic Challenge Award from the Technical University of Munich, the Amoco Undergraduate Teaching Award and several other teaching awards from the University of Michigan. He remains active in commercialization activities for MEMS-based sports training systems, and is founding partner of Cast Analysis, LLC that manufactures a fly casting training system.
AVTT 4-1 & DAC 13-1: Environmental Policy in Vehicle Design
Tuesday, August 30, 2011
10:40am–12:00pm Location: Capitol A

Panelists: William Ross Morrow, Iowa State University; Jeremy Michalek, Carnegie Mellon University; Bert Bras, Georgia Institute of Technology; Kate Whitefoot, University of Michigan

Moderator: Jeremy Michalek, Carnegie Mellon University

Description: In this panel session, jointly organized by the Design Automation Conference and the International Conference on Advanced Vehicle and Tire Technologies, panelists will consider the influence of environmental policy in the design of next-generation vehicles. Topics include an analysis of policies to reduce oil consumption and greenhouse gas emissions from the U.S. transportation sector; a discussion of the costs associated with plug-in vehicles and the case for targeting small battery packs; an assessment of the effects of policies affecting water use and quality; and an evaluation of fuel economy standards using an engineering model of endogenous product design.

CIE 11-1: Energy Systems – Energy Efficient Manufacturing I
Tuesday, August 30, 2011
10:40am–12:00pm Location: Congressional B

Panelists: Alex Folk, NIST; Khershed Cooper, NRL; WenWu Zhang, GE

Moderators: Kevin Lyons, NIST; Robert Ivester, NIST

Description: To cope with the emerging global environmental crises and market competitiveness, companies are evaluating all opportunities to reduce the energy required to manufacture its products. Government agencies are funding studies and focused research along with defining regulation and codes. And universities are-positioning themselves to conduct leading edge research and educate tomorrow workers for careers in energy technologies. This year an invited panel comprised of technical experts from government and industry will present the latest research efforts in process/tool development illustrating related research occurring globally. The panel will highlight challenging research covering engineering approaches for controlling green processes and quantifying measurement techniques, developing effective tools, and collecting relevant data that support objective evaluation of progress toward energy conservation within the enterprise. This special topic area will bring together researchers on Energy Efficient Manufacturing and their applications that are contributing to energy conservation successes and the formation of best practices.

CIE 15-1: Addressing the NAE Grand Challenges through Research in CIE
Tuesday, August 30, 2011
3:40pm–5:20pm Location: Columbia A

Panelists: Nagendra Somanath, United Technologies; Christiaan Paredis, Georgia Institute of Technology; Monica Bordegoni, Politecnico di Milano; Judy Vance, Iowa State University

Moderators: Derek Yip-Hoi, Western Washington University; Krishnan Suresh, University of Wisconsin; Paul Witherell, NIST; Abhishek Seth, Caterpillar

Description: Panelists will present their perspective on research efforts targeting NAE Grand Challenges. This will include a discussion of scientific tools used at United Technologies and the purposeful design of new such tools to address grand experiments and missions of exploration; reflections from the Systems Engineering, Information and Knowledge Management Technical Committee and the Computer-Aided Product and Process Development Technical Committee on leveraging CIE-related research; and a presentation on the use of virtual reality in product development.
CIE 20-1: Funding Opportunities for Research
Wednesday, August 31, 2011
10:40am–12:00pm Location: Columbia A

Panelists: Vijay Srinivasan, NIST; Steven McKnight, NSF; Todd Hughes, DARPA; Robert Neches, OSD; Frederica Darema, AFOSR

Moderators: Ram Sriram, NIST; John Michopoulos, NRL

Description: Panel discussion on funding opportunities from federal funding agencies and government laboratories with representative perspectives from the Systems Engineering Division of the Engineering Laboratory at NIST, the Civil, Mechanical, and Manufacturing Innovation Division at NSF, the Adaptive Execution Office at DARPA, the Office of the Secretary of Defense program on Advanced Engineering Initiatives, and the Air Force Office of Scientific Research. The latter will include a discussion of system-level methods for designing, building, and managing the operation, maintenance, and extensibility of complex systems and the need for novel methods that can model, monitor, and analyze all components of such systems, individually and at the level of the system framework.

DAC 6-1: Q&A with Design Engineering Division’s Journal Editors
Monday, August 29, 2011
1:40pm–3:20pm Location: Capitol A

Panelists: Ahmed Shabana, University of Illinois at Chicago; Arthur Erdman, University of Minnesota; Bahram Ravani, University of California, Davis; Michael McCarthy, University of California, Irvine; Noel Perkins, University of Michigan; Panos Papalambros, University of Michigan

Moderator: Kurt Anderson, Rensselaer Polytechnic Institute


DAC 13-1 & AVTT 4-1: Environmental Policy in Vehicle Design
Tuesday, August 30, 2011
10:40am–12:00pm Location: Capitol A

Panelists: William Ross Morrow, Iowa State University; Jeremy Michalek, Carnegie Mellon University; Bert Bras, Georgia Institute of Technology; Kate Whitefoot, University of Michigan

Moderator: Jeremy Michalek, Carnegie Mellon University

Description: In this panel session, jointly organized by the Design Automation Conference and the International Conference on Advanced Vehicle and Tire Technologies, panelists will consider the influence of environmental policy in the design of next-generation vehicles. Topics include an analysis of policies to reduce oil consumption and greenhouse gas emissions from the U.S. transportation sector; a discussion of the costs associated with plug-in vehicles and the case for targeting small battery packs; an assessment of the effects of policies affecting water use and quality; and an evaluation of fuel economy standards using an engineering model of endogenous product design.

DAC 23-1: Design Frontiers
Wednesday, August 31, 2011
10:40am–12:00pm Location: Capitol A

Panelists: Panos Papalambros, University of Michigan; Ritesh Khire, United Technologies Research Center; Katja Holttt-Otto, University of Massachusetts, Dartmouth; Conrad Tucker, University of Illinois at Urbana-Champaign

Moderator: Tim Simpson, Pennsylvania State University

Description: Panel discussion on challenges and opportunities for research in design automation with emphasis on frontiers of design engineering. Panelists will provide reflections from academia and the commercial research sector.

DEC 1-1: Building Bridges for Engineering Education – Partnership with Industry
Monday, August 29, 2011
10:40am–12:00pm Location: Capitol A

Panelists: Tim Simpson, Pennsylvania State University; Matt Bohm, University of Louisville; Richard Goff, Virginia Polytechnic Institute and State University; Julie Linsey, Texas A&M University; Josh Summer, Clemson University

Moderator: Robert Nagel, James Madison University

Description: Providing real-world design projects for engineering students to work on is an important part of the undergraduate educational experience. During these projects, we want our students to learn the design process as well as how to apply the concepts from their engineering science courses to real-world problems. Having industry sponsored projects also helps to make these experiences more concrete as students transition from problems with black-and-white answers to problems with solutions that are shades of grey while simultaneously introducing the new task of interacting with industry clients and/or customers. This panel will discuss experiences and lessons learned from working with industry sponsored capstone projects from both the faculty advisor and industry sponsor perspective.
DEC 3-1: Attracting Future Engineers – Best Practices and Lessons Learned  
Tuesday, August 30, 2011  
10:40am–12:00pm Location: Everglades  
Panelists: Jeffrey Wilcox, Lockheed Martin; Kathy Jacobson, Lockheed Martin  
Moderator: Kathy Jacobson, Lockheed Martin

Description: Increasing the number of engineering and science graduates is a challenging task. Attracting students in engineering and science during early education is essential. If students are attracted to the engineering early, they can be better prepared with appropriate science and mathematics skills suitable for engineering. Institutions, engineers, instructors and teachers have used design and other engineering activities to attract students to pursue education in engineering. The panel will address best practices and lessons learned from activities and events to attract future engineering students.

DFMLC 3-1: Entertainment Engineering: Realizing “Entertaining” Ideas  
Monday, August 29, 2011  
10:40am–12:00pm Location: Congressional A  
Panelist: Stephen Sywak, McLaren Engineering Group; Tanner Rinke, Walt Disney Imagineering  
Moderator: John Wesner, Carnegie Mellon University

Description: What is special about Entertainment Engineering, that demands unique approaches, different from many other design applications? Think of an unusually broad spectrum of application environments, a different approach to end-user “customers,” and engineering that is at its best when it is not visible to the end-users. The design projects that engineers undertake in the world of entertainment come from different sources than many of us are used to. Most often it is other highly creative team members who come up with the difficult challenges faced in Entertainment Engineering.

DFMLC 3-2: Entertainment Engineering: Technical Implementations  
Tuesday, August 30, 2011  
10:40am–12:00pm Location: Congressional A  
Panelist: Thomas Mackin, Cal Poly; David Huber, Columbus McKinnon; Michael Aikens, Butler County Community College  
Moderator: John Wesner, Carnegie Mellon University

Description: Examples of the great diversity of design challenges are embodied in the concept of Entertainment Engineering. This includes, but is not limited to, just the roller coasters that many of us were introduced to in a high school physics class visit to a nearby amusement park.
CIE GRADUATE STUDENT POSTER SESSION

This session provides an opportunity for graduate students early in their research program (within one year of starting a MS or two years of starting a PhD) to present their current work to the research community. Students will have the opportunity to get external feedback on their preliminary research that may not yet be ready for presentation at the conference in archival form. This year’s poster session will be held in conjunction with the Student Networking Reception 6:30pm–8:30pm on Tuesday, August 30 in the Regency A Ballroom.

STUDENT MECHANISMS AND ROBOTICS DESIGN COMPETITION

Graduate students will be able to showcase their talents and abilities in front of respected world-renowned experts in mechanism design from academia and industry. Posters will be on display in the hallways on the Lobby Level of the hotel beginning in the afternoon on Tuesday, August 30.

MSNDC POSTER SESSION

View research posters in the area of multibody systems and nonlinear dynamics selected for the MSNDC Best Poster Award competition. Posters will be on display in the hallways on the Ballroom Level of the hotel beginning after lunch on Monday, August 29. Please also join us at the two rapid-fire oral presentation sessions in the afternoon on Tuesday, August 30 in Congressional C.

MNS PHOTO CONTEST

One of the offshoots of working with micro- and nanosystems inevitably is some really interesting pictures of novel creations. The MNS Photo Contest is a forum to display these pictures for recognition and evaluation by leading researchers in the field. Photos will be on display 6:00pm–7:00pm on the Ballroom Level of the hotel on Tuesday, August 30.

NSF/ASME STUDENT DESIGN ESSAY COMPETITION

This competition will address issues that are foundational to the creation of a scientific formalism for design. Posters will be on display in the hallways on the Lobby Level of the hotel beginning in the afternoon on Monday, August 29.

MSNDC STUDENT PAPER COMPETITION

The goal of the MSNDC student paper competition, sponsored by the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics is to encourage talented students to conduct excellent scientific work and to write outstanding scholarly articles. The submitted papers undergo rigorous peer review and are judged on originality, quality of technical content, relevance, organization and clarity.


Jared Dunnmon, Samuel C. Stanton, Brian Mann, and Earl Dowell, “Aeroelastic Limit Cycles As a Small Scale Energy Source,” DETC2011-47002

These papers will be presented during a regular technical session and, separately, during the symposium MSNDC-5: Student Paper Competition, scheduled for 10:40am–noon on Monday, August 29. The aim of this special session is to highlight work where the student played a major role in developing an idea and conducting research. While the presentations are judged by a panel of experts, we hope that this session will also offer an opportunity for students to interact with the ASME community at an early stage in their careers.
Following his affiliation with the University of New South Wales, the realization of complex engineered systems. Who have developed the competencies to create value through industry, a curriculum for educating strategic engineers—those focus is on learning to manage uncertainty in multiscale design research accomplishments are embodied in the twin scholarships University of New South Wales (Sydney, Australia), Mistree's mentor, Mistree has inspired countless students to study engineering design and, more importantly, to learn how to learn. Since serving as a lecturer/senior lecturer (1976-81) at the University of New South Wales (Sydney, Australia), Mistree’s research accomplishments are embodied in the twin scholarships of design integration and design education. His current research focus is on learning to manage uncertainty in multiscale design (from molecular to reduced order models) to facilitate the integrated design of materials, product and design process chains. Currently, Mistree is focusing on creating and implementing, in partnership with industry, a curriculum for educating strategic engineers—those who have developed the competencies to create value through the realization of complex engineered systems. Following his affiliation with the University of New South Wales, Mistree was an associate professor (1981-87) and professor (1987-1992) at the University of Houston before joining the faculty at the George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology, Atlanta. At Georgia Tech (1992-2009), Mistree served as the founding director of the Systems Realization Laboratory (1992-97). Founded by Drs. Allen, Bras, Rosen and Mistree, this was the first occurrence of faculty in the Woodruff School volunteering to share to gain and adopting principles of governance embodied in a Learning Organization as proffered by Dr. Peter M. Senge. The members of this laboratory sought colleagues with a dream and a passion for making a difference by becoming the thought leaders of tomorrow. One of the courses offered by Mistree was the graduate-level Teaching Practicum that had two components—a lecture component and a practicum. Over the five years he was responsible for the course, Mistree transformed it into a professional practicum through the introduction of two new segments: preparing for a career after graduation and the role of an educated engineer in society. This course, his favorite, has made a difference in the lives of many students, all of whom have been a source of joy and inspiration to him.

After retiring from Georgia Tech as professor emeritus in August 2009, Mistree joined the University of Oklahoma (OU), Norman, where he is professor, director of the School of Aerospace and Mechanical Engineering, and L.A. Comp chair. Working with his OU family and others in the OU community, he focuses on developing a curriculum anchored in experiential learning. Mistree has supervised 28 doctoral students and more than 50 master’s students, all of whom are well-placed around the world; 12 of his doctoral students are pursuing highly successful careers in academia. In addition, he has mentored two students, one master's and one doctoral, who now own several for-profit colleges in Orissa, India.

He has co-authored two textbooks; one monograph; and more than 350 technical papers covering the design of mechanical and structural systems, ships and aircraft, as well as more than 30 dealing exclusively with education. An ASME Fellow, Mistree served as chair of the Design Engineering Division’s (DED) Honors and Awards Committee (1997-2003), co-general chair for the 1998 Design Engineering Technical Conferences, and conference papers chair for the 1994 ASME Design Theory and Methodology Conference. He was DED’s session organizer for the 1985 International Conference on Computers in Engineering, and he developed a joint industry-university research agenda in concurrent engineering for the ASME Winter Annual Meeting in 1992. The DED honored him with Distinguished Service awards in 1998 and 2003, and the Design Automation Award in 1999. Mistree is an honorary member of Pi Tau Sigma, the International Mechanical Engineering Honor Society, where he served as secretary-treasurer (1995-2008) and invested his time inspiring undergraduate students to undertake graduate studies. He was instrumental in creating a Pi Tau Sigma Endowment for scholarships (in excess of $300,000), with the first scholarships being awarded in 2008. He is also an Associate Fellow of the American Institute of Aeronautics and Astronautics; and a member of the American Society for Engineering Education, The Honor Society of Phi Kappa Phi, the Royal Institution of Naval Architects, and the Society of Naval Architects and Marine Engineers. Among his honors, Mistree received the Jack M. Zeigler Outstanding Educator Award (2001) from Georgia Tech’s Woodruff School of Mechanical Engineering and was named Distinguished Professor for 1993. He was recognized by Mortar Board, Inc., the National College Senior Honor Society, as the Top Professor for 1987-88 and an Outstanding Professor for 1982-83 from the Cullen College of Engineering at the University of Houston; and received a Teaching Excellence Award (1984) from the University of Houston’s Sigma Zeta Chapter of Pi Tau Sigma.

**ASME SOCIETY AWARDS**

**2011 Ruth and Joel Spira Award Design Engineering Division**

*The Ruth and Joel Spira Outstanding Design Educator Award was established as a division award in 1998. The Award was elevated to a Society award in 2001 to recognize a person who exemplifies the best in furthering engineering design education through vision, interactions with students and industry, scholarship and impact on the next generation of engineers, and a person whose action serves as a role model for other educators to emulate.*

Farrokh Mistree

*University of Oklahoma*

**Biographical Description:** Dr. Mistree has spent his career pursuing his passion: to have fun in defining the emerging discipline of complex systems, in defining new education paradigms anchored in competency-based education that encourages students to pursue careers in academia, and in providing an opportunity for highly motivated and talented people to learn how to define and achieve their dreams. As an ardent educator, researcher, technical leader, advisor and mentor, Mistree has inspired countless students to study engineering design and, more importantly, to learn how to learn.
Mistree received his bachelor’s of technology in naval architecture, with honors, at the Indian Institute of Technology, Kharagpur, in 1967. He earned his master’s and Ph.D. degrees in engineering at the University of California, Berkeley, in 1970 and 1974, respectively.

2011 Barnett Uzgiris Product Safety Award
Design Engineering Division

The award recognizes individuals who have made significant contributions to the safe design of products through teaching, research, and professional accomplishments.

The award was established as the Triodyne Safety Award by the Design Engineering Division and operated as a division award until 2008 when it was elevated to a Society award and renamed the ASME Barnett-Uzgiris Product Safety Design Award.

John Vorderbrueggen
US Department of Energy

Biographical Description: Mr. Vorderbrueggen has more than 35 years of experience in design, process safety, federal regulatory programs involving worker and public safety, maintenance management, human factors, quality assurance and workforce training in industries including chemical, petrochemical, pharmaceutical, and nuclear and fossil power. He has extensive experience in fitness-for-service engineering analyses, incident investigations and management programs addressing the Occupational Safety and Health Administration’s Process Safety Management standard and the Environmental Protection Agency’s Risk Management Program regulation.

Currently, Vorderbrueggen is a nuclear engineer at the U.S. Department of Energy’s (DOE) Office of the Departmental Representative to the Defense Nuclear Facilities Safety Board (DNFSB) in Washington, D.C. He is responsible for coordinating between DOE offices and the DNFSB to resolve DNFSB-identified technical and management issues addressing health, safety and security relating to the design, construction, operation and decommissioning of the DOE defense nuclear facilities.

Prior to joining the DOE in April 2011, Vorderbrueggen spent more than eight years as an investigations supervisor at the U.S. Chemical Safety Board in Washington, D.C. He managed more than a dozen major accident investigations at industrial facilities in the U.S. that involved worker fatalities and toxic chemical releases into the community. Extensive on-scene activities, the analysis of physical evidence, and research into the technical, regulatory and legal issues involved resulted in comprehensive reports with root causes and recommendations for actions to prevent similar incidents in the future. He also worked closely with agency staff to create video animations of the incidents and the report findings. The videos are world-renowned for their effectiveness as training tools throughout industry.

While promoting the application of good engineering practices through his work at the U.S. Chemical Safety Board, Vorderbrueggen advocated for the use of ASME codes and standards in both the government and private sectors to further public safety. Earlier in his career, Vorderbrueggen worked in the industrial sector in positions including quality engineer, reliability test design engineer, engineering supervisor and vice president of process industries services. He is a frequent public speaker at technical conferences, stakeholder meeting and public meetings. He served on the Technical Advisory Committee (2001-02) for the Mary Kay O’Connor Process Safety Center at Texas A&M University, College Station.

Vorderbrueggen earned his bachelor’s degree in mechanical engineering at California Polytechnic State University, San Luis Obispo, in 1974. He is a registered professional engineer in Ohio, Maryland and California.
**P. Den Hartog Award**

**Design Engineering Division**

The award recognizes lifetime contribution to the teaching and practice of vibration engineering

This award was established by the Design Engineering Division in 1987 and elevated to a Society award in 2010.

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**Chieh-Su Hsu**  
**University of California, Berkeley**

**Biographical Description:** Dr. Hsu has been on the faculty of the University of California, Berkeley, teaching and doing research, since 1958. He is currently professor of applied mechanics, emeritus, in the department of mechanical engineering.

Prior to his career at UC Berkeley, Hsu worked at IBM (Poughkeepsie, N.Y.) from 1951 to 1955 and the University of Toledo, Ohio, from 1955 to 1958. Hsu’s research activities have been primarily in the areas of solid mechanics and dynamical systems. His first research task, undertaken in 1948, was a study of the vibration of beams under moving loads. Subsequent research has spanned the areas of classic elasticity theory and problems, elastic stability theory, snap-through instability problems of elastic bodies, theory of nonlinear oscillations, parametrically excited dynamical systems, dynamical systems involving time delays, dynamic stability of shallow arches and shells, point mapping dynamical systems, and global analysis of nonlinear dynamical systems.

Among his accomplishments, Hsu has made seminal contributions to vibration theory and nonlinear mechanics. In the area of parametrically excited dynamical systems, practical methods of determining the stability criteria were developed for systems of multiple degrees of freedom, and a variety of new concepts were introduced. For global analysis of nonlinear dynamical systems, a new methodology of cell-to-cell mapping was introduced, explored and developed. He reported on the early developments of this method in his book Cell-to-Cell Mapping—A Method of Global Analysis for Nonlinear Systems (Springer-Verlag, 1987). Hsu has educated thousands of students and has had a significant impact on the success of their professional careers.

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An ASME Fellow, Hsu served on the Western Committee of Applied Mechanics (1966-71) and held the positions of secretary (1969-70) and chair (1970-71); and was general chair of the 1971 Applied Mechanics Western Conference. He was associate editor (1971-76) and technical editor (1976-82) of the Journal of Applied Mechanics. He received ASME’s Centennial Award in 1980 and the Design Engineering Division’s N.O. Myklestad Award in 1995.

Hsu was elected to the National Academy of Engineering in 1988 and Academia Sinica (Republic of China, Taiwan) in 1990. He is a Fellow of the American Academy of Mechanics, and he has been a member of the Acoustical Society of America since 1955. Among his honors, Hsu received a Guggenheim Foundation fellowship (1964-65) and the Alexander von Humboldt Senior U.S. Scientist Award from the Humboldt Foundation, Germany (1986). Hsu graduated from the National Institute of Technology (Chungking, China) in 1945. He earned his master’s degrees in mechanical engineering and his Ph.D. in applied mechanics at Stanford University, California, in 1948 and 1951, respectively.
DIVISION AWARDS

2011 CIE Lifetime Achievement Award
Computers & Information in Engineering Division

In recognition of outstanding achievements in the discipline of computers and information in engineering.

Charbel Farhat
Stanford University

Biographical Description: Charbel Farhat is the Vivian Church Hoff Professor of Aircraft Structures at Stanford University, where he is also Chairman of the Department of Aeronautics and Astronautics, Professor of Mechanical Engineering, Professor in the Institute for Computational and Mathematical Engineering, and Director of the Army High Performance Computing Research. He also currently serves on the United States Bureau of Industry and Security's Emerging Technology and Research Advisory Committee at the Department of Commerce.

Professor Farhat is designated by the Institute for Science Information as a highly cited researcher in engineering. He is also the recipient of several prestigious awards including the American Institute of Aeronautics and Astronautics (AIAA) Structures, Structural Dynamics and Materials Award (2010), the United States Association of Computational Mechanics (USACM) John von Neumann Medal (2009), the Institute of Electrical and Electronics Engineers (IEEE) Computer Society Gordon Bell Award (2002), the International Association of Computational Mechanics (IACM) Computational Mechanics Award (2002), the AIAA Rocky Mountain Section Engineer of the Year Award (2001), the Department of Defense Modeling and Simulation Award (2001), the USACM Computational and Applied Sciences Award (2001), the IACM Award in Computational Mechanics for Young Investigators (1998), the USACM R. H. Gallagher Special Achievement Award for Young Investigators (1997), the IEEE Computer Society Sidney Fernbach Award (1997), the IBM Sup’Prize Achievement Award (1995), the American Society of Mechanical Engineers (ASME) Aerospace Structures and Materials Best Paper Award (1994), the Society of Automotive Engineers (SAE) Arch T. Colwell Merit Award (1993), the CRAY Research Award (1990), a TRW fellowship (1989), the United States Presidential Young Investigator Award (1989), and the Control Data Corporation PACER Award (1987). He is Editor of the International Journal for Numerical Methods in Engineering and the International Journal of Numerical Methods in Fluids. He is a Fellow of the Society of Industrial and Applied Mathematics (2011), Fellow of the American Society of Mechanical Engineers (2003), Fellow of the International Association of Computational Mechanics (2002), Fellow of the World Innovation Foundation (2001), Fellow of the United States Association of Computational Mechanics (2001), and Fellow of the American Institute of Aeronautics and Astronautics (1999). He has been an AGARD lecturer on aeroelasticity and computational mechanics at several distinguished European institutions, and a keynote speaker at numerous international scientific meetings. He is the author of over 400 refereed publications on fluid/structure interaction, computational fluid dynamics on moving grids, structural dynamics, acoustics, numerical analysis, and parallel processing.
2011 CIE Leadership Award
Computers & Information in
Engineering Division

In recognition of one’s outstanding leadership in furthering the discipline of computers and information in engineering

BVR Mohan Reddy (aka Mohan)
Infotech Enterprises Ltd.

Biographical Description: Mohan is the Founder, Chairman and CEO of Infotech Enterprises Ltd (Infotech). He is a renowned visionary who not only pioneered the introduction of CAD/CAM Technology and systems in India but has also been a successful entrepreneur with global impact.

In early 1980s Mohan joined OMC Computers as the Managing Director to introduce CAD/CAM systems in India. Later, he established Infotech (www.infotech-enterprises.com) in 1991 with a handful of engineers working from his home. Infotech today is a global company that employs over 9000 professionals with 21 different nationalities. It has presence in 30 global locations including 14 development centers.

With Mohan’s leadership, Infotech has become a recognized world leader in delivering Information Technology (IT) services for engineering. Infotech offers services to leading manufacturers, such as Boeing, Airbus, Pratt & Whitney, Hamilton Sundstrand, Bombardier, Alstom, Philips, Siemens, Invensys, Tom Tom, BT, to name a few.

Mohan serves as an executive council member of National Association of Software Services Companies (NASSCOM) and devotes quality time in driving engineering services and education initiatives. He is also actively involved with the Confederation of Indian Industry (CII). He served as the Chairman of the AP State Council and subsequently as the Chairman of Southern Region Council. He is also on the governing bodies and advisory councils of BM Birla Science Centre, Indian Institute of Technology (IIT) Hyderabad, Jawaharlal Nehru Technological University (JNTU) Kakinada, etc. With the belief that education is an enabler for societal development he has created a Charitable Trust (Infotech Enterprises Charitable Trust) and committed 1% of yearly profits to the trust for social initiatives.

Mohan is a recipient of several awards including: Entrepreneur of the Year Award (1996) by Hyderabad Management Association; HYSEA Outstanding Contribution Award (1997) for his efforts in promoting software industry; Outstanding Achievement Award (2004) by All India Manufacturers Organization; Felicitated as a Distinguished Scientist (2010) by Jawaharlal Nehru Technology University, India; Distinguished Alumnus Award (2011) by Indian Institute of Technology (IIT), Kanpur; Businessman of the Year Award (2011) by ZEE Television Media Network.

Mohan has a B.E in Mechanical Engineering from College of Engineering, Kakinada, India, an M.Tech in Mechanical Engineering from IIT, Kanpur, India, and an M.S. in Industrial Engineering from University of Michigan, Ann Arbor, U.S. In 2007, he received an Honorary Degree of Doctor of Philosophy from Jawaharlal Nehru Technology University, India.
2011 CIE Young Engineer Award
Computers & Information in Engineering Division

In recognition of one’s ability and potential for making significant contributions to the discipline of computers and information in engineering

Gaurav Ameta
Washington State University

Biographical Description: Gaurav Ameta is an Assistant Professor in the School of Mechanical and Materials Engineering at Washington State University. Prior to that, he was a Guest Researcher at the National Institute of Standards and Technology, Gaithersburg, MD and a Post-doctoral research associate at Arizona State University, Tempe, AZ. He received his MS and PhD in Mechanical Engineering from Arizona State University in 2004 and 2006, respectively.

Dr. Ameta’s research interests include (a) Tolerances, (b) Sustainable design and (c) Product models and informatics. In his studies on tolerances, Dr. Ameta has enhanced a math model, called (Tolerance-Maps) T-Maps, of the nuances, such as different tolerance types tolerance interactions, related rules, datum selection, material modifiers, datum precedence, specified in the tolerancing standards (ASME Y14.5 and ISO 1101). He created T-Maps for tolerance specifications on parts with angular dimensions and also developed T-Maps for feature-clusters, which are combinations of basic geometric elements such as points, lines and planes. Furthermore, he developed a statistical model of T-Maps that combines inspection/measurement methods with manufacturing biases for assigning and analyzing tolerances to individual parts in a product/assembly. Dr. Ameta received best paper award in the CIRP 2009 seminar on Computer Aided Tolerancing held at Annecy, France. He is also a member of the International Scientific committee for Computer Aided Tolerancing Seminar supported by the CIRP society.

Dr. Ameta has published 40 articles in various journals and conferences, including the Journal of Mechanical Design and Journal of Computing and Information Science in Engineering, among others. He has been regularly publishing in the IDETC/CIE conferences since 2004. He has served the CIE conference as a review co-ordinator and symposium organizer for the past 4 years. He is a member of Sigma XI, American Society of Mechanical Engineers (ASME), American Society of Engineering Education (ASEE) and the Mathematical Association of America (MAA).

Abhishek Seth
Caterpillar, Inc.

Biographical Description: Dr. Abhishek Seth is a Senior Engineer, Research & Development in the Product Development & Global Technology Division at Caterpillar Inc. Before joining Caterpillar, he worked as a Post Doctoral Researcher at the Virtual Reality Applications Center, Iowa State University and led a research team on various industry sponsored projects. Dr. Seth received his BS degree in Production Engineering from G.B. Pant University of Agriculture and Technology, India. He holds MS in Industrial Education and Technology and Ph.D. in Mechanical Engineering with a Co-Major in Human Computer Interaction from Iowa State University.

At Caterpillar Inc, Dr. Seth manages research, development and deployment of virtual reality, advanced visualization and digital human modeling technologies. He has made significant contributions to expanding the applications of VR technology and embedding it into the product development processes at Caterpillar. He has been successful in driving a culture change across the enterprise and established the value of using VR early in product development. Dr. Seth’s research interests include virtual reality (VR) applications in design, manufacturing, assembly/disassembly, ergonomics simulation, digital human modeling, human computer interaction, haptic interfaces, and scientific visualization.

In addition to his work at Caterpillar, Dr. Seth has been constantly involved with the academic research community. He is a founding member of the International Society for Human Simulation and serves as a member of the Strategic Advisory Board for Purdue University Calumet’s visualization & simulation research center. He served as the Technical Program Chair for the ASME 2010 World Conference on Innovative Virtual Reality (WinVR2010).

Dr. Seth is a member of the American Society of Mechanical Engineering (ASME) and IEEE. Dr. Seth is an active participant in the ASME International Design Engineering Conferences (IDETC/CIE). He currently serves as the Chair of the CIE Virtual Environments & Systems (VES) Technical Committee. Previously, he served as the Co-Chair of the VES Technical Committee from 2007-2009 and Panel Chair for a joint industry panel between CIE and DAC on Virtual Reality Applications in Industry in 2009.
2011 CIE Excellence in Research Award
Computers & Information in Engineering Division
In recognition of research excellence in the discipline of computers and information in engineering.

Chris Paredis
GW Woodruff School of Mechanical Engineering

Biographical Description: Dr. Chris Paredis is an Associate Professor in the G.W. Woodruff School of Mechanical Engineering and Associate Director of the Model-Based System Engineering Center at Georgia Tech. He received his M.S. degree in Mechanical Engineering from the Catholic University of Leuven (Belgium) in 1988, and his M.S. and Ph.D. in Electrical and Computer Engineering from Carnegie Mellon University in 1990 and 1996, respectively. From 1996 to 2002, he was a Research Scientist at the Institute for Complex Engineered Systems at Carnegie Mellon University. Dr. Paredis has a broad, multidisciplinary background. In his research, he focuses on Model-Based Systems Engineering, combining aspects of decision theory, information technology, simulation, and systems theory to support the design of complex mechatronic systems. In these areas, he has published more than 100 refereed journal articles and conference papers. He is active within the Object Management Group (OMG), as chair of the Finalization Task Force for the SysML-Modelica Transformation Specification, and as a member of the SysML Revision Task Force. Dr. Paredis received the 2007 CETL/BP Junior Faculty Teaching Excellence Award and the 2007 SAE Ralph R. Teetor Educational Award. In 2007-2008, he was the Chair of the ASME Computers and Information in Engineering (CIE) Division.

2011 CIE Best Paper Award
Computers & Information in Engineering Division
CIE sponsors the Best Conference Paper Award to recognize the author whose paper was selected to be the best paper from the entire conference.

“Controlled Kinetic Monte Carlo Simulation of Nanomanufacturing Processes”

Yan Wang
Georgia Institute of Technology

Biographical Description: Dr. Yan Wang is an Assistant Professor at the Woodruff School of Mechanical Engineering, Georgia Institute of Technology. Prior, he was on the faculty of the University of Central Florida (2005-2009). He received his Ph.D. from the University of Pittsburgh, M.S. from Chinese Academy of Sciences, and B.S. from Tsinghua University. His current research interests include compute-aided design, computer-aided manufacturing, multiscale systems engineering, modeling and simulation, uncertainty quantification and analysis. Dr. Wang has published over 70 journal and conference papers. He is a receipt of the 2007 U.S. National Science Foundation Early Career Development Award. He has taught courses of computer-aided design, computer-aided manufacturing, numerical methods, and stochastic simulation.
2011 CIE Distinguished Service Award
Computers & Information in Engineering Division

In recognition of distinguished service for the Computers and Information in Engineering Division of ASME.

Ravi Rangan
Centric Software, Inc.

Biographical Description: As the chief technical officer of Centric Software Inc., Ravi Rangan brings real-world PLM implementation experience in enterprise scale product structure/configuration management, search-based applications and process-driven system integration/design automation in the automotive, aerospace, high technology and medical device industries, where he holds several U.S. patents. He is currently responsible for deploying Centric’s PLM systems into emerging markets such as systems engineering, consumer goods, apparel and high-fashion, with a focus on rapidly deployable and affordable PLM deployments that emphasize fine-grain life cycle support, domain level configurability and low cost of ownership. Ravi was the CTO of Product Sight Corporation (acquired by Centric Software, Inc. in 2005), a company he co-founded to address process-aware product lifecycle applications for the PLM market. He previously served as a world-wide corporate director for SDRC’s ExperTeam program (now Siemens PLM), and worked as the Founding Technical Director of SDRC’s Enterprise Solution Center and onsite Metaphase solution architect with The Boeing Company’s DCAC/MRM business process reengineering initiative, where he consulted and contributed to various business process/IT architecture teams and provided leadership to the architecture, design, and implementation phases of the program. Rangan has published extensively, and organized symposia, panels and tutorials in the areas of business process modeling, systems architecture, design automation, and information/knowledge management. He has served on the Executive Steering Committee of American Society of Mechanical Engineers (ASME) CIE Division, the Engineering Database Program, and is a founding member and currently Advisory Board Member of the ASME’s Journal of Computing and Information Science in Engineering editorial board, and a reviewer for several other journals. Ravi completed his Ph.D. in mechanical engineering, with a specialty in engineering information management, from Georgia Tech in 1990; an M.S. from the University of Wyoming and a B.E. from M.S. University of Baroda, India.

Ravi was inducted to the Academy of Distinguished Engineers at Georgia Tech. in 2008, and received a Best Paper Award at the ASME CIE-EDBP Conference in 1990, and numerous awards from companies for contributions to their global PLM projects. He set up the Robert E. Fulton Best Paper Award for the ASME CIE Division to honor the contributions of Dr. Bob Fulton, the founder of EDBP.

2011 Leonardo Da Vinci Award
Design Engineering Division

The award recognizes an individual for eminent achievements in the design or invention of a product which is universally recognized as an important advance in machine design.

Shorya Awtar
University of Michigan

Biographical Description: Shorya Awtar, Sc.D. is an Assistant Professor of Mechanical Engineering at the University of Michigan (Ann Arbor, MI). He received his undergraduate degree from the Indian Institute of Technology (Kanpur, India) and graduate degrees from Rensselaer Polytechnic Institute (Troy, NY) and the Massachusetts Institute of Technology (Cambridge, MA). Prior to joining the University of Michigan, Shorya worked at the General Electric Global Research Center (Niskayuna, NY) and the National Institute of Standards and Technology (Gaithersburg, MD).

Shorya’s engineering and research interests lie in machine design, flexure mechanisms, precision engineering, and mechatronic systems. He is currently working on large-range nanopositioning systems for metrology and manufacturing applications, MEMS actuators and sensors, high-dexterity minimally invasive surgical tools, and kinetic energy harvesting devices. He has published several dozen conference and journal articles and has more than two dozen inventions that are patented or patent-pending. Shorya is also the co-founder of two startup companies – FlexDex Inc. and HiPERNaP LLC. He has received the National Science Foundation’s CAREER Award, the Society of Manufacturing Engineers’ Outstanding Young Manufacturing Engineer Award, and the Research and Development magazine’s R&D100 Award, among others, for his contributions to machine and mechanism design.
DESIGN ENGINEERING DIVISION
TECHNICAL COMMITTEE AWARDS

Design Automation Award
Technical Committee on Design Automation

The award is given by the Technical Committee on Design Automation recognizes the sustained meritorious contribution to research in design automation.

Ram Sriram
National Institute of Standards and Technology

Biographical Description: Ram D. Sriram is currently the chief of the Software and Systems Division in the Information Technology Laboratory, Prior to that he was the group leader of the Design and Process group in the Manufacturing Systems Integration Division at the National Institute of Standards and Technology, where he conducted research on standards for interoperability of computer-aided design systems. Before that he was on the engineering faculty (1986-1994) at the Massachusetts Institute of Technology (MIT) and was instrumental in setting up the Intelligent Engineering Systems Laboratory. At MIT, Sriram initiated the MIT-DICE project, which was one of the pioneering projects in collaborative engineering. Sriram has co-authored or authored nearly 250 publications in computer-aided engineering and health care informatics.

His design work at NIST focused on establishing a semantically-based, validated, product representation scheme as a standard that supports seamless interoperability among current and next generation computer-aided design systems (CAD), and that supports Product Lifecycle Management (PLM) concepts and software throughout the product’s lifecycle, from conceptualization to disposal with a major emphasis on sustainable manufacturing. Sriram’s work in this area has found wide spread use in the product design community. During his tenure at MIT, Sriram developed several new courses, with significant impact on engineering education. His book entitled “Intelligent Systems for Engineering” is an encyclopedic volume on the use of artificial intelligence techniques to solving engineering problems. The three volume series on artificial intelligence applications to engineering design that he co-edited will remain as a classic on artificial intelligence applications. MIT also produced and marketed a 5 video series on object-oriented systems with Sriram as the instructor.

Sriram was a founding co-editor of the International Journal for AI in Engineering. He was the technical chair of the first and second international conferences on the applications of artificial intelligence for engineering. Sriram also serves on the editorial board of several leading computer-aided engineering journals.

In 1989, Sriram was awarded a Presidential Young Investigators Award from the National Science Foundation, U.S.A. A paper he co-authored with his student in the Journal of Computing in Civil Engineering received the “best paper award” in 1995. A recent paper he co-authored received the Journal of CAD’s “most cited paper award” for 2011. Sriram is a Fellow of ASME, a Fellow of AAAS, a Senior Member of IEEE, a Member (life) of ACM, a member of AAAI, and a member of AMIA. Sriram has a B.S. from IIT, Madras, India, and an M.S. and a Ph.D. from Carnegie Mellon University, Pittsburgh, USA.

Design Automation Young Investigator Award
Technical Committee on Design Automation

The award is given to an outstanding young investigator who is making noteworthy contribution in the area of design automation.

Levent Burak Kara
Carnegie Mellon University

Biographical Description: Levent Burak Kara is an Assistant Professor of Mechanical Engineering at Carnegie Mellon University. He received a B.S. in Mechanical Engineering from Middle East Technical University (1998), and M.S (2000) and Ph.D. (2005) degrees in Mechanical Engineering from Carnegie Mellon University. He is the founding director of Visual Design and Engineering Laboratory. His research focuses on the development of computational tools for human-centric geometric modeling and design exploration, with primary applications to industrial product design. His primary interests include computer aided design, design automation, geometric modeling, pen computing, virtual reality, and human–computer interaction. At Carnegie Mellon, he teaches the Mechanical Engineering Senior Capstone Design course and the graduate level AI and Machine Learning for Engineering Design course. He received the NSF Career Award in 2009, and was awarded the Professor of the Year by the Mechanical Engineering senior class of 2010.
Kos Ishii-Toshiba Award
Technical Committee on Design and Manufacturing and the Life Cycle

This award was established in honor of the late Professor Kos Ishii, to recognize sustained meritorious contributions to the use of optimization and other modeling techniques to support design, manufacturing and life cycle management decisions in product development.

Satyandra K. Gupta
University of Maryland

Biographical Description: Satyandra K. Gupta is a Professor in the Department of Mechanical Engineering and the Institute for Systems Research at the University of Maryland. He is also the director of Maryland Robotics Center. He received a Bachelor of Engineering (B.E.) degree in Mechanical Engineering from the University of Roorkee (presently known as the Indian Institute of Technology, Roorkee) in 1988. He received a Master of Technology (M. Tech.) in Production Engineering from the Indian Institute of Technology, Delhi in 1989. He received a Ph.D. in Mechanical Engineering from the University of Maryland at College Park in 1994.

Dr. Gupta’s research interest is broadly in the area of automation. He is specifically interested in automation problems arising in Design, Manufacturing, and Robotics. He has authored or co-authored more than two hundred articles in journals, conference proceedings, and book chapters. He is a fellow of the American Society of Mechanical Engineers (ASME). He has served as the Chair of the Design for Manufacturing Technical Committee in the Design Division of ASME. He has organized several conference sessions in the area of computer-aided design, manufacturing automation, and robotics. He has served as Program Co-Chair in 1998 ASME Design for Manufacturing Conference, Papers Chair in 1999 ASME Design for Manufacturing Conference, Exhibit Chair in 2000 ASME Design Engineering Technical Conferences, Program Chair in 2002 ASME Design for Manufacturing Conference, and Conference Chair in 2003 ASME Design for Manufacturing Conference. He has served as a member on the Editorial Advisory Board for Assembly Automation and Computer Aided Design and Applications journals. He has also served as an Associate Editor for IEEE Transactions on Automation Science and Engineering, ASME Journal of Computing and Information Science in Engineering, and SME Journal of Manufacturing Processes.

AWARDS AND MEMORIAMS

Dr. Gupta has won many honors and awards for his research accomplishments. He received the Best Paper Award at the 1994 ASME International Conference on Computers in Engineering, the Best Paper Award at the 1999 ASME Design for Manufacturing Conference, a Young Investigator Award from the Office of Naval Research in 2000, a Robert W. Galvin Outstanding Young Manufacturing Engineer Award from the Society of Manufacturing Engineers in 2001, a CAREER Award from the National Science Foundation in 2001, the Outstanding Systems Engineering Faculty Award from the Institute for Systems Research in 2001, a Presidential Early Career Award for Scientists and Engineers (PECASE) in 2001, a Highly Commended Paper Award from Literati Club in 2002, the Best Paper Award at the 2006 ASME Computers and Information in Engineering Conference, a Compliant Mechanism Applications Award at the 2010 ASME Mechanism and Robotics Conference. He also holds a US Patent titled Apparatus and Method for Multi-Purpose Setup Planning for Sheet Metal Bending Operations.
Mechanisms and Robotics Committee Award
Technical Committee on Mechanisms and Robotics

The Mechanisms and Robotics Award, established in 1974, is an honor given by the ASME Mechanisms and Robotics Committee in recognition of an individual who is known internationally for a cumulative contribution to the fundamental theory, design and applications of mechanisms and robotic systems.

J. Michael McCarthy
University of California Irvine

Biographical Description: J. Michael McCarthy is a Professor of Mechanical and Aerospace Engineering at the University of California, Irvine where he is the Henry Samueli Chair and Director of the Center for Engineering Science in Design. He previously served on the faculties at Loyola Marymount University, from which he received his B.S. in mechanical engineering, and the University of Pennsylvania and as the Chief Technical Officer of Accuray Incorporated. He received his M.S. and Ph.D. degrees in mechanical engineering from Stanford University. Dr. McCarthy is a Fellow of ASME who served as the General Conference Chair of the 1996 ASME IDETC and as the Chair of the ASME Mechanisms Committee from 1994 to 1998. He is the founding editor of the ASME Journal of Mechanisms and Robotics and was previously the editor of the ASME Journal of Mechanical Design. Dr. McCarthy has been the recipient of many past awards including, among others, the ASME Machine Design Award and the ASME Outstanding Service Award.

Dr. McCarthy has made a tremendous impact on the field of mechanisms and robotics, publishing over 160 journal and conference papers, presenting in excess of 70 invited lectures, and graduating many Ph.D. students who have gone on to make significant contributions of their own to the field in both academia and industry. Dr. McCarthy’s two books are foundational for anyone working in theoretical kinematics and mechanism synthesis. Highlights from his many research contributions include extensions of curvature theory to spherical motion, development of a unified geometric framework for rigid-body guidance that spans planar, spherical, and spatial mechanisms, synthesis techniques for spatial mechanisms, and software tools for synthesis.

MESA Achievement Award
Technical Committee on Mechatronic and Embedded Systems and Applications

The MESA Achievement Award is given once a year for an outstanding, cumulative contribution to the field of mechatronic and embedded systems and applications following the bylaws of the MESA technical committee.

Bernard Roth
Stanford University

Biographical Description: Dr. Bernard Roth is the Rodney H. Adams Professor of Engineering at Stanford University. He has published approximately 200 research papers in the areas of design, kinematics, robotics, creativity and education. He has received many awards for both his teaching and research. These include seven Best Paper Awards (ASME), the Melville Medal and the Outstanding Design Educator Award (ASME), J. F. Engleberger Award (IFR), the Pioneer in Robotics Award (IEEE) and honorary PhDs by the University of Paris and the University of Casino. He also has been as an industrial and government consultant and a director of several corporations. He has served as president of the International Federation for the Promotion of Mechanism and Machine Science (IFToMM) and as chair of ASME’s Design Engineering Division. He is the organizer of workshops on creativity and personal effectiveness, and is one of the founders of Stanford’s “d-school,” where he now serves as Academic Director.

Honorary Award
Technical Committee on Multibody Systems and Nonlinear Dynamics

This award is given by the Design Engineering Division’s Technical Committee on Multibody Systems and Nonlinear Dynamics in recognition of significant contribution to computational dynamics.

Eusebius Doedel
Concordia University

Biographical Description: Eusebius Doedel was born in The Netherlands. At age 20 he moved to Canada, where he studied mathematics at the University of British Columbia, obtaining his PhD there in 1976. After two years as a postdoc at Caltech and two years as an assistant professor at Vanderbilt University he returned to Canada, where he has been a professor in the Department of Computer Science at Concordia University in Montreal since 1979. Since then he has also held visiting positions at Caltech, where he was closely associated with the late Herb Keller, at the Universities of Utah and Minnesota, the Université de Technologie de Compiègne, the Université de
Poitiers, the Benemérita Universidad Autónoma de Puebla, and other institutions. He has worked on algorithms for differential equations, especially boundary value problems, with application to dynamical systems. He is the original author of the software AUTO for the bifurcation analysis of dynamical systems.

**Professor Javier García de Jalón**

**Universidad Politécnica de Madrid, Spain**

**Biographical Description:** Professor Javier García de Jalón was born in Zaragoza (Spain) in 1949. He graduated in Mechanical Engineering from the University of Navarre at San Sebastián (Spain) in 1971, and received his Ph.D. in September 1977 in Computational Mechanics. In 1977 he moved to the School of Engineering of Bilbao, where he started his work in kinematics and dynamics of multibody systems, becoming a full professor on Mechanisms and Machines in 1980. In 1979 he started the development of the so-called “natural coordinates”, a system of generalized coordinates that bypasses the use of angles to describe the configuration of a multibody system. These coordinates seamlessly connect the kinematics and dynamics of multibody systems with finite-element models and optical motion-capture systems. Since their initial formulation, these coordinates have found numerous applications, including to the study of flexible bodies and biomechanics. In 1981 Prof. García de Jalón returned to San Sebastián and until 2000 he worked in the Applied Mechanics Department of the University of Navarre and CEIT (Centre of Technical and Research Studies of Gipuzkoa), where he served as Professor, senior Researcher, and Head of the Department. In 2000 he moved to the Universidad Politécnica de Madrid, where he is Professor of Applied Mathematics in the Mechanical Engineering School. He also works for INSIA (University Institute for Automobile Research), where he develops methods and software for real time simulation, design, and parameter identification of vehicles. Prof. García de Jalón has authored over 80 papers in international Journal and Conferences. In 1994 he co-authored with Prof. Bayo the book “Kinematic and Dynamic Simulation of Multibody Systems - The Real Time Challenge-”, that mostly summarizes the theory on natural coordinates and penalty methods as a way to enforce kinematic constraints. He has supervised 19 doctoral dissertations, among them seven university professors. In a 1987 talk at the VIIth IFTóMM World Congress on the Theory of Machines and Mechanisms, in Seville (Spain), he presented a multibody kinematic and dynamic program that ran interactively with realistic CAD models on one of the first 3-D graphic workstations. This was the starting point for a large activity of research and consulting work for many institutions, including the ESA (European Space Agency), Mechanical Dynamics, Inc., and other Spanish and European institutions.

**D’Alembert Award**

**Technical Committee on Multibody Systems and Nonlinear Dynamics**

This award was established to recognize lifelong contributions to the field of multibody system dynamics.

**Javier García de Jalón**

**Universidad Politécnica de Madrid, Spain**

**Earl H. Dowell**

**Duke University**

**Biographical Description:** Prof. Earl H. Dowell received his B.S. degree from the University of Illinois and his S.M. and Sc.D. degrees from the Massachusetts Institute of Technology. Before coming to Duke as Dean of the School of Engineering, serving from 1983-1999, he taught at M.I.T. and Princeton. He has also worked with the Boeing Company. Currently he serves on boards of visitors of Carnegie Mellon University, Georgia Institute of Technology, Princeton University, University of Illinois and the University of Rochester. He is a consultant to government, industry and universities in science and technology policy and engineering education as well as on the topics of his research. Dr. Dowell is an elected member of the National Academy of Engineering, an Honorary Fellow the American Institute of Aeronautics and Astronautics (AIAA) and a Fellow of the American Academy of Mechanics and the American Society of Mechanical Engineers. He has also served as Vice President for Publications and member of the Executive Committee of the Board of Directors of the AIAA, as a member of the United States Air Force Scientific Advisory Board, the Air Force Studies Board, the AGARD (NATO) advisory panel for aerospace engineering, as President of the American Academy of Mechanics, Chair of the US National Committee on Theoretical and Applied Mechanics and as Chairman of the National Council of Deans of Engineering. From the AIAA he has received the Structure, Structural Dynamics and Materials Award, the Von Karman Lectureship and the Crichlow Prize; from the ASME he has received the Spirit of St. Louis Medal and Den Hartog Award; and he has also received the Guggenheim Medal which is awarded jointly by the AIAA, ASME, AHS and SAE. Dr. Dowell research ranges over the topics of aerelasticity, nonsteady aerodynamics and nonlinear dynamics. In addition to being author of over two hundred research articles, Dr. Dowell is the author or co-author of four books, “Aerelasticity of Plates and Shells”, “A Modern Course in Aerelasticity”, “Studies in Nonlinear Aeroelasticity” and “Dynamics of Very High Dimensional Systems”. His teaching spans the disciplines of acoustics, aerodynamics, and dynamics.
Darle W. Dudley Award
Technical Committee on Power Transmission and Gearing

The Darle W. Dudley Award for Outstanding Contributions to the Power Transmission and Gearing Community honors those who have made life-long contributions to the art and science of gear and power transmission technology. The award is named for Darle Dudley who represented the spirit of this award so well.

Aizoh Kubo
Kyoto University, Japan

Biographical Description: Dr. Aizoh Kubo is a Professor Emeritus at Kyoto University, Japan. He serves on the Board of the Research Institute for Applied Sciences in Kyoto, Japan. Dr. Kubo is also the CEO of Kubo’s Gear Technologies Company.

Dr. Kubo received his Ph.D. degree from Kyoto University in 1971. He has served as a guest researcher at Stuttgart University and FZG, T.U. Muenchen in Germany. Since 1979, he has been a Professor in the Department of Precision Mechanics in Kyoto University until his retirement in 2007. His research focus has been on dynamics of high speed gearing; design and troubleshooting of gear failure, vibration, and noise issues; analysis of gear manufacturing processes; development of simulation tools, and development of measurement techniques for characterizing the geometry of machine parts.

Dr. Kubo is a member of JSME and AGMA. He has served as the Head of the Japanese delegate to the ISO TC60 (1980-2009). He is also a member of the Gear Technical Committee of IFToMM, and has served as a Chair of that committee (1994-1997). He is also a past Chair of the Machine Design and Tribology Division of JSME (1996-1997) as well as a past Chair of the the JSME Gear Committee RC-156. Dr. Kubo has served as the Secretary General of the MPT-91 and the Chairman of the MPT-2001 conferences (International Conference on Motion and Power Transmissions). He was a member of the Board of Excellence at the VDI Conference on Gears, 2010. Dr. Kubo is also the Head of the Gear Industry Society in Kansai district in Japan. Research papers authored by Dr. Kubo have received several JSME awards. His work on the Development of Design Methods of Railway Traction Drives received an Invention Prize from Japan Institute of Invention and Innovation. Dr. Kubo has also been active in ASME conferences, and delivered the Buckingham Lecture in the ASME/AGMA International Conference in 2003.

Noel C. Perkins
University of Michigan

Biographical Description: Noel Perkins is the Donald T. Greenwood Collegiate Professor of Engineering and an Arthur F. Thurnau Professor in Mechanical Engineering at the University of Michigan. He earned his Ph.D at U. C. Berkeley in 1986 (Mechanical Engineering) prior to joining the faculty at Michigan. His research interests draw from the fields of computational, nonlinear and structural dynamics with applications to the mechanics of single molecule DNA and DNA/protein complexes, wireless inertial sensors for analyzing human motion, and the dynamics of cable structures, vehicle systems, and axially moving materials. He presently serves as the Editor of the ASME J. Vibration and Acoustics and has previously served in editorial capacities for the ASME J. Applied Mechanics (Associate Editor), the Journal of Vibration and Control (Member, Editorial Board), the International Journal of Non-linear Mechanics (Guest Editor), and the Journal of Sound and Vibration (Member, Editorial Board). He is a Fellow of the American Society of Mechanical Engineers, a recipient of the General Motors Outstanding Distance Learning Faculty Award (twice), the Academic Challenge Award from the Technical University of Munich, the Amoco Undergraduate Teaching Award and several other teaching awards from the University of Michigan. He remains active in commercialization activities for MEMS-based sports training systems, and is founding partner of Cast Analysis, LLC that manufactures a fly casting training system.
John Eldon Renaud  
University of Maine

Biographical Description: John Eldon (Jack) Renaud, Ph.D., P.E., of Niles, Michigan, passed away on March 18, 2011, at the age of 50. Jack had a distinguished career in industry and academia and he was an active and enthusiastic supporter of ASME. He graduated with a BSME in 1982 from the University of Maine at Orono. He then worked five years as a manufacturing systems design engineer at the Eastman Kodak Company in Rochester, New York. He returned to graduate school, earning MS (’88) and PhD (’92) degrees in Mechanical Engineering from the Rensselaer Polytechnic Institute. Jack joined the Department of Aerospace and Mechanical Engineering at the University of Notre Dame in 1992 as the Clark Equipment Assistant Professor. He received the National Science Foundation Young Investigator Award in 1994, was promoted to Associate Professor in 1998 and Professor in 2002. In 2008 Dr. Renaud was appointed Department Chair.

Jack was internationally recognized as an expert in engineering design methodology and optimization theory. He, with his students and colleagues, authored over 65 refereed articles in the leading journals of his discipline and he contributed over 130 papers to symposia and conferences and he held two US patents. The research conducted in his Design Automation Laboratory at Notre Dame was supported by the National Science Foundation, NASA, the State of Indiana, the Office of Naval Research, the Air Force Office of Scientific Research, the US Army, the Department of Energy, Honda R&D and others. His research contributions in mechanical system and product design and optimization ranged from plastic snap fasteners and compliant mechanism to bone cement composite materials, cortical bone and nano-ceramics. His recent work in applying optimization methods to improve crashworthiness and survivability of vehicles was highlighted in 2010 on a national television broadcast. Jack’s research engaged mathematicians, management experts, bioengineers and materials scientists - he had a true multidisciplinary perspective. He is particularly recognized for his efforts to explore and develop the application of hybrid cellular automata to engineering design.

Jack was elected to the grade of Fellow of the American Society of Mechanical Engineers in 2002. He was Associate Editor of the Journal of Mechanical Design and member of the Editorial Advisory Boards for the Journal of Aircraft and Engineering Optimization. He was the General Conference Vice-Chair for the 2003 ASME International Design Engineering Technical Conferences and he held a variety of positions including being a member of, the Executive Committee of the ASME Design Engineering Division, the ASME Design Automation Committee and the ASME Design Division Education Committee. Jack also served as the Treasurer, Secretary, Vice-Chair and Chair of the St. Joseph Valley Section of the ASME.

Dr. Renaud’s professional contributions included extensive service to NSF through service on dozens of Review Panels and he provided reviews to 16 different journals and books. He was also active in the American Institute of Aeronautics and Astronautics (AIAA) where he was an Associate Fellow, Technical Chair of the 2004 AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization and member and Chair of the Multidisciplinary Optimization Technical Committee. Jack was very dedicated to engineering education and encouraging students, particularly his graduate students to continually challenge themselves and excel. His research laboratory was an exciting and inspiring place for undergraduates, graduate students, visitors and colleagues. He supervised 14 doctoral students and 18 MS students, along with over 75 undergraduate research projects. He was instrumental in the development of the Aerospace and Mechanical Engineering Department’s Masters of Engineering in Mechanical Engineering (MEME) degree program and he chaired the College of Engineering’s committee that resulted in the development of the college-wide Engineering and Business Practice Program that now enrolls over 60% of all graduates in the College of Engineering.
SUNDAY, AUGUST 28, 2011

Design Engineering Division Meetings
Design Engineering Division EC 2:00pm–5:00pm Capitol B
Systems & Design Group w/ DED 5:00pm–6:00pm Capitol B

MONDAY, AUGUST 29, 2011

Design Engineering Division Meeting
Technical Committees Leadership Training 7:00am–8:30am Thornton Lounge

CIE Division - Technical Committee Meetings
Advanced Modeling & Simulation (AMS) 12:00pm–1:00pm Grand Teton
Computer-Aided Product and Process Development (CAPPD) 12:00pm–1:00pm Glacier
Systems Engineering, Info. & Knowledge Management (SEIKMD) 12:00pm–1:00pm Bryce
Virtual Environments and Systems (VES) 12:00pm–1:00pm Yosemite

ASME’s Center For Research Technology and Development
Jointed Structures Research Committee 12:00pm–1:00pm Columbia Foyer

TUESDAY, AUGUST 30, 2011

Design Engineering Division Meeting
DED General Meeting 2:30pm–6:30pm Thornton Lounge

CIE Division Meetings
CIE Division EC Meeting 7:30pm–8:30pm Regency B

Design Division - Technical Committee Meetings
Advanced Vehicle and Tire Technologies (AVTT) 5:30pm–7:30pm Congressional C
Design Automation (DAC) 6:00pm–7:30pm Lexington
Design Education (DEC) 5:30pm–7:00pm Congressional D
Design for Manufacturing and the Life Cycle (DFMLC) 6:00pm–7:00pm Bunker Hill
Design Theory and Methodology (DTM) 6:00pm–8:00pm Concord
Mechanisms and Robotics (MECH) 7:00pm–10:00pm Columbia Foyer
Micro & Nano Systems (MNS) 7:00pm–9:30pm Columbia C
Mechatronic and Embedded Systems and Applications (MESA) 6:00pm–7:00pm Congressional A
MESA FDTA Symposium Team Meeting (MESA-FDTA) 7:00pm–8:00pm Congressional A
Multibody Systems and Nonlinear Dynamics (MSND) 7:00pm–9:00pm Columbia A
Vibration and Sound (TCVS) 7:30pm–9:30pm Capitol A
Workshop 1: Non-Contact Vibration Characterization
Sunday, August 28, 2011
8:00am–5:00pm Location: Columbia A
Instructors:  David Oliver (d.oliver@polytec.com)
             Jerome Eichenberger (j.eichenberger@polytec.com)

Overview:
Laser Doppler vibrometry has been used for non-contact vibration characterization for several decades by leading research institutes and companies. The technology has become instrumental in a wide range of applications that include automotive, aerospace, defense, data storage, microelectronics (MEMS), ultrasonics and medical industries. Non-contact vibration sensors are being used for basic research, design development, model verification, process control, and to troubleshoot unwanted vibration. A wide variety of laser Doppler vibrometers are available, each tailored towards specific needs. Single point vibrometers measure the vibration response at just one location. Dual beam vibrometers are used to measure vibrations at two points to remove common mode vibrations. Rotational vibrometers measure the dynamics of a rotating shaft or spindles. Among the higher-end systems, 3D scanning systems are used to measure a tri-axial response and map the vibrations across the entire surface of an object.

The morning session of the workshop will be focused on dynamic characterization of macrostructures (structures ranging in dimension from 1cm to 10s of meters) and the afternoon session will be geared towards microstructure applications. Each workshop session will consist of two parts: 1) an overview over the fundamental principles of laser Doppler vibrometry and how it integrates seamlessly into the design and development process, and 2) a hands-on demonstration on Polytec’s high-end scanning vibrometers.

Workshop 2: Mechanical Engineering Design Knowledge Modeling
Sunday, August 28, 2011
8:00am–5:00pm Location: Columbia B
Instructors:  David Rosen (david.rosen@me.gatech.edu)
             Joshua Summers (jsummer@clemson.edu)

Overview:
The primary objective of this proposed workshop is to clearly define the needs and develop an outline for a research program for capturing, representing, and modeling mechanical engineering (ME) design knowledge. The idea is to model knowledge about ME principles, for instance the conservation of mass and energy, and their application to ME devices and systems using standard techniques such as free-body diagrams or control volumes. Further, the knowledge about how to formulate models of devices and of design decisions should be modeled. The proposed research program is a much grander vision than other NSF sponsored projects and programs that were focused on collecting repositories for artifacts (functions, geometries, behaviors, etc.). A formalized language of mechanical engineering is envisioned that will allow engineers to communicate more precisely between each other and with computers. The resulting formalized ME design knowledge and language will be encoded and implemented in an open-knowledge repository. Such a knowledge repository could capture the disparate and representationally diverse ME knowledge of typical undergraduate students providing numerous benefits: 1) standard for ME knowledge, 2) a knowledge base to support engineering design, 3) a knowledge base for computer-aided tutoring systems, and 4) more generally a key component of the ME research and education infrastructure. When considering the challenges associated with developing a true Mechanical Engineering modeling language (MEml), collaboration with many disciplines is necessary. A convergence of artificial intelligence, engineering informatics, description logics, and the semantic web with mechanical engineering design research will be the enabling factor to realize the vision of this research proposal and workshop. The workshop is funded by a NSF grant from the Engineering Design program in the CMMI Division.
Sunday, August 28, 2011
8:00am–12:00pm
Location: Lexington

Instructors: Sudarasan Rachuri (sudarsan.rachuri@nist.gov)
Anantha Narayanan (anantha.narayanan@nist.gov)
Paul Witherell (paul.witherell@nist.gov)
Kevin Lyons (kevin.lyons@nist.gov)
Mahesh Mani (Mahesh.mani@nist.gov)
Guodong Shao (gshao@nist.gov)

Overview:
Sustainability is a holistic systems approach for the production and consumption of goods and services that minimizes resource depletion while maximizing value to the producer, consumer, and society at large. Sustainable manufacturing takes into account various factors including: energy efficiency, resource usage, health and safety of plant workers, and depending on the markets, a variety of environmental regulations. To maintain a competitive edge, manufacturers must be able to quickly assess the impacts of different design choices, and develop a good understanding of health, safety and environmental regulations. This calls for a systems approach that considers all aspects of the enterprise, and comprehensively captures and utilizes the properties of the various interacting systems.

Workshop 4: Teraflop Parallel Computing on a Budget: Applications of Graphics Processing Unit (GPU) Computing in Mechanical Engineering
Sunday, August 28, 2011
8:00am–5:00pm
Location: Bunker Hill

Instructors: Dan Negrut (negrut@engr.wisc.edu)
Krishnan Suresh (suresh@engr.wisc.edu)
Sara McMains (mcmains@me.berkeley.edu)

Overview:
As the computer microprocessor industry rallies behind a new design paradigm that emphasizes parallel architectures, today’s computational methods in Mechanical Engineering, mostly drawing on sequential computing algorithms, are gradually becoming ill-positioned to answer the ever growing modeling and simulation challenges posed by engineering applications. In this landscape, the GPU recently emerged as a convenient and inexpensive accelerator (co-processor) that can deliver today 0.5 TFlops at a cost of less than $1500. Enabling speedups by factors of 10 to 100, GPU computing in particular and parallel computing in general usher in an era where each one of us will have Teraflop level computational speed at our fingertips.

Workshop 5: Precision Structronic and Mechatronic Devices with Smart Materials
Sunday, August 28, 2011
8:00am–12:00pm
Location: Congressional B

Instructor: Hornsen (HS) Tzou (hstzou@zju.edu.cn)

Overview:
“Smart structures and structronic systems” technology has been evolving for over two decades. This tutorial focuses on the design and application aspects of the technology. Histories, fundamental characteristics, materials (e.g., piezoelectrics, electro- and magneto-strictive materials, shape memory materials, electro- and magneto-rheological fluids, photostrictive materials, polyelectrolyte gels, pyroelectric materials, magneto-optical materials, superconductors, etc.), design principles, precision devices (sensors and actuators), micro-/nano-actuations, and practical applications (from aerospace structures, mechanical systems to micro-/nano-devices) are emphasized. Modern research issues are also discussed.
Overview:
This workshop describes the Villanova University LEGO Real Time target (VU-LRT) which extends MATLAB and Simulink to enable application development on the LEGO Mindstorms NXT brick. The VU-LRT teaching platform aims to address the growing need for hands-on and project-based learning via a low-cost, easy to use hardware and software platform that builds on the widely used MATLAB & Simulink platform.

The VU-LRT Blockset enables students to access the hardware capabilities of the 32-bit LEGO NXT brick from within Simulink environment, and to automatically generate and cross-compile the necessary code for real time autonomous implementation. Faculty who attend will have a chance to work through lab modules with examples of embedded genetic algorithms, motor speed control and mobile inverted pendulum. They will have an opportunity to gain practical hands-on experience in building such high-level examples themselves, and by extension understand the potential for use in the classroom with undergraduate students.

Overview:
The goal of the workshop on Navigating and Leading Change is to provide a professional development experience and opportunity for community and networking within the Design Engineering Division (DED) of ASME that supports and mentors underrepresented groups. The workshop is designed to provide participants with tools to drive transformation and manage change in their personal life as well as with teams and entire organizations. This workshop will be the third workshop event of the Broadening Participation committee of the ASME DED.

In the workshop, participants will explore the five element systems model, a simple, yet powerful model that represents the ideal, full, “healthy” life cycle of an individual, team, project or organization. The model will enable participants to map the dynamics in various scenarios, to “diagnose” where individuals / groups may be “stuck”, and identify what work they need to do to move forward in a healthy way. The dynamics of the model operate at multiple levels simultaneously - on the personal, relational, team, project, organization, and even societal levels. In addition, people often gravitate toward a particular phase that resonates with their individual personality or leadership style. In the workshop, participants will begin to identify their own style or tendency and begin to understand how as leaders to manage that dynamic. This will enable participants to leverage their strengths and work on areas that challenge their style in the context of change.

Overview:
Bio-inspired design (BID) or biomimicry is an emerging research area in engineering design, computer science and biology that seeks to systematically mine biological knowledge to solve existing engineering problems. However, the community of BID researchers at present is fragmented with no professional society, unifying funding source, or recurring conference meeting. BID design research is active across many disciplines and has had important and significant results. Nevertheless, BID remains largely a research activity contained in universities, not an activity practiced by design engineers in the field. The research-not-practice status of BID requires approaches to mine biology for solutions to problems for which we have no current “engineered” solution. For example, biological solutions exhibit superior sustainability to engineered solution. Similarly, biological solutions are complex both in their solution and the problem they solve. As the problems solved become more complex, and the engineered solutions themselves also become more complex, perhaps biology offers insight on how to solve the problem.

In this NSF sponsored second workshop on bio-inspired design, the organizers will summarize the results from the first workshop (held on 20-March-2011 in Palo Alto, CA), engage participants in short design concept generation with current BID approaches and, based on the first two activities, identify future directions for BID research.
Workshop 9: Passive Nonlinear Targeted Energy Transfer in Coupled Oscillators
Sunday, August 28, 2011
8:00am–12:00pm Location: Concord

Instructors: Alexander F. Vakakis (avakakis@illinois.edu), Lawrence A. Bergman (lbergmany@illinois.edu), D. Michael McFarland (dmmcf@illinois.edu)

Overview:
In this tutorial, the presenters will discuss the fundamentals and some applications of a new, fully passive, paradigm for protecting critical systems from destructive force and motion inputs: targeted energy transfer (TET). The novelty of this approach is its applicability to wide-band and transient inputs, as well as the usual narrow-band and steady-state excitations. The method represents a new and unique application of strong intentional nonlinearity, the nonlinear energy sink (NES), a local, simple, lightweight subsystem capable of completely altering the global behavior of the primary system to which it is attached. The underlying mechanism, a series of transient resonance captures and escapes, combined with nonlinear beating phenomena associated with excitation of special impulsive orbits which comprise the bridges to TET, provides an entirely different passive approach to quickly, efficiently, and nearly irreversibly moving vibration energy in a preferred, a priori selected direction from the primary system to an NES where it can be localized and harmlessly dissipated. Some first applications of TET through the use of both smooth and discontinuous NESs will be demonstrated in the areas of aeroelastic flutter suppression, vibration and shock isolation, blast protection and seismic mitigation. Additional potential applications of the technology currently under investigation, such as vibration control of bluff bodies in flow, broadband acoustic attenuation, and broadband vibration amplification for energy harvesting will be discussed.

Workshop 10: Creative Design of Parallel Mechanisms
Sunday, August 28, 2011
1:00pm–5:00pm Location: Congressional B

Instructors: Xianwen Kong (x.kong@hq.ac.uk), Clement Gosselin (gosselin@gmac.ulaval.ca)

Overview:
During the past decade, significant progress has been made in the type synthesis (creative design or conceptual design) of parallel mechanisms. These advances have led to a concise approach – the virtual-chain approach – to the type synthesis of parallel mechanisms. In this approach, parallel mechanisms can be constructed using several compositional units. Unfortunately, it is not well realized that the virtual-chain approach can be applied by engineers and researchers with basic knowledge in mathematics and mechanisms (mechanics) taught in undergraduate courses. In order to fill the gap between research and practice, this tutorial aims at presenting the fundamental principles of the virtual-chain approach to the type synthesis of parallel mechanisms and at illustrating step by step how parallel mechanisms are constructed using this approach. As a by-product, one can carry out the mobility analysis of parallel mechanisms following the reverse process of the type synthesis. Then the type synthesis of translational parallel manipulators with linear input-output equations will be discussed. Some open issues in the type synthesis of parallel mechanisms, especially parallel mechanisms with multiple operation modes and compliant translational parallel manipulators, will also be presented.
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<td>The First Symposium on Virtual Prototyping in Mechatronics (VPM’11)</td>
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<td>The Third Symposium on Bio-Mechatronics - Medical Devices &amp; Technologies (BIOMECH’11)</td>
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PROGRAM SCHEDULE

MSNDC-02 Contact and Interface Dynamics
MSNDC-03 Control and Optimization
MSNDC-04 Macro- and Microscale Device and System Design
MSNDC-05 Student paper competition
MSNDC-06 Industry panel
MSNDC-07 Keynotes
MSNDC-08 Dynamical Systems with Time-Variability, Delay, or Discontinuities
MSNDC-09 Flexible Multibody Dynamics
MSNDC-10 Dynamics of Land, Sea, Air, and Space Vehicles
MSNDC-11 Rapid-fire poster session
MSNDC-12 Emerging Frontiers
MSNDC-13 Education and Industrial Tools
MSNDC-14 Structural Dynamics
MSNDC-15 Experimental Dynamics, Uncertainty, and Validation
DAC-01 Design Optimization Algorithms
DAC-02 Application-Tailored Optimization Methods
DAC-03 Keynote
DAC-04 Celebration of K.K. Choi’s 65th Birthday
DAC-05 Formulation of Mass Customization Problems
DAC-06 Q&A with Design Engineering Division’s Journal Editors
DAC-07 Multiscale Mechanics and Design Optimization of Cellular Materials
DAC-08 Decision Making in Engineering Design
DAC-09 Design for Market Systems
DAC-10 Applying Large Scale Demand Models in Design Optimization
DAC-11 Design for the Developing World
DAC-12 Design and Optimization of Sustainable Energy Systems
DAC-13 Panel: Environmental Policy in Vehicle Design
DAC-14 Multidisciplinary Design Optimization (MDO)
DAC-15 Metamodel-Based Design Optimization (MBDO)
DAC-16 Simulation-Based Design Under Uncertainty
DAC-17 Geometric Modeling and Algorithms for Design and Manufacturing
DAC-18 Design and Manufacturing of Systems
DAC-19 Product Design and Exploration
DAC-20 Design of Multiscale Engineering Systems
DAC-21 Multi-Objective Optimization and Sensitivity Analysis
DAC-22 Product Family and Product Platform Design
DAC-23 Panel: Design Frontiers
PTG-01 Gear System Design and Analysis
PTG-02 Surface Engineering and Tribology
PTG-03 Plastic Gears
PTG-04 Gear System Dynamics and Noise
PTG-05 Power Loss in Gear Systems
PTG-06 Gear Strength and Durability
PTG-07 Novel Transmission Concepts and Control
PTG-08 Keynote
PTG-09 Wind Turbine Gears
PTG-10 Panel Discussion
PTG-11 Gear Manufacturing
PTG-12 Bearings
RSAFP-01 Considerations in Design Process and Computer-based Analyses for RSAFP
RSAFP-02 Stress Analyses
RSAFP-03 Failure Analyses and Modeling
MECH-01 Mobile Robots
MECH-02 Tensegrity and Cable-Driven Systems
MECH-03 Mechanisms and Robots in Medicine
MECH-04 Keynote
MECH-05 Student Mechanism and Robot Design Competition
MECH-06 Robot Dynamics and Control
MECH-07 Mechanisms and Robotics Education
MECH-08 Compliant Mechanisms
MECH-09 Mechanism Analysis and Synthesis
MECH-10 Parallel Manipulators
MNS-01 Symposium on Micro- and Nano- Manufacturing
MNS-02 Symposium on Micro and Nano Mechanisms and Robotics
MNS-03 Symposium on Nonlinear mechanics, dynamics, and control in Atomic Force Microscopy
MNS-04 Symposium on Micro Mechanics, Surface Engineering, and Contact Mechanics/Tribology
MNS-05 Symposium on BIO MEMS/NEMS
MNS-06 Symposium on Dynamics of MEMS and NEMS
MNS-07 Symposium on Measurement and Control in Micro- and Nano-Systems
MNS-08 Keynote
DEC-01 Panel - “Building Bridges for Engineering Education–Partnership with Industry”
DEC-02 Best Practices and Lessons Learned in Design Education
DEC-03 Panel - “Attracting Future Engineers–Best Practices and Lessons Learned”
DEC-04 Experiential Learning and New Pedagogy for Engineering Education
DEC-05 Teaching Design for Sustainability
DEC-06 Broad Adaptation/Adoption of Design Tools in Engineering Education - Issues and Lessons Learned
DEC-07 Innovation and Entrepreneurship in Design
DEC-08 Opportunities and Barriers to Bringing Change in Engineering Education
DTM-01 Design representations and formalisms
DTM-02 Function Based Methods
DTM-03 User-Centric Design
DTM-04 Product Family and Architecture Design
DTM-05 Quantitative Assessment Methods
DTM-06 Creativity Methods and Studies
DTM-07 Design Behavior and Analogical Design
DTM-08 Uncertainty and Risk in Design
DTM-09 Complexity and Adaptability in Design
DTM-10 Understanding Innovation
DTM-11 Challenges in Complex/Sustainable System Design
DFMLC-01 Theoretical Foundations for Design and Manufacturing Integration
DFMLC-02 Keynote
DFMLC-03 Panels
DFMLC-04 Manufacturing Cost Estimation and Total Cost of Ownership
DFMLC-05 Sustainable Design
DFMLC-06 Integrated Product and Process Development Processes
DFMLC-07 Life Cycle Decision Making
DFMLC-08 Design for Mass Customization, Design for Service, Design for Layered Manufacturing & Design
DFMLC-09 Design for Supply Chain
DFMLC-10 Keynotes
DFMLC-11 Integrated Assembly Design and Planning
AVTT-01 Keynotes
AVTT-02 Advances in Multibody Systems Modeling and Validation for Vehicle Dynamics Applications
AVTT-03 Advances in Methods for Vehicle Systems Design and Tire Modeling
AVTT-04 Panel: Environmental Policy in Vehicle Design
AVTT-05 Advances in Alternative Propulsion Systems and Non-conventional, Energy Efficient Vehicles
AVTT-06 Advances in Dynamics and Control of Vehicle Systems and Subsystems
## 23rd Biennial Conference on Mechanical Vibration and Noise (VIB)

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- **T1 = Tuesday, 8:40am–10:20am**
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### 8TH INTERNATIONAL CONFERENCE ON MULTIBODY SYSTEMS, NONLINEAR DYNAMICS, AND CONTROL (MSNDC)

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## 11TH ASME INTERNATIONAL POWER TRANSMISSION AND GEARING CONFERENCE (PTG)

### Program Schedule

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# 21st Reliability, Stress Analysis, and Failure Prevention Conference (RSAFP)

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# PROGRAM SCHEDULE

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# 8TH INTERNATIONAL CONFERENCE ON DESIGN AND DESIGN EDUCATION (DEC)

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# 23RD INTERNATIONAL CONFERENCE ON DESIGN THEORY AND METHODOLOGY (DTM)

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MONDAY, AUGUST 29

VIB-1 CONDITION MONITORING AND DIAGNOSTICS

VIB-1-1 Vibration Monitoring

Columbia A 8:40am–10:20am

Session Chair: Steve Wilcox, University of Glamorgan, Pontypridd, Wales, United Kingdom
Session Co-Chair: Yimin Shao, Chongqing University, Chongqing, Chongqing, China

Start-up Vibration Response Characterization for Oil Whirl, Oil Whip and Dry Whip

Technical Publication. DETC2011-48818
Chen-Chao Fan, National Central University, Taoyuan City, Taiwan, Jhe-Wei Syu, National Central University, Taoyuan County, Taiwan, Min-Chun Pan, National Central University, Jhongli City, Taoyuan County, Taiwan, Wen-Chang Tsao, National Central University, Jhongli, Taiwan

The Use of Time-Frequency Methods in Rotor/Stator Impact-Rubbing Detection

Technical Publication. DETC2011-48211
Jindrich Liska, Jan Jakli, University of West Bohemia in Pilsen, Pizen, Czech Republic, Vaclav Cerny, Skoda Power, A Doosan Company, Pizen, Czech Republic

Strategy and Technique of High Efficiency Balancing in Field for Turbo-generator Units with Large Capacity

Technical Publication. DETC2011-47018
Wenfang Cai, Songyuan Lu, Zhengfeng Wu, Xiaochuan Luo, Southeast University, Nanjing, Jiangsu Province, China

Failure Analysis of a High Pressure Descaling Pump using Vibration Data

Technical Publication. DETC2011-47553
Yimin Shao, Wennian Yu, Huifang Xiao, Chongqing University, Chongqing, China, Qing Chen, Xiangzhi Yu, Chongqing Pump Industry Co., Ltd., Chongqing, China

Three Dimensional Vibration Analysis of Rectangular Plates with Undamaged and Damaged Boundaries by the Spectral Collocation Method

Technical Publication. DETC2011-48049
Ma’en Sari, Eric Butcher, New Mexico State University, Las Cruces, NM, United States

VIB-2 DISCONTINUOUS DYNAMICAL SYSTEMS AND SYNCHRONIZATION

VIB-2-1 Fractional Dynamics and Control

Congressional C 8:40am–10:20am

Session Chair: J.A. Tenreiro Machado, Institute of Engineering of Polytechnic of Porto, Porto, Portugal
Session Co-Chair: Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

Chaos and Diffusion in Dynamical System with Periodic Impulses

Technical Publication. DETC2011-47837
Albert Luo, Southern Illinois University Edwardsville, Edwardsville, IL, United States

Fractional Variable Structure Control

Technical Publication. DETC2011-47639
J.A. Tenreiro Machado, Institute of Engineering of Polytechnic of Porto, Porto, Portugal

On Stability of a Nonlinear, Periodically Time-Varying, Spinning Blade

Technical Publication. DETC2011-48574
Fengxia Wang, SIUE, Edwardsville, IL, United States

A Numerical Scheme for a Class of Parametric Problem of Fractional Variational Calculus

Technical Publication. DETC2011-48766
Md Mehedi Hasan, X.W. Tangpong, North Dakota State University, Fargo, ND, United States, Om P. Agrawal, Southern Illinois University, Carbondale, IL, United States

Investigation of the Internal Resonance and Regenerative Chatter Dynamics in Nonlinear Milling Process

Technical Publication. DETC2011-48490
Moradi Hamed, Mohammad M. Movahhedy, Gholamreza Vossoughi, Mohammad Ahmadian, Sharif University of Technology, Tehran, Iran

VIB-3 ENERGY HARVESTING

VIB-3-1 Electromagnetic Energy Harvesting

Grand Teton 8:40am–10:20am

Session Chair: Lei Zuo, State University of New York at Stony Brook, Stony Brook, NY, United States
Session Co-Chair: Mustafa Arafa, American University in Cairo, Cairo, Egypt

Multi-Modal Vibration Energy Harvesting using a Trapezoidal Plate

Technical Publication. DETC2011-47817
Mustafa Arafa, American University in Cairo, Cairo, Egypt

Vertically-Aligned Spingless Energy Harvester

Technical Publication. DETC2011-48371
Mohamed Bendame, Karim Elrayes, Ehab Abdel-Rahman, Ehab El-Saadany, Raafat Mansour, University of Waterloo, Waterloo, ON, Canada, Mohamed E. Mahmoud, Ain Shams University, Electronics and Communication Department, Cairo, Egypt

Optimization of a Micro Power Unit

Technical Publication. DETC2011-48687
Iman Khodadad, Iman Shafieeloo, Arjae Spectral Enterprises, Waterloo, ON, Canada, Len Ball, Rahul Bhagat, Ehab Abdel-Rahman, Ehab El-Saadany, Raafat Mansour, University of Waterloo, Waterloo, ON, Canada, Arsen Hajian, Arjae Spectral Enterprises, Waterloo, ON, Canada

Assessment of Energy Potential and Vibration Mitigation of Regeneratve Tuned Mass Dampers in Wind Excited Tall Buildings

Student Competition Paper. DETC2011-48728
Tao Ni, Lei Zuo, State University of New York at Stony Brook, Stony Brook, NY, United States, Ahsan Kareem, University of Notre Dame, Notre Dame, IN, United States
Enhanced Design of Vibration Energy Harvester using Dual Masses

**Student Competition Paper.** DETC2011-48791

Xiudong Tang, Lei Zuo, State University of New York at Stony Brook, Stony Brook, NY, United States

**VIB-4 FINITE ELEMENT MODELING, MODAL TESTING, MODEL UPDATING, AND DAMAGE DETECTION**

**VIB-4-1 Modeling, Analysis, and Simulation**

Congressional A 8:40am–10:20am

Session Chair: Nickolas Vlahopoulos, University of Michigan, Ann Arbor, MI, United States
Session Co-Chair: Ranjan Mukherjee, Michigan State University, East Lansing, MI, United States

Structural-Acoustic Simulations of Naval Vehicles using an Energy Finite Element Method

**Technical Publication.** DETC2011-47758
Nickolas Vlahopoulos, University of Michigan, Ann Arbor, MI, United States

Design a New Spherical Superelement to Static and Modal Analysis of Spherical Structures

**Technical Publication.** DETC2011-47151
Hamid Faghani, Mohammad Ahmadian, Sharif University of Technology, Tehran, Iran

Complex Eigenvalue Analysis for Structures with Viscoelastic Behavior.

**Technical Publication.** DETC2011-48897
Gaël Chevallier, Franck Renaud, Sylvain Thouviot, Jean-Luc Dion, Supmeca, Saint Ouen, France

Application of Targeted Energy Transfer (TET) Techniques to the Seismic Protection of a Small Scale Multistorey Eccentric Steel Structure

**Technical Publication.** DETC2011-48923
Concetta Tripepi, Francesco Nucera, Mediterranean University, Reggio Calabria, Italy, Lawrence Bergman, D. Michael McFarland, Alexander Vakakis, University of Illinois at Urbana Champaign, Urbana, IL, United States

Nonlinear Normal Modes of Real-World Structures: Application to a Full-Scale Aircraft

**Technical Publication.** DETC2011-47141
Maxime Peeters, Gaetan Kerschen, Jean-Claude Golinval, University of Liege, Liege, Belgium, Cyrille Stephan, Onera, Chatillon, France

**CIE-1 AMS: MATERIAL CHARACTERIZATION METHODS AND APPLICATIONS**

**CIE-1-1 Full-field Strain Measurement**

Lexington 8:40am–10:20am

Session Chair: Tomonari Furukawa, Virginia Tech, Danville, VA, United States
Session Co-Chair: Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States

Experimental Validation of the 2D Meshless Random Grid Method

**Technical Publication.** DETC2011-48232
Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States, John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States, Adrian Orifici, RMIT University, Melbourne, Victoria, Australia, Rodney S. Thomson, Cooperative Research Centre for Advanced Composite Structures Limited, Fishermans Bend, Victoria, Australia

A Computational Workbench for Remote Full Field 3D Displacement and Strain Measurements

**Technical Publication.** DETC2011-47739
John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States

Online Material Characterization using Full-field Strain Measurement

**Technical Publication.** DETC2011-48870
Tomonari Furukawa, Virginia Tech, Danville, VA, United States, John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States, Jan Wei Pan, Virginia Polytechnic Institute and State University, Danville, VA, United States, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States

Experimental System and Validation for Energy-based Characterization

**Technical Publication.** DETC2011-48902
Jan Wei Pan, Jinquan Cheng, Virginia Polytechnic Institute and State University, Danville, VA, United States, Tomonari Furukawa, Virginia Tech, Danville, VA, United States, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States, John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States
CIE-2 CAPPD: COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT GENERAL

CIE-2-1 Frameworks, Representations and Information Modeling

Yellowstone 8:40am–10:20am

Session Chair: Jitesh Panchal, Washington State University, Pullman, WA, United States
Session Co-Chair: Charlie C.L. Wang, The Chinese University of Hong Kong, Hong Kong, China

A Framework for Non-nominal Visualization and Perceived Quality Evaluation

Technical Publication. DETC2011-48270
Ola Wagersten, Casper Wickman, Volvo Car Corporation, Gothenburg, Sweden, Karin Forslund, Department of Product and Production Development, Gothenburg, Sweden, Rikard Söderberg, Chalmers University of Technology, Gothenburg, Sweden, Sweden

Product-Service Systems Representation with Product and Service Elements and a Case Study

Technical Publication. DETC2011-48779
Yong Se Kim, Sang Won Lee, Dong Chan Koh, Creative Design Institute, Sungkyunkwan University, Suwon, Korea (Republic)

Supporting Quotation Preparation by Process and Knowledge Modeling

Technical Publication. DETC2011-48374
Fredrik Elgh, Jonkoping University, Jonkoping, Sweden

A Framework for Concurrent Consideration in Advanced Product Development Technology Selection

Technical Publication. DETC2011-47176
Philip Farrugia, Karl Coppini, Emmanuel Francalanza, University of Malta, Msida, Malta

Towards a Framework for Holistic Ideation in Conceptual Design

Technical Publication. DETC2011-47589
Manikandan Mohan, Ying Chen, Jami J. Shah, Arizona State University, Tempe, AZ, United States

CIE-3 SEIKM: DESIGN INFORMATICS: ADVANCES OF INTELLIGENT INFORMATION PROCESSING AND KNOWLEDGE MANAGEMENT IN ENGINEERING DESIGN

CIE-3-1 SEIKM Design Informatics I

Yosemite 8:40am–10:20am

Session Chair: Ying Liu, NUS, Singapore, Singapore
Session Co-Chair: Karthik Ramani, Purdue University, West Lafayette, IN, United States

Design Preference Centered Review Recommendation: A Similarity Learning Approach

Technical Publication. DETC2011-48181
Jian Jin, Ping Ji, The Hong Kong Polytechnic University, Hong Kong, China, Ying Liu, NUS, Singapore, Singapore, Richard Y.K. Fung, City University of Hong Kong, Hong Kong, China

Content Based Support for Annotating New Content in a Wiki for Shape Memory Technology

Technical Publication. DETC2011-48240
Ralf Theiß, Sven Langbein, Tim Sadek, Ruhr-University Bochum, Bochum, Germany

Ontology-Based Representation and Verification to Enable Feature Interoperability between CAD Systems

Technical Publication. DETC2011-48537
Sean Tessier, Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

A Framework for Self-Realizing Process Models for Additive Manufacturing

Technical Publication. DETC2011-47425
Sungshik Yim, 3D Systems, Rock Hill, US Outlying Is, David Rosen, Georgia Institute of Technology, Atlanta, GA, United States

An Experimental Evaluation of a Rule-Based Approach to Manufacturing Supplier Discovery in Virtual Environments

Technical Publication. DETC2011-47768
Farhad Ameri, Christian McArthur, Texas State University, San Marcos, TX, United States

CIE-4 VES: VIRTUAL ENVIRONMENTS AND SYSTEMS, GENERAL

CIE-4-1 VES Session 1

Thornton A 8:40am–10:20am

Session Chair: Abhishek Seth, Caterpillar Inc., Peoria, IL, United States
Session Co-Chair: Sven Kreft, University of Paderborn/ Heinz Nixdorf Institute, Paderborn, Germany

Realization and Application Method of Mechanisms Motion Simulation in Virtual Assembly System

Technical Publication. DETC2011-47098
Zhixian Zhang, Jianhua Liu, Yang Liu, Beijing Institute of Technology, Beijing, China

A Collaborative Virtual System for Product Maintainability Design

Technical Presentation Only. DETC2011-48773
Peng Gaoliang, Liu Wenjian, Li Xin, Harbin Institute of Technology, Harbin, China, Jun Gao, Reliability and Environment Research Center, Guangzhou, Tianhe District, China

Combining 3D Simulation Technology with Object-Oriented Databases: A Database Oriented Approach to Virtual Reality Systems

Technical Publication. DETC2011-48230
Martin Hoppen, Juergen Rossmann, Michael Schluse, Ralf Waspe, RWTH Aachen University, Institute for Man-Machine Interaction, Aachen, Germany, Malte Rast, RWTH Aachen University, Aachen, Germany

Numerical Simulation and Virtual Reality Visualization of Horizontal and Vertical Axis Wind Turbines

Technical Publication. DETC2011-47969
Nan Yan, Tyamo Okosun, Sanjit Basak, Dong Fu, John Moreland, Chenn Zhou, Purdue University Calumet, Hammond, IN, United States
A Holistic Workflow Pattern for using VR for Design Decisions — Learning from other Disciplines

**Technical Publication.** DETC2011-47460
Matthias Aust, Fraunhofer IAO / University of Stuttgart IAT, Stuttgart, Germany, Matthias de Clerk, BMW Group, München, Germany, Roland Blach, Manfred Dangelmaier, Fraunhofer IAO, Stuttgart, Germany

**CIE-5 AMS: GPU-BASED HIGH PERFORMANCE COMPUTING**

CIE-5-1 AMS GPU-HPC Session 1

**Congressional B 8:40am–10:20am**

Session Chair: Dan Negrut, University of Wisconsin-Madison, Madison, WI, United States
Session Co-Chair: Roshan M. D’Souza, University of Wisconsin, Milwaukee, WI, United States

**GPU-friendly Preconditioners for Efficient 3-D Finite Element Analysis of Thin Structures**

**Technical Publication.** DETC2011-47330
Vikalp Mishra, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

**Using GPU-based Computing to Solve Large Sparse Systems of Linear Equations**

**Technical Publication.** DETC2011-48452
Travis Carrigan, Jacob Watt, Brian H. Dennis, The University of Texas at Arlington, Arlington, TX, United States

**Boundary Element Parallel Computation for 3D Elastostatics using CUDA**

**Technical Publication.** DETC2011-47981
Yingjun Wang, Qifu Wang, Gang Wang, Yunbao Huang, Yixiong Wei, Huazhong University of Science and Technology, Wuhan, Hubei, China

**uBlasCL: Architecture Agnostic Massively Parallel Linear Algebra System**

**Technical Publication.** DETC2011-48228
Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States, John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States

**MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)**

**MESA-1-1 Fractional Dynamics and Fractional Differential Equations**

**Everglades 8:40am–10:20am**

Session Chair: Cao Junyi, Xi’an Jiaotong University, Xi’an, China
Session Co-Chair: Thomas Royston, University of Illinois at Chicago, Chicago, IL, United States

**Nonlinear Dynamic Analysis of a Cracked Rotor-Bearing System with Fractional Order Damping**

**Student Competition Paper.** DETC2011-47415
Shiming Xue, Cao Junyi, Xi’an Jiaotong University, Xi’an, China, YangQuan Chen, Utah State Univ, Logan, UT, United States

**Identifying Fractional Viscoelastic Models Based on Surface Wave Motion**

**Technical Publication.** DETC2011-47769
Marco Iannitto, Thomas Royston, Richard Magin, University of Illinois at Chicago, Chicago, IL, United States

**Fractional Optimal Control Within Caputos Derivative**

**Technical Publication.** DETC2011-48045
Raj Kumar Biswas, Siddhartha Sen, IIT Kharagpur, Kharagpur, India

**Hybrid Modeling and Fractional Control of a SKAFO Orthosis for Gait Assistance**

**Technical Publication.** DETC2011-48175
S. Hassan HosseinNia, Francisco Romero, Blas Vinagre, Francisco Javier Alonso Sánchez, Inés Tejado, University of Extremadura, Badajoz, Spain, Josep M. Font-Llagunes, Universitat Politècnica de Catalunya, Barcelona, Catalunya, Spain

**The Solution of Linear Fractional Differential Equations using the Fractional Meta-Trigonometric Functions**

**Technical Publication.** DETC2011-47395
Carl F. Lorenzo, Glenn Research Center, Cleveland, OH, United States, Rachid Malti, University of Bordeaux, talence, France, Tom Hartley, The University of Akron, Akron, OH, United States

**MESA-2 THE THIRD SYMPOSIUM ON SMALL UNMANNED AERIAL VEHICLE TECHNOLOGIES AND APPLICATIONS (SUAVTA’11)**

**MESA-2-1 Rotary-Wing UAVs**

**Bryce 8:40am–10:20am**

Session Chair: Youmin Zhang, Concordia University, Montreal, Quebec, QC, Canada
Session Co-Chair: Emanuele Frontoni, Università Politecnica delle Marche, Ancona, Italy

**Integration of An Autopilot System with a Hobby Rc Helicopter**

**Technical Publication.** DETC2011-48606
Pu Xie, Bryndan Gardner, Ou Ma, New Mexico State University, Las Cruces, NM, United States

**Optimal Error-clamping Design for Position-based Visual Servoing of a 2-dof Model Helicopter**

**Technical Publication.** DETC2011-48644
Maryam Alizadeh, Chayatat Ratanasawanya, Mehran Mehrandezh, Raman Paranjape, University of Regina, Regina, SK, Canada

**Fault Tolerant Control Applied to a Quadrotor Unmanned Helicopter**

**Student Competition Paper.** DETC2011-48806
Tong Li, Youmin Zhang, Brandon W. Gordon, Concordia University, Montreal, QC, Canada
Dynamic Modeling of an Unmanned Helicopter from Flight Test Data

Student Competition Paper. DETC2011-48836
Guanlin Wang, Tsinghua University, Beijing, China, HuiXia, Nanjing University of Science and Technology, Nanjing, China, Jihong Zhu, Tsinghua University, Beijing, China

UAVs Safe Landing using Range Images
Technical Publication. DETC2011-49012
Emanuele Frontoni, Adriano Mancini, Primo Zingaretti, Università Politecnica delle Marche, Ancona, Italy

MESA-3 THE THIRD SYMPOSIUM ON CYBER-PHYSICAL AND COOPERATIVE SYSTEMS (CPCS’11)

MESA-3-1 Cyber-Physical and Cooperative Systems
Thornton B 8:40am–10:20am
Session Chair: Stephen Nestinger, Worcester Polytechnic Institute, Worcester, MA, United States
Vehicle Platooning: A Brief Survey and Categorization
Student Competition Paper. DETC2011-47861
Pooja Kavathekar, YangQuan Chen, Utah State University, Logan, UT, United States

Controlling Modular Reconfigurable Robots with Handheld Smart Devices
Student Competition Paper. DETC2011-48415
David Ko, Nalaka Kahawatte, Harry H. Cheng, University of California, Davis, Davis, CA, United States

On the Design of Serial Manipulators with Linearized Dynamics
Technical Publication. DETC2011-47899
Sergey Jatsun, Andrey Jatsun, South-West State University, Kursk, Russia, Vigen Arakelian, Souren Sargsyan, INSA Rennes, Rennes, France

A point to point trajectory planning for a dual-drive spherical robot base on decoupled principle
Technical Publication. DETC2011-47165
Ming Yue, Dalian University of Technology, Dalian City, China, Zongquan Deng, Harbin Institute of Technology, State Key Laboratory of Robotics and System, Harbin, Heilongjiang Province, China

Optimization of Complex Dynamic Systems with Respect to Their Behavior in Time and Frequency Domain
Technical Publication. DETC2011-48429
Matthias Marx, Chunsheng Wei, Dirk Söffker, University of Duisburg-Essen, Duisburg, Germany

Discrete Time Linear Quadratic Tracking Controller for Omni-Directional Mobile Robots
Technical Publication. DETC2011-47354
Ehsan Hashemi, Mechatronics Research Lab, Qazvin Azad University, Qazvin, Qazvin, Iran, Maani Ghaffari Jadidi, Mechatronics Research Lab., Qazvin, Qazvin, Iran

The KCLBOT: A Double Compass Self-localising Manoeuvrable Mobile Robot
Technical Publication. DETC2011-47753
Evangelos Georgiou, Jian Dai, Michael Luck, King’s College London, London, United Kingdom

Development of An Improved Robotic Graft System for Gourd Type Vegetable Seedlings
Technical Publication. DETC2011-47793
Wu Chuanyu, Zhang Lu, Wang Zhelu, Zhejiang Sci-Tech University, Hangzhou, China, Zhang Lei, Zhejiang Sci-Tech University, Mechanical Engineering and Automation, Hangzhou, Zhejiang, China

A Novel Control Strategy for Multiple Switches Based on Electro-rheological Fluid
Technical Publication. DETC2011-48190
Luning Xu, Li Han, Junbiao Liu, Institute of Electrical Engineering, Chinese Academy of Sciences, Beijing, China
MSNDC-1 COMPUTATIONAL METHODS

MSNDC-1-1 Algorithms and Integration Methods

Bunker Hill 8:40am–10:20am

Session Chair: Kurt Anderson, Rensselaer Polytechnic Institute, Troy, NY, United States
Session Co-Chair: Rudranarayan Mukherjee, NASA Jet Propulsion Laboratory, Pasadena, CA, United States

Variational Integrators for Dissipative Systems with One Degree of Freedom

Technical Publication. DETC2011-47143
Masashi Iura, Tokyo Denki University, Saitama, Japan

Mutibody Vehicle Dynamics Analysis using An Explicit-Implicit Integrator with Subsystem Synthesis Method

Technical Publication. DETC2011-47788
Sung-Soo Kim, Junyoun Jo, Wan Hee Jeong, Chungnam National University, Daejeon, Korea (Republic), Ji-Hyeun Wang, Agency for Defense Development, Daejeon, Korea (Republic)

Parallel Efficiency of Lagrange Multipliers Based Divide and Conquer Algorithm for Dynamics of Multibody Systems

Technical Publication. DETC2011-47827
Pawel Malczyk, Janusz Fraczek, Warsaw University of Technology, Warsaw, Poland

Efficient Solution of Maggi’s Equations

Technical Publication. DETC2011-48366
Javier García de Jalón, Technical University of Madrid, Madrid, Madrid, Spain, Alfonso Callejo, Andrés Hidalgo, María D. Gutiérrez, INSIA-UPM, Madrid, Madrid, Spain

Fast Electrostatic Force and Moment Calculations in Multibody-based Simulations of Coarse-grained Biopolymers

Student Competition Paper. DETC2011-48376
Mohammad Poursina, Jeremy Laflin, Kurt Anderson, Rensselaer Polytechnic Institute, Troy, NY, United States

MSNDC-2 CONTACT AND INTERFACE DYNAMICS

MSNDC-2-1 Contact and Interface Dynamics I

Congressional D 8:40am–10:20am

Session Chair: Al Ferri, Georgia Tech, Atlanta, GA, United States
Session Co-Chair: Raymond Cipra, Purdue University, West Lafayette, IN, United States

A Methodology to Detect the Precise Instant of Contact in Multibody Dynamics

Technical Publication. DETC2011-47081
Paulo Flores, University of Minho, Guimaraes, Portugal

A Novel Continuous Contact Force Model for Multibody Dynamics

Student Competition Paper. DETC2011-47086
Margarida Machado, Paulo Flores, University of Minho, Guimaraes, Portugal

Correlation between Impulse and Compliance Based Methods in Rigid Body Collisions

Technical Publication. DETC2011-48925
Mohamed Gharib, Yildirim Hurmuzlu, Southern Methodist University, Dallas, TX, United States

Volumetric Contact Dynamics Models and Experimental Validation of Normal Forces for Simple Geometries

Technical Publication. DETC2011-49016
Michael Boos, John McPhee, University of Waterloo, Waterloo, ON, Canada

On the Contact Modeling and Analysis of the Human Knee Joint

Technical Publication. DETC2011-47257
Margarida Machado, Paulo Flores, University of Minho, Guimaraes, Portugal

MSNDC-3 CONTROL AND OPTIMIZATION

MSNDC-3-1 Control and Optimization I

Concord 8:40am–10:20am

Session Chair: Olivier Brüls, University of Liège, Liège, Belgium
Session Co-Chair: Betsch Peter, University of Siegen, Siegen, Germany

Trajectory Tracking of Underactuated Multibody Systems

Technical Publication. DETC2011-47207
Stefan Reichl, Wolfgang Steiner, Upper Austria University of Applied Sciences, Wels, Austria

Control Constraint Realization Applied to Underactuated Aerospace Systems

Technical Publication. DETC2011-47276
Pierangelo Masarati, Marco Morandini, Politecnico di Milano, Milano, Italy, Alessandro Fumagalli, Altran Italia, Milano, Italy
Servo Constraint-based Computed Torque Control of Underactuated Mechanical Systems

Technical Publication. DETC2011-48533
László L. Kovács, József Kövecses, McGill University, Montreal, QC, Canada, Ambrus Zelei, László Bencsik, Gábor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

Motion Planning of Uncertain Fully-Actuated Dynamical Systems An Inverse Dynamics Formulation

Technical Publication. DETC2011-48229
Joe Hays, Adrian Sandu, Dennis Hong, Corina Sandu, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States

Control of Constrained Systems Described by Lagrangian DAEs

Technical Publication. DETC2011-47502
Jason P. Frye, Fabien Brian C., University of Washington, Seattle, WA, United States

MSNDC-4 MACRO- AND MICROSCALE DEVICE AND SYSTEM DESIGN

MSNDC-4-1 Macro- and Microscale Device and System Design

Sequoia 8:40am–10:20am
Session Chair: Mohammed Daqaq, Clemson University, Clemson, SC, United States
Session Co-Chair: Jeffrey F. Rhoads, Purdue University, West Lafayette, IN, United States

Design Considerations for an Aeroelastic Micro-Power Generator

Technical Publication. DETC2011-47833
Amin Bibo, Gang Li, Mohammed Daqaq, Clemson University, Clemson, SC, United States

Integrated Power Control Analysis of DFIG Wind Turbines Considering Structural Flexibility

Technical Publication. DETC2011-48253
Qiong-zhong Chen, Olivier Brûls, University of Liège, Liège, Belgium

On the Dynamics of Two Mutually-Coupled, Electromagnetically-Actuated Microbeam Oscillators

Student Competition Paper. DETC2011-47968
Andrew Sabater, Jeffrey F. Rhoads, Purdue University, West Lafayette, IN, United States

Exploiting Super-Harmonic Resonances of a Bi-Stable Axially-Loaded Beam for Energy Harvesting under Low-Frequency Excitations

Technical Publication. DETC2011-47723
Ravindra Masana, Mohammed Daqaq, Clemson University, Clemson, SC, United States

Subharmonic Resonance Cascades in a Class of Coupled Resonators

Technical Publication. DETC2011-48599
Scott Strachan, Steven Shaw, Michigan State University, East Lansing, CA, United States

DAC-1 DESIGN OPTIMIZATION ALGORITHMS

DAC-1-1 Design Optimization Algorithms

Regency C 8:40am–10:20am
Session Chair: Scott Ferguson, North Carolina State University, Raleigh, NC, United States
Session Co-Chair: Rahul Rai, Cal State fresno, Fresno, CA, United States

Study of the Sequential Constraint-Handling Technique for Evolutionary Optimization with Application to Structural Problems

Technical Publication. DETC2011-47057
Damien Motte, Axel Nordin, Robert Bjärnemo, Lund University, LUND, Sweden

Methodology for Geothermal Pipeline Route Selection using the NSGA II and Distance Transform Algorithms

Technical Publication. DETC2011-47766
Sigurjon Kjaernested, Magnus Thor Jonsson, Halldor Palsson, University of Iceland, Reykjavik, Iceland

Interactive Modular Optimization Strategy for Layout Problems

Technical Publication. DETC2011-47925
Julien Benabes, Emilie Poirson, Fouda Bennis, IRCCyN, Nantes, France, Yannick Ravaut, Thales Communications, Cholet, France

Assessing the Effectiveness of using Graveyard Data for Generating Design Alternatives

Technical Publication. DETC2011-48636
Garrett Foster, Scott Ferguson, North Carolina State University, Raleigh, NC, United States

Comparison of Gene Expression Programming and Common Metamodeling Techniques in Engineering Design

Technical Publication. DETC2011-47130
Mi Xiao, Liang Gao, Xinyu Shao, Haobo Qiu, Li Nie, Huazhong University of Science and Technology, Wuhan, China

DAC-2 APPLICATION-TAILORED OPTIMIZATION METHODS

DAC-2-1 Application-Tailored Optimization Methods

Capital A 8:40am–10:20am
Session Chair: Mohammed Shalaby, General Electric Global Research, Niskayuna, NY, United States
Session Co-Chair: Matthew Campbell, University of Texas at Austin, Austin, TX, United States

Elastohydrodynamic Ball Bearing Optimization using Genetic Algorithm and Heuristic Gradient Projection

Technical Publication. DETC2011-47624
Mohamed Abbas, Sayed Metwalli, Cairo University, Cairo, Egypt
PipeSynth: An Algorithm for Automated Topological and Parametric Design and Optimization of Pipe Networks

Technical Publication. DETC2011-47906
William Patterson, GE Energy, Houston, TX, United States, Matthew Campbell, University of Texas at Austin, Austin, TX, United States

Compliant Mechanism Design using a Strain Based Topology Optimization Method

Technical Publication. DETC2011-48525
Xiaobao Liu, Ping An Du, University of Electronic Science and Technology of China, Chengdu, China, Euihark Lee, Hae Chang Gea, Rutgers University, Piscataway, NJ, United States

Optimizing the Shear Beam of a Non-pneumatic Wheel for Low Rolling Resistance

Technical Publication. DETC2011-48532
Biranjan Thyagaraja, Prabhu Shankar, Georges Fadel, Paolo Guarneri, Clemson University, Clemson, SC, United States

Decomposition Templates and Joint Morphing Operators for Genetic Algorithm Optimization of Multi-Component Topology

Technical Publication. DETC2011-48572
Karim Hamza, Kazuhiro Saitou, University of Michigan, Ann Arbor, MI, United States, Zebin Zhou, Donghua University, Shanghai, China

PTG-1 GEAR SYSTEM DESIGN AND ANALYSIS

PTG-1-1 Gear System Design and Analysis I

Capital B 8:40am–10:20am
Session Chair: Jeremy Wagner, John Deere, Waterloo, IA, United States

Pitch Configurations: Definitions, Analytical and Computer Synthesis

Technical Publication. DETC2011-47562
Valentin Abadjiev, Emilia Abadjieva, Dochka Petrova, Institute of Mechanics, Bulgarian Academy of Sciences, Sofia, Bulgaria

Lightweight and Low-Misalignment Planetary Gear System for Open Rotor Power Gearbox

Technical Publication. DETC2011-47342

An Experimental Investigation of the Effect of Tooth Asymmetry and Tooth Root Shape on Root Stresses and Single Tooth Bending Fatigue Life of Gear Teeth

Technical Publication. DETC2011-48303
Aaron Sanders, Donald R. Houser, Ahmet Kahraman, Jonny Harianto, Sam Shon, The Ohio State University, Columbus, OH, United States

Development and Comparison of Shaft-Gear Models for the Computation of Gear Misalignments Due to Power Transmission

Technical Publication. DETC2011-47895
Victor Roda-Casanova, Jose L. Iserete, Francisco T. Sanchez-Marin, Universitat Jaume I, Castellon, Castellon, Spain, Alfonso Fuentes, Ignacio Gonzalez-Perez, Polytechnic University of Cartagena, Cartagena, Murcia, Spain

Further Evaluation of Spur Gear Tooth Profile Designs Used in Heavily Loaded Transmissions

Technical Publication. DETC2011-47404
Nihat Yildirim, Abdullah Akpolat, Gaziantep University, Gaziantep, Turkey, Hakan Isci, TUSAS - Turk Havacilik ve Uzay San. A.S, Ankara, Turkey

MECH-1 MOBILE ROBOTS

MECH-1-1 Legged Locomotion

Columbia Foyer 8:40am–10:20am
Session Chair: Venkat Krovi, SUNY Buffalo, Buffalo, NY, United States
Session Co-Chair: David J. Cappelleri, Stevens Institute of Technology, Hoboken, NJ, United States

Development of a Full-Sized Bipedal Humanoid Robot Utilizing Spring Assisted Parallel Four-Bar Linkages with Synchronized Actuation

Technical Publication. DETC2011-48412
Jeakweon Han, Dennis Hong, Virginia Tech, Blacksburg, VA, United States

Experimental Validation of a Walking Model for Planar Bipeds with Curved Feet

Technical Publication. DETC2011-48243
Anne Martin, Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States

Development of An Omnidirectional Walking Engine for Full-Sized Lightweight Humanoid Robots

Technical Publication. DETC2011-48786
Seungmoon Song, Carnegie Mellon University, Pittsburgh, PA, United States, Young-Jae Ryoo, Mokpo National University, Muan-go, Korea (Republic), Dennis Hong, Virginia Tech, Blacksburg, VA, United States

Analytic-Holistic Two-Segment Model of Quadruped Back-Bending in the Sagittal Plane

Technical Publication. DETC2011-48853
Justin Seipel, Purdue University, West Lafayette, IN, United States
MECH-2 TENSEGRITY AND CABLE-DRIVEN SYSTEMS

MECH-2-1 Cable-Driven Systems

Regency B  8:40am–10:20am

Session Chair: Phil Voglewede, Marquette University, Milwaukee, WI, United States
Session Co-Chair: Carl Crane, University of Florida, Gainesville, FL, United States

A Spatial Spring-Loaded Cable-Loop-Driven Parallel Mechanism
Technical Publication. DETC2011-48261
Hanwei Liu, Clement Gosselin, Thierry Laliberté, University Laval, Québec, QC, Canada

Reciprocal Screw-Based Force-Closure of Cable-Driven Closed Chains
Technical Publication. DETC2011-47599
Shabbir Kurbanhusen Mustafa, Singapore Institute of Manufacturing Technology, Singapore, Singapore, Singapore, Sunil K. Agrawal, University of Delaware, Newark, DE, United States

An Improved Branch-and-Bound Algorithm for Minimizing the Potential Energy of a Cable-Suspended Rigid Body
Technical Publication. DETC2011-48169
Francois Guay, Philippe Cardou, Universite Laval, Quebec City, QC, Canada, Jean-François Collard, Marc Gouttefarde, LIRMM (CNRS / University Montpellier 2), Montpellier, France

Seven-dof Cable-Driven Humanoid Robot Arm
Technical Publication. DETC2011-48276
Jun Ding, Robert Williams II, Ohio University, Athens, OH, United States

Towards Parallel Cable-Driven Pantographs
Technical Publication. DETC2011-47751
Simon Perreault, Minogue Medical Inc., Montreal, QC, Canada, Philippe Cardou, Clement Gosselin, Université Laval, Québec, QC, Canada

MECH-3 MECHANISMS AND ROBOTS IN MEDICINE

MECH-3-1 Surgical & Diagnostic Applications

Glacier  8:40am–10:20am

Session Chair: Joo H. Kim, NYU-Poly, Brooklyn, NY, United States
Session Co-Chair: Ashish Deshpande, University of Maine, Orono, ME, United States

Robot Kinematic Design Studies for Natural Orifice Surgery
Technical Publication. DETC2011-47961
Chi Min Seow, Wei Jian Chin, Carl A. Nelson, University of Nebraska, Lincoln, NE, United States

Multi-Functional Surgical Robot for Laparo-Endoscopic Single-Site Colectomies
Technical Publication. DETC2011-48497
T.D. Wortman, R.L. McCormick, E.J. Markvicka, T.P. Frederick, S.M. Farritor, University of Nebraska - Lincoln, Lincoln, NE, United States, D. Oleynikov, University of Nebraska Medical Center, Omaha, NE, United States

A Fully Decoupled Remote Center-of-Motion Parallel Manipulator for Minimally Invasive Surgery
Technical Publication. DETC2011-48053
Chin-Hsing Kuo, National Taiwan University of Science and Technology, Taipei, Taiwan, Jian Dai, King’s College London, University of London, London, United Kingdom

Design and Optimization of a Novel MRI Compatible Wire-Driven Robot for Prostate Cryoablation
Technical Publication. DETC2011-48092
Salih Abdelaziz, Laure Esteveny, Bernard Bayle, Michel De Mathelin, University of Strasbourg, Strasbourg, France, Pierre Renaud, Insa de Strasbourg, Strasbourg, France

Optimal Synthesis of a New Spherical Parallel Mechanism for Application to Tele-Echography Chain
Technical Publication. DETC2011-47184
Med Amine Laribi, Said Zeghloul, Institut Pprime, Poitiers, France, Terence Essomba, Gerard Poisson, PRES Loire Valley University, Orléans, France, France

MNS-1 SYMPOSIUM ON MICRO- AND NANO-MANUFACTURING

MNS-1-1 Micro and Nano-Manufacturing

Columbia B  8:40am–10:20am

Session Chair: Gloria Wiens, University of Florida, Gainesville, FL, United States
Session Co-Chair: Irene Fassi, CNR-ITIA, Milano, Italy

Non-cleanroom Fabrication of Carbon Nanotube-Based MEMS Force and Displacement Sensors
Technical Publication. DETC2011-47945
Michael Cullinan, Robert M. Panas, Cody R. Daniel, Martin L. Culpepper, Massachusets Institute of Technology, Cambridge, MA, United States, Joshua Gafford, Stanford University, Stanford, CA, United States

A Two Degree of Freedom Nanopositioner with Electrothermal Actuator for Decoupled Motion
Technical Publication. DETC2011-48619
Yongsik Kim, Satyandra Gupta, University of Maryland, College Park, MD, United States, Nicholas G. Dagalakis, National Institute of Standards and Technology, Gaithersburg, MD, United States

Micro Injection Moulding Process and Product Characterization
Technical Publication. DETC2011-48301
Rossella Surace, Gianluca Trotta, Vincenzo Bellantone, CNR-ITIA, Bari, Italy, Alessandro Bongiorno, Claudia Pagano, Irene Fassi, CNR-ITIA, Milano, Italy

Electrical Discharge Machining of Micro Holes on Titanium Sheets
Technical Publication. DETC2011-47298
Chiara Ravasio, Gianluca D’Urso, Giancarlo Maccarini, Michela Longo, Università degli Studi di Bergamo, Dalmine, Italy
MicroElectro Discharge Milling of Freeform Micro-features with High Aspect Ratio

Technical Publication. DETC2011-48331
Francesco Modica, Valeria Marrocco, Gianluca Trotta, CNR-ITIA, Bari, Italy, Irene Fassi, CNR-ITIA, Milano, Italy

DTM-1 DESIGN REPRESENTATIONS AND FORMALISMS

DTM-1-1 Design Representations and Formalisms
Regency D 8:40am–10:20am

Session Chair: Kristina Shea, Institute of Product Development, Virtual Product Development Group, Technische Universität München, Garching, Bavaria, Germany
Session Co-Chair: Gregory Mocko, Clemson University, Clemson, SC, United States

Environment Based Design (EBD) Methodology
Technical Publication. DETC2011-48263
Yong Zeng, Concordia University, Montreal, QC, Canada

Discovering Structure in Design Databases Through Functional and Surface Based Mapping
Technical Publication. DETC2011-48322
Katherine Fu, Jonathan Cagan, Kenneth Kotovsky, Carnegie Mellon University, Pittsburgh, PA, United States, Kristin Wood, UT Austin, Austin, TX, United States

Towards a Formal Representation Model of Problem Formulation in Design
Technical Publication. DETC2011-48396
Mahmoud Dinar, Jamil J. Shah, Glen Hunt, Ellen Campana, Pat Langley, Arizona State University, Tempe, AZ, United States

An Information Technological Specification of Abstract Prototyping for Artfact and Service Combinations
Technical Publication. DETC2011-47079
Imre Horvath, Zoltan Rusak, Eliai Z. Opiyo, Wilhelm F. van der Vegte, Adrie Kooijman, David Peck, Delft University of Technology, Delft, ZH, Netherlands, Eva Hernandez Martin, Faculty of Industrial Design Engineering, Delft University of Technology, Delft, Netherlands

More Space to Think: Eight Years of Visual Support for Rationale Capture, Creativity and Knowledge Management in Aerospace Engineering
Technical Publication. DETC2011-47911
Nathan Eng, Marco Aurisicchio, Imperial College London, London, United Kingdom, Rob Bracewell, Cambridge University, Cambridge, Cambridgeshire, United Kingdom, Gareth Armstrong, Rolls-Royce plc., Derby, United Kingdom

DFMLC-1 THEORETICAL FOUNDATIONS FOR DESIGN AND MANUFACTURING INTEGRATION

DFMLC-1-1 Theoretical Foundations for Design and Manufacturing Integration
Columbia C 8:40am–10:20am

Session Chair: Derrick Tate, Texas Tech University, Lubbock, TX, United States

Study on Design Methodologies of Product Service Systems
Technical Publication. DETC2011-47140
Huibin Sun, Northwestern Polytechnical University, Xi’an, China

Platform Approaches in Manufacturing - Considering Integration with Product Platforms
Technical Publication. DETC2011-48275
Marcel T. Michaelis, Hans Johannesson, Chalmers University of Technology, Gothenburg, Sweden

The Role of Conceptualization and Design in Product Realization
Technical Publication. DETC2011-48676
Mohamed El-Sayed, Kettering University, Flint, MI, United States

A Method for Evaluating Manufacturing Change using Component Coupling
Technical Publication. DETC2011-48466
Christopher Brooks, Gregory Mocko, Clemson University, Clemson, SC, United States

Parameters Influencing the Perception of Geometrical Deviations in a Virtual Environment
Technical Publication. DETC2011-48096
Karim Forslund, Lars Lindkvist, Department of Product and Production Development, Gothenburg, Sweden, Ola Wagersten, Volvo Car Corporation, Gothenburg, Sweden, Sebastian Tafuri, Daniel Segerdahl, Johan Carlsson, Department of Geometry and Motion Planning, Fraunhofer Chalmers Centre, Gothenburg, Sweden, Rikard Soderberg, Chalmers University of Technology, Gothenburg, Sweden, Sweden
VIB-5 KEYNOTES

VIB-5-1 Den Hartog Award Keynote Session

Columbia B  10:40am–12:00pm
Session Chair: Jian-Qiao Sun, University of California at Merced, Merced, CA, United States

Den Hartog Award Keynote Lecture: The 21st Century Global Innovation Environment
Keynote. DETC2011-49039
Dan Mote, University of Maryland, College Park, United States

CIE-1 AMS: MATERIAL CHARACTERIZATION
METHODS AND APPLICATIONS

CIE-1-2 Material Characterization
Lexington  10:40am–12:00pm
Session Chair: John Hermanson, Forest Products Laboratory, Madison, WI, United States
Session Co-Chair: Tomonari Furukawa, Virginia Tech, Danville, VA, United States

Application of the Complex Variable Semi-Analytic Method to the Inverse Determination of Unknown Material Properties
Technical Publication. DETC2011-48488
Weiya Jin, Zhejiang University of Technology, ZJUT, Hangzhou, Zhejiang, China, Brian H. Dennis, The University of Texas at Arlington, Arlington, TX, United States

Identification of Contact Failures in Multi-Layered Composites
Technical Publication. DETC2011-47511
Luiz Abreu, Helcio Orlande, Carolina Naveira-Cotta, Joao Quaresma, Renato Cotta, Federal University of Rio De Janeiro - Ufrj, Rio De Janeiro, Brazil, Brazil, Jari Kaipio, University of Auckland, Auckland, New Zealand, Ville Kolehmainen, University of Eastern Finland, Kuopio, Select Country, Finland

Theoretical and Numerical Analysis on Material-Stiffness Characteristics for Thin-Walled Beams on Vehicles
Technical Publication. DETC2011-47420
Xiao Han, Wenbin Hou, Ping Hu, Dalian University of Technology, Dalian, Liaoning, China

On the Constitutive Response Characterization for Composite Materials Via Data-Driven Design Optimization
Technical Publication. DETC2011-47740
John G. Michopoulos, John Hermanson, Forest Products Laboratory, Madison, WI, United States, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States, Tomonari Furukawa, Virginia Tech, Danville, VA, United States

CIE-2 CAPPD: COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT GENERAL

CIE-2-2 Geometric Modeling Techniques

Yellowstone  10:40am–12:00pm
Session Chair: Xiaoping Qian, IIT, Chicago, IL, United States
Session Co-Chair: Charlie C.L. Wang, The Chinese University of Hong Kong, Hong Kong, China

Direct NC Path Generation: From Discrete Points to Continuous Spline Paths
Technical Publication. DETC2011-48205
Yu Liu, Songtao Xia, Xiaoping Qian, IIT, Chicago, IL, United States

Feature Sensitive Mesh Reconstruction by Normal Vector Cone Filtering
Technical Publication. DETC2011-47410
Ji Ma, Hsi-Yung Feng, The University of British Columbia, Vancouver, BC, Canada, Lihui Wang, University of Skövde, Skövde, Sweden

Tool Contact Maps by Rectangular Grid Decomposition
Technical Publication. DETC2011-48668
Eyyup Aras, King Saud University, Riyadh, Saudi Arabia

Self-intersection Free and Topologically Faithful Slicing of Implicit Solid
Technical Publication. DETC2011-47661
Pu Huang, Charlie C.L. Wang, The Chinese University of Hong Kong, Hong Kong, China, Yong Chen, University of Southern California, Los Angeles, CA, United States

CIE-3 SEIKM: DESIGN INFORMATICS: ADVANCES OF INTELLIGENT INFORMATION PROCESSING AND KNOWLEDGE MANAGEMENT IN ENGINEERING DESIGN

CIE-3-2 SEIKM Design Informatics II

Yosemite  10:40am–12:00pm
Session Chair: Karthik Ramani, Purdue University, West Lafayette, IN, United States
Session Co-Chair: Ying Liu, NUS, Singapore, Singapore

P-SMOTE: One Oversampling Technique for Class Imbalanced Text Classification
Technical Publication. DETC2011-47313
Jingjing Wang, Wenfeng Lu, Han Tong Loh, National University of Singapore, Singapore, Singapore

A Function–Behaviour Oriented Search for Patent Digging
Technical Publication. DETC2011-47733
Davide Russo, T. Montecchi, University of Bergamo, Bergamo, Italy

Bag-of-features Sampling Techniques for 3D CAD Model Retrieval
Technical Publication. DETC2011-48064
Yan Wang, Wenfeng Lu, Jerry Y H Fuh, Yoke San Wong, National University of Singapore, Singapore, Singapore, Singapore
Online Semantic Knowledge Management for Product Design Based on Product Engineering Ontologies

**Technical Publication. DETC2011-48684**
Li Juan Zhu, Uma Jayaram, Okjoon Kim, Washington State University, Pullman, WA, United States

CIE-5 AMS: GPU-BASED HIGH PERFORMANCE COMPUTING

CIE-5-2 AMS GPU-HPC Session 2

Congressional B 10:40am–12:00pm

Session Chair: Dan Negrut, University of Wisconsin-Madison, Madison, WI, United States
Session Co-Chair: Roshan M. D’Souza, University of Wisconsin, Milwaukee, Milwaukee, WI, United States

Towards Physics-Based Interactive Design for Manufacturing of Cast Parts using Smoothed Particle Hydrodynamics on GPUs

**Technical Publication. DETC2011-48598**
Ivan Komarov, Samuel Thomas Alberts, Roshan M. D’Souza, University of Wisconsin, Milwaukee, Milwaukee, WI, United States

Multi-Objective Topology Optimization on the GPU

**Technical Presentation Only. DETC2011-47918**
R Ganesh, Indian Institute of Science, Bangalore, Bangalore, India, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

Rapid Mapping and Exploration of Configuration Space

**Technical Publication. DETC2011-47213**
Sai gopal Nelaturi, Mikola Lysenko, Vadim Shapiro, University of Wisconsin-Madison, Madison, WI, United States

Parallel Multiscale Simulation of Quantum Dot Infrared Photodetector

**Technical Publication. DETC2011-48905**
Alex Fedoseyev, Vinod Venugopalan, Ranjan S. Mehta, CFD Research Corporation, Huntsville, AL, United States

CIE-6 AMS: MODELING AND SIMULATION IN BIOMECHANICS

CIE-6-1 AMS MSB Session 1

Bunker Hill 10:40am–12:00pm

Session Chair: Mark Palmer, University of Michigan, Ann Arbor, Ann Arbor, MI, United States
Session Co-Chair: Jingzhou (James) Yang, Texas Tech University, Lubbock, TX, United States

Deformation Prediction of Mouse Embryos in Cell Injection Experiment By a Feed-Forward Artificial Neural Network

**Technical Publication. DETC2011-47073**
Ali Asghar Abbasi, Gholamreza Vossoughi, Mohammad Ahmadian, Sharif University of Technology, Tehran, Iran

Effect of ACL Laxity on ACL Strain: Dynamic Simulation using Impulsive Loads

**Technical Publication. DETC2011-48484**
Jesal Parekh, Scott McLean, Mark Palmer, University of Michigan, Ann Arbor, Ann Arbor, MI, United States

Optimization-Based Seated Posture Prediction Considering Contact with Environment

**Technical Publication. DETC2011-48685**
Bradley Howard, Jingzhou (James) Yang, Texas Tech University, Lubbock, TX, United States

Evaluation of the Effect of Wire Angle on the Stiffness of a Two-Ring Ilizarov Fixator By Finite Element Analysis

**Technical Publication. DETC2011-48696**
Yi Zhang, S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

MESA-5 KEYNOTES

MESA-5-1 Keynotes I

Columbia A 10:40am–12:00pm

Session Chair: Primo Zingaretti, Università Politecnica delle Marche, Ancona, Italy

From Italy to China, Driverless!

**Keynote. DETC2011-49021**
Alberto Broggi, University of Parma, Parma, Italy

MSNDC-5 STUDENT PAPER COMPETITION

MSNDC-5-1 Student Paper Competition

Regency B 10:40am–12:00pm

See page 33 for details

Session Chair: Aki Mikkola, Lappeenranta University of Technology, Lappeenranta, Finland

DAC-3 KEYNOTE

DAC-3-1 Keynote Session - Jointly sponsored by MECH, DFMLC and DAC

Regency C 10:40am–12:00pm

Session Chair: Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States
Session Co-Chair: Michael Stanisic, University of Notre Dame, Notre Dame, IN, United States

Innovation and US-based Manufacturing

**Keynote. DETC2011-49023**
Sridhar Kota, University of Michigan, Ann Arbor, United States

PTG-2 SURFACE ENGINEERING AND TRIBOLOGY

PTG-2-1 Surface Engineering and Tribology

Columbia Foyer 10:40am–12:00pm

Session Chair: Al Karvelis, Exponent Inc., Lisle, IL, United States

A Fatigue Model for Spur Gear Contacts Operating under Mixed Elastohydrodynamic Lubrication Conditions

**Technical Publication. DETC2011-47287**
Sheng Li, Ahmet Kahraman, Mark Klein, The Ohio State University, Columbus, OH, United States
Micro-Scale Surface Texture Design for Improved Scuffing Resistance in Gear Applications

Technical Publication. DETC2011-47324
Aaron Greco, Oyelayo Ajayi, Robert Erck, Argonne National Laboratory, Argonne, IL, United States

Analysis of Microelastohydrodynamic Lubrication and Surface Fatigue in Gear Micropitting Tests

Technical Publication. DETC2011-47714
H P Evans, Ray Snidle, K Sharif, Cardiff University, Cardiff, Wales, United Kingdom

Optimal Design of Screw and Flow Field Analysis for Twin-screw Pump

Technical Publication. DETC2011-48056
Qian Tang, Yuanxun Zhang, Chongqing University, Chongqing, China, Linqing Pei, Wollongong University, Wollongong, Australia, Jiong Tang, University of Connecticut, Storrs, CT, United States

PTG-3 PLASTIC GEARS

PTG-3-1 Plastic Gears
Concord 10:40am–12:00pm
Session Chair: Ahmet Kahraman, The Ohio State University, Columbus, OH, United States

Performance of Injection-Molded Plastic Helical Gears Finished by Hot Rolling
Technical Publication. DETC2011-47426
Morimasa Nakamura, Atsushi Katayama, Ichiro Moriwaki, Kyoto Institute of Technology, Kyoto, Japan

Methods of Describing Plastic Gear Geometry After a Temperature Change with Application to the Prediction of Gear Load Distribution
Technical Publication. DETC2011-47501
Sumanth Kashyap, Donald R. Houser, The Ohio State University, Columbus, OH, United States, Zan Smith, Zan Smith, Cincinnati, OH, United States, Senthilvelan Selvaraj, Indian Institute of Technology, Guwahati, Assam, India, James M Casella, Xerox Research Center, Webster, NY, United States, Jeffrey Bradway, Xerox Corporation, Webster, NY, United States

Designing a Polymer Gear for use in the Environment of an Internal Combustion Engine
Technical Publication. DETC2011-48372
Rod Kleiss, Kleiss Gears, Inc., Grantsburg, WI, United States, Frank J. Ferfecki, Victrex Polymer Solutions, Birmingham, MI, United States

Heat Generation, Power Transmission Efficiency, and Life of Plastic Worm and Helical Wheels Meshed with Steel Worm
Technical Publication. DETC2011-47557
Takao Koide, Kouitsu Miyachika, Tottori University, Tottori, Tottori, Japan, Mikio Takahashi, Hideo Takahashi, Kisarazu National College of Technology, Kisarazu, Chiba, Japan

MECH-4 KEYNOTE

MECH-4-1 Keynote Session - Jointly Sponsored by MECH, DFMLC and DAC
Regency C 10:40am–12:00pm
Session Chair: Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States
Session Co-Chair: Michael Stanisic, University of Notre Dame, Notre Dame, IN, United States

Innovation and US-based Manufacturing
Keynote. DETC2011-49023
Sridhar Kota, University of Michigan, Ann Arbor, United States

MNS-2 SYMPOSIUM ON MICRO AND NANO MECHANISMS AND ROBOTICS

MNS-2-1 Micro and Nano Mechanisms and Robotics
Capital B 10:40am–12:00pm
Session Chair: Dan Popa
Session Co-Chair: David J. Cappelleri, Stevens Institute of Technology, Hoboken, NJ, United States

Design and Analysis of a Micro-Positioning Stage
Technical Publication. DETC2011-47717
Jau-Liang Chen, Yan-Ming Chen, National Chung Hsing University, Taichung, Taiwan, Taiwan

Decoupling of the Cartesian Stiffness Matrix: A Case Study on Accelerometer Design
Technical Publication. DETC2011-47914
Ting Zou, Jorge Angeles, McGill University, Montreal, QC, Canada

Challenges in Development of Sub-millimeter Resolution Thermo-Fluidic Actuator Based Wearable Tactile Display System for Blind Individuals
Technical Publication. DETC2011-48810
Prakash CRJ Naidu, TechnoDevelop Corp. (Canada) and Yantric Inc. (USA), West Newton, MA, United States, Ramesh Yechangunja, Yantric Inc, West Newton, MA, United States, Andrea Prosperetti, Johns Hopkins University, Baltimore, MD, United States, Srinivasan Mandayam A, Yantric Inc, West Newton, MA, United States

Configuration of a Novel Sub-millimeter Resolution Piezoelectric Actuator Based Wearable Tactile Display System for Blind Individuals
Technical Publication. DETC2011-48842
Prakash CRJ Naidu, TechnoDevelop Corp. (Canada) and Yantric Inc. (USA), West Newton, MA, United States, Ramesh Yechangunja, Srinivasan Mandayam A, Yantric Inc, West Newton, MA, United States
A Function Based Approach to TRIZ
Technical Publication, DETC2011-47973
Anthony Nix, Robert Stone, Ben Sherrett, Oregon State University, Corvallis, OR, United States

An Ontology of Classification Criteria for Functional Taxonomies
Technical Publication, DETC2011-48125
Yoshinobu Kitamura, Sho Segawa, Munehiko Sasajima, Riichiro Mizoguchi, Osaka University, Ibaraki, Osaka, Japan

Automated Assignment of Physical Effects to Functions using Ports Based on Bond Graphs
Technical Publication, DETC2011-48140
Bergen Helms, Hansjörg Schultheiß, Technische Universität München, Garching b. Muenchen, Germany, Kristina Shea, Institute of Product Development, Virtual Product Development Group, Technische Universität München, Garching, Bavaria, Germany

DFMLC-2 KEYNOTE

DFMLC-2-1 Keynote Session - Jointly Sponsored by MECH, DFMLC and DAC
Regency C 10:40am–12:00pm
Session Chair: Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States
Session Co-Chair: Michael Stanisic, University of Notre Dame, Notre Dame, IN, United States

Innovation and US-based Manufacturing
Keynote. DETC2011-49023
Sridhar Kota, University of Michigan, Ann Arbor, United States

AVTT-1 KEYNOTES

AVTT-1-1 Keynote I
Columbia C 10:40am–12:00pm
Session Chair: Xubin Song, Eaton Corp, Southfield, MI, United States
Session Co-Chair: Massimiliano Gobbi, Politecnico di Milano, Milan, Italy

Design and Control of Electrified Vehicles for Improved Fuel Economy
Keynote. DETC2011-49018
Huei Peng, University of Michigan, Ann Arbor, United States
VIB-1 CONDITION MONITORING AND DIAGNOSTICS

VIB-1-2 Advanced Sensors, Systems & Signal Processing

Columbia A 1:40pm–3:20pm

Session Chair: Min-Chun Pan, National Central University, Jhongli City, Taoyuan County, Taiwan
Session Co-Chair: Steve Wilcox, University of Glamorgan, Pontypridd, Wales, United Kingdom

Blind Source Separation Based on a Single-Channel Repeated Independent Component Analysis

Technical Publication. DETC2011-47120
Yong-gang Leng, Tianjin University, Tianjin, China, Ting-ting Chen, Zhi-hui Lai, Tianjin University, School of Mechanical Engineering, Tianjin, China, Yue-ran Pan, Tianjin University, School of Civil Engineering, Tianjin, China

The Underwater Effects of High Power, High Frequency Acoustic Noise on MEMS Gyroscopes

Technical Publication. DETC2011-47180
William Yunker, Pregassen Soobramaney, Meagan Black, Robert N. Dean, George Flowers, Anwar Ahmed, Auburn University, Auburn, AL, United States

On the Use of the Instantaneous Angular Speed Measurement in Non Stationary Mechanism Monitoring

Student Competition Paper. DETC2011-47470
Hugo Andre, Didier Rémond, Adeline Bourdon, Université de Lyon, CNRS, UMR5259, INSA-Lyon, LaMCoS,, Villeurbanne, France

A Novel and Flexible Design of Magnetostrictive Sensor for Strand/Rope Defect Inspection

Technical Publication. DETC2011-47692
Peter W. Tse, X.J. Wang, D. Wang, City University of Hong Kong, Hong Kong, China, X.C. Liu, Beijing University of Technology, Beijing, China

Development of a Test Rig for Multi-axial Static and Dynamic Loading of Bearings

Technical Publication. DETC2011-48260
William Jacobs, Rene Boonen, Paul Sas, David Moens, Department of Mechanical Engineering - K.U.Leuven, Leuven, Belgium, Marco Malago’, Università degli Studi di Ferrara, Ferrara, Italy

VIB-2 DISCONTINUOUS DYNAMICAL SYSTEMS AND SYNCHRONIZATION

VIB-2-2 Dynamical Systems and Synchronization

Congressional C 1:40pm–3:20pm

Session Chair: Hamid R. Hamidzadeh, Tennessee State University, Nashville, TN, United States
Session Co-Chair: X.W. Tangpong, North Dakota State University, Fargo, ND, United States

Visualizing Non-Linear Control System Performance By Means of Multidimensional Scaling

Technical Publication. DETC2011-47283
J.A. Tenreiro Machado, Institute of Engineering of Polytechnic of Porto, Porto, Portugal

Synchronization Dynamics of Two Nonlinear Gyroscope Systems

Technical Publication. DETC2011-47388
Fuhong Min, Nanjing Normal University, Nanjing, Jiangsu, Christmas Island, Albert Luo, Southern Illinois University Edwardsville, Edwardsville, IL, United States

Identification of the Cutting Forces Coefficients Via Miling Process Simulation

Technical Publication. DETC2011-48216
Sergey Voronov, Igor Kiselev, Bauman Moscow State Technical University, Moscow, Russia, Maxim G. Yakovlev, Federal State Unitary Enterprise Moscow Machine Building Production Plant Salut, Moscow, Russia

Vibrations of Supported Flow Conveying Pipe

Technical Publication. DETC2011-48767
Hamid R. Hamidzadeh, Tennessee State University, Nashville, TN, United States, Akindeji Ojetola, Noel Jordan Jameson, Tennessee State University, Department of Mechanical and Manufacturing Engineering, Nashville, TN, United States

Analytical Solutions for Nonlinear Lateral Sloshing in Partially-Filled Elliptical Tankers

Technical Publication. DETC2011-48468
Davood Younesian, Hassan Askari, Iran University of Science and Technology, Tehran, Iran, Zia Saadatnia, Iran University of Science and Technology, Narmak, Tehran, Iran, Ebrahim Esmaiizadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

VIB-3 ENERGY HARVESTING

VIB-3-2 Piezoelectric Energy Harvesting

Grand Teton 1:40pm–3:20pm

Session Chair: Lei Zuo, State University of New York at Stony Brook, Stony Brook, NY, United States
Session Co-Chair: Hornsen Tzou, Zhejiang University, Hangzhou, Zhejiang, China, Tian-Bing Xu, National Institute of Aerospace/NASA Langley Research Center, Hampton, VA, United States

Topology Optimization of Energy Harvesting Skin Structure Utilizing Harmonic Vibration

Technical Publication. DETC2011-47097
Soobum Lee, Andrés Tovar, University of Notre Dame, Notre Dame, IN, United States

Optimum Design of Cantilevered Piezoelectric Harvester Based on Distributed Parameter Model

Technical Publication. DETC2011-47803
Saad Alazemi, Public Authority of Applied Education and Training- College of Technological Studies- Mechanical DP., Shuwaikh, Kuwait, Ahmet S. Yigit, Khaled A. Alhazza, Kuwait University, Safat, Kuwait

Effects of Geometric and Material Properties on Electrical Power Harvested from a Bimorph Piezoelectric Cantilever Beam

Technical Publication. DETC2011-48003
Nataraj Chandrasekharan, Jaehyung Ju, Lonny Thompson, Clemson University, Clemson, SC, United States
Evaluation of Ring-type Energy Harvesters
**Technical Publication.** DETC2011-48137
Shundi Hu, Hua Li, Hornsen Tzou, Zhejiang University, Hangzhou, Zhejiang, China

Energy Harvesting Characteristics of Conical Shells
**Technical Publication.** DETC2011-48143
Hua Li, Shundi Hu, Hornsen Tzou, Zhejiang University, Hangzhou, China

CIE-2 CAPPD: COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT GENERAL

CIE-2-3 CAD Applications and Parametric Modeling

Yellowstone 1:40pm–3:20pm
Session Chair: Kristina Shea, Institute of Product Development, Virtual Product Development Group, Technische Universität München, Garching, Bavaria, Germany
Session Co-Chair: Cameron Turner, Colorado School of Mines, Golden, CO, United States

Consideration of Uncertainty in Virtual Product Design
**Technical Publication.** DETC2011-47278
Lucia Mosch, André Sprenger, Reiner Anderl, Technische Universität Darmstadt, Darmstadt, Hessen, Germany

Design Procedure and Rules to Configure Lower Limb Prosthesis
**Technical Publication.** DETC2011-47651
Giorgio Colombo, Politecnico di Milano, Milan, Italy, Stella Gabbiadini, Daniele Regazzoni, Caterina Rizzi, University of Bergamo, Dalmine, Italy

Noise Prediction System for Low Acoustic Noise Server Design
**Technical Presentation Only.** DETC2011-48113
Sachio Kobayashi, Fujitsu Laboratories Ltd., Kawasaki-shi, Kanagawa, Japan, Hiroki Kobayashi, Hideki Abe, Masayoshi Hashima, Yuichi Sato, Fujitsu Laboratories Ltd., Kawasaki, Japan

Mass Customization of Hip-replacement Joint Design using Shape Grammar
**Technical Publication.** DETC2011-48477
Soumitra Nandi, Zahed Siddique, University of Oklahoma, Norman, OK, United States

A Programming Language Approach to Parametric CAD Data Exchange
**Technical Publication.** DETC2011-48530
John Altit, Jack Wileden, Jeffrey McPherson, Ian Grosse, Sundar Krishnamurty, University of Massachusetts Amherst, Amherst, MA, United States, Felicia Cordeiro, Audrey Lee-StJohn, Mount Holyoke College, South Hadley, MA, United States

CIE-4 VES: VIRTUAL ENVIRONMENTS AND SYSTEMS, GENERAL

CIE-4-2 VES Session 2
Thornton A 1:40pm–3:20pm
Session Chair: Monica Bordegoni, Politecnico di Milano, Milan, Italy
Session Co-Chair: Doug McCorkle, Iowa State University, Ames, IA, United States

Automated Generation of Virtual Roadways Based on Geographic Information Systems
**Technical Publication.** DETC2011-48141
Sven Kreft, Jürgen Gausemeier, Michael Grafe, Bassem Hassan, University of Paderborn/ Heinz Nixdorf Institute, Paderborn, Germany

VR-SMART a Virtual Reality System for Smart Home Environments
**Technical Publication.** DETC2011-48585
Nathan Darnall, Uma Jayaram, Sankar Jayaram, Washington State University, Pullman, WA, United States, Vinay Mishra, DS Solidworks Corporation, Concord, MA, United States

Design, Implementation, and Evaluation of Optical Low-Cost Motion Capture System
**Technical Publication.** DETC2011-47270
Abhinav Chadda, Wenjuan Zhu, Ming C. Leu, Xiaqing Frank Liu, Missouri University of Science and Technology, Rolla, MO, United States

An Exploratory Framework for Combining CFD Analysis and Evolutionary Optimization into a Single Integrated Computational Environment
**Technical Publication.** DETC2011-48866
Doug McCorkle, Kenneth Bryden, Iowa State University, Ames, IA, United States

Virtual-Reality Enhanced Online Learning Environments as a Substitute for Classroom Instruction
**Technical Publication.** DETC2011-48826
Hatem M. Wasy, Jeanne M. Peters, Advanced Science and Automation Corp., Hampton, VA, United States, Tamer Wasy, Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States, Riham Mahfouz, Thomas Nelson Community College, Hampton, VA, United States
ESTIMATION OF HEAT FLUX DISTRIBUTION IN A CONTINUOUS CASTING MOLD BY INVERSE HEAT TRANSFER ALGORITHMS

**Technical Publication.** DETC2011-47435

Paola Ranut, University of Trieste - Department of Mechanical Engineering and Naval Architecture, Trieste, Italy, Cristiano Persi, Ergolines Lab s.r.l., Trieste, Italy, Enrico Nobile, University of Trieste - Department of Mechanical Engineering and Naval Architecture, Trieste, Italy, Stefano Spagnul, Ergolines Lab s.r.l., Trieste, Italy

AN INVERSE ANALYSIS METHOD FOR ESTIMATION OF HEAT FLUX AND TEMPERATURE-DEPENDENCE OF HEAT TRANSFER COEFFICIENT

**Technical Publication.** DETC2011-47547

Shiro Kubo, Seiji Ioka, Osaka University, Suita, Osaka, Japan

GEO + ES HYBRID OPTIMIZATION ALGORITHM APPLIED TO THE PARAMETRIC THERMAL MODEL ESTIMATION OF A 200N HYDRAZINE THRUSTER

**Technical Publication.** DETC2011-47584

Roberto Luiz Galski, Heitor Patire Júnior, Fabiano Luís de Sousa, José Nivaldo Hinckel, Fernando Manuel Ramos, National Institute for Space Research, São José dos Campos, São Paulo, Brazil, Pedro Lacava, Aeronautical Technological Institute, São José dos Campos, São Paulo, Brazil

APPLICATION OF A BAYESIAN FILTER TO ESTIMATE UNKNOWN HEAT FLUXES IN A NATURAL CONVECTION PROBLEM

**Technical Publication.** DETC2011-47652

Marcelo J. Colaco, Wellington B. Silva, Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil, Helcio Orlande, Federal University of Rio de Janeiro - Ufrj, Rio de Janeiro, Brazil, George Dulikravich, Florida International University, Miami, FL, United States

SOME THEORETICAL ASPECTS FOR AN INVERSE PROBLEMS OF DIFFUSION CONTROL.

**Technical Publication.** DETC2011-48947

Yuri V. Glasko Jr., Scientific Research Computer Center of Moscow State University, Moscow, Russia, Russia

CAPTURING INTERACTIONS AND EMERGENT FAILURE BEHAVIOR IN COMPLEX ENGINEERED SYSTEMS AND MULTIPLE SCALES

**Technical Publication.** DETC2011-47767

Nikolaos Papakonstantinou, Seppo Sierla, Aalto University, Espoo, Finland, David Jensen, Irem Tumer, Oregon State University, Corvallis, OR, United States

SUPPORTING CO-DESIGN OF PHYSICAL AND CONTROL ARCHITECTURES OF MECHATRONIC SYSTEMS

**Technical Publication.** DETC2011-48200

Andres A. Alvarez Cabrera, Hitoshi Komoto, Delft University of Technology, Delft, Zuid Holland, Netherlands, Tetsuo Tomiyama, TU Delft, Delft, Netherlands

TECHNOLOGY CHARACTERIZATION MODELS AND THEIR USE IN DESIGNING COMPLEX SYSTEMS

**Technical Publication.** DETC2011-48365

Robert R. Parker, Richard Malak, Texas A&M University, College Station, TX, United States

TOWARD A META-MODEL OF BEHAVIORAL INTERACTION FOR DESIGNING COMPLEX ADAPTIVE SYSTEMS

**Technical Publication.** DETC2011-48821

Winston Chiang, Yan Jin, University of Southern California, Los Angeles, CA, United States

TOWARDS ENABLING VISUAL DESIGN EXPLORATION INVOLVING MULTIPLE ABSTRACTIONS OF DESIGN DESCRIPTIONS

**Technical Publication.** DETC2011-47291

Srikanth Devanathan, Dassault Systèmes SIMULIA Corporation, Cary, NC, United States, Karthik Ramani, Purdue University, West Lafayette, IN, United States
MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-2 Mathematical Fundamentals of Fractional Calculus

Everglades 1:40pm–3:20pm
Session Chair: Manuel Ortigueira, UNINOVA/Faculdade de Ciências e Tecnologia da UNL, Caparica, Portugal
Session Co-Chair: Chunhai Kou, Donghua University, Shanghai, China

Equivalent Same-order System for Multi-rational-order Fractional Differential System with Caputo Derivative
Technical Publication. DETC2011-47204
Changpin Li, Fengrong Zhang, Shanghai University, Shanghai, China

On a Unified Fractional Derivative
Technical Publication. DETC2011-47317
Manuel Ortigueira, UNINOVA/Faculdade de Ciências e Tecnologia da UNL, Caparica, Portugal, Juan Trujillo, Universidad de La Laguna, La Laguna, Spain

Fractional integration of Generalized Bessel Function of the First Kind
Technical Publication. DETC2011-48950
Pradeep Malik, Saiful R Mondal, Swaminathan Anbhu, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India

Existence of Solutions for Fractional Functional Differential Equations with Boundary Value Conditions
Technical Publication. DETC2011-47107
Chunhai Kou, Huacheng Zhou, Sijia Wu, Donghua University, Shanghai, China

MESA-2 THE THIRD SYMPOSIUM ON SMALL UNMANNED AERIAL VEHICLE TECHNOLOGIES AND APPLICATIONS (SUAVTA’11)

MESA-2-2 Multi-UAV Systems

Bryce 1:40pm–3:20pm
Session Chair: Long Di, Utah State Univ, Logan, UT, United States
Session Co-Chair: Youmin Zhang, Concordia University, Montreal, Quebec, QC, Canada

Visual Attitude Estimation for Low-Cost Personal Remote Sensing Systems
Technical Publication. DETC2011-47742
Tobias Fromm, Long Di, YangQuan Chen, Utah State University, Logan, UT, United States, Holger Voos, University of Luxembourg, Luxembourg, Luxembourg, Luxembourg

Consensus Based Multiple Small Fixed-Wing UAV Formation
Technical Publication. DETC2011-47844
Yaojin Xu, Southeast University, China and Utah State University, USA, Logan, UT, United States, Long Di, YangQuan Chen, Utah State University, Logan, UT, United States

Cognitive Multi-UAV Formation Flight: Principle, Low-Cost UAV Testbed, Controller Tuning and Experiments
Technical Publication. DETC2011-47848
Long Di, Haiyang Chao, Jinlu Han, YangQuan Chen, Utah State University, Logan, UT, United States

Vorad-based Coverage Control for Multi-quadrotor UAVs
Technical Publication. DETC2011-48651
Farid Sharifi, Youmin Zhang, Brandon W. Gordon, Concordia University, Montreal, QC, Canada

Dynamic Key-Frame Based Airborne Scene Matching Vision Navigation
Technical Publication. DETC2011-48954
Yaojun Li, Quan Pan, Chunhui Zhao, Feng Yang, Yongmei Cheng, Northwestern Polytechnical University, Xi’an, 710072, China

MESA-6 THE THIRD SYMPOSIUM ON MECHATRONIC CONTROL AND ELECTRICAL VEHICULAR SYSTEMS (MCEVS’11)

MESA-6-1 Mechatronic Control & Electrical Vehicular Systems

Thornton B 1:40pm–3:20pm
Session Chair: Ma Chengbin, Shanghai Jiao Tong University, Shanghai, China

An Measurement System for Electric Vehicle Powered By Supercapacitor
Technical Publication. DETC2011-47138
Zhongyue Zou, Zhang Huarong, Cao Junyi, Xi’an Jiaotong University, Xi’an, China, Chengbin Ma, UM-SJTU Joint Institute, Shanghai Jiaotong University, Shanghai

Wireless Charging of Electric Vehicles: A Review and Experiments
Technical Publication. DETC2011-48942
Ma Chengbin, Xin Zen, Minfan Fu, Shanghai Jiao Tong University, Shanghai, China

Model Verification and Design of Speed Control System of Water Driven Stage
Technical Publication. DETC2011-47804
Yohichi Nakao, Toshiaki Sano, Midori Nagashima, Kenji Suzuki, Kanagawa University, Yokohama, Kanagawa, Japan

Parametric Vehicular Simulator in the Evaluation of HELVIS mini-HEV EDS Control
Technical Publication. DETC2011-48403
Rafael Coronel Bueno Sampaio, Vinicius V.M. Fernandes, Marcelo Becker, University of Sao Paulo/EESC, Sao Carlos, Brazil, Lima Gabriel, Andre Hernandez, University of Sao Paulo/EES, Sao Carlos, Brazil

Efficient traffic simulation using busses as active sensor network
Student Competition Paper. DETC2011-49013
Ludovico Catani, Emanuele Frontoni, Primo Zingaretti, Università Politecnica delle Marche, Ancona, Italy, Guido di Pasquale, Pluservice, Senigallia, Italy
MSND-1 COMPUTATIONAL METHODS

MSND-1-2 Methods for Constrained and Discontinuous Dynamics

Bunker Hill 1:40pm–3:20pm

Session Chair: Javier Cuadrado, University of La Coruna, Ferrol, La Coruna, Spain
Session Co-Chair: Sung-Soo Kim, Chungnam National University, Daejeon, Korea (Republic)

Numerics of Non-smooth Multibody Systems

Technical Publication. DETC2011-47297
Friedrich Pfeiffer, Technical University Munich, D-85748 Garching, Bavaria, Germany

An Alternative Formulation of Motion Equations in Redundant Coordinates for the Inverse Dynamics of Constrained Mechanical Systems

Technical Publication. DETC2011-47365
Andreas Müller, University Duisburg-Essen, Duisburg, Germany

A Comparison of Various Methods of Redundant Constraints Handling in Multibody System Simulations

Technical Publication. DETC2011-48144
Marek Wojtyra, Janusz Fraczek, Warsaw University of Technology, Warsaw, Poland

Continuous Null Space Method for Constrained Mechanical Systems

Technical Publication. DETC2011-48150
Keisuke Kamiya, Makoto Sawada, Yuji Furusawa, Aichi Intitute of Technology, Toyota, Aichi, Japan

Operational Space Impulse Momentum Algorithm for Flexible Multibody Systems with Generalized Topologies

Technical Publication. DETC2011-48886
R. Mukherjee, California Institute of Technology, Pasadena, CA, United States

MSND-2 CONTACT AND INTERFACE DYNAMICS

MSND-2-2 Contact and Interface Dynamics II

Congressional D 1:40pm–3:20pm

Session Chair: Dan Negrut, University of Wisconsin-Madison, Madison, WI, United States
Session Co-Chair: Tamer Wasfy, Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States

On the Application of the Lu-Gre Model to Simulate Joint Friction in Multi-Body Systems

Technical Publication. DETC2011-47360
Kedar Kale, Altair Engineering Inc., Bangalore, Karnataka, India, Rajiv Rampalli, Altair Engineering Inc., Troy, MI, United States

Blade Vibration Suppression using Friction Elements in Shrouding

Technical Publication. DETC2011-47523
Michal Hajzman, Miroslav Byrtus, Vladimir Zeman, University of West Bohemia, Plzen, Czech Republic

Some Experimental and Analytical Results on Self Excited Vibration of a Dynamic Sliding System in the Case of Striebeck Law for Friction Coefficient

Technical Publication. DETC2011-47709
Julian Le Rouzic, Joël Perret-Liaudet, Alexandre Carbonelli, Alain Le Bot, Denis Mazuyer, Laboratoire de Tribologie et Dynamique des Systèmes, Ecully Cedex, France

Kinematics and Dynamics of a Sliding/Bouncing Two Mass System

Technical Publication. DETC2011-48405
Mohamed Gharib, Ali Tavakoli, Yildirim Hurmuzlu, Southern Methodist University, Dallas, TX, United States

On the Spatial Modeling of a Vibratory Micro-Pin Feeder using Rigid-Body Dynamics

Technical Publication. DETC2011-48526
Benjamin Rimai, Raymond Cipra, Purdue University, West Lafayette, IN, United States

MSND-3 CONTROL AND OPTIMIZATION

MSND-3-2 Control and Optimization II

Concord 1:40pm–3:20pm

Session Chair: Olivier Brüls, University of Liège, Liège, Belgium
Session Co-Chair: Robert Seifried, University of Stuttgart, Stuttgart, Germany

Natural Coordinates in the Optimal Control of Multibody Systems

Technical Publication. DETC2011-47310
Betsch Peter, Ralf Siebert, Nicolas Sänger, University of Siegen, Siegen, Germany

Command-Shaping Control System for Double-Pendulum Gantry Cranes

Technical Publication. DETC2011-48400
Ziyad Masoud, German Jordanian University, Amman, Jordan, Khaled A. Alhazza, Kuwait University, Safat, Kuwait

A Continuous Modulated Wave-Form Command Shaping for Damped Overhead Cranes

Technical Publication. DETC2011-48336
Khaled A. Alhazza, Asmahan Al-Shehaima, Kuwait University, Safat, Kuwait, Ziyad Masoud, German Jordanian University, Amman, Jordan

Improving the Positioning and Anti-Swing Performance of Traveling Crane-lifter Systems

Technical Publication. DETC2011-47092
Moradi Hamed, Sharif University of Technology, Tehran, Iran, Firooz Bakhtiar-Najad, Amirkabir University of Technology, Tehran, Iran

Implementation of an algorithm for the direct solution of optimal control problems

Technical Publication. DETC2011-48750
Fabien Brian C., University of Washington, Seattle, WA, United States
DAC-4 CELEBRATION OF K.K. CHOI’S 65TH BIRTHDAY

DAC-4-1 Celebration of K.K. Choi’s 65th Birthday

Regency C 1:40pm–3:20pm

Session Chair: Byeng D. Youn, Seoul National University, Seoul, Korea (Republic)
Session Co-Chair: Nam Kim, University of Florida, Gainesville, FL, United States

A Modified Formulation for Automattic Synthesis of Planar Linkage Mechanisms

Technical Publication. DETC2011-47341
Gang-Won Jang, Sejong University, Seoul, Korea (Republic), Sang Jun Nam, Samsungtechwin, Seongnam-si, Korea (Republic), Yoon Young Kim, Seoul National University, Seoul, Korea (Republic)

Isogeometric Shape Design Sensitivity Analysis using Mixed Transformation Method for Kronecker Delta Property

Technical Publication. DETC2011-47697
Seonho Cho, Bon-Yong Koo, Minho Yoon, Seung-Wook Lee, Seoul National University, Seoul, Korea (Republic), Yoon Doh Ha, Kunsan National University, Kunsan, Korea (Republic)

Adjoint Design Sensitivity Analysis of Fracture Mechanics using Molecular-Continuum Multiscale Approach

Technical Publication. DETC2011-47700
Hyun-Seok Kim, Hong-Lae Jang, Min-Geun Kim, Seonho Cho, Seoul National University, Seoul, Korea (Republic)

Condition of Equivalence Between Continuum and Discrete Sensitivities

Technical Publication. DETC2011-48800
Nam Kim, University of Florida, Gainesville, FL, United States

A Bilevel Programming Algorithm and Applications to Shape Optimization of Elastic Solids in Contact.

Technical Publication. DETC2011-48100
Jose Herskovits, Mario Tanaka Fo., COPPE/Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil, Anatoli Leontiev, Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil

DAC-5 FORMULATION OF MASS CUSTOMIZATION PROBLEMS

DAC-5-1 Mass Customization and Consumer Preferences

Columbia Foyer 1:40pm–3:20pm

Session Chair: Scott Ferguson, North Carolina State University, Raleigh, NC, United States
Session Co-Chair: Roger Jiao, Georgia Tech, Atlanta, GA, United States

Global Product Family Design: A Mathematical Model for Simultaneous Decision of Module Commonalization and Supply Chain Configuration

Technical Publication. DETC2011-47853
Kikuo Fujita, Hirofumi Amaya, Ryota Akai, Osaka University, Suita, Osaka, Japan

Design Preference Elicitation using Efficient Global Optimization

Technical Publication. DETC2011-48316
Yi Ren, Panos Y. Papalambros, University of Michigan, Ann Arbor, MI, United States

Learning Stylistic Desires and Generating Preferred Designs of Consumers using Neural Networks and Genetic Algorithms

Technical Publication. DETC2011-48642
Ian Tseng, Jonathan Cagan, Kenneth Kotovsky, Carnegie Mellon University, Pittsburgh, PA, United States

Exploring Marketing to Engineering Information Mapping in Mass Customization - a Presentation of Ideas, Challenges and Resulting Questions

Technical Publication. DETC2011-48742
Scott Ferguson, North Carolina State University, Raleigh, NC, United States, Andrew Olewnik, NYS Center for Engineering Design and Industrial Innovation, Buffalo, NY, United States, Phil Cormier, University at Buffalo, Buffalo, NY, United States

Design for Mass Customization and Personalization: Status and Prospect

Technical Publication. DETC2011-48919
Roger Jiao, Georgia Tech, Atlanta, GA, United States

DAC-6 Q&A WITH DESIGN ENGINEERING DIVISION’S JOURNAL EDITORS

DAC-6-1 Panel: ASME Journals’ Chief Editors

Capital A 1:40pm–3:20pm

Session Co-Chair: Kurt Anderson, Rensselaer Polytechnic Institute, Troy, NY, United States

Journal Introduction Panel. DETC2011-49041
Ahmed Shabana, University of Illinois at Chicago, Chicago, IL, United States

Journal Introduction Panel. DETC2011-49042
Arthur Erdman, University of Minnesota, St. Paul’s, United States

Journal Introduction Panel. DETC2011-49043
Bahram Ravani, UC Davis, Davis, United States

Journal Introduction Panel. DETC2011-49044
J. Michael McCarthy, University of California, Irvine, Irvine, CA, United States

Journal Introduction Panel. DETC2011-49045
Noel C. Perkins, University of Michigan, Ann Arbor, MI, United States

Journal Introduction Panel. DETC2011-49046
Panos Y. Papalambros, University of Michigan, Ann Arbor, MI, United States
PTG-1 GEAR SYSTEM DESIGN AND ANALYSIS

PTG-1-2 Gear System Design and Analysis II
Capital B 1:40pm–3:20pm
Session Chair: Alessio Artoni, University of Pisa, Pisa, Italy

Preliminary Design Considerations on Epicyclic Gears in Aircraft High-Lift Systems
Technical Publication. DETC2011-48462
Anngwo Wang, Dr. Lotfi El-Bayoumy, Neil Venables, MOOG Inc. Aircraft Group, Torrance, CA, United States

Influence of Rim-Thickness on Planet Bending Stresses and Load Sharing
Technical Publication. DETC2011-47643
Shyamsananth Madhavan, Manish Agrawal, SP Ganesan, General Motors - Technical Centre India, Bangalore, Karnataka, India

An Approach for Analysis of Load Sharing in Planetary Gear Drives with a Floating Sun Gear
Technical Publication. DETC2011-47600
Shyi-Jeng Tsai, Siang-Yu Ye, Guan-Lin Huang, National Central University, Jhong-Li, Taiwan

Influence of Bearing Clearance on Load Sharing in Planetary Gears
Technical Publication. DETC2011-47622
Atsushi Suzuki, Takayuki Aoyama, Noboru Sugiura, Mizuho Inagaki, Toyota Central R&D Labs., Inc., Aichi, Japan, Takashi Shimizu, Toyota Motor Corporation, Aichi, Japan

A New Method to Measure Planet Load Sharing and Sun Gear Radial Orbit of Planetary Gear Sets
Technical Publication. DETC2011-47196
Brian Boguski, Ahmet Kahraman, The Ohio State University, Columbus, OH, United States, Takayuki Nishino, Mazda Motor Corporation, Hiroshima, Japan

PTG-4 GEAR SYSTEM DYNAMICS AND NOISE

PTG-4-1 Gear System Dynamics and Noise I
Congressional A 1:40pm–3:20pm
Session Chair: Brian Wilson, Romax Technology, Inc., Troy, MI, United States

Assessment of the Vibration Excitation and Optimization of Cylindrical Gears
Technical Publication. DETC2011-47443
Michael Heider, Michael Otto, Jens Bihr, FZG - Gear Research Center - Institute for Machine Elements, Garching / Munich, Germany, Bernd-Robert Höhn, Karsten Stahl, FZG - Gear Research Center - Institute for Machine Elements, Garching, Germany

Simulations of Gear Journal Bearing Interactions
Technical Publication. DETC2011-47228
Romain Fargere, DCNS, La Montagne, France, Philippe Velex, INSA Lyon, Villeurbanne, France

Estimation Method of Mesh Excitation Waveform of a Gear System (Hybrid Estimation with Vibration Measurement and Simulation)
Technical Publication. DETC2011-48130
Shigeki Matsumura, Tokyo Institute of Technology, Yokohama, Kanagawa-ken, Japan, Toshiya Nagumo, Sumitomo Heavy Industries, Yokosuka, Japan, Haruo Houjoh, Tokyo Institute of Technology, Yokohama, Japan

Nonlinear Dynamic Simulation of Hypoid Gear Box with Elastic Housing
Technical Publication. DETC2011-48564
Junyi Yang, Teik Lim, University of Cincinnati, Cincinnati, OH, United States

Eccentricity Effect Analysis in Right-Angle Gear Dynamics
Technical Publication. DETC2011-47579
Tao Peng, ArvinMeritor Inc., Troy, MI, United States, Teik Lim, Junyi Yang, University of Cincinnati, Cincinnati, OH, United States

RSAFP-1 RSAFP CONSIDERATIONS IN DESIGN PROCESS AND COMPUTER-BASED ANALYSES FOR RSAFP

RSAFP-1-1 RSAFP Considerations in Design Process and Computer-Based Analysis for RSAFP
Sequoia 1:40pm–3:20pm
Session Chair: Toshiyuki Sawa, Hiroshima university, Hiroshima, Japan
Session Co-Chair: Erol Sancaktar, University of Akron, Akron, OH, United States

A Method for Estimating Parameters of P-S-N Curves Based on Weibull Distribution
Technical Publication. DETC2011-47375
Dan Ling, Shun-Peng Zhu, Hong-Zhong Huang, Li-Ping He, Zhong-Lai Wang, University of Electronic Science and Technology of China, Chengdu, Sichuan, China

System Optimization Design under Time Variant Reliability Constraints
Technical Publication. DETC2011-48002
Xiao-Ling Zhang, Hong-Zhong Huang, Zhong-Lai Wang, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, Peinan Ge, Rutgers University, Piscatway, NJ, United States

Surface Modification of Polymer-Clay Nanocomposites by Excimer Laser Ablation
Technical Publication. DETC2011-47265
I-Ta Chang, Erol Sancaktar, University of Akron, Akron, OH, United States

Combining Separable Monte Carlo with Importance Sampling for Improved Accuracy
Technical Publication. DETC2011-48650
Anirban Chaudhuri, Raphael T. Haftka, University of Florida, Gainesville, FL, United States
Design Attributes for Geometry Optimization Process of Thin Walled Honeycomb Structures

**Technical Publication.** DETC2011-47080
Shabnam Sadeghi-Esfahlani, Hassan Shirvani, Sunday Nwaubani, Ayoub Shirvani, Anglia Ruskin University, Chelmsford, united kingdom, United Kingdom

**MECH-2 TENSEGRITY AND CABLE-DRIVEN SYSTEMS**

**MECH-2-2 Tensegrity & Cable-Driven Systems**

Regency B 1:40pm–3:20pm

Session Chair: Philippe Cardou, Université Laval, Quebec City, QC, Canada
Session Co-Chair: Clement Gosselin, Université Laval, Quebec, QC, Canada

A Comparative Study of 4-Cable Planar Manipulators Based on Cylindrical Algebraic Decomposition

**Technical Publication.** DETC2011-47726
Damien Chablat, CNRS - IRCCyN, Nantes, France, Erika Ottaviano, University of Cassino, Cassino, Italy, Guillaume Moroz, LORIA - INRIA, Vandoeuvre-lès-Nancy, France

Capstan as a Mechanical Amplifier

**Technical Publication.** DETC2011-48262
Michael Starkey, Robert Williams II, Ohio University, Athens, OH, United States

Inflatable Tendon Driven Manipulator with Constant Volume

**Technical Publication.** DETC2011-47432
Sebastien Voisembert, CEA-LIST, Fontenay aux Roses, France, Alain Riwan, CEA, LIST, Interactive Robotics Laboratory, Fontenay aux Roses, Hauts de Seine, France, Nazih Mechbal, PIMM, UMR-CNRS, AMPT, Paris, Ile de France, France, André Barraco, AMPT, Paris, Ile de France, France

Novel Formfinding of Tensegrity Structures using Ant Colony Systems

**Student Competition Paper.** DETC2011-47900
Yao Chen, Jian Feng, Southeast University, Nanjing, Jiangsu, China, Yong F. Wu, PLA University of Science and Technology, Nanjing, Jiangsu, China

Wrench Capability Analysis of Cable-Driven Parallel Mechanisms

**Technical Publication.** DETC2011-47807
Yu Zou, Yuru Zhang, Beihang University, Beijing, China

**MECH-3 MECHANISMS AND ROBOTS IN MEDICINE**

**MECH-3-2 Assistive and Rehabilitation Applications**

Glacier 1:40pm–3:20pm

Session Chair: Carl Nelson, University of Nebraska-Lincoln, Lincoln, NE, United States
Session Co-Chair: Jingzhou (James) Yang, Texas Tech University, Lubbock, TX, United States

Spinal Implant with Adjustable and Nonlinear Stiffness

**Technical Publication.** DETC2011-47913
Eric Dodgen, Larry L. Howell, Anton Bowden, Brigham Young University, Provo, UT, United States

Mechanical Design and Fabrication of a Low-Cost, Modular, Mobile Gantry for Non-Invasive Medical Applications

**Technical Publication.** DETC2011-47027
Joshua Gafford, Stanford University, Stanford, CA, United States, Johannes Schneider, Levant Power/MIT, Somerville, MA, United States

Design of a Motor-driven Mechanism to Conduct Experiments to Determine the Passive Joint Properties of the Human Index Finger

**Technical Publication.** DETC2011-48009
Pei-Hsin Kuo, Jerod Hayes, Ashish Deshpande, University of Maine, Orono, ME, United States

Controller Implementation of a Powered Transtibial Prosthetic Device

**Technical Publication.** DETC2011-47957
Jinming Sun, Philip Voglewede, Marquette University, Milwaukee, WI, United States

Development of a Control Method of a Walking Assistance Apparatus for the Elderly or Rehabilitants

**Technical Publication.** DETC2011-48389
Eiichiro Tanaka, Hirokazu Yusa, Yusuke Sato, Tomohiro Sakurai, Kazuhisa Ito, Shibaura Institute of Technology, Saitama, Japan, Tadaaki Ikehara, Tokyo Metropolitan College of Industrial Technology, Tokyo, Japan, Shozo Saegusa, Louis Yuge, Hiroshima University, Hiroshima, Japan
MECH-5 STUDENT MECHANISM AND ROBOT DESIGN COMPETITION

MECH-5-1 Student Mechanism Design Competition - Undergraduate

Yosemite 1:40pm–3:20pm

Session Chair: Brian Trease, NASA JPL, Pasadena, CA, United States
Session Co-Chair: David J. Cappelleri, Stevens Institute of Technology, Hoboken, NJ, United States

MNS-4 SYMPOSIUM ON MICRO MECHANICS, SURFACE ENGINEERING, AND CONTACT MECHANICS/TRIBOLOGY

MNS-4-1 Experimental Investigations

Columbia B 1:40pm–3:20pm

Session Chair: Hartono Sumali, Sandia National Laboratories, Albuquerque, NM, United States
Session Co-Chair: Yong Shi, Stevens Institute of Technology, Hoboken, NJ, United States

3-Dimensional Force Curve and Dissipation Model Acquisition using the Spectral Inversion Method in Tapping Mode AFM

Technical Publication. DETC2011-47112
Jeffrey C. Williams, Santiago D. Solares, University of Maryland, College Park, College Park, MD, United States

Electrical Determination of Elastic Modulus of Individual PZT Nanofibers by in Situ SEM

Technical Publication. DETC2011-47226
Xi Chen, Yong Shi, Stevens Institute of Technology, Hoboken, NJ, United States

Towards MEMS Tester for Measuring Metal Nanofilms Lorenz Number

Technical Publication. DETC2011-47681
Weih Xu, Qi Chen, Yong Shi, Stevens Institute of Technology, Hoboken, NJ, United States

Contact Mechanics of Anisotropically Rough Honed Fractal Surfaces

Technical Publication. DETC2011-47885
Daniel Burbridge, Mircea Teodorescu, Cranfield University, Bedfordshire, United Kingdom, Sebastian Howell-Smith, Capricorn Automotive Ltd, Basingstoke, Hampshire, United Kingdom

Experimental considerations in single asperity interactions

Technical Publication. DETC2011-48999
Daniel Burbridge, Cranfield University, Bedfordshire, United Kingdom, S.N. Gordeev, University of Bath, Bath, United Kingdom

DTM-3 USER-CENTRIC DESIGN

DTM-3-1 User Centric Design

Regency D 1:40pm–3:20pm

Session Chair: Wei Chen, Northwestern University, Evanston, IL, United States
Session Co-Chair: Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

Co-Design Methodology for the Development of Sustainable Renewable Energy Systems for Underserved Communities: A Case Study with the Pinoeille Pomo Nation

Technical Publication. DETC2011-47748
Ryan Shelby, Yael Perez, Alice Agogino, University of California, Berkeley, Berkeley, CA, United States

Detecting Design Trends using Perceptive Tests Based on An Interactive Genetic Algorithm

Technical Publication. DETC2011-47923
Emilie Poirson, Jean-François Petiot, Julien Benabes, IRCCYN, Nantes, France, Ludvine Boivin, Renault, Guyancourt, France, David Blumenthal, AgroParitech, Massy, France

Formalizing User Activity Product Function Association Based Design Rules for Universal Products

Technical Publication. DETC2011-47926
Shraddha Sangelkar, Daniel A. McAdams, Texas A&M University, College Station, TX, United States

A Real Options-based Approach to Designing for Changing User Populations of Long-Lifetime Products

Student Competition Paper. DETC2011-48712
Gopal Nadadur, Chris Garneau, Charlotte de Vries, Matthew Parkinson, Pennsylvania State University, University Park, PA, United States

The Role of Sketch Finish and Style in User Response to Early Stage Design Concepts

Technical Publication. DETC2011-48714
Bryan Macomber, Maria Yang, Massachusetts Institute of Technology, Cambridge, CA, United States
DFMLC-4 MANUFACTURING COST ESTIMATION AND TOTAL COST OF OWNERSHIP

DFMLC-4-1 Through Life Costing of Products and Services

Columbia C 1:40pm–3:20pm

Session Chair: Rahul Rai, Cal State Fresno, Fresno, CA, United States

Machining Experiments for Establishment of Parameters for Deviation-based Cost of Manufacturing Formulations

Technical Publication. DETC2011-47232
Nilmani Pramanik, University of Northern Iowa, Cedar Falls, IA, United States, Parikshit Deshmukh, Belcan Engineering Inc., Peoria, IL, United States

A Suggested Framework for Product Life Cycle Cost Analysis at Product Design Stage

Technical Publication. DETC2011-47001
Laxman Waghmode, Annasaheb Dange College of Engineering and Technology, Ashta, Sangli, Maharashtra, India, Anil Sahasrabudhe, College of Engineering, Pune, Maharashtra, India

Modelling Uncertainty in Through life Costing at the Early Design Stages.

Technical Publication. DETC2011-47863
Mohammad Saravi, University of Bath, Bath, Somerset, United Kingdom, Mey Goh, Loughborough University, Loughborough, United Kingdom, Linda Newnes, Antony Mileham, University of Bath, Bath, United Kingdom, Karen Morton, Duncan Beedall, DePuy International, Leeds, United Kingdom

Design for Emerging Bottom of the Pyramid Markets: A Product Service System (PSS) Based Approach

Technical Publication. DETC2011-47744
Carson Schafer, Richard Parks, Rahul Rai, California State University, Fresno, Fresno, CA, United States

Market-Driven Positioning of Remanufactured Product for Design for Remanufacturing with Part Upgrade

Technical Publication. DETC2011-48432
Minjung Kwak, Harrison Kim, University of Illinois at Urbana-Champaign, Urbana, IL, United States

AVTT-2 ADVANCES IN MULTIBODY SYSTEMS MODELING AND VALIDATION FOR VEHICLE DYNAMICS APPLICATIONS

AVTT-2-1 Advances in Multibody Systems Modeling and Validation for Vehicle Dynamics Applications

Thornton C 1:40pm–3:20pm

Session Chair: Corina Sandu, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States
Session Co-Chair: Xiaobo Yang, Oshkosh Corporation, Oshkosh, WI, United States

Active Variable Wheelbase as an Innovative Approach in Vehicle Dynamic Control

Technical Publication. DETC2011-48036
Avesta Goodarzi, Amir Soltani, Iran University of Science and Technology, Tehran, Iran, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

Importance of Correct Validation of Simulation Models

Technical Publication. DETC2011-47688
Cor-Jacques Kat, Pieter Schalk Els, University of Pretoria, Pretoria, Gauteng, South Africa

Motion Planning of Uncertain Fully-Actuated Dynamical Systems: A Forward Dynamics Formulation

Technical Publication. DETC2011-48233
Joe Hays, Adrian Sandu Dennis Hong, Corina Sandu, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States,

Integration of Time Waveform Replication process in a Multibody software for reverse load identification

Technical Publication. DETC2011-48539
Alessandro Toso, Joris De Cuyper, LMS International, Leuven, Belgium, Bruno Darnis, LMS Deutschland, Leonberg, Germany, William Prescott, LMS International, Coralville, IA, United States

Influence of Vehicle Inertia Tensor and Center of Gravity Location on Road Accident Reconstruction

Technical Publication. DETC2011-47891
Giampiero Mastinu, Massimiliano Gobbi, Giorgio Previati, Politecnico di Milano, Milan, Italy
VIB-1 CONDITION MONITORING AND DIAGNOSTICS

VIB-1-3 Acoustics, Prediction & Diagnosis

Columbia A 3:40pm–5:20pm

Session Chair: Peter W. Tse, City University of Hong Kong, Hong Kong, China
Session Co-Chair: Steve Wilcox, University of Glamorgan, Pontypridd, Wales, United Kingdom

Multi-Fault Diagnosis of Ball Bearings using Appropriate Imfs for Envelope Analysis

Technical Publication. DETC2011-48138

Wen-Chang Tsao, National Central University, Jhongli, Taiwan, Min-Chun Pan, National Central University, Jhongli City, Taoyuan County, Taiwan

Finite Element Simulation of Acoustic Transducer Array for Concealed Weapon Detection

Technical Publication. DETC2011-48678

George Vadakkel, S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

Acoustic Imaging for Detection of Concealed Weapons

Technical Publication. DETC2011-48683

George Vadakkel, S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

Cracked Shaft Damage Identification via Symmetry Breaking Active Magnetic Bearing Control and Interrogation

Technical Publication. DETC2011-48738

Jie Zhao, Hans DeSmedt, University of Tennessee at Knoxville, Knoxville, TN, United States

Acoustic Emission Source Location During the Monitoring of Composite Fracture using a Closely Arranged Sensor Array

Technical Publication. DETC2011-48878

Dirk Aljets, Alex Chong, Steve Wilcox, University of Glamorgan, Pontypridd, Wales, United Kingdom

VIB-3 ENERGY HARVESTING

VIB-3-3 Nonlinear Energy Harvesting

Grand Teton 3:40pm–5:20pm

Session Chair: Dane Quinn, The University of Akron, Akron, OH, United States
Session Co-Chair: Brian Mann, Duke University, Durham, NC, United States

Comparison of Linear and Nonlinear Electromagnetic Coupling Models for a Linear Oscillator

Student Competition Paper. DETC2011-47782

Benjamin Owens, Brian Mann, Duke University, Durham, NC, United States

Comparing the Performance of a Nonlinear Energy Harvester in Mono- and Bi-Stable Potentials

Technical Publication. DETC2011-47828

Ravindra Masana, Mohammed Daqqaq, Clemson University, Clemson, SC, United States

Analytical Approximation and Experimental Study of Bistable Hybrid Nonlinear Energy Harvesting System

Student Competition Paper. DETC2011-47871

Amin Karami, University of Michigan, Ann Arbor, MI, United States, Paulo Varoto, Universidade de Sao Paulo, Sao Paulo, SP, Brazil, Daniel J. Inman, Virginia Tech, Blacksburg, VA, United States

Experimental Investigation of Energy Harvesting with Essential Nonlinearities

Technical Publication. DETC2011-48164

Angie Triplett, Dane Quinn, The University of Akron, Akron, OH, United States

Investigations on a Nonlinear Energy Harvesting System Consisting of a Flapping Foil and an Electro-magnetic Generator using Power Flow Analysis

Technical Publication. DETC2011-48445

J. Yang, Y.P. Xiong, J.T. Xing, University of Southampton, Southampton, United Kingdom

VIB-4 FINITE ELEMENT MODELING, MODAL TESTING, MODEL UPDATING, AND DAMAGE DETECTION

VIB-4-2 Modal Analysis and Testing

Congressional A 3:40pm–5:20pm

Session Chair: Gaetan Kerschen, University of Liege, Liege, Belgium
Session Co-Chair: S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

Mode Shape Function of Rectangular Mindlin Plate with a Finite-length Part-through Crack

Technical Publication. DETC2011-47419

Li-hua Chen, Zhi-jie Zhang, Hao-qun Li, Wei Zhang, Beijing University of Technology, Beijing, China

Frequency Based Subsystem Identification using Hybrid Primal-Dual Formulation

Technical Publication. DETC2011-47634

Walter D’Ambrogio, Università dell’Aquila, L’Aquila, AQ, Italy, Annalisa Fregolent, Università di Roma La Sapienza, Roma, Italy

Operational Modal Analysis in Absence of a Random Distributed Load

Technical Publication. DETC2011-47858

Antonio Culla, Annalisa Fregolent, Università di Roma La Sapienza, Roma, Italy, Walter D’Ambrogio, Università dell’Aquila, L’Aquila, AQ, Italy

Experimental Dynamical Characterization of Beach Tennis Rackets by Modal Analysis

Technical Publication. DETC2011-48241

Emiliano Mucchi, University of Ferrara, Ferrara, Italy

Amplitude and Frequency Dependence of the Signal-to-Noise Ratio in LDV Measurements

Technical Publication. DETC2011-48692

Patrick F. O’Malley, Joseph F. Vignola, John A. Judge, The Catholic University of America, Washington, DC, United States
CIE-2 CAPPD: COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT GENERAL

CIE-2-4 Tolerancing and Process Planning

Yellowstone 3:40pm–5:20pm

Session Chair: Satyandra Gupta, University of Maryland, College Park, MD, United States
Session Co-Chair: Derek Yip-Hoi, Western Washington University, Bellingham, WA, United States

A Mereotopology-Based Approach for Integrated Assembly Modeling and Planning

Technical Publication. DETC2011-47439
Frédéric Demoly, Aristeidis Matsokis, Dimitris Kiritsis, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

An Adaptive Rapidly-exploring Random Tree Algorithm for Assembly Path Planning in Complex Environments

Technical Publication. DETC2011-47535
Wei Shang, Jianhua Liu, Beijing Institute of Technology, Beijing, Beijing, China

Runner Optimization for In-mold Assembly of Multi-Material Compliant Mechanisms

Technical Publication. DETC2011-48573
Wojciech Bejgerowski, Satyandra Gupta, University of Maryland, College Park, MD, United States

Mathematical Representation of Entity Cluster in Geometric and Design Tolerancing

Technical Publication. DETC2011-47937
Yadong Shen, Jami J. Shah, Joseph K. Davidson, Arizona State University, Tempe, AZ, United States

Evaluation of Deviation Zone Based on Maximum Conformance to Tolerances

Technical Publication. DETC2011-48444
Ahmad Barari, University of Ontario Institute of Technology, Oshawa, ON, Canada

CIE-4 VES: VIRTUAL ENVIRONMENTS AND SYSTEMS, GENERAL

CIE-4-3 VES Session 3

Thornton A 3:40pm–5:20pm

Session Chair: Hai-Jun Su, University of Maryland Baltimore County, Baltimore, MD, United States
Session Co-Chair: Rafael Radkowski, Heinz Nixdorf Institute, Paderborn, Germany

Fast VR Application Development Based on Versatile Rigid Multi-body Dynamics Simulation

Technical Publication. DETC2011-47621
Thomas Josef Jung, Malte Rast, Eric Guiffo Kaigom, RWTH Aachen University, Aachen, Germany, Juergen Rossmann, RWTH Aachen University, Institute for Man-Machine Interaction, Aachen, Germany

Comparison Between 2D and 3D Hand Gesture Interaction for Augmented Reality Applications

Technical Publication. DETC2011-48155
Rafael Radkowski, Christian Stritzke, Heinz Nixdorf Institute, Paderborn, Germany

An Exploratory Study to Fill the Gap Between Co-Design Tools and Industrial Applications

Technical Publication. DETC2011-48958
Margherita Peruzzini, Maura Mengoni, Michele Germani, Polytechnic University of Marche, Ancona, Italy

Using Brain Computer Interfaces for Geometry Selection in CAD Systems: P300 Detection Approach

Technical Publication. DETC2011-48775
Ehsan Tarkesh Esfahani, Sundararajan V, University of California Riverside, Riverside, CA, United States

Developing Interfaces for Interactive Product Visualization in Truly 3D Virtual Workspaces

Technical Publication. DETC2011-47088
Elia Z. Opiyo, Delft University of Technology, Delft, Netherlands

A Hybrid Method for Haptic Feedback to Support Manual Virtual Product Assembly

Technical Publication. DETC2011-47665
Daniela Faas, Massachusetts Institute of Technology, Cambridge, MA, United States

CIE-7 AMS: INVERSE PROBLEMS IN SCIENCE AND ENGINEERING

CIE-7-2 AMS IPSE Session 2

Lexington 3:40pm–5:20pm

Session Chair: Brian H. Dennis, The University of Texas at Arlington, Arlington, TX, United States
Session Co-Chair: George Dulikravich, Florida International University, Miami, FL, United States

A Polynomial Chaos Based Bayesian Inference Method with Uncertain Hyper-parameters

Technical Publication. DETC2011-47632
Piyush Tagade, Han-Lim Choi, Korea Advanced Institute of Science and Technology, Daejeon, Korea (Republic)

Determining the Ordinary Differential Equation from Noisy Data

Technical Publication. DETC2011-47658
P. Venkataraman, Rochester Institute of Technology, Rochester, NY, United States

Complete High Dimensional Inverse Characterization of Fractal Surfaces

Technical Publication. DETC2011-47784
John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States
Error Estimations in Linear Inverse Problems with a Priori Information

Technical Publication. DETC2011-47799
Anatoly G. Yagola, Yury M. Korolev, MSU Lomonosov, Faculty of Physics, Moscow, Russia

Multi-Objective Optimization of a Segmented Lunar Wheel Concept

Technical Publication. DETC2011-47946
Michele Faragalli, Damiano Pasini, Peter Radziszewski, McGill University, Montreal, QC, Canada

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-3 Fractional Order Controls Design and Tuning Methods

Everglades 3:40pm–5:20pm
Session Chair: Ivo Petras, Technical University of Kosice, Kosice, Slovakia
Session Co-Chairs: Patrick Lanusse, University of Bordeaux, Talence, France, Mohammad Saleh Tavazoei, Sharif University of Technology, Tehran, Iran

Practical Aspects of Tuning and Implementation of Fractional-Order Controllers

Technical Publication. DETC2011-47053
Ivo Petras, Technical University of Kosice, Kosice, Slovakia

Crone Control-System Design Toolbox for the Control Engineering Community

Technical Publication. DETC2011-47286
Patrick Lanusse, Rachid Malti, University of Bordeaux, Talence, France, Pierre Melchior, University of Bordeaux, Talence Cedex, France

Fractional PI Tuning Satisfying Gain and Phase Margin Constraints

Technical Publication. DETC2011-47696
Kaveh Paridari, Mohammad Saleh Tavazoei, Sharif University of Technology, Tehran, Iran

Tuning Fractional Order Proportional Integral Controllers for Time Delayed Systems with a Fractional Pole

Technical Publication. DETC2011-48782
Hadi Malek, YangQuan Chen, Utah State University, Logan, UT, United States, Ying Luo, South China University of Technology, Guangzhou, Tianhe Qu, China

A New Fractional Order Observer Design for Fractional Order Nonlinear Systems

Student Competition Paper. DETC2011-48861
Sara Dadras, Hamid Reza Momeni, Tarbiat Modares University, Tehran, Tehran, Iran

MESA-2 THE THIRD SYMPOSIUM ON SMALL UNMANNED AERIAL VEHICLE TECHNOLOGIES AND APPLICATIONS (SUAVTA’11)

MESA-2-3 Advanced Navigation and Flight Control Techniques

Bryce 3:40pm–5:20pm
Session Chair: Youmin Zhang, Concordia University, Montreal, Quebec, QC, Canada
Session Co-Chair: YangQuan Chen, Utah State University, Logan, UT, United States

Model-Based Optimal $H$-Infinity Controller on the Stability of a 2-DoF Quadrotor

Technical Publication. DETC2011-48447
Rafael Coronel Bueno Sampaio, Marcelo Becker, Adriano Siqueira, Ricardo Breganon, Fabio de Salvi, Eduardo Belo, USP/EESC, Sao Carlos, Brazil

Fault Tolerant Control of a Quadrotor Unmanned Helicopter using Model Reference Adaptive Control

Technical Publication. DETC2011-48755
Iman Sadeghzadeh, Ankit C. Mehta, Youmin Zhang, Concordia University, Montreal, Quebec, QC, Canada

Integrated Adaptive Fault Diagnosis and State-Feedback Control for Systems with Constant Actuator Faults and Control Input Constraints

Technical Publication. DETC2011-48788
Jinhua Fan, Youmin Zhang, Concordia University, Montreal, Quebec, QC, Canada, Zhiqiang Zheng, National University of Defense Technology, Changsha, China

Path Tracking of a Fixed-Wing Autonomous Aerial Vehicle by High Order Sliding Mode Control

Technical Publication. DETC2011-48975
Herman Castañeda, Jesús de León, Universidad Autonoma de Nuevo Leon, San Nicolas de los Garza, Nuevo Leon, Mexico, Ernesto Olguín-Díaz, Cinvestav, Ramos Arizpe, Coahuila, Mexico

Development of Flight Guidance System of a Small Unmanned Aerial Vehicle (UAV)

Technical Publication. DETC2011-48561
Rianto Adhy Sasongko, Javensius Sembiring, Faculty of Mechanical and Aerospace Eng., Institut Teknologi Bandung, Bandung, Jawa Barat, Indonesia
### MESA-7 THE SECOND SYMPOSIUM ON DIAGNOSIS AND MONITORING IN MECHATRONIC SYSTEMS (DMMS’11)

#### MESA-7-1 Diagnosis and Monitoring in Mechatronics Systems

**Sequoia** 3:40pm–5:20pm

Session Chair: **Wen Chen**, Wayne State University, Detroit, MI, United States

**A Novel Design of Iterative Learning Observer for Fault Estimation**

*Technical Publication.* DETC2011-47679  
**Wen Chen**, Wayne State University, Detroit, MI, United States, **Chun-Mei Liu**, Shenyang University of Technology, LiaoYang, Liao Ning, China, **Han-Long Yang**, Navistar Inc., Melrose Park, IL, United States

**A Generalized Form of ToMFIR Approach to Fault Detection in dynamic systems**

*Technical Publication.* DETC2011-47680  
**Wen Chen**, Wayne State University, Detroit, MI, United States, **Chun-Mei Liu**, Shenyang University of Technology, LiaoYang, Liao Ning, China

**Vision Based Fault Detection in Automated Assembly Equipment**

*Technical Publication.* DETC2011-48493  
**Greg Szkilnyk**, Kevin Hughes, Brian Surgenor, Queen’s University, Kingston, ON, Canada

**Hidden Markov Model for Health Estimation and Prognosis of Turbopfan Engines**

*Technical Publication.* DETC2011-48174  
**Andrea Giantomassi**, Francesco Ferracuti, Alessandro Benini, Gianluca Ippoliti, Sauro Longhi, Antonio Petrucci, Università Politecnica delle Marche, Ancona, Ancona, Italy

**The Influence of Nonlinear Friction and Disturbance in the Control of a Mechatronic System: CNC Machine Tool Application**

*Technical Publication.* DETC2011-48553  
**Liz Rincon**, Joao Rosario, University of Campinas, Campinas, SP, Brazil

### MSNDC-1 COMPUTATIONAL METHODS

#### MSNDC-1-3 Novel Methods and Nonlinear Dynamics

**Bunker Hill** 3:40pm–5:20pm

Session Chair: **Kurt Anderson**, Rensselaer Polytechnic Institute, Troy, NY, United States  
Session Co-Chair: **Andreas Müller**, University Duisburg-Essen, Duisburg, Germany

**Dynamic Response of Multibody Systems with Multiple Clearance Joints**

*Technical Publication.* DETC2011-47224  
**Paulo Flores**, University of Minho, Guimaraes, Portugal, **Hamid Lankarani**, Wichita State University, Wichita, KS, United States

**Efficient Multirate Simulation of Complex Multibody Systems Based on Free Software**

*Technical Publication.* DETC2011-47306  
**Tommaso Solcia**, Pierangelo Masaratti, Politecnico di Milano, Milano, Italy

**Stability and Bifurcations in a Model of a Follower Loaded Rod**

*Technical Publication.* DETC2011-47441  
**Jorge Galan-Vioque**, Miguel Angel Lago-Hidalgo, Universidad de Sevilla, Sevilla, Sevilla, Spain, **Juan Valverde**, Universidad de Cadiz, Cadiz, Cadiz, Spain

**Reduced State Space Model for the Substructuring of Nonlinear Multibody Mechanisms**

*Technical Publication.* DETC2011-47907  
**Marco Gubitosa**, Jan Anthonis, Joris De Cuyper, LMS International, Leuven, Belgium, **Wim Desmet**, KULeuven, Heverlee, Belgium

**Two Lie Group Formulations for Dynamic Multibody Systems with Large Rotations**

*Technical Publication.* DETC2011-48132  
**Olivier Brüls**, University of Liège, Liège, Belgium, **Martin Arnold**, Martin Luther University Halle-Wittenberg, Halle (Saale), Germany, **Alberto Cardona**, Universidad Nacional del Litoral - Conicet, Santa Fe, Argentina

### MSNDC-2 CONTACT AND INTERFACE DYNAMICS

#### MSNDC-2-3 Contact and Interface Dynamics III

**Congressional D** 3:40pm–5:20pm

Session Chair: **Alessandro Tasora**, Università degli Studi di Parma, Parma, Italy  
Session Co-Chair: **John McPhee**, University of Waterloo, Waterloo, ON, Canada

**Model Reduction of Contact Dynamics Simulation with Modified Lyapunov Balancing Method**

*Technical Publication.* DETC2011-47149  
**jianxun liang**, Ou Ma, New Mexico State University, Las Cruces, NM, United States
Time-accurate Multibody Dynamics Model for Toroidal Traction Drives

Student Competition Paper. DETC2011-48794
Cagkan Yildiz, Tamer Wasfy, Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States

Enabling Computational Dynamics in Distributed Computing Environments using a Heterogeneous Computing Template

Technical Publication. DETC2011-48347
Toby Heyn, Andrew Seidl, Hammad Mazhar, Dan Negrut, University of Wisconsin-Madison, Madison, WI, United States, David Lamb, TARDEC, Warren, MI, United States, Alessandro Tasora, Università degli Studi di Parma, Parma, Italy

Multibody Modelling of Spalled Rolling Bearings: Effectiveness of Different Contact Algorithms

Technical Publication. DETC2011-48218

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MSNDC-3 CONTROL AND OPTIMIZATION

MSNDC-3-3 Control and Optimization III

Concord 3:40pm–5:20pm

Session Chair: József Kövecses, McGill University, Montreal, QC, Canada
Session Co-Chair: Stefan Reichl, Upper Austria University of Applied Sciences, Wels, Austria

Integrated Design Approaches for Controlled Flexible Multibody Systems

Technical Publication. DETC2011-47707
Robert Seifried, Alexander Held, University of Stuttgart, Stuttgart, Germany

Dynamics of Multibody Haptic Systems

Technical Publication. DETC2011-48551
Sara Shayan Amin, József Kövecses, McGill University, Montreal, QC, Canada

Efficient Sensitivity Analysis for Multibody Dynamics Systems using an Iterative Steps Method with Application in Topology Optimization

Technical Publication. DETC2011-47578
Guang Dong, Zheng-Dong Ma, Gregory Hulbert, Noboru Kikuchi, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Sudhakar Arepally, Madan Vunnam, U.S. Army TARDEC, Warren, MI, United States, Ken-An Lou, ArmorWorks LLC, Chandler, AZ, United States

Efficient Operational Space Sensitivity Analysis of Dynamic Multibody Systems with Generalized Topologies

Technical Publication. DETC2011-48884
R. Mukherjee, California Institute of Technology, Pasadena, CA, United States

Vibration Reduction in Large Flexible Systems Through Independent Modal Control

Technical Publication. DETC2011-48989
Francesco Braghin, Simone Cinquemani, Ferruccio Resta, Politecnico di Milano, Milan, Italy

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Tuning Methodology of Nonlinear Vibration Absorbers Coupled to Nonlinear Mechanical Systems

Technical Publication. DETC2011-47146
Regis Viguie, Techspace Aero, Milmort, Belgium, Gaetan Kerschen, University of Liege, Liege, Belgium

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DAC-4 CELEBRATION OF K.K. CHOI’S 65TH BIRTHDAY

DAC-4-2 Celebration of K.K. Choi’s 65th Birthday

Regency C 3:40pm–5:20pm

Session Chair: Nam Kim, University of Florida, Gainesville, FL, United States
Session Co-Chair: Byeng D. Youn, Seoul National University, Seoul, Korea (Republic)

Decomposition of System Level Reliability-Based Design Optimization to Reduce the Number of Simulations

Technical Publication. DETC2011-47815
Diane Villanueva, Raphael T. Haftka, Bhavani V. Sankar, University of Florida, Gainesville, FL, United States, Rodolphe Le Riche, Gauthier Picard, Ecole des Mines de Saint Etienne, Saint-Etienne, France

Random Field Characterization with Insufficient Data Sets for Probability Analysis and Design

Technical Publication. DETC2011-48319
Zhimin Xi, University of Michigan - Dearborn, Dearborn, MI, United States, Byungchang Jung, University of Maryland, College Park, MD, United States, Byeng D. Youn, Seoul National University, Seoul, Korea (Republic)

An Asymmetric Dimension-Adaptive Tensor-Product Method for Reliability Analysis

Technical Publication. DETC2011-48850
Chao Hu, University of Maryland, College Park, MD, United States, Byeng D. Youn, Seoul National University, Seoul, Korea (Republic)

Robust Design Optimization of Ball Grid Array Packaging.

Technical Publication. DETC2011-48858
Jae Chang Kim, Joo-Ho Choi, Yeong K. Kim, Korea Aerospace University, Goyang-City, Korea (Republic)

Topology Optimization of Spacers for Maximizing Permeate Flux on Membrane Surface in Reverse Osmosis Channel

Technical Publication. DETC2011-48933
Semyung Wang, , Minkyu Park, Joonha Kim, Seungjae Oh, Minkyu Park, Joonha Kim, Gwangju Institute of Science and Technology, Gwangju, Korea (Republic)
DAC-7 MULTISCALE MECHANICS AND DESIGN OPTIMIZATION OF CELLULAR MATERIALS

DAC-7-1 Multiscale Mechanics and Design Optimization of Cellular Materials

Capital A 3:40pm–5:20pm

Session Chair: Damiano Pasini, McGill University, Montreal, QC, Canada
Session Co-Chair: Joshua Summers, Clemson University, Clemson, SC, United States

Optimization of Lattice Material Parameters
**Technical Publication. DETC2011-47390**
Andrea Vigliotti, Damiano Pasini, McGill University, Montreal, QC, Canada

Multiscale Design and Multiobjective Optimization of Orthopaedic Cellular Implants
**Technical Publication. DETC2011-47487**
Sajad A. Khanoki, Damiano Pasini, McGill University, Montreal, QC, Canada

Shape Synthesis of Unit Cell Geometry for Periodic Cellular Solids in Fatigue Failure Design
**Technical Publication. DETC2011-47983**
Ehsan Masoumi Khalil Abad, Sajad A. Khanoki, Damiano Pasini, McGill University, Montreal, QC, Canada

Shear Compliant Hexagonal Cellular Solids with a Shape Memory Alloy
**Technical Publication. DETC2011-48790**
Jaehyung Ju, Joshua Summers, Clemson University, Clemson, SC, United States

Optimization of Honeycomb Cellular Meso-Structures for High Speed Impact Energy Absorption
**Technical Publication. DETC2011-48000**
Jesse Schultz, David Griese, Prabhu Shankar, Joshua Summers, Lonny Thompson, Jaehyung Ju, Clemson University, Clemson, SC, United States

PTG-5 POWER LOSS IN GEAR SYSTEMS

PTG-5-1 Power Loss in Gear Systems
Regency B 3:40pm–5:20pm

Session Chair: Robert Handschuh, NASA Glenn Research Center, Cleveland, OH, United States

Analytical Model of the Efficiency of Spur Gears: Study of the Influence of the Design Parameters
**Technical Publication. DETC2011-47662**
Miguel Pleguezuelos, Jose I. Pedrero, Miryam B. Sanchez, UNED, Madrid, Madrid, Spain

A Note on Flow Regimes and Churning Loss Modelling
**Technical Publication. DETC2011-47227**
Christophe Changenet, ECAM, Lyon, France, Gauthier Leprince, Fabrice Ville, Philippe Velex, INSA Lyon, Villeurbanne, France

Effects of Bearing Preload, Oil Volume and Operating Temperature on Axle Power Losses
**Technical Publication. DETC2011-47169**
Hai Xu, Avinash Singh, General Motors Company, Pontiac, MI, United States, Ahmet Kahraman, Joshua Hurley, Sam Shon, The Ohio State University, Columbus, OH, United States

An Experimental Investigation of the Efficiency of Planetary Gear Sets
**Technical Publication. DETC2011-47126**
David Talbot, Ahmet Kahraman, The Ohio State University, Columbus, OH, United States, Avinash Singh, General Motors Company, Pontiac, MI, United States

PTG-6 GEAR STRENGTH AND DURABILITY

PTG-6-1 Gear Strength and Durability
Capital B 3:40pm–5:20pm

Session Chair: Moshen Kolivand, The Gleason Works, Rochester, NY, United States

Flank-Load-Carrying Capacity of Case Hardened Gears with Grinding Burn
**Technical Publication. DETC2011-47261**
Bernd-Robert Höhn, Karsten Stahl, Peter Oster, Thomas Tobie, Peter Koller, FZG - Gear Research Center - Institute for Machine Elements, Garching, Germany, Simon Schwenbacher, Alupress, Brixen, Italy

Coupling Between Dynamic Behavior and Contact Fatigue in Spur Gears
**Technical Publication. DETC2011-47314**
Thaer Osman, Philippe Velex, INSA Lyon, Villeurbanne, France

On Failure Problem of Gears Made from Very High Strength Steel
**Technical Publication. DETC2011-47642**
Aizoh Kubo, Research Institute for Applied Sciences, Kyoto, Japan, Japan

Tooth Root Stresses of Helical Gear Pairs with Unequal and Offset Face Widths
**Technical Publication. DETC2011-48835**
Carlos Wink, Eaton Corp., Galesburg, MI, United States

Deformation and Stresses in Face-Hobbed Spiral Bevel Gears
**Technical Publication. DETC2011-47089**
Vilmos SiMonday, Budapest University of Technology and Economics, Budapest, Hungary
MECH-1 MOBILE ROBOTS

MECH-1-2 Air and Water Locomotion

Columbia Foyer 3:40pm–5:20pm

Session Chair: Dennis Hong, Virginia Tech, Blacksburg, VA, United States
Session Co-Chair: Justin Seipel, Purdue University, West Lafayette, IN, United States

A Low Cost Attitude and Heading Reference System Based on a MEMS IMU for a T-quadrotor
Technical Publication. DETC2011-48960
Yangbo Long, Shi Bai, Paras Patel, David J. Cappelleri, Stevens Institute of Technology, Hoboken, NJ, United States

Analysis and Synthesis of Multi-Rotor Vehicles
Technical Publication. DETC2011-47114
Qimi Jiang, Vijay Kumar, Daniel Mellinger, Christine Kappeyne, University of Pennsylvania, Philadelphia, PA, United States

Quadrotor UAV Control: Online Learning Approach
Technical Publication. DETC2011-47095
Pong-in Pipatpaibul, Puren Ouyang, Ryerson University, Toronto, ON, Canada

Determination of Minimum Time Rendezvous Points for Multiple Mobile Robots Via Level Set Methods
Technical Publication. DETC2011-48282
Travis L. Brown, Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States, Tariq D. Aslam, Los Alamos National Laboratory, Los Alamos, NM, United States

Generation of State Transition Model using Simulation for Unmanned Sea Surface Vehicle Trajectory Planning
Technical Publication. DETC2011-48624
Atul Thakur, Petr Svec, Satyandra Gupta, University of Maryland, College Park, MD, United States

MECH-5 STUDENT MECHANISM AND ROBOT DESIGN COMPETITION

MECH-5-2 Student Mechanism Design Competition - Graduate

Yosemite 3:40pm–5:20pm

Session Chair: Girish Krishnan, University of Michigan, Ann Arbor, MI, United States
Session Co-Chair: Brian Trease, NASA JPL, Pasadena, CA, United States

MECH-6 ROBOT DYNAMICS AND CONTROL

MECH-6-1 Dynamics and Control

Congressional B 3:40pm–5:20pm

Session Chair: Anurag Purwar, Stony Brook University, Stony Brook, NY, United States
Session Co-Chair: Stephen Canfield, Tennessee Technological University, Cookeville, TN, United States

A New Variable Stiffness Suspension Mechanism
Technical Publication. DETC2011-48279
Olugbenga Anubi, Carl Crane, University of Florida, Gainesville, FL, United States

Improved Robotic Control using an Adaptive Two-Input Single-Output Coarse/Fine Approach
Technical Publication. DETC2011-47881
Carl Nelson, Alyssa Koch, University of Nebraska-Lincoln, Lincoln, NE, United States, Eric Wood, Colorado State University, Fort Collins, CO, United States

NURBs for Robot Manipulator Trajectory Generation
Technical Publication. DETC2011-47477
John Steuben, John Steele, Cameron Turner, Colorado School of Mines, Golden, CO, United States

An Analytical Stiffness Analysis between Actuator Structure and Principal Bearings Used for Robot Actuators
Technical Publication. DETC2011-48030
Hoon Lee, Delbert Tesar, The University of Texas at Austin, Austin, TX, United States

Optimum Trajectory Planning for Redundant and Hyper-Redundant Manipulators Through Inverse Dynamics
Technical Publication. DETC2011-48237
Kagan Koray Ayten, Pejman Iravani, Mehmet Sahinkaya, University of Bath, Bath, United Kingdom

Kinematics of the (nS)-2SPU Wrist
Technical Publication. DETC2011-47103
Raffaele Di Gregorio, Department of Engineering - University of Ferrara, Ferrara, FE, Italy
MNS-3 SYMPOSIUM ON NONLINEAR MECHANICS, DYNAMICS, AND CONTROL IN ATOMIC FORCE MICROSCOPY

MNS-3-2 Nonlinear Mechanics, Dynamics, and Control in Atomic Force Microscopy II

Glacier 3:40pm–5:20pm

Session Chair: Arvind Raman, Purdue, West Lafayette, IN, United States

Measuring Local Elastic Modulus with a Bifurcation Based Atomic Force Microscope Method

Technical Publication. DETC2011-47503

Wei Huang, Andrew Dick, Rice University, Houston, TX, United States

On a Control Design to An Afm Microcantilever Beam, Operating in a Tapping Mode, with Irregular Behavior

Technical Publication. DETC2011-47543

José Manoel Balthazar, UNESP: Univ Estadual Paulista, Rio Claro, SP, Brazil, Kleber dos Santos Rodrigues, Engineering College of Bauru (FEB), São Paulo, Brazil, Angelo Marcelo Tusset, Department of Engineering Science, UTFPR, Paraná, Brazil, Bento Rodrigues Pontes Junior, UNESP: Univ Estadual Paulista, FEB, UNESP, São Paulo, Brazil

Noise and Contact in Dynamic AFM Operations

Technical Publication. DETC2011-47955

Ishita Chakraborty, Bala Balachandran, University of Maryland, College Park, MD, United States

Unifying Theory of Quantitative Atomic Force Microscopy using Piezo Base Excitation in Liquids

Technical Publication. DETC2011-47730

Daniel Kiracofe, Arvind Raman, Purdue, West Lafayette, IN, United States

Utilization of Simple Scaling Laws for Modulating Tip-sample Interaction Forces in Aqueous Environment AFM Characterization: Application to the Self-assembly of Protein Polymers

Technical Publication. DETC2011-47199

Santiago D. Solares, Jonathan Chang, Joonil Seog, Adam Kareem, University of Maryland, College Park, MD, United States

MNS-4 SYMPOSIUM ON MICRO MECHANICS, SURFACE ENGINEERING, AND CONTACT MECHANICS/TRIBOLOGY

MNS-4-2 Modeling Techniques

Columbia B 3:40pm–5:20pm

Session Chair: Mircea Teodorescu
Session Co-Chair: Yong Shi, Stevens Institute of Technology, Hoboken, NJ, United States

Vibrational Analysis of Wavy Carbon Nanotube-Reinforced Composites

Technical Publication. DETC2011-47152

Mohamad Shafiee Motahar, Mohammad Ahmadian, Sharif University of Technology, Tehran, Iran

Numerical Analysis of the Band Excitation Afm Method: Examining the Characteristics of the Excitation Signals and the Corresponding Response Behavior At the Cantilever Tip

Technical Publication. DETC2011-47167

Adam Kareem, Santiago D. Solares, University of Maryland, College Park, College Park, MD, United States

Static Analysis of Electrically Actuated Nano to Micron Scale Beams using Nonlocal Theory

Technical Publication. DETC2011-47616

Youness Alizadeh Vaghasloo, Amirkabir University of Technology, Tehran, Iran, Abdolreza Pasharavesh, Mohammad Ahmadian, Sharif University of Technology, Tehran, Iran, Ali Fallah, Sharif University of Technology, School of Mechanical Engineering, Tehran, Tehran, Iran

Determining the Sub-Surface Stresses in a Graded-Elastic Solid: An Analytic Approach

Technical Publication. DETC2011-47883

Stewart Chidlow, Nick Vaughan, Cranfield University, Cranfield, United Kingdom, Mircea Teodorescu, Cranfield University, Bedfordshire, United Kingdom

DEC-2 BEST PRACTICES AND LESSONS LEARNED IN DESIGN EDUCATION

DEC-2-1 Best Practices and Lessons Learned in Design Education

Thornton B 3:40pm–5:20pm

Session Chair: John Gershenson, Michigan Technological University, Houghton, MI, United States
Session Co-Chair: Ben Sherrett, Oregon State University, Corvallis, OR, United States

The Development of a Framework for Investigating the Effectiveness of Capstone Course Curricular Changes

Technical Publication. DETC2011-48724

Ben Sherrett, Oregon State University, Corvallis, OR, United States, John Parmigiani, Oregon State University, School of Mechanical, Industrial, and Manufacturing Engineering, Corvallis, OR, United States
Evolution of Velovations: A Bicycle Design Enterprise in Lieu of Capstone Design

Technical Publication. DETC2011-47980
John Gershenson, Michigan Technological University, Houghton, Mi, United States

A Coding Scheme for Analyzing Capstone Design Reports: Problem and Solution Descriptions

Technical Publication. DETC2011-47154
Shraddha Joshi, Joshua Summers, Clemson University, Clemson, SC, United States

Mapping Problem and Requirements to Final Solution: a Document Analysis of Capstone Design Projects

Technical Publication. DETC2011-47471
Shraddha Joshi, Beshoy Morkos, Joshua Summers, Clemson University, Clemson, SC, United States

DTM-4 PRODUCT FAMILY AND ARCHITECTURE DESIGN

DTM-4-1 Product Family and Architecture Design

Regency D 3:40pm–5:20pm

Session Chair: David Wynn, Cambridge University, Cambridge, United Kingdom
Session Co-Chair: Michael Scott, University of Illinois at Chicago, Chicago, IL, United States

Modeling and using Product Architectures in Industrial Mechatronic Product Development: Experiments and Observations

Technical Publication. DETC2011-47148
Andres A. Alvarez Cabrera, Maarten J. Foeken, Delft University of Technology, Delft, Zuid Holland, Netherlands, Krijn Woestenenk, University of Twente, Enschede, Netherlands, Guy Stoot, Oce Technologies B.V., Venlo, Netherlands, Tetsuo Tomyama, TU Delft, Delft, Netherlands

Level of Modularity at Different Levels of System Granularity

Technical Publication. DETC2011-47889
Noemi Chiriac, Katja Hollta-Otto, University of Massachusetts Dartmouth, North Dartmouth, MA, United States, Eun Suk Suh, Dusan Lysy, Xerox Corporation, Webster, NY, United States

Empirically Derived Heuristics to Assist Designers with Satisfying Consumer Variation in Product Design

Technical Publication. DETC2011-48448
Phil Cormier, Brian Literman, Department of Mechanical and Aerospace Engineering, Buffalo, NY, United States, Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States

Identifying Enablers and Barriers to Successful Platform-Based Product Development: A Case Study from Business-to-Business Products

Technical Publication. DETC2011-48458
Jens Jorgensen, David Havens, Paul Salvatore, Alvaro J. Rojas Arciniegas, Marcos Esterman Jr, Rochester Institute of Technology, Rochester, NY, United States

DFMLC-5 SUSTAINABLE DESIGN

DFMLC-5-1 Sustainable Design

Columbia C 3:40pm–5:20pm

Session Chair: Karl R. Haapala, Oregon State University, Corvallis, OR, United States

Addressing Uncertainties Within Product Redesign for Sustainability: A Function Based Framework

Student Competition Paper. DETC2011-47137
Devarajan Ramanujan, William Z. Bernstein, Fu Zhao, Karthik Ramani, Purdue University, West Lafayette, IN, United States

Towards Sustainable Product Design

Technical Publication. DETC2011-47736
Qing Wang, Durham University, Durham, United Kingdom, Jun Liu, Kratos Analytical Ltd, Manchester, United Kingdom

Selecting a Design-Stage Energy Estimation Approach for Manufacturing Processes

Technical Publication. DETC2011-48418
Alexander Weissman, Satyandra Gupta, University of Maryland, College Park, MD, United States

Sustainable Vehicle Design for Transportation System-A Technical & Social System of System Based Approach

Technical Publication. DETC2011-48536
Zulfiqar Ali-Qureshi, University of Windsor, Windsor, ON, Canada

A Conceptual Framework for a Sustainable Product Development Collaboratory to Support Integrated Sustainable Design and Manufacturing

Technical Publication. DETC2011-48922
Kyoung-Yun Kim, Alper Murat, Ratna Chinnam, Leslie Monplaisir, Wayne State University, Detroit, MI, United States, Karl Haapala, Oregon State University, Corvallis, OR, United States, Gul E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States
**DFMLC-6 INTEGRATED PRODUCT AND PROCESS DEVELOPMENT PROCESSES**

**DFMLC-6-1 Integrated Product Design and Process Development Processes I**

Congressional C 3:40pm–5:20pm

Session Chair: Shun Takai, Missouri University of Science and Technology, Rolla, MO, United States

**Thermo-Mechanical Rigidity of High Performance and Life Improvements for Caster Roll in Continuous Casting Machines**

*Technical Publication*. DETC2011-47025
Mostafa El-Bealy, Company’s Chair of Materials Processing, Heliopolis, Cairo, Egypt

**An Approach toward Making a Design Decision Based on Future Demand Prediction**

*Technical Publication*. DETC2011-47493
Shun Takai, Swithin S. Razu, Missouri University of Science and Technology, Rolla, MO, United States, Tae Yang, General Motors Company, Warren, MI, United States

**Reliability and Accuracy of Bootstrap and Monte Carlo Methods for Demand Distribution Modeling**

*Technical Publication*. DETC2011-47496
Swithin S. Razu, Shun Takai, Missouri University of Science and Technology, Rolla, MO, United States

**A Simplified Integration System for the Fabrication of Total Surface Bearing Transtibial Socket by Employing Rapid Prototyping Technology**

*Technical Publication*. DETC2011-48877
Lai-Hsing Hsu, Jo-Tong Chen, National Cheng Kung University, Tainan, Taiwan, Ming-Ji Tzeng, National University of Tainan, Tainan, Taiwan

**On a Probabilistic View of Commonality for Product Evolution and Reuse**

*Technical Publication*. DETC2011-48616
Vijitashw Pandey, Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States, Deborah Thurston, University of Illinois at Urbana-Champaign, Urbana, IL, United States

**AVTT-3 ADVANCES IN METHODS FOR VEHICLE SYSTEMS DESIGN AND TIRE MODELING**

**AVTT-3-1 Advances in Methods for Vehicle Systems Design and Tire Modeling I**

Thornton C 3:40pm–5:20pm

Session Chair: Fredrik Oijer, Volvo 3P, Gothenburg, Sweden

**Statistical Evaluation of Chassis Load Variations for Heavy Trucks**

*Technical Publication*. DETC2011-475047
Per Sundell, Fredrik Oijer, Martin Olofsson, Volvo 3P, Gothenburg, Sweden

**Application of a Lightweight Engineering Tool: Lazy Parts Analysis and Redesign of a Remote Controlled Car**

*Technical Publication*. DETC2011-47544
David Greise, Essam Namouz, Prabhu Shankar, Joshua Summers, Gregory Mocko, Clemson University, Clemson, SC, United States

**Numerical Simulation of Tread Effects on the Interaction between Cellular Shear Band Based Non-pneumatic Tire and Sand**

*Technical Publication*. DETC2011-47044
J. Ma, Saint Louis University, Saint Louis, MO, United States, Joshua Summers, Paul F. Joseph, Clemson University, Clemson University, SC, United States

**Numerical Investigation of Effect of Membrane Thickness on the Performance of Cellular Shear Band ased Non-pneumatic Tire**

*Technical Publication*. DETC2011-47045
J. Ma, Saint Louis University, Saint Louis, MO, United States, Joshua Summers, Paul F. Joseph, Clemson University, Clemson University, SC, United States

**Soil Modeling using FEA and SPH Techniques for a Tire-Soil Interaction**

*Technical Publication*. DETC2011-47104
Moustafa El-Gindy, University of Ontario Institute of Technology, Oshawa, ON, Canada, Ryan Lescoc, Pratt & Whitney, East Hartford, CT, United States, Trivedi Mukesh, Volvo 3P, Greensboro, NC, United States, Fredrik Oijer, Inge Johansson, Volvo 3P, Göteborg, Sweden

**An Experimentally Validated Model of a Motorcycle Shock Absorber for Studying Suspension Dynamics**

*Technical Publication*. DETC2011-47214
Alberto Doria, Università di Padova, Padova, Veneto, Italy, Marco Lucchini, University of Padova - DIPEG, Padova, Italy
TUESDAY, AUGUST 30

VIB-4 FINITE ELEMENT MODELING, MODAL TESTING, MODEL UPDATING, AND DAMAGE DETECTION

VIB-4-3 Vibration-based Structural Damage Detection

Congressional A 8:40am–10:20am

Session Chair: John A. Judge, The Catholic University of America, Washington, DC, United States
Session Co-Chair: Gaël Chevallier, Supmeca, Saint Ouen, France

Damage Detection in Steel-Concrete Composite Beams using Derivatives of Mode Shapes

Technical Publication. DETC2011-48686
Francis Chigbo, S. Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

Identification of Blockage in a Pipe using Modal Analysis

Technical Publication. DETC2011-48787
Dapo Bello, Nishant Virani, S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

Comparisons of Damage Detection in Simply Supported Beams using Stationary Wavelet Transform on Displacement Mode Shapes and Natural Frequency Curves

Technical Publication. DETC2011-48718
Shuncong Zhong, Fuzhou University, Fuzhou, China, S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom

Damage Detection of Space Frame Structures with L-shaped Beams and Bolted Joints using Changes in Natural Frequencies

Student Competition Paper. DETC2011-48982
Kun He, Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

Detecting Loosening of Bolted Connections in a Pipeline using Changes in Natural Frequencies

Technical Publication. DETC2011-47912
Kun He, Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

VIB-6 VIBRATION AND CONTROL OF DISTRIBUTED STRUCTURAL SYSTEMS

VIB-6-1 Vibration and Control of Distributed Structural Systems I

Columbia B 8:40am–10:20am

Session Chair: Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada
Session Co-Chair: Shundi Hu, Zhejiang University, Hangzhou, Zhejiang, China

Random Base Excitation of Timoshenko Beam Traversed by Moving Load

Technical Publication. DETC2011-48844
Fahim Javid, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada, Davood Younesian, Iran University of Science and Technology, Tehran, Iran

An Accurate Spatial Discretization and Substructure Method with Application to Moving Elevator Cable-Car Systems. Part I: Methodology

Technical Publication. DETC2011-48549
Hui Ren, Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

An Accurate Spatial Discretization and Substructure Method with Application to Moving Elevator Cable-Car Systems. Part II: Application

Student Competition Paper. DETC2011-49005
Hui Ren, Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

The Use of the Fixed Points Method for Optimal Damping of Harmonically Forced Cantilever Beams

Technical Publication. DETC2011-47638
Jimmy Issa, Lebanese American University, Byblos, Lebanon

Optimal Level Set Vibration Control of Plate Structures

Technical Publication. DETC2011-48050
Masoud Ansari, Amir Khajepour, University of Waterloo, Waterloo, ON, Canada, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

VIB-7 DYNAMICS AND CONTROL OF BIO-SYSTEMS

VIB-7-1 Dynamics and Control of Bio-Systems

Regency D 8:40am–10:20am

Session Chair: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States
Session Co-Chairs: Bogdan Epureanu, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Brian Feeny, Michigan State University, East Lansing, MI, United States

Complex Modal Analysis of the Swimming Motion of a Whiting

Keynote Paper. DETC2011-48204
Brian Feeny, Albert K. Feeny, Michigan State University, East Lansing, MI, United States

Feature Extraction and Abnormality Detection in Autonomic Regulation of Cardiovascular System

Technical Publication. DETC2011-48617
Ali Jalali, C. Nataraj, Margaret Butchy, Villanova University, Villanova, PA, United States, Ali Ghaffari, KN University of Technology, Tehran, Tehran, Iran

Computational Modeling of Hypoplastic Left Heart Syndrome (HLHS) in Newborn Babies

Technical Publication. DETC2011-48825
Ali Jalali, C. Nataraj, Gerard F. Jones, Villanova University, Villanova, PA, United States, Daniel J. Licht, University of Pennsylvania School of Medicine, Philadelphia, PA, United States

Coupled-Oscillator Model of Locomotion Stability with Elastically-Suspended Loads

Technical Publication. DETC2011-48828
Jeffrey Ackerman, Justin Seipel, Purdue University, West Lafayette, IN, United States
CIE-2 CAPPD: COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT GENERAL

CIE-2-5 Models and Metamodels under Uncertainty

Yellowstone  8:40am–10:20am

Session Chair: Cameron Turner, Colorado School of Mines, Golden, CO, United States
Session Co-Chair: Richard Crawford, University of Texas at Austin, Austin, TX, United States

Metamodeling in Product and Process Design

Technical Publication. DETC2011-47483
Cameron Turner, Colorado School of Mines, Golden, CO, United States

Engineering System Design using Firefly Algorithm and Multi-Objective Optimization

Technical Publication. DETC2011-47197
Fran Sérgio Lobato, Edu Barbosa Arruda, Valder Steffen Jr., Federal University of Uberlândia, School of Mechanical Engineering, Uberlândia, Minas Gerais, Brazil, Aldemir Ap. Cavallini Jr., Federal University of Uberlândia, Uberlândia, Minas Gerais, Brazil

Robust Optimization and Analysis of NURBs-based Metamodels using Graph Theory

Technical Publication. DETC2011-47217
John Steuben, Cameron Turner, Colorado School of Mines, Golden, CO, United States

A Review and Evaluation of Existing Adaptive Sampling Criteria and Methods for the Creation of NURBS-based Metamodels

Technical Publication. DETC2011-47288
Bethany Pickett, Cameron Turner, Colorado School of Mines, Golden, CO, United States

An Improved Size, Matching, and Scaling Method for the Design of Deterministic Mesoscale Truss Structures

Technical Publication. DETC2011-47729
Patrick Chang, David Rosen, Georgia Institute of Technology, Atlanta, GA, United States

CIE-4 VES: VIRTUAL ENVIRONMENTS AND SYSTEMS, GENERAL

CIE-4-4 VES Session 4

Thornton A  8:40am–10:20am

Session Chair: Sven Kreft, University of Paderborn/ Heinz Nixdorf Institute, Paderborn, Germany
Session Co-Chair: Umberto Cugini, Politecnico di Milano, Milano, Italy

A Novel 3D Interaction Technique Based on Eye Tracking for Mixed Reality Environments

Technical Publication. DETC2011-48288
Giandomenico Caruso, Monica Bordegoni, Politecnico di Milano, Milano, Italy

CIE-9 CAPPD: EMOTIONAL ENGINEERING

CIE-9-1 CAPPD: Emotional Engineering I

Columbia C  8:40am–10:20am

Session Chair: Monica Bordegoni, Politecnico di Milano, Milano, Italy
Session Co-Chair: Hideyoshi Yanagisawa, University of Tokyo, Tokyo, Japan

Deviation of Visual Expectation from Somatosensory Experience in Emotional Quality: Effects of Surface Characteristic in Context of Lifting Object

Technical Publication. DETC2011-47568
Hideyoshi Yanagisawa, Norihito Yuki, University of Tokyo, Tokyo, Japan

Air Bubble Detection for Product Quality Inspection

Technical Publication. DETC2011-47630
Teruaki Ito, The University of Tokushima, Tokushima, Japan

A study of Kansei Engineering in PET Bottle Silhouette

Technical Publication. DETC2011-48066
Khusnun Widiyati, Hideki Aoyama, Keio University, Yokohama, Kanagawa, Japan

A Design of Arm Wrestling Robot Systems for Intuitive Operation

Technical Publication. DETC2011-48149
Takashi Yamada, Kagawa University, Makamatsu, Japan, Tomio Watanabe, Okayama Prefectural University, Soja, Japan
CIE-10 SEIKM: SYSTEMS ENGINEERING

CIE-10-1 Systems Engineering

Lexington 8:40am–10:20am

Session Chair: Jitesh Panchal, Washington State University, Pullman, WA, United States
Session Co-Chair: Anantha Narayanan, National Institute of Standards and Technology, Gaithersburg, MD, United States

A Conceptual Framework for Consistency Management in Model-Based Systems Engineering

Technical Publication. DETC2011-47924
Sebastian J.I. Herzig, Georgia Institute of Technology / Technische Universitaet Muenchen, Atlanta, GA, United States
Ahsan Qamar, KTH Royal Institute of Technology, Stockholm, Sweden
Axel Reichwein, Christiaan J.J. Paredis, Georgia Institute of Technology, Atlanta, GA, United States

Overview of Architecture Frameworks and Modeling Languages for Model-Based Systems Engineering

Technical Publication. DETC2011-48028
Axel Reichwein, Christiaan J.J. Paredis, Georgia Institute of Technology, Atlanta, GA, United States

Capturing Design Process Information of Complex Product Development

Technical Publication. DETC2011-48105
Krijn Woestenenk, G.M. Bonnema, University of Twente, Enschede, Netherlands
Andres A. Alvarez Cabrera, Delft University of Technology, Delft, Zuid Holland, Netherlands
Tetsuo Tomiyama, TU Delft, Delft, Netherlands

Process Integration and Design Optimization for Model-Based Systems Engineering with SysML

Technical Publication. DETC2011-48453
Byung I. Min, Aleksandr A. Kerzhner, Christiaan J.J. Paredis, Georgia Institute of Technology, Atlanta, GA, United States

A Representation Model for Capturing and Formalizing the Evolving Design Rationale

Technical Publication. DETC2011-47421
Liu Jihong, Hu Xujie, Beihang University, Beijing, China

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-4 Applied Fractional Calculus in Materials and Mechanics

Everglades 8:40am–10:20am

Session Chair: Malgorzata Klimek, Czestochowa University of Technology, Czestochowa, Poland
Session Co-Chair: Masataka Fukunaga, Nihon University, Kooriyama, Fukushima, Japan

Three-Dimensional Fractional Derivative Models for Finite Deformation

Technical Publication. DETC2011-47552
Masataka Fukunaga, Nihon University, Kooriyama, Fukushima, Japan
Nobuyuki Shimizu, Iwaki Meisei University, Iwaki, Fukushima, Japan

On Reflection Symmetry and Its Application to the Euler-Lagrange Equations in Fractional Mechanics

Technical Publication. DETC2011-47721
Malgorzata Klimek, Czestochowa University of Technology, Czestochowa, Poland

Fractional Order Constitutive Model of Geomaterials

Technical Publication. DETC2011-47898
Deshun Yin, Hao Wu, Hohai University, Nanjing, Jiangsu, China
YangQuan Chen, Utah State University, Logan, UT, United States
Cheng Chen, Hohai University, Nanjing, China

Lagrangians with Linear Velocities Within Hilfer Fractional Derivative

Technical Publication. DETC2011-47953
Dumitru Baleanu, Cankaya University, Ankara, Turkey
Om P. Agrawal, Southern Illinois University, Carbondale, IL, United States
Sam i. Muslih, Azhar University, Gaza, Israel

Fractional-order Spectra for Complex Viscoelastic Materials

Technical Publication. DETC2011-48909
Kai-Xin Hu, Keqin Zhu, Tsinghua, Beijing, China

MESA-2 THE THIRD SYMPOSIUM ON SMALL UNMANNED AERIAL VEHICLE TECHNOLOGIES AND APPLICATIONS (SUAVTA’11)

MESA-2-4 Small UAV Systems and Applications

Bryce 8:40am–10:20am

Session Chair: Calvin Coopmans, Utah State Univ, Logan, UT, United States
Session Co-Chair: Chandra Asthana, Concordia University, Montreal, QC, Canada

Autonomous Flying under 500 Usd Based on RC Aircraft

Technical Publication. DETC2011-47851
Long Di, YangQuan Chen, Utah State University, Logan, UT, United States


Technical Publication. DETC2011-48167
Calvin Coopmans, Long Di, Austin Jensen, Aaron Dennis, YangQuan Chen, Utah State University, Logan, UT, United States

Prediction Models for the Estimation of Soil Moisture Content

Technical Publication. DETC2011-48259
Swathi Gorthi, Huifang Dou, Utah State University, Logan, UT, United States

Improved Hybrid Kalman Filter for In-flight Aircraft Engine Performance Estimation

Technical Publication. DETC2011-47603
YingQing Guo, Jun Lu, ShuGang Zhang, School of Power and Energy, Northwestern Polytechnical University, Xi’an, Shaanxi, China
Low Cost Output Feedback Controllers for Small UAVs

Technical Publication. DETC2011-47518
Chandra Asthana, Concordia University, Montreal, QC, Canada, Seetharama M. Bhat, Indian Institute of Science, Bangalore, Select Country, India

MESA-8 THE FIRST SYMPOSIUM ON VIRTUAL PROTOTYPING IN MECHATRONICS (VPM’11)

MESA-8-1 Virtual Prototyping in Mechatronics
Thornton C 8:40am–10:20am
Session Chair: Maura Mengoni, Polytechnic University of Marche, Ancona, Italy

Developing a Tactile Actuator to be Integrated into a Force Feedback Device for the Haptic Rendering of Virtual Textiles
Technical Publication. DETC2011-48995
Marco Fontana, Lab. Percro, Pontedera, Italy, Fabio Salsedo, Simone Marcheschi, Massimo Bergamasco, Percro - Scuola Superiore Sant’Anna, Pontedera, Italy

Evaluation Process Support in Mechatronics Design
Technical Publication. DETC2011-48111
Pierre Couturier, Mambaye Lo, Ouael Mouselhi, Ecole des Mines d’Ales, Nimes, France

A Method for Roughness and Texture Simulation Via Tactile Displays
Technical Publication. DETC2011-48880
Maura Mengoni, Michele Germani, Margherita Peruzzini, Paolo Morichetti, Polytechnic University of Marche, Ancona, Italy

Transmission System Improvements in Actuating a Desktop Haptic Strip for Exploration of Virtual Objects
Technical Publication. DETC2011-48941
Mario Covarrubias, Monica Bordegoni, Umberto Cugini, Michele Antolini, Politecnico di Milano, Milano, Italy

MESA-9 THE THIRD SYMPOSIUM ON BIO-MECHATRONICS - MEDICAL DEVICES & TECHNOLOGIES (BIOMECH’11)

MESA-9-1 Bio-Mechatronics I
Congressional D 8:40am–10:20am
Session Chair: Lei Zuo, State University of New York at Stony Brook, Stony Brook, NY, United States
Session Co-Chair: Shane Xie, The University of Auckland, Auckland, New Zealand

Assistive Rehabilitation Device for the Joints of the Lower Limb
Technical Publication. DETC2011-47179
Tudor T. Deaconescu, Andrea I. Deaconescu, Ioana G. Petre, Transilvania University, Brasov, Romania

Design of a Robotic Endoscope for Mini Invasive Surgery
Student Competition Paper. DETC2011-47445
Cynthia Corina Zazzarini, Alberto Pansini, Pietro Cerveri, Bioengineering Department - Politecnico di Milano, Milano, Italy, Renzo Zaltieri, ZD MechaTronics srl, Gorgonzola, MI, Italy, Damiano Lavizzari, Cibin s.r.l. - Lavorazioni ottiche, Carnate (MI), Italy

Finite Element Modeling of a Microdroplet Generator with Integrated Sensing
Technical Publication. DETC2011-48027
William Rone, Pinhas Ben-Tzvi, George Washington University, Washington, DC, United States

A Socially Assistive Robot that can Interpret Human Body Language
Technical Publication. DETC2011-48031
Derek McColl, Goldie Nejat, University of Toronto, Toronto, ON, Canada

Design and Development of Active Endoscope using Shape Memory Alloy Actuators
Technical Publication. DETC2011-48124
Aman Arora, Partha Bhattacharjee, Central Mechanical Engineering Research Institute, Durgapur, West Bengal, India

MSND-6 INDUSTRY PANEL

MSND-6-1 Industry Panel
Capital A 8:40am–10:20am
Session Chair: Rudranarayan Mukherjee, NASA Jet Propulsion Laboratory, Pasadena, CA, United States
Session Co-Chair: József Kövecses, McGill University, Montreal, QC, Canada

Nonlinear Stochastic Dynamics and Multiscale Coupling in Complex Engineering Systems
Panel. DETC2011-49030
Samuel Stanton, U. S. Army Research Office, Durham, United States

Defense Application of Modeling and Simulations
Panel. DETC2011-49031
Bahram Fatemi, BAE Systems, Santa Clara, United States

Vehicle Modeling and Experimental Work
Panel. DETC2011-49032
Randolph Jones, U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, United States

Applications of Multibody Dynamics for Training
Panel. DETC2011-49034
Marek Teichmann, CMLabs Simulations, Montreal, Canada
DAC-8 DECISION MAKING IN ENGINEERING DESIGN

DAC-8-1 Decision Making in Engineering Design

Columbia A 8:40am–10:20am

Session Chair: Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States
Session Co-Chair: Bernard Yannou, Ecole Centrale Paris, Chatenay-Malabry, France

An Early-Stage Tool to Evaluate the Product Redesign Impact
Technical Publication. DETC2011-47625
Roberto Raffaeli, Maura Mengoni, Michele Germani, Polytechnic University of Marche, Ancona, Italy

A New Framework for Collaborative Set-Based Design: Application to the Design Problem of a Hollow Cylindrical Cantilever Beam
Technical Publication. DETC2011-48153
Baris Canbaz, Bernard Yannou, Ecole Centrale Paris, Chatenay-Malabry, France, Pierre-Alain Vuars, Supmeca, Saint-Ouen, France

Incorporating Process Architecture in the Evaluation of Stability in Distributed Design
Technical Publication. DETC2011-48375
Erich Devendorf, Department of Mechanical and Aerospace Engineering, Buffalo, NY, United States, Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States

Probability of User Fit for Spatially Optimized Products
Technical Publication. DETC2011-48569
Christopher Garneau, Matthew Parkinson, Pennsylvania State University, University Park, PA, United States

Granularity Enhancement of Extracted Preferential Probabilities from Design Team Discussion
Technical Publication. DETC2011-48749
Haifeng Ji, Yahoo! Inc., Sunnyvale, CA, United States, Tomonori Honda, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

DAC-9 DESIGN FOR MARKET SYSTEMS

DAC-9-1 Design for Market Systems

Grand Teton 8:40am–10:20am

Session Chair: Shapour Azarm, University of Maryland, College Park, MD, United States
Session Co-Chair: Byeng D. Youn, Seoul National University, Seoul, Korea (Republic)

Defining Technology-Adoption Indifference Curves using Stated Preference Experiments for Residential Solar Electricity Generation
Technical Publication. DETC2011-48007
Bart D. Frischknecht, University of Technology Sydney, Ultimo, NSW, Australia, Kate Whitefoot, University of Michigan, Ann Arbor, MI, United States

Customer-Driven Product Design Selection with User-Generated Content (Ugc)
Technical Publication. DETC2011-48338
Lulu Wang, Shapour Azarm, University of Maryland, College Park, MD, United States, Byeng D. Youn, Seoul National University, Seoul, Korea (Republic), P.K. Kannan, Department of Marketing, R.H. Smith School of Business, University of Maryland, College Park, College Park, MD, United States

Design Optimization under Parametric Uncertainty of Consumer Choice Models using the Delta Method
Technical Publication. DETC2011-48409
Camilo B. Resende, C. Grace Heckmann, Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

Customer Driven Design Decision for Convergence Products
Technical Publication. DETC2011-47927
Zhichao Wang, Shapour Azarm, University of Maryland, College Park, MD, United States, P.K. Kannan, Department of Marketing, R.H. Smith School of Business, University of Maryland, College Park, College Park, MD, United States

PTG-1 GEAR SYSTEM DESIGN AND ANALYSIS

PTG-1-3 Gear System Design and Analysis III

Capital B 8:40am–10:20am

Session Chair: Qi Fan, The Gleason Works, Rochester, NY, United States

Determination of the Most Dangerous Meshing Point for Modified Hourglass Worm Drives
Technical Publication. DETC2011-47202
Yaping Zhao, Tianchao Wu, Wuhan University of Science and Technology, Wuhan, Hubei Province, China

A Study on Tooth Modification for Spur Gear for Articulated Hauler
Technical Publication. DETC2011-47295
Qi Zhang, Gyeongsang National University, Gyeongnam, Korea (Republic), Zhezhu Xu, Sungki Lyu, Gyeongsang National University, Jinju, Korea (Republic)

Geometric Calculations of the Chamfered Tip and the Protuberance Undercut of a Tooth Profile
Technical Publication. DETC2011-47305
Milos Nemcek, Zdenek Dejl, VSB-Technical University of Ostrava, Ostrava Poruba, Czech Republic

Back-side Contact Gear Mesh Stiffness
Technical Publication. DETC2011-48055
Yichao Guo, Robert Parker, Ohio State University, Columbus, OH, United States

Gear Transmission Density Maximization
Technical Publication. DETC2011-47021
Alex Kapelievich, AKGears, LLC, Shoreview, MN, United States, Viacheslav Ananiev, CIAM, Moscow, Russia
PTG-7 NOVEL TRANSMISSION CONCEPTS AND CONTROL

PTG-7-1 Novel Transmission Concepts and Control

Regency B 8:40am–10:20am

Session Chair: Vance Browne, Minnesota State University, Mankato, Mankato, MN, United States

The Study of PHEV Shift Strategy based on AMT without Synchronizer

Technical Publication. DETC2011-47208

Xiangyu Dong, Junqiang Xi, Huiyan Chen, Beijing Institute of Technology, Beijing, Beijing, China

Improvement of Positioning Error on a Ball Screw Drive System by Liquid-Cooling

Technical Publication. DETC2011-47280

Zhezhu Xu, Qi Zhang, Sungki Lyu, Gyengsang National University, Jinju, Korea (Republic)

Studies of Belt Tension During Shifts in a Morphing Pulley Belt Driven Transmission System

Technical Publication. DETC2011-47417

Reza Farshidi, Jean W. Zu, University of Toronto, Toronto, ON, Canada

The Dynamic Simulation and Analysis of a Cycloidal Type Speed Reducer

Technical Publication. DETC2011-48494

Sandeep Thube, Todd Bobak, Sumitomo Drive Technologies, Chesapeake, VA, United States

On a Gearing Problem in Conventional Harmonic Drives with Involute Toothing Gear Set

Technical Publication. DETC2011-48849

Rathindranath Maiti, Bikash Routh, Indian Institute of Technology (IIT), Kharagpur, Kharagpur, West Bengal, India

RSAFP-2 STRESS ANALYSES

RSAFP-2-1 Stress Analysis

Sequoia 8:40am–10:20am

Session Chair: Erol Sancaktar, University of Akron, Akron, OH, United States

Session Co-Chair: Toshiyuki Sawa, Hiroshima University, Hiroshima, Japan

A Protective Device, Life Saver During Structural Collapse

Technical Publication. DETC2011-47076

Alireza Heidari, Vera Galishnikova, Peoples Friendship University of Russia, Moscow, Russia, Iradj Mahmoudzadeh Kani, Tehran University, Tehran, Iran

Effects of Strain Rate on the Stress Propagations in Bonded Shrink Fitted Joints under Impact Push-Off Loadings

Technical Publication. DETC2011-48222

Lijuan Liao, Yasuhiro Goda, Toshiyuki Sawa, Hiroshima University, Hiroshima, Japan, Takashi Kobayashi, Numazu National College of Technology, Numazu, Shizuoka, Japan

FEM Stress Analysis of the Characteristics of Bolted Joints under External Loadings (In the case where two hollow cylinders are clamped)

Technical Publication. DETC2011-48247

Toshiyuki Sawa, Hiroshima University, Hiroshima, Japan, Kengo Kuwaki, Hiroshima University, Higashihiroshima, Hiroshima, Japan, Yukio Morozumi, Masahiko Okumura, Toyota Motor Corporation, Toyota, Aichi, Japan

Modeling and Analysis of Concrete-Filled Steel Structure under Aircraft Impact

Technical Publication. DETC2011-48874

Zirong Hu, Westinghouse Electric Company, Cranberry Township, PA, United States, Jin Huo, SG Automotives Group, Beijing, Beijing, China, Yuping Sun, LanZhou University of Science and Technology, Lan Zhou, China

A Study on Performance of O-shaped Seal Ring in LWD Device using Finite Element Analysis

Technical Publication. DETC2011-48807

Li Xin, Liu Wenjian, Peng Gaoliang, Harbin Institute of Technology, Harbin, China, Wang Qiang, Fenghuo Machinery Factory, China Aerospace Science and Technology Corporation, Chengdu, China

MECH-1 MOBILE ROBOTS

MECH-1-3 Mobility

Columbia Foyer 8:40am–10:20am

Session Chair: Sunil K. Agrawal, University of Delaware, Newark, DE, United States

Session Co-Chair: James Van de Ven, Worcester Polytechnic Institute, Worcester, MA, United States

Dynamic Modeling and Soil Mechanics for Path Planning of Mars Exploration Rovers

Technical Publication. DETC2011-47896

Brian Trease, NASA JPL, Pasadena, CA, United States, Raymond E. Arvidson, Keith Bennett, Lauren Van Dyke, Washington University, St. Louis, MO, United States, Randel Lindemann, California Institute of Technology, Instrument Mechanical Engineering Section, Pasadena, CA, United States, Feng Zhou, Washington University, Earth and Planetary Science Department, Saint Louis, MO, United States, Karl Iagnemma, Carmine Senatore, Massachusetts Institute of Technology, Cambridge, MA, United States

A Hybrid Grasp Matrix for Cooperative Robotic Object Manipulation

Technical Publication. DETC2011-48534

Tyson Ringold, Raymond Cipra, Purdue University, West Lafayette, IN, United States

Modeling and Design of a Linkage-Based Suspension for Tracked-Type Climbing Mobile Robotic Systems

Technical Publication. DETC2011-48555

Padmanabhan Kumar, Tristan Hill, David Bryant, Stephen Canfield, Tennessee Technological University, Cookeville, TN, United States
<table>
<thead>
<tr>
<th>Technical Sessions</th>
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| **On the Design of Mobile Parallel Robots for Large Workspace Applications**  
*Student Competition Paper*, DETC2011-48101  
Hai YangCédric Baradat, Tecnalia, Montpellier, France,  
Sébastien Krut, François Pierrot, Robotics Department, LIRMM - UM2/CNRS, Montpellier, France |
| **Dynamic Modeling, Stability and Energy Consumption Analysis of Turning Motion of Realistic Hexapod Walking Robots**  
*Technical Publication*, DETC2011-47253  
Roy Shibendu Shekhar, National Institute of Technology, Durgapur, Durgapur, West Bengal, India, Dilip Kumar Pratihar, Indian Institute of Technology, Kharagpur, Kharagpur, West Bengal, India |
| **MECH-5 STUDENT MECHANISM AND ROBOT DESIGN COMPETITION** |
| **MECH-5-3 Student Robot Design Competition - Undergraduate**  
**Yosemite** 8:40am–10:20am  
Session Chair: **Yu Zhou**, State University of New York at Stony Brook, Stony Brook, NY, United States  
Session Co-Chair: **David J. Cappelleri**, Stevens Institute of Technology, Hoboken, NJ, United States |
| **MECH-6 ROBOT DYNAMICS AND CONTROL** |
| **MECH-6-2 Grasping and Manipulation**  
**Congressional B** 8:40am–10:20am  
Session Chair: **Nilesh Mankame**, General Motors Company, Warren, MI, United States  
Session Co-Chair: **Satyandra Gupta**, University of Maryland, College Park, MD, United States |
| **Planning Manipulation and Grasping Tasks with a Redundant Arm**  
*Technical Publication*, DETC2011-47453  
Steven Gray, Joseph Romano, Jordan Brindza, Soonkyum Kim, Katherine J. Kuchenbecker, Vijay Kumar, University of Pennsylvania, Philadelphia, PA, United States |
| **Inclination Parameter Estimation for Manipulator and Humanoid Robot Links**  
*Technical Publication*, DETC2011-48221  
Vishesh Vikas, Carl Crane, University of Florida, Gainesville, FL, United States |
| **Vibration Suppression for a Flexible Link Robot using Acceleration and/or Angular Rate Measurements and a Flatness Based Trajectory Control**  
*Technical Publication*, DETC2011-47362  
Peter Stauber, Hubert Gattringer, Hartmut Bremer, Johannes Kepler University, Linz, Austria |
| **Kinematic Mapping and Calibration of the Thumb Motions for Telemanipulating a Humanoid Robot Hand**  
*Technical Publication*, DETC2011-47728  
Lei Cui, Carnegie Mellon University, Pittsburgh, PA, United States, Ugo Cupicic, Shadow Robot Company, London, United Kingdom, Jian Dai, King’s College London, University of London, London, United Kingdom |
| **Contact Force Analysis in Static Two-fingered Robot Grasping**  
*Technical Publication*, DETC2011-47132  
I Cheng, Chaohwa Liu, Yin-Tien Wang, Tamkang University, New Taipei City, Taiwan |
| **MECH-7 MECHANISMS AND ROBOTICS EDUCATION** |
| **MECH-7-1 Mechanisms and Robotics Education**  
**Glacier** 8:40am–10:20am  
Session Chair: **Alba Perez-Gracia**, Idaho State University, Pocatello, ID, United States  
Session Co-Chair: **Robert Williams II**, Ohio University, Athens, OH, United States |
| **Real-Time Validation and Control Environment for Parallel Robot Control Design**  
*Technical Publication*, DETC2011-47259  
Asier Zubizarreta, Eva Portillo, Itziar Cabanes, Marga Marcos, Charles Pinto, University of the Basque Country, Bilbao, Spain |
| **Improved Robotics Joint-Space Trajectory Generation with Via Point**  
*Technical Publication*, DETC2011-47592  
Robert Williams II, Ohio University, Athens, OH, United States |
| **Teaching Manipulator Kinematics by Painting with Light**  
*Technical Publication*, DETC2011-47670  
Michael Shomin, Jonathan Fiene, University of Pennsylvania, Philadelphia, PA, United States |
| **freeLoader: An Open Source Universal Testing Machine for High-Throughput Experimentation**  
*Technical Publication*, DETC2011-48296  
John R. Amend, Jr., Hod Lipson, Cornell University, Ithaca, NY, United States |
| **Software for Programming an Industrial Serial Manipulator**  
*Technical Publication*, DETC2011-48312  
Julio Correa, Universidad Pontificia Bolivariana, Medellin, Antioquia, Colombia |
Lessons Learned from a Project-Based Learning Approach for Teaching Cognitive Product Development to Multi-Disciplinary Student Teams

Technical Publication. DETC2011-48168
Torsten Metzler, Institute of Product Development, Virtual Product Development Group, Technische Universität München, Garching b. München, Germany, Kristina Shea, Institute of Product Development, Virtual Product Development Group, Technische Universität München, Garching, Bavaria, Germany

Cued Active Learning: An Initial Study

Technical Publication. DETC2011-47475
Seth Orsborn, Bucknell University, Lewisburg, PA, United States, Ryan Hutcheson, Missouri University of Science and Technology, Rolla, MO, United States

Using Wikis as a Formative Assessment Tool for Student Engineering Design Teams

Technical Publication. DETC2011-48310
Jacob P. Moore, Christopher Williams, Marie C. Paretti, Virginia Tech, Blacksburg, VA, United States

Impacts of Team Characteristics and Design Activities on Design Outcomes

Technical Publication. DETC2011-47498
Shun Takai, Missouri University of Science and Technology, Rolla, MO, United States

DTM-5 QUANTITATIVE ASSESSMENT METHODS

DTM-5-1 Quantitative Assessment Methods

Concord 8:40am–10:20am

Session Chair: Eric Coatanéa, Aalto University - School of Engineering, Espoo, Finland
Session Co-Chair: Levent Burak Kara, Carnegie Mellon University, Pittsburgh, PA, United States

Multi-Relationship Evaluation Design: Formalizing Test Plan Input and Output Elements for Evaluating Developing Intelligent Systems

Technical Publication. DETC2011-47971
Brian Weiss, National Institute of Standards and Technology, Gaithersburg, MD, United States, Linda Schmidt, University of Maryland- College Park, College Park, MD, United States

Characterizing Modularity, Hierarchy and Module Interfacing in Complex Design Systems

Technical Publication. DETC2011-47992
Somwrita Sarkar, Andy Dong, The University of Sydney, Sydney, NSW, Australia

A Validation Regarding Effectiveness of Scenario Graph

Technical Publication. DETC2011-48047
Hiroyuki Yagita, SDM Research Institute, Graduate School of System Design and Management, Keio University, Yokohama, Kanagawa, Japan, Akira Tose, Madoka Nakajima, Sun K. Kim, Takashi Maeno, Graduate School of System Design and Management, Keio University, Yokohama, Kanagawa, Japan
Misuse of Information-Theoretic Dispersion Measures As Design Complexity Metrics

**Technical Publication. DETC2011-48295**
Jami J. Shah, George Runger, Arizona State University, Tempe, AZ, United States

Towards a Tool for Characterizing the Progression of Academic Research

**Technical Publication. DETC2011-48441**

**DFMLC-6 INTEGRATED PRODUCT AND PROCESS DEVELOPMENT PROCESSES**

DFMLC-6-2 Integrated Product Design and Process Development Processes II

Congressional C 8:40am–10:20am
Session Chair: Harrison Kim, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Effects of Design Parameters in Cost Estimation and Cost Uncertainty Modeling

**Technical Publication. DETC2011-47886**
Karan Banga, Shun Takai, Missouri University of Science and Technology, Rolla, MO, United States

Sequential Multi-Attribute Process-Performance Simulation and Optimization of Thin-Walled Components

**Technical Publication. DETC2011-47686**
Ali Najafi, Masoud Rais-Rohani, Mississippi State University, Mississippi State, MS, United States

Functional Concept-based Detection for Transformative Product Design

**Technical Publication. DETC2011-47738**
Keunho Choi, Kyoung-Yun Kim, Wayne State University, Detroit, MI, United States

Design Process Planning by Multi-objective Optimization of Technical Performance and Product Integrity

**Technical Publication. DETC2011-48156**
Yutaka Nomaguchi, Ryousuke Matsuyasu, Takahiro Horinouchi, Kikuo Fujita, Osaka University, Suita, Osaka, Japan

Virtual Repair: Geometric Reconstruction for Remanufacturing Gas Turbine Airfoils

**Technical Publication. DETC2011-48652**
Cecil Piya, J. Michael Wilson, Sundar Murugappan, Karthik Ramani, Yung Shin, Purdue University, West Lafayette, IN, United States

**DFMLC-7 LIFE CYCLE DECISION MAKING**

DFMLC-7-1 Life Cycle Decision Making I
Regency C 8:40am–10:20am
Session Chair: Mey Goh, Loughborough University, Loughborough, United Kingdom

A Design Support System for Scenario-based Lifecycle Design

**Technical Publication. DETC2011-47447**
Shinichi Fukushige, Eisuke Kunii, Kazuhiro Yamamoto, Yasushi Umeda, Osaka University, Suita, Osaka, Japan

A Model for Making Part Sourcing Decisions for Long Life Cycle Products

**Technical Publication. DETC2011-47593**
Varun J. Prabhakar, Peter Sandborn, University of Maryland, College Park, College Park, MD, United States

Challenges for Managing Component Obsolescence in Low Volume Products through the Product Development Lifecycle

**Technical Publication. DETC2011-48422**
Travis E. Brown, Scott E. Bartholomew, Glen A. Dragon, Aaron C. Smykowski, Harris Corporation, Rochester, NY, United States, Alvaro J. Rojas Arciniegas, Marcos Esterman Jr, Rochester Institute of Technology, Rochester, NY, United States

Uncertainty Analysis and Its Application to Service Contracts

**Technical Publication. DETC2011-48106**
Melanie E. Kreye, Linda Newnes, University of Bath, Bath, United Kingdom, Mey Goh, Loughborough University, Loughborough, United Kingdom

A Markov Chain Model to Maximize Revenue by Varying Refurbished Product Upgrade Levels

**Technical Publication. DETC2011-47879**
Sara Behdad, Deborah Thurston, University of Illinois at Urbana-Champaign, Urbana, IL, United States
VIB-5 KEYNOTES

VIB-5-2 Myklestad Award Keynote Session
Columbia B 10:40am–12:00pm
Session Chair: Steve Shaw, MSU, East Lansing, MI, United States
Myklestad Award Keynote Lecture: Computing the Twisted Mechanics of Your DNA
Keynote. DETC2011-49040
Noel C. Perkins, University of Michigan, Ann Arbor, MI, United States

CIE-9 CAPPD: EMOTIONAL ENGINEERING

CIE-9-2 CAPPD: Emotional Engineering II
Columbia C 10:40am–12:00pm
Session Chair: Goldie Nejat, University of Toronto, Toronto, ON, Canada
Session Co-Chair: Shuichi Fukuda, Stanford University, Palo Alto, CA, United States
The Development of a Facial-Affect Recognition System for Application in Human-Robot Interaction Scenarios
Technical Publication. DETC2011-48195
David Schacter, Christopher Wang, Goldie Nejat, Beno Benhabib, University of Toronto, Toronto, ON, Canada
Emotion and Process Quality
Technical Publication. DETC2011-48663
Shuichi Fukuda, Stanford University, Palo Alto, CA, United States
Context-Specific Experience Sampling for User Emotion Research
Technical Publication. DETC2011-48682
Yong Se Kim, Yeon Koo Hong, Sun Ran Kim, Jin Hui Kim, Creative Design Institute, Sungkyunkwan University, Suwon, Korea (Republic)
Reverse Engineering System Based on Uniforming Measurement Data Density in 3D-Lattice
Technical Publication. DETC2011-48803
Gaku Shibata, Hideki Aoyama, Megumi Sato, Keio University, Yokohama, Japan

CIE-11 PANEL: ENERGY SYSTEMS - ENERGY EFFICIENT MANUFACTURING

CIE-11-1 Panel I
Congressional B 10:40am–12:00pm
Session Chair: Kevin Lyons, NIST, Gaithersburg, MD, United States
Session Co-Chair: Robert Ivester

MESA-5 KEYNOTES

MESA-5-2 Keynotes II
Columbia A 10:40am–12:00pm
Session Chair: Harry H. Cheng, University of California, Davis, CA, United States
Decentralized Vibration Control for Large Flexible Structures with Smart Embedded Devices
Keynote. DETC2011-49028
Dong-Xu Li, National University of Defense Technology, Changsha, China

MSNDC-7 KEYNOTES

MSNDC-7-1 Lyapunov Award Keynote Session
Capital B 10:40am–12:00pm
Session Chair: Bogdan Epureanu, University of Michigan - Ann Arbor, Ann Arbor, MI, United States
Some Recent Advances in Nonlinear Aeroelasticity: Fluid-Structure Interaction in the 21st Century
Keynote. DETC2011-47006
Earl Dowell, Duke University, Durham, NC, United States

DAC-10 APPLYING LARGE SCALE DEMAND MODELS IN DESIGN OPTIMIZATION

DAC-10-1 Applying Large Scale Demand Models in Design Optimization
Grand Teton 10:40am–12:00pm
Session Chair: Joseph Donndelinger, General Motors Company, Warren, MI, United States
Session Co-Chair: Anil Kumar Maddulapalli, General Motors, Bangalore, Karnataka, India
Employing Market Simulators to Design for Regulation Compliant Robust Vehicle Portfolio
Technical Publication. DETC2011-47164
Anil Kumar Maddulapalli, Parameshwaran Iyer, Srinivasa/N.R. Raghavan, General Motors Company, Bangalore, Karnataka, India
On Usage Context of Hybrid Electric Vehicles in Choice Studies

Lin He, Wei Chen, Northwestern University, Evanston, IL, United States, Guenter Conzelmann, Argonne National Laboratory, Argonne, IL, United States

Exploring Heterogeneity of Customer Preference to Balance Commonality and Market Coverage

Scott Ferguson, Callaway Turner, North Carolina State University, Raleigh, NC, United States, Joseph Donndelinger, General Motors Company, Warren, MI, United States

Exploring Differences in Preference Heterogeneity Representation and Their Influence in Product Family Design

Scott Ferguson, Eric Sullivan, North Carolina State University, Raleigh, NC, United States, Joseph Donndelinger, General Motors Company, Warren, MI, United States

DAC-11 DESIGN FOR THE DEVELOPING WORLD

DAC-11-1 Design for the Developing World

Thornton A 10:40am–12:00pm

Session Chair: Kenneth Bryden, Iowa State University, Ames, IA, United States
Session Co-Chair: Christopher Mattson, Brigham Young University, Provo, UT, United States

A Method for Designing Collaborative Products for Poverty Alleviation

Jacob Morrise, Patrick Lewis, Christopher Mattson, Spencer Magleby, Brigham Young University, Provo, UT, United States

Principles of Mechanical Design for the Developing World: A Case Study Approach

Adam Andersen, Charles Kim, Bucknell University, Lewisburg, PA, United States

A Method for Identifying Design Principles for the Developing World

Robert Campbell, Patrick Lewis, Christopher Mattson, Brigham Young University, Provo, UT, United States

Understanding Rural Village Energy Needs and Design Constraints

Kenneth Bryden, Nathan Johnson, Iowa State University, Ames, IA, United States

DAC-12 DESIGN AND OPTIMIZATION OF SUSTAINABLE ENERGY SYSTEMS

DAC-12-1 Design and Optimization of Sustainable Energy Systems

Congressional D 10:40am–12:00pm

Session Chair: Achille Messac, Syracuse University, Syracuse, NY, United States
Session Co-Chair: Nickolas Vlahopoulos, University of Michigan, Ann Arbor, MI, United States

Multi-discipline Design of a Wind Turbine

Nickolas Vlahopoulos, Hong Yoon Kim, Kevin Maki, University of Michigan, Ann Arbor, MI, United States, Ricardo Sbragio, Michigan Engineering services, LLC, Ann Arbor, MI, United States

A New Model for Wind Farm Layout Optimization with Landowner Decisions

Le Chen, Erin Macdonald, Iowa State University, Ames, IA, United States

Characterizing the Influence of Land Configuration on the Optimal Wind Farm Performance

Souma Chowdhury, Jie Zhang, Luciano Castillo, Rensselaer Polytechnic Institute, Troy, NY, United States, Achille Messac, Syracuse University, Syracuse, NY, United States

Developing Innovative Energy Harvesting Approaches for Infrastructure Health Monitoring Systems

Travis McEvoy, Eric Dierks, Jason Weaver, Sumedh Inamdar, Kristin Wood, Richard Crawford, University of Texas at Austin, Austin, TX, United States, Krystian Zimowski, Manufacture and Design Research Laboratory, Austin, TX, United States, Dan Jensen, United State Air Force Academy, USAF Academy, CO, United States
DAC-13 PANEL: ENVIRONMENTAL POLICY IN VEHICLE DESIGN

DAC-13-1 Environmental Policy in Vehicle Design: Panel Session Jointly Sponsored by DAC and AVTT

Capital A 10:40am–12:00pm

Session Chair: Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

Analysis of Policies to Reduce Oil Consumption and Greenhouse Gas Emissions from the U.S. Transportation Sector

Panel. DETC2011-49047
William Ross Morrow, Iowa State University, Ames, IA, United States

Are Plug-in Vehicles Worth the Cost? Why U.S. Policy Should Target Small Battery Packs

Panel. DETC2011-49050
Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

How Water Policies Affect Vehicle Design

Panel. DETC2011-49049
Bert Bras, Georgia Institute of Technology, Atlanta, GA, United States

Evaluating Fuel Economy Standards with an Engineering Model of Endogeneous Product Design

Panel. DETC2011-49048
Kate Whitefoot, University of Michigan, Ann Arbor, MI, United States

PTG-8 KEYNOTE

PTG-8-1 ASME International Power Transmission and Gearing Conference Buckingham Lecture

Regency D 10:40am–12:00pm

Session Chair: Avinash Singh, General Motors Company, Pontiac, MI, United States
Session Co-Chair: Timothy Krantz, NASA, Cleveland, OH, United States

Current Gaps and Future Directions in Gear Research

Keynote. DETC2011-49025
Ahmet Kahraman, The Ohio State University, Columbus, OH, United States

MECH-1 MOBILE ROBOTS

MECH-1-4 Crawling and Worm Robots

Columbia Foyer 10:40am–12:00pm

Session Chair: Raymond Cipra, Purdue University, West Lafayette, IN, United States
Session Co-Chair: Raffaele Di Gregorio, Department of Engineering - University of Ferrara, Ferrara, FE, Italy

Design of a Four-Dof Modular Self-Reconfigurable Robot with Novel Gaits

Technical Publication. DETC2011-47746
Khoa Chu, SGM Hossain, Carl Nelson, University of Nebraska-Lincoln, Lincoln, NE, United States

A Model of Caterpillar Locomotion based on Assur Tensegrity Structures

Technical Publication. DETC2011-47708
Omer Orki, Offer Shai, School of Mechanical Engineering, Faculty of Engineering, Tel-Aviv University, Tel-Aviv, Israel, Amir Ayali, Department of Zoology, Faculty of Life Sciences, Tel Aviv University, Tel Aviv, Israel, Uri Ben-Hanan, Department of Mechanical Engineering, Ort Braude College, Karmiel, Israel

MECH-5 STUDENT MECHANISM AND ROBOT DESIGN COMPETITION

MECH-5-4 Student Robot Design Competition - Graduate

Yosemite 10:40am–12:00pm

Session Chair: Yu Zhou, State University of New York at Stony Brook, Stony Brook, NY, United States
Session Co-Chair: Girish Krishnan, University of Michigan, Ann Arbor, MI, United States

MECH-8 COMPLIANT MECHANISMS

MECH-8-1 Theory: Metrics and Design Tools

Yellowstone 10:40am–12:00pm

Session Chair: Larry L. Howell, Brigham Young University, Provo, UT, United States
Session Co-Chair: Jonathan Hopkins, Lawrence Livermore National Laboratory, Livermore, CA, United States

The Modified Quadrilateral Discretization Model for the Topology Optimization of Compliant Mechanisms

Technical Publication. DETC2011-47469
Hong Zhou, Pranjal P. Killekar, Texas A&M University-Kingsville, Kingsville, TX, United States
Quantifying Uncertainty for Planar Pseudo-Rigid Body Models

Technical Publication. DETC2011-47456
Craig Lusk, The University of South Florida, Tampa, FL, United States

Analytical Compliance Analysis and Synthesis of Flexure Mechanisms

Technical Publication. DETC2011-48013
Hai-Jun Su, Hongliang Shi, University of Maryland Baltimore County, Baltimore, MD, United States, Jingjun Yu, Beihang University, Beijing, China

A Metric to Evaluate and Synthesize Distributed Compliant Mechanisms

Technical Publication. DETC2011-48603
Girish Krishnan, Sridhar Kota, University of Michigan, Ann Arbor, MI, United States, Charles Kim, Bucknell University, Lewisburg, PA, United States

MECH-9 MECHANISM ANALYSIS AND SYNTHESIS

MECH-9-1 Spatial Mechanisms

Lexington 10:40am–12:00pm
Session Chair: J. Michael McCarthy, University of California, Irvine, Irvine, CA, United States
Session Co-Chair: Federico Thomas, Institut de Robòtica i Informàtica Industrial, CSIC-UPC, Barcelona, Catalonia, Spain

Geometric Design of Spherical Serial Chains with Curvature Constraints in the Environment

Technical Publication. DETC2011-47263
Nina Robson, Anurag Tolety, Texas A&M, College Station, TX, United States

Towards Whole-Arm Statics

Technical Publication. DETC2011-47666
Nicolas Lauzier, Clement Gosselin, Université Laval, Quebec, QC, Canada

Geometry and Kinematics of a Plane-Symmetric Spatial Eight-Bar Linkage with Exact Straight-Line Motion

Technical Publication. DETC2011-48281
Guowu Wei, Jian Dai, King’s College London, University of London, London, United Kingdom

A Procedure to Analyse and Compare the Sensitivity to Geometrical Parameter Variations of One-Dof Mechanisms

Technical Publication. DETC2011-48244
Nicola Sancisi, Diego Zannoli, Vincenzo Parenti-Castelli, DIEM - University of Bologna, Bologna, Italy

MNS-3 SYMPOSIUM ON NONLINEAR MECHANICS, DYNAMICS, AND CONTROL IN ATOMIC FORCE MICROSCOPY

MNS-3-3 Nonlinear Mechanics, Dynamics, and Control in Atomic Force Microscopy III

Glacier 10:40am–12:00pm
Session Chair: Santiago D. Solares, University of Maryland, College Park, College Park, MD, United States

Trimodal Tapping-mode Atomic Force Microscopy: A Possible Method for Simultaneous Measurement of Conservative and Dissipative Interactions

Technical Publication. DETC2011-47668
Gaurav Chawla, Santiago D. Solares, University of Maryland, College Park, College Park, MD, United States

A Comprehensive Modeling of Piezoresistive Microcantilever Sensors used in Piezoactive Materials Characterization

Technical Publication. DETC2011-47985
Samira Faegh, Nader Jaliili, Northeastern University, Boston, MA, United States

Feedback Controlled Optomechanical Force Sensor

Technical Publication. DETC2011-47455
Jon Pratt, Paul Wilkinson, Gordon Shaw, NIST, Gaithersburg, MD, United States

Nano-Scale Forces, Stresses, and Tip Geometry Evolution of Amplitude Modulation Atomic Force Microscopy Probes

Student Competition Paper. DETC2011-48653
Vahid Vahdat, Robert W. Carpick, University of Pennsylvania, Philadelphia, PA, United States, David S. Grierson, Kevin Turner, University of Wisconsin-Madison, Madison, WI, United States

MNS-5 SYMPOSIUM ON BIO MEMS/NEMS

MNS-5-2 BIO MEMS/NEMS-II

Bunker Hill 10:40am–12:00pm
Session Chair: Gou-Jen Wang, National Chung-Hsing University, Taichung, Taiwan
Session Co-Chair: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States

A Highly Sensitive Electrochemical Impedimetric Nanobiosensor for Dust Mite Antigen Der P2 Detection

Technical Publication. DETC2011-47123
I-Jiuan Bau, Gou-Jen Wang, National Chung-Hsing University, Taichung, Taiwan

In-vitro Diagnosis of Colon Cancer Using Bio-functionalized Magnetic Nanoparticles

Technical Publication. DETC2011-47178
Chin-Yih Hong, National Chung-Hsing University, Taichung, Taiwan, Shieh-Yueh Yang, MagQu Co., Ltd., New Taipei City, Taiwan, K.W. Huang, National Taiwan University Hospital, Taipei City, Taiwan, Herng-Er Horng, National Taiwan Normal University, Taipei City, Taiwan, Hong-Chang Yang, National Taiwan University, Taipei City, Taiwan
Fabrication of Pillared PLGA Microvessel Scaffold using Femtosecond Laser Ablation

Technical Publication. DETC2011-47532
Hsiao-Wei Wang, Ching-Wen Li, Gou-Jen Wang, National Chung-Hsing University, Taichung, Taiwan; Chung-Wei Cheng, Industrial Technology Research Institute, Tainan County, Taiwan

On Electrostatically Actuated CNT Bio-Sensors

Technical Publication. DETC2011-48379
Dumitru Caruntu, Cone S. Salinas Trevino, University of Texas Pan American, Edinburg, TX, United States

DEC-3 PANEL - ATTRACTING FUTURE ENGINEERS
BEST PRACTICES AND LESSONS LEARNED

DEC-3-1 Attracting Future Engineers
Best Practices and Lessons Learned

Everglades 10:40am–12:00pm
Session Chair: Kathy J. Jacobson

DTM-6 CREATIVITY METHODS AND STUDIES

DTM-6-1 Creativity Methods and Studies

Concord 10:40am–12:00pm
Session Chair: Katja Holtta-Otto, University of Massachusetts Dartmouth, North Dartmouth, MA, United States
Session Co-Chair: Julie Linsey, Texas A&M University, College Station, TX, United States

A Computer Aided Approach for Reformulating Ill Defined Problems

Technical Publication. DETC2011-47212
Davide RussoValentino Birolini, University of Bergamo, Bergamo, Italy

Design Fixation in Physical Modeling: An Investigation on the Role of Sunk Cost

Technical Publication. DETC2011-47862
Vimal Viswanathan, Julie Linsey, Texas A&M University, College Station, TX, United States

Study of the Effectiveness of Empathic Experience Design Creativity Technique

Technical Publication. DETC2011-48256
Nicole Genco, Katja Holtta-Otto, University of Massachusetts Dartmouth, North Dartmouth, MA, United States
Danny Johnson, Carolyn Seepersad, The University of Texas at Austin, Austin, TX, United States

Characterizing the Effect of Domain Distance in Design-by-Analogy

Technical Publication. DETC2011-48428
Ricardo Lopez, Texas A&M, College Station, TX, United States
Julie Linsey, Steven Smith, Texas A&M University, College Station, TX, United States

DFMLC-3 PANELS

DFMLC-3-2 Panel: Entertainment Engineering:
Technical Implementations

Congressional A 10:40am–12:00pm
Panel Moderator: Jon Wesner

AVTT-1 KEYNOTES

AVTT-1-2 Keynote II

Bryce 10:40am–12:00pm
Session Chair: Xubin Song, Eaton Corp, Southfield, MI, United States
Session Co-Chair: Massimiliano Gobbi, Politecnico di Milano, Milan, Italy

Next Generation Hybrids for Commercial Vehicles:
Challenges and Opportunities

Keynote. DETC2011-49019
Mihai Dorobantu, Eaton Corporation, Southfield, United States

AVTT-4 PANEL: ENVIRONMENTAL POLICY IN VEHICLE DESIGN

AVTT-4-1 Environmental Policy in Vehicle Design: Panel
Session Jointly Sponsored by DAC and AVTT

Capitol A 10:40am–12:00pm
Session Chair: Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

Analysis of Policies to Reduce Oil Consumption and Greenhouse Gas Emissions from the U.S. Transportation Sector
Panel. DETC2011-49047
William Ross Morrow, Iowa State University, Ames, IA, United States

Are Plug-in Vehicles Worth the Cost? Why U.S. Policy Should Target Small Battery Packs
Panel. DETC2011-49050
Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

How Water Policies Affect Vehicle Design
Panel. DETC2011-49049
Bert Bras, Georgia Institute of Technology, Atlanta, GA, United States

Evaluating Fuel Economy Standards with an Engineering Model of Endogeneous Product Design
Panel. DETC2011-49048
Kate Whitefoot, University of Michigan, Ann Arbor, MI, United States
VIB-6 VIBRATION AND CONTROL OF DISTRIBUTED STRUCTURAL SYSTEMS

VIB-6-2 Vibration and Control of Distributed Structural Systems II

Columbia B 1:40pm–3:20pm

Session Chair: Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States
Session Co-Chair: Francesco Nucera, Mediterranean University, Reggio Calabria, Italy

Dynamic Analysis of a Micro-Resonator Driven By Electrostatic Combs

Technical Publication. DETC2011-47905
Mitao Song, Dengqing Cao, Harbin Institute of Technology, Harbin, China, Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

Flexoelectric Signals on Rings

Technical Publication. DETC2011-48129
Shundi Hu, Hua Li, Hornsen Tzou, Zhejiang University, Hangzhou, Zhejiang, China

Study of Nanoring Energy Generators

Technical Publication. DETC2011-48136
Shundi Hu, Hua Li, Hornsen Tzou, Zhejiang University, Hangzhou, Zhejiang, China

Dynamics Simulation of a Circular Membrane with an Eccentric Circular Areal Constraint

Student Competition Paper. DETC2011-48489
Assaad Alsahlani, Ranjan Mukherjee, Michigan State University, East Lansing, MI, United States

Dynamic Modeling and Validation of a Traveling-wave Type Ultrasonic Motor with Beam Teeth via Finite Elements

Technical Publication. DETC2011-48326
Chao C.-P., National Chiao Tung University, Hsinchu, Taiwan, Chun-Wei Chiu, Chung Yuan Christian University, Chungli, Taiwan, Po-Hung Lu, Chung-Yuan Christian University, Taiwan, China

VIB-8 GLOBAL NONLINEAR DYNAMICS

VIB-8-1 Global Nonlinear Dynamics - I

Capital A 1:40pm–3:20pm

Session Chair: Henryk Flashner, University of Southern California, Los Angeles, CA, United States
Session Co-Chair: Jun Jiang, Professor, Xi’an, China

Fuzzy Codimension Two Bifurcations

Technical Publication. DETC2011-47249
Ling Hong, State Key Lab for Strength and Vibration, Xi’an Jiaotong University, Xi’an, Shaanxi, China, Jian-Qiao Sun, University of California at Merced, Merced, CA, United States

Periodic Solutions and Their Regions of Attraction for Flexible Structures under Relay Feedback Control with Nonlinear Control Law

Technical Publication. DETC2011-47350
Michael Borre, University of Southern California, Glendale, CA, United States, Henryk Flashner, University of Southern California, Los Angeles, CA, United States

Study of Evolution of Global Structure into Chaotic Itinerancy by Point Mapping under Cell Reference Method

Technical Publication. DETC2011-48011
Jun Jiang, Professor, Xi’an, China, Xu Guo, Xi’an Jiaotong University, Xi’an, China

Computation Schemes for Optimizing Domains of Attraction in Dynamical Systems

Technical Publication. DETC2011-48158
Angela Castillo, Pedro Zufiria, Universidad Politécnica de Madrid, Madrid, Madrid, Spain

Global Analysis of Nonlinear Time-Delayed Dynamical Systems

Technical Publication. DETC2011-48069
Jian-Qiao Sun, Bo Song, University of California, Merced, Merced, CA, United States, Jie Yang, China University of Geosciences, Wuhan, Hubei, China

VIB-9 ROTOR DYNAMICS AND CONTROL

VIB-9-1 Rotor Dynamics and Control I - Magnetic Bearings

Thornton A 1:40pm–3:20pm

Session Chair: George Flowers, Auburn University, Auburn, AL, United States
Session Co-Chair: Mehmet Sahinkaya, University of Bath, Bath, United Kingdom

Contact Whirling Vibration of a Rotating Shaft Supported By a Repulsive Magnetic Bearing and the Influence of the Axial Displacement on Its Suppression

Technical Publication. DETC2011-47277
Tomohiro Sugai, NTN Corporation, Shizuoka, Japan, Tsuyoshi Inoue, Yukio Ishida, Nagoya University, Nagoya, Japan

Symptoms of Misaligned Worn Journal Bearings in Rotor Response under External Excitation of a Magnetic Bearing

Technical Publication. DETC2011-47566
Athanasios C. Chasalevris, Fadi Dohnal, Richard Markert, Technische Universität Darmstadt, Darmstadt, Germany

Adaptive Bias Current Control in Active Magnetic Bearings for Energy Optimization

Technical Publication. DETC2011-47868
Satoshi Ueno, Ritsumeikan University, Kusatsu, Japan, Mehmet Sahinkaya, University of Bath, Bath, United Kingdom

Modeling and Vibration Control of a Flexible Rotor By using Magnetic Bearings

Technical Publication. DETC2011-48057
Takuya Nomoto, Daizuke Hunakoshi, Toru Watanabe, Nihon University, Tokyo, Japan, Kazuto Seto, Seto Vibration Control Laboratory, Kanagawa, Japan

Hybrid Adaptive Rotor Imbalance Vibration Control Via Passive Autobalancer and Active Bearing Actuation

Technical Publication. DETC2011-48629
Dae-yi Jung, Hans DeSmidt, University of Tennessee at Knoxville, Knoxville, TN, United States
CIE-11 PANEL: ENERGY SYSTEMS - ENERGY EFFICIENT MANUFACTURING

CIE-11-2 Panel II
Congressional B 1:40pm–3:20pm
Session Chair: Robert Ivester
Session Co-Chair: Kevin Lyons, NIST, Gaithersburg, MD, United States

CIE-12 AMS: ADVANCED MODELING AND SIMULATION, GENERAL

CIE-12-1 AMS Session 1 Modeling
Columbia Foyer 1:40pm–3:20pm
Session Chair: Stephanie Wimmer, Naval Research Laboratory, Washington, DC, United States
Session Co-Chair: Jitesh Panchal, Washington State University, Pullman, WA, United States
Computational Modeling of Fugitive Phase Rotations within Tape Cast Ceramics
Technical Publication. DETC2011-47216
Stephanie Wimmer, Ming-Jen Pan, Naval Research Laboratory, Washington, DC, United States
A Method and Algorithm for Transforming Damped Linear Systems into Independent Equations
Technical Publication. DETC2011-47474
Fai Ma, Matthias Morzfeld, Daniel T. Kawano, University of California at Berkeley, Berkeley, CA, United States
Simulating Equipment Interaction with Predictive Dynamics
Technical Publication. DETC2011-47489
Jun Choi, Rajankumar Bhatt, HyunJoon Chung, Jasbir Arora, Karim Abdel-Malek, University of Iowa, Iowa City, IA, United States
Dielectric Response of Beta-HMX at THz Frequencies Calculated by Density Functional Theory
Technical Publication. DETC2011-47669
Lulu Huang, Samuel G Lambrakos, Noam Bernstein, Verne L Jacobs, Naval Research Laboratory, Washington, DC, United States, Andrew Shabaev, George Mason University, Fairfax, VA, United States, Daniel Finkenstadt, U.S. Naval Academy, Annapolis, MD, United States, Louis J Massa, Hunter College, CUNY, New York, NY, United States
Using SysML for Conceptual Representation of Agent-based Models
Technical Publication. DETC2011-47476
Zhenghui Sha, Qize Le, Jitesh Panchal, Washington State University, Pullman, WA, United States

CIE-13 SEIKM: KNOWLEDGE-CAPTURE, REUSE, MANAGEMENT

CIE-13-1 Knowledge Capture, Reuse, and Management
Grand Teton 1:40pm–3:20pm
Session Chair: Matt Bohm, University of Louisville, Louisville, KY, United States
Session Co-Chair: Paul Witherell, National Institute of Standards and Technology, Gaithersburg, MD, United States
Early Bom Derivation from Requirement Specifications by Reusing Product Knowledge
Technical Publication. DETC2011-47631
Sebastian Maltzahn, Reiner Anderl, Technische Universität Darmstadt, Darmstadt, Hessen, Germany
Formalizing Flow Relationships in Data Archival and Reuse for Product Design
Technical Publication. DETC2011-47849
Matt Bohm, University of Louisville, Louisville, KY, United States, Robert Nagel, James Madison University, Harrisonburg, VA, United States
Support of Product Innovation with a Modular Framework for Knowledge Management: A Case Study
Technical Publication. DETC2011-48346
Douglas Eddy, Sundar Krishnamurty, Ian Grosse, Jack Wileden, UMass Amherst, Amherst, MA, United States

DRAFT: Discovering Latent Functional Requirements using Annotated Knowledge Repositories
Technical Publication. DETC2011-48812
Brittany Ballard, Nathan Barrett, Jay McCormack, University of Idaho, Moscow, ID, United States
An Ontology-based Online Community to Maintain Engineering Knowledge in a Training Domain
Technical Publication. DETC2011-47920
Okjoon Kim, Uma Jayaram, Lijuan Zhu, Washington State University, Pullman, WA, United States

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-5 Fractional Order Controls Applications
Everglades 1:40pm–3:20pm
Session Co-Chair: J.A. Tenreiro Machado, Institute of Engineering of Polytechnic of Porto, Porto, Portugal
Visualizing Fractional Control System Approximations By Means of Multidimensional Scaling
Technical Publication. DETC2011-47284
J.A. Tenreiro Machado, Institute of Engineering of Polytechnic of Porto, Porto, Portugal
Transient Response Control By Fractional-Order PI Controllers
Technical Publication. DETC2011-47444
Serdar Ethem Hamamci, Inonu University, Malatya, Turkey, Serhat Obuz, Clemson University, Clemson, SC, United States
Analysis of Oscillations in Fractional Order LTI Systems

Technical Publication. DETC2011-47699

Milad Siami, Mohammad Saleh Tavazoei, Sharif University of Technology, Tehran, Iran

Robust CRONE Design for a Variable-Ratio Planetary Gearing in a variable speed wind turbine

Technical Publication. DETC2011-47842

Benjamin Feytout, Valeol, Bègles, France, Patrick Lanusse, University of Bordeaux, Talence, France, Jocelyan Sabatier, Université Bordeaux 1, Talence, France, Serge Gracia, Valeol, Bègles, France

Multi-Group Consensus of Heterogeneous Fractional-Order Dynamics Agents Via Pinning Control

Technical Publication. DETC2011-48151

Wei Sun, Beijing Institute of Technology, Beijing, China, YangQuan Chen, Utah State University, Logan, UT, United States, Changpin Li, Shanghai Univ, Shanghai, China

MESA-9 THE THIRD SYMPOSIUM ON BIO-MECHATRONICS - MEDICAL DEVICES & TECHNOLOGIES (BIOMECH’11)

MESA-9-2 Bio-Mechatronics II

Congressional D 1:40pm–3:20pm

Session Chair: Shane Xie, The University of Auckland, Auckland, New Zealand
Session Co-Chair: Lei Zuo, State University of New York at Stony Brook, Stony Brook, NY, United States

Robust Disturbance Observer-Based Adaptive Fuzzy Controller for Pneumatic Muscle Actuators

Technical Publication. DETC2011-48039

Prashant Jamwal, Shane Xie, Sean Quigley, The University of Auckland, Auckland, New Zealand

Fractional Thermal Model of the Lungs using Havrilak-Negami Function.

Student Competition Paper. DETC2011-48095

Mathieu Pellet, Pierre Melchior, Alain Oustaloup, University of Bordeaux, Talence Cedex, France, Youssef Abdelmoumen, Hospital du Haut-Lévêque, Chu de Bordeaux, Pessac Cedex, France

Design and Fabrication of Differential Scanning Nanocalorimeter for Biological Applications

Technical Publication. DETC2011-48704

Lei Zuo, Xiaoming Chen, State University of New York at Stony Brook, Stony Brook, NY, United States, Ming Lu, Brookhaven National Laboratory, Upton, NY, United States

An Automatic Injection Device for Precise Cement Delivery During Osteoporotic Bone Augmentation

Student Competition Paper. DETC2011-48719

Michael D. Kutzer, Mehran Armand, Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States, Ehsan Basafa, Yoshito Otake, Johns Hopkins University, Baltimore, MD, United States

Prosthetics for Transtibial Amputees-A Literature Survey

Technical Publication. DETC2011-47024

Thomas Powelson, Jingzhou (James) Yang, Texas Tech University, Lubbock, TX, United States

MESA-10 THE FIFTH SYMPOSIUM ON EMBEDDED SYSTEMS INFRASTRUCTURE AND THEORY (ESIT’11)

MESA-10-1 Infrastructure for Embedded Systems

Redwood 1:40pm–3:20pm

Session Chair: Bo Chen, Michigan Technological University, Houghton, MI, United States
Session Co-Chair: Peter Roessler, University of Applied Sciences Technikum Wien, Wien, Austria

A Heterogeneous System-level Power Macro-modeling for Network-on-Chip Router

Technical Publication. DETC2011-48908

Ning Wu, Fang Zhou, Ying Zhang, Fen Ge, Nanjing University of Aeronautics and Astronautics, Nanjing, China

A Joint-Coding Scheme with Crosstalk Avoidance

Technical Publication. DETC2011-48912

Lei Zhou, Ning Wu, Fen Ge, Nanjing University of Aeronautics and Astronautics, Nanjing, China

A Methodology for Remote Debug, Test and Maintenance Based on IEEE 1588

Technical Publication. DETC2011-48957

Peter Roessler, Roland Hoeller, Martin Zauner, University of Applied Sciences Technikum Wien, Wien, Austria

Dedicated Infrastructure for Academic Courses Related to Embedded Systems Design Supporting Students in Distance Learning Programs

Technical Publication. DETC2011-47843

Michael Kramer, Roman Beneder, Philipp Brejcha, Peter Balog, UAS Technikum Wien, Vienna, Austria

Model-Based Embedded System Design Methodology for Automotive Applications

Student Competition Paper. DETC2011-47910

Wei Luo, Bo Chen, Michigan Technological University, Houghton, MI, United States
MSNDC-8 DYNAMICAL SYSTEMS WITH TIME-VARIABILITY, DELAY, OR DISCONTINUITIES

MSNDC-8-1 Dynamical Systems with Time-Variability, Delay, or Discontinuities I

Regency D 1:40pm–3:20pm

Session Chair: Stefano Lenci, Polytechnic University of Marche, Ancona, Ancona, Italy
Session Co-Chair: Gabor Oroz, University of Michigan, Ann Arbor, MI, United States

Visuomotor Tracking Tasks with Delayed Pursuit and Escape

Technical Publication. DETC2011-47312

John Milton, The Claremont Colleges, Claremont, CA, United States, Joshua Lippai, Pomona College, Claremont, CA, United States, Rachel Bellows, Pitzer College, Claremont, CA, United States, Andrew Blomberg, Toru Ohira, Joint Science Department, Claremont, CA, United States, Atsushi Kamimura, Institute of Industrial Science, Tokyo, Japan

Comparative Study of Semi-analytical Methods for the Stability Analysis of Delay Differential Equations

Technical Publication. DETC2011-47519

Dennis Tweten, Genevieve Lipp, Firas Khasawneh, Brian Mann, Duke University, Durham, NC, United States

Resonances in an Infinitely Long Cable on a Tensionless Non-smooth Foundation: A Numerical Analysis

Technical Publication. DETC2011-47890

Lucio Demeio, Giovanni Lancioni, Stefano Lenci, Polytechnic University of Marche, Ancona, Italy

Fold Bifurcation in the State-Dependent Delay Model of Milling Analytical and Numerical Solutions

Technical Publication. DETC2011-48300

Daniel Bachrathy, HAS-BUTE Research Group on Dynamics of Machines and Vehicles, Budapest, Hungary, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

Delayed Car-Following Dynamics for Human and Robotic Drivers

Technical Publication. DETC2011-48829

Gabor Oroz, University of Michigan, Ann Arbor, MI, United States, Jeff Moehlis, Francesco Bullo, University of California, Santa Barbara, Santa Barbara, CA, United States

MSNDC-9 FLEXIBLE MULTIBODY DYNAMICS

MSNDC-9-1 Flexible Multibody Dynamics I

Columbia A 1:40pm–3:20pm

Session Chair: Ahmed Shabana, University of Illinois at Chicago, Chicago, IL, United States
Session Co-Chair: Wan-Suk Yoo, Pusan National University, Busan, Korea (Republic)


Technical Publication. DETC2011-47187

Frank Naets, Gert H.K. Heirman, Wim Desmet, KU Leuven, Heverlee, Vlaams-Brabant, Belgium

On Pure-Bending Non-Linear Plate Elements with Developable Surfaces

Technical Publication. DETC2011-47794

Oleg N. Dmitrochenko, Aki Mikola, Lappeenranta University of Technology, Lappeenranta, Finland

A Controller Design for Flexible Multibody System by the Use of Absolute Nodal Coordinate Formulation

Technical Publication. DETC2011-47979

Yoshiki Sugawara, Aoyama Gakuin University, Sagamihara-shi Kanagawa-ken, Japan, Nobuyuki Kobayashi, Aoyama Gakuin University, Fuchinobe, Kanagawa, Japan

A Generalized Component Mode Synthesis Approach for Multibody System Dynamics Leading to Constant Mass and Stiffness Matrices

Technical Publication. DETC2011-47826

Johannes Gerstmayr, Linz Center of Mechatronics, Linz, Austria, Astrid Pechstein, Johannes Kepler University Linz, Linz, Austria, Austria

On the Accuracy of Assumed Mode Modeling for Flexible Manipulators

Technical Publication. DETC2011-47967

Fatemeh Heidari, Mohammad Vakil, Reza Fotouhi, University of Saskatchewan, Saskatoon, SK, Canada

MSNDC-10 DYNAMICS OF LAND, SEA, AIR, AND SPACE VEHICLES

MSNDC-10-1 Dynamics of Vehicles I

Glacier 1:40pm–3:20pm

Session Chair: Hiroyuki Sugiyama, Tokyo University of Science, Tokyo, Japan
Session Co-Chair: Khaled Zaazaa, ENSCO, Inc., Springfield, VA, United States

Combined Nodal and Non-Conformal Contact Approach for the Analysis of Turnout Negotiations of Multibody Railroad Vehicles

Technical Publication. DETC2011-47540

Hiroyuki Sugiyama, Takuto Sekiguchi, Ryosuke Matsumura, Shunpei Yamashita, Tokyo University of Science, Tokyo, Japan, Yoshihiro Suda, University of Tokyo, Tokyo, Japan

Eigenvalue Analysis of Multibody Models of Railroad Vehicles Including Track Flexibility

Technical Publication. DETC2011-48212

Jose Escalona, Rosario Chamorro, Antonio Recuero, University of Seville, Seville, Spain

Evaluations of the Racing Kart Dynamic Behavior with Flexible Multibody Dynamic Analysis

Technical Publication. DETC2011-48019

Taichi Shiiba, Muhamad Fadzili Bin Ashari, Michiya Yano, Yuichiro Takada, Meiji University, Kawasaki, Japan

Sensitivity Analysis of Mobile Robots for Unstructured Environments

Technical Publication. DETC2011-48440

Bahareh Ghotbi, Ali Azimi, József Kövecses, Jorge Angeles, McGill University, Montreal, QC, Canada
Perturbation Analysis and Chaotic Dynamics of Rotating Blade with Varying Angular Speed

Technical Publication. DETC2011-47359
Yanping Chen, Minghui Yao, Wei Zhang, Qian Wang, Beijing University of Technology, Beijing, China

MSNDC-11 RAPID-FIRE POSTER SESSION

MSNDC-11-1 Rapid-fire Poster Session I
Congressional C 1:40pm–3:20pm

Session Chair: Harry Dankowicz, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Multibody Dynamics in Generalized Divide and Conquer Algorithm (GDCA) Scheme

Technical Publication. DETC2011-48383
Mohammad Poursina, Kurt Anderson, Rensselaer Polytechnic Institute, Troy, NY, United States

Partitioned Model vs Parallelized Solver

Technical Publication. DETC2011-47645
Lars Mikelsons, Dieter Schramm, Nils Menager, University of Duisburg-Essen, Duisburg, Germany

Operation Space Algorithms for Constrained Multibody System Dynamics

Technical Publication. DETC2011-48657
Rudranarayan Mukherjee, NASA Jet Propulsion Laboratory, Pasadena, CA, United States

Multi-Pulse Chaotic Motions for a Cantilever Beam with One-to-one Internal Resonance

Technical Publication. DETC2011-47174
Shuangbao Li, Civil Aviation University of China, Tianjin, China, Wei Zhang, Beijing University of Technology, Beijing, China

Further Remarks on Invariance Properties of Time Delay Systems

Technical Publication. DETC2011-48234
Nikola Stankovic, Sorin Olaru, Supelec Systems Sciences (E3S) - Automatic Control Department, GIF-Sur-Yvette, Ile-de-France, France, Silviu Niculescu, LSS - Laboratory of Signals and Systems, Supelec - CNRS, GIF-Sur-Yvette, France

Finite Element Modeling of Prestressed Concrete Crossties with Ballast and Subgrade Support

Technical Publication. DETC2011-47452
Hailing Yu, David Jeong, John Choros, Ted Sussmann, John A. Volpe National Transportation Systems Center, Cambridge, MA, United States

Comfort and Handling of a Commercial Vehicle with Individual FrontSuspension

Technical Publication. DETC2011-47876
Hoda Yarmohamadi, Viktor Berbyuk, Chalmers University of Technology, Gothenburg, Sweden

On a Magnetically Levitated Body Nonlinear Dynamics Behavior using State Dependent Riccati Equation (SDre) and an Optimal Control Methods

Technical Publication. DETC2011-47406
José Manoel Balthazar, UNESP : Univ Estadual Paulista, Rio Claro, SP, Brazil, Fábio Roberto Chavarette, Célia Aparecida dos Reis, UNESP Univ Estadual Paulista, Department of Mathematics, Ilha Solteira, SP, Brazil, Nelson José Peruzzi, UNESP Univ Estadual Paulista, Jaboticabal - SP, Brazil

DAC-14 MULTIDISCIPLINARY DESIGN OPTIMIZATION (MDO)

DAC-14-1 Multidisciplinary Design Optimization (MDO)

Yosemite 1:40pm–3:20pm

Session Chair: Eliot Winer, Iowa State University, Ames, IA, United States
Session Co-Chair: James Allison, MathWorks, Inc., Natick, MA, United States

A Web Services-Based Framework for Multidisciplinary Design Optimization

Technical Publication. DETC2011-47422
Liu Jihong, Li Liangsheng, Beihang University, Beijing, China

Multidisciplinary Reliability Design and Optimization Based on CSSO and PMA

Technical Publication. DETC2011-47423
Liu Jihong, Li Liangsheng, Liu Shaohua, Beihang University, Beijing, China

Multidisciplinary Design Optimization of Ship Hull Forms using Metamodels

Technical Publication. DETC2011-47761
Jim He, Michigan Engineering Services, Ann Arbor, MI, United States, Shari Hannapel, Nickolas Vlahopoulos, University of Michigan, Ann Arbor, MI, United States

Visually Exploring a Design Space through the Use of Multiple Contextual Self-Organizing Maps

Technical Publication. DETC2011-47944
Trevor Richardson, Eliot Winer, Iowa State University, Ames, IA, United States

Quantifying the Convergence Time of Distributed Design Processes

Technical Publication. DETC2011-48377
Erich Devendorf, Department of Mechanical and Aerospace Engineering, Buffalo, NY, United States, Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States
DAC-15 METAMODEL-BASED DESIGN OPTIMIZATION (MBDO)

DAC-15-1 Metamodel-based Design Optimization (MBDO)

Sequoia 1:40pm–3:20pm

Session Chair: Rahul Rai, Cal State Fresno, Fresno, CA, United States
Session Co-Chair: Jay Martin, Pennsylvania State University, Spring Mills, PA, United States

A Rational Design Approach to Gaussian Process Modeling for Variable Fidelity Models

Technical Publication. DETC2011-48227
Roxanne Moore, Christiaan J.J. Paredis, Georgia Institute of Technology, Atlanta, GA, United States, David Romero, University of Toronto, Toronto, ON, Canada

An Improved Support Vector Domain Description Method for Modeling Valid Search Domains in Engineering Design Problems

Technical Publication. DETC2011-48435
Erin Roach, Robert Parker, Richard Malak, Texas A&M University, College Station, TX, United States

On Using Kriging Models for Complex Design

Technical Publication. DETC2011-48579
Jay Martin, Pennsylvania State University, Spring Mills, PA, United States

Surrogate Modeling of Complex Systems using Reliability Based Hybrid Functions

Student Competition Paper. DETC2011-48608
Jie Zhang, Souma Chowdhury, Junqiang Zhang, Luciano Castillo, Rensselaer Polytechnic Institute, Troy, NY, United States, Achille Messac, Syracuse University, Syracuse, NY, United States

Convex Estimators for Optimization of Kriging Model Problems

Technical Publication. DETC2011-48566
Karim Hamza, University of Michigan, Ann Arbor, MI, United States, Mohammed Shalaby, General Electric Global Research, Niskayuna, NY, United States

DAC-16 SIMULATION-BASED DESIGN UNDER UNCERTAINTY

DAC-16-1 Simulation-based Design Under Uncertainty

Bryce 1:40pm–3:20pm

Session Chair: Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States
Session Co-Chair: Harrison Kim, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Addressing Limitations of Pareto Front in Design under Uncertainty

Technical Publication. DETC2011-47238
Vijitashwa Pandey, Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States, Efstratios Nikolaidis, University of Toledo, Toledo, OH, United States

Model Uncertainty Quantification using Standards for Measurement Uncertainty

Technical Publication. DETC2011-47865
Xiaoping Du, Harsheel Shah, Missouri University of Science and Technology, Rolla, MO, United States

Multi-Stage Uncertainty Propagation for Verifying the Correctness of Complex System Designs

Technical Publication. DETC2011-47888
Christopher Hoyle, Irem Tumer, Oregon State University, Corvallis, OR, United States, Tolga Kurtoglu, Palo Alto Research Center, Palo Alto, CA, United States, Wei Chen, Northwestern University, Evanston, IL, United States

A Markovian Reliability Approach for Hybrid Power Generation System Design Optimization

Technical Publication. DETC2011-48607
Shen Lu, Harrison Kim, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Robust Structural Design Optimization under Non-Probabilistic Uncertainties

Technical Publication. DETC2011-48710
Jiantao Liu, Ping An Du, University of Electronic Science and Technology of China, Chengdu, China, Hae Chang Gea, Rutgers University, Piscataway, NJ, United States

PTG-4 GEAR SYSTEM DYNAMICS AND NOISE

PTG-4-2 Gear System Dynamics and Noise II

Congressional A 1:40pm–3:20pm

Session Chair: Teik Lim, University of Cincinnati, Cincinnati, OH, United States

Whine Noise Development of Engine Timing Gear System in Heavy Duty Vehicle

Technical Publication. DETC2011-47251
Sukil OH, Koo-Tae Kang, Kang-Young Soh, Jung-Ho Kim, Hyundai Motors, Gyeonggi-Do, Korea (Republic)

Gear Whine Noise Spectra Caused by Transmission Errors

Technical Publication. DETC2011-48126
Alfonso Fuentes, Ignacio Gonzalez-Perez, Polytechnic University of Cartagena, Cartagena, Murcia, Spain, Hiroyuki Nagamoto, Kenichi Hayasaka, Yamaha Motor Company, Iwata, Shizuoka, Japan

Impact Noise from the Shaft-Bearing-Plate Due to the Axial Excitation of Helical Gears

Technical Publication. DETC2011-47427
Chan II Park, Gangneung-Wonju National University, Wonju, Gangwon-do, Korea (Republic)

Effects of Assembly Errors on Crossed Beveloid Gear Tooth Contact and Dynamic Response

Technical Publication. DETC2011-47413
Caichao Zhu, Chaosheng Song, Chongqing University, Chongqing, Chongqing, China, Teik Lim, University of Cincinnati, Cincinnati, OH, United States, Tao Peng, ArvinMeritor Inc., Troy, MI, United States
Effect of Gear Tooth Crack and Spalling on Spur Gear Dynamic Response by Simulation and Experiments

Technical Publication. DETC2011-47524
Yimin Shao, Xi Wang, Zaigang Chen, Chongqing University, Chongqing, Chongqing, China, Teik Lim, University of Cincinnati, Cincinnati, OH, United States

MECH-6 ROBOT DYNAMICS AND CONTROL
MECH-6-3 Legged Locomotion
Capital B 1:40pm–3:20pm
Session Chair: Brian Trease, NASA JPL, Pasadena, CA, United States
Session Co-Chair: Cameron Turner, Colorado School of Mines, Golden, CO, United States

Ground Reaction Forces for Various Standing Tasks Considering Generic Terrain
Technical Publication. DETC2011-48529
Bradley Howard, Jingzhou (James) Yang, Texas Tech University, Lubbock, TX, United States

How Dynamic Is Dynamic Walking? Human Vs. Robotic Gait
Technical Publication. DETC2011-47897
Carlotta Mummolo, Joo H. Kim, NYU-Poly, Brooklyn, NY, United States

Pseudo Standing, Forward Falling, and Pulling Simulation for Pregnant Woman
Technical Publication. DETC2011-48654
Qiuling Zou, Jingzhou (James) Yang, Texas Tech University, Lubbock, TX, United States

Optimal Trajectory Planning for Brachiation Robot on Ladder with Irregular Branches
Technical Publication. DETC2011-47648
Ali Meghdari, Seyyed Mohammad Hosseini Lavasani, Mir Saman Rahimi Mousavi, Mohsen Norouzi, Sharif University of Technology, Tehran, Iran

Hybrid Position-Force Control of Climbing Parallel Robot using Electrohydrodynamic Servo Actuators
Technical Publication. DETC2011-48349
Ilka A. Banfield, Roque Saltaren, Lisandro J. Puglisí Rafael Aracil, Universidad Politécnica de Madrid, Madrid, Spain

MECH-8 COMPLIANT MECHANISMS
MECH-8-2 Applications: Material and Geometric Factors
Yellowstone 1:40pm–3:20pm
Session Chair: Craig Lusk, The University of South Florida, Tampa, FL, United States
Session Co-Chair: Mark B. Colton, Brigham Young University, Provo, UT, United States

A Novel Approach for Designing Parabolic Mirrors using Optimized Compliant Bands
Technical Publication. DETC2011-47096
Lifang Li, Harbin Institute of Technology, Harbin, Heilongjiang, China, Andrés Kecskeméthy, University of Duisburg-Essen, Duisburg, Germany, Abul Fazal M. Arif, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, Steven Dubowsky, Massachusetts Institute of Technology, Cambridge, MA, United States

Expanding the Capabilities of Credit-Card Sized Products using Lamina Emergent Mechanisms
Technical Publication. DETC2011-48420
Nathan Albrechtsen, Spencer Magleby, Larry L. Howell, Brigham Young University, Provo, UT, United States

An XYZ Parallel Kinematic Flexure Mechanism with Geometrically Decoupled Degrees of Freedom
Technical Publication. DETC2011-47713
Shorya Awtar, John Ustick, Shiladitya Sen, University of Michigan, Ann Arbor, MI, United States

A Systematic Approach to Designing Multi-Material Miniature Compliant Mechanisms
Technical Publication. DETC2011-48410
Dana Vogtmann, University of Maryland, College Park, Mechanical Engineering Department, College Park, MD, United States, Satyandra Gupta, Sarah Bergbreiter, University of Maryland, College Park, MD, United States

Compliant Mechanism Road Bicycle Brake: A Rigid-Body Replacement Case Study
Technical Publication. DETC2011-48621
Brian M. Olsen, Los Alamos National Lab, Los Alamos, NM, United States, Larry L. Howell, Spencer Magleby, Brigham Young University, Provo, UT, United States

MECH-9 MECHANISM ANALYSIS AND SYNTHESIS
MECH-9-2 Planar Synthesis I
Lexington 1:40pm–3:20pm
Session Chair: José M. Rico, División de Ingenierías Campus Irapuato-Salamanca. Universidad de Guanajuato., Salamanca, Gto., Mexico
Session Co-Chair: Qimi Jiang, University of Pennsylvania, Philadelphia, PA, United States

Fine-Tuning Geometrically Constrained Planar Motions
Technical Publication. DETC2011-48210
Ping Zhao, Qiaode Jeffrey Ge, Stony Brook University, Stony Brook, NY, United States, Feng Gao, Shanghai Jiaotong University, Shanghai, China, Hai-Jun Su, University of Maryland Baltimore County, Baltimore, MD, United States
DEC-4 EXPERIENTIAL LEARNING AND NEW PEDAGOGY FOR ENGINEERING EDUCATION

DEC-4-1 Experiential Learning and New Pedagogy for Engineering Education

Thornton B 1:40pm–3:20pm

Session Chair: Warren Smith, University of NSW, Canberra, ACT, Australia
Session Co-Chair: Wenfeng Lu, National University of Singapore, Singapore, Singapore

Some Initial Findings from an Investigation of Engineering Students Choices and Motivations

Technical Publication. DETC2011-47796
Warren Smith, University of NSW, Canberra, ACT, Australia

Preparing Mechanical Engineering Students for Product Design Professional Practice through PBL: Planning and Execution of the subject Product Design Methodology

Technical Publication. DETC2011-48078
Juan Manuel Munoz-Guijosa, Andrés Díaz-Lantada, Javier Echávarri, José Luis Muñoz, Pilar Lafont, Enrique Chacón, Victor Rodríguez de la Cruz, Eduardo de la Guerra, Daniel Fernández-Caballero, Universidad Politécnica de Madrid, Madrid, Spain

Engineering Design and Education: A Case Study on Designing a Competition Fuel Efficient Vehicle through Experiential Learning

Technical Publication. DETC2011-48817
Wenfeng Lu, Hong Wee Lim, Kim Hoo Goh, National University of Singapore, Singapore, Singapore

Experiential Learning Based Engineering Curriculum to Develop Meta-Competencies

Technical Publication. DETC2011-48258
Zahed Siddique, Amy C. Bradshaw, Farrokh Mistree, Patricia L. Hardre, University of Oklahoma, Norman, OK, United States

DTM-7 DESIGN BEHAVIOR AND ANALOGICAL DESIGN

DTM-7-1 Design behavior and analogical design

Concord 1:40pm–3:20pm

Session Chair: Sofiane Achiche, Technical University of Denmark, Kgs. Lyngby, Copenhagen Area, Denmark
Session Co-Chair: Jacquelyn Nagel, James Madison University, Harrisonburg, VA, United States

A Systematic Approach to Biologically-inspired Engineering Design

Technical Publication. DETC2011-47398
Jacquelyn Nagel, James Madison University, Harrisonburg, VA, United States, Robert Stone, Oregon State University, Corvallis, OR, United States

Understanding of Emotions and Reasoning During Consumer Tradeoff Between Function and Aesthetics in Product Design

Technical Publication. DETC2011-48173
Brian Sylcott, Jonathan Cagan, Golnaz Tabibnia, Carnegie Mellon University, Pittsburgh, PA, United States
Foraging for Inspiration: Understanding and Supporting the Online Information Seeking Practices of Biologically Inspired Designers

Technical Publication. DETC2011-48238
Swaroop Vattam, Ashok Goel, Georgia Institute of Technology, Atlanta, GA, United States

Form Function Fidelity

Technical Publication. DETC2011-48325
Ian Tseng, Jonathan Cagan, Kenneth Kotovsky, Carnegie Mellon University, Pittsburgh, PA, United States


Technical Publication. DETC2011-48661
Lora Oehlberg, Celeste Roschuni, Alice Agogino, University of California, Berkeley, Berkeley, CA, United States

DFMLC-8 DESIGN FOR MASS CUSTOMIZATION, DESIGN FOR SERVICE, DESIGN FOR LAYERED MANUFACTURING & DESIGN

DFMLC-8-1 Design for Mass Customization, Design for Service, Design for Layered Manufacturing & Design I

Bunker Hill 1:40pm–3:20pm

Session Chair: Ming-Chuan Chiu, Pennstate University, University Park, PA, United States

Service Information Database for Consumer Acceptance

Technical Publication. DETC2011-47309
Kenji Iino, SYDROSE LP, San Jose, CA, United States, Masayuki Nakao, The University of Tokyo, Bunkyo-ku, Tokyo, Japan, Tsukasa Hayashi, The Chugoku Electric Power Co., Inc, Matsue City, Shimane, Japan

Preventing Misuse of Consumer Products

Technical Publication. DETC2011-47357
Masayuki Nakao, Toshio Miyamura, Kensuke Tsuchiya, The University of Tokyo, Bunkyo-ku, Tokyo, Japan, Kenji Iino, SYDROSE LP, San Jose, CA, United States

Engineering Applicability of a Universal Design Performance Measure

Technical Publication. DETC2011-47749
Austin Talley, Richard Crawford, University of Texas at Austin, Austin, TX, United States, Kimberly Talley, Austin Community College, Austin, TX, United States

An Analysis of Industrial Practice for Estimating the In-service Costs of a Product Service System

Technical Publication. DETC2011-47904
Estelle Huang, Linda Newnes, University of Bath, Bath, United Kingdom, Glenn Parry, Faculty of Business & Law, UWE Frenchay Campus, Bristol, United Kingdom

A Service Structural Analysis Based on Functional Dependency

Technical Publication. DETC2011-48032
Koji Kimita, Tokyo Metropolitan University, Hino-shi, Japan, Shigeru Hosono, NEC Corporation, Tokyo, Japan, Yoshiki Shimomura, Tokyo Metropolitan University, Tokyo, Japan

AVTT-5 ADVANCES IN ALTERNATIVE PROPULSION SYSTEMS AND NON-CONVENTIONAL, ENERGY EFFICIENT VEHICLES

AVTT-5-1 Advances in Alternative Propulsion Systems and Non-conventional, Energy Efficient Vehicles

Thornton C 1:40pm–3:20pm

Session Chair: Ming Cao
Session Co-Chair: Joel Anstrom, Larson Institute Penn State, University Park, PA, United States

Investigation of Mechanical Differentials as Continuously Variable Transmissions

Technical Publication. DETC2011-47479
Dax B. Wells, Brigham Young University Department of Mechanical Engineering, Othello, WA, United States, Groen Benjamin C., Brigham Young University Department of Mechanical Engineering, Lake Orion, MI, United States, Robert H. Todd, Brigham Young University Department of Mechanical Engineering, Provo, UT, United States

DC Motor Selection for Hybrid and Electric Vehicles using an Infinitely Variable Transmission

Technical Publication. DETC2011-47484
Groen Benjamin C., Brigham Young University Department of Mechanical Engineering, Lake Orion, MI, United States, Robert H. Todd, Brigham Young University Department of Mechanical Engineering, Provo, UT, United States

Battery Sizing as a Function of Powertrain Component Efficiencies for Various Drive Cycles

Technical Publication. DETC2011-47514
Lynn R. Gantt, R. Jesse Alley, Douglas J. Nelson, Virginia Tech, Blacksburg, VA, United States

Design of An Hydrogen Powered Electrical Race Vehicle

Technical Publication. DETC2011-48284
Gianmarco Galmarini, Giampiero Mastinu, Massimiliano Gobbi, Marco Mauri, Politecnico di Milano, Milan, Italy
VIB-8 GLOBAL NONLINEAR DYNAMICS

VIB-8-2 Global Nonlinear Dynamics - II

Capital A 3:40pm–5:20pm

Session Chair: Jian-Qiao Sun, University of California at Merced, Merced, CA, United States
Session Co-Chair: Young S. Lee, New Mexico State University, Las Cruces, NM, United States

Multi-Pulse Chaotic Motion for a Six-Dimensional Nonautonomous Rectangular Thin Plate by using the Extended Melnikov Method

Technical Publication. DETC2011-47101
W.L. Hao, Wei Zhang, Beijing University of Technology, Beijing, China

Bifurcation of Nonlinear Normal Modes by Means of Synge's Stability

Technical Publication. DETC2011-48690
Young S. Lee, Heng Chen, New Mexico State University, Las Cruces, NM, United States

Multi-Pulse Chaotic Dynamics of Three-Degree-of-Freedom Model for Iced Cable Structure

Technical Publication. DETC2011-47779
Minghui Yao, College of Mechanical Engineering, Beijing University of Technology, Beijing, China, Wei Zhang, Beijing University of Technology, Beijing, China, Jean W. Zu, University of Toronto, Toronto, ON, Canada

The Effect of Interface Delays in Substructuring Experiments

Technical Publication. DETC2011-47948
Maria Rosaria Marsico, David Wagg, Simon Neild, University of Bristol, Bristol, United Kingdom

Mechanism of Bistable Resonance with larg Conditions Frequency

Technical Publication. DETC2011-47119
Yong-gang Leng, Tianjin University, Tianjin, China, Zhi-hui Lai, Tianjin University, School of Mechanical Engineering, Tianjin, China, Jun-zhong Xia, Academy of Military Transportation, Automobile Engineering Department, Tianjin, China, Yan Guo, Tianjin University, School of Management, Tianjin, China

VIB-9 ROTOR DYNAMICS AND CONTROL

VIB-9-2 Rotor Dynamics and Control II - Nonlinear Dynamics

Thornton A 3:40pm–5:20pm

Session Chair: C. Nat Nataraj, Villanova University, Villanova, PA, United States
Session Co-Chair: Tsuyoshi Inoue, Nagoya University, Nagoya, Japan

Double Nonlinearity - Unbalance Response of Rotor on Ball Bearings with Squeeze Film Dampers

Technical Publication. DETC2011-47414
David Fleming, Nasa Glenn (retired), North Olmsted, OH, United States

Prediction of Horseshoes Chaos in Active Magnetic Bearings with Time-Varying Stiffness

Technical Publication. DETC2011-48317
Cedrick Kitio Kwuimy, C. Nataraj, Villanova University, Villanova, PA, United States

An Insight into the Snubbing Mechanism for the Reduction of Turbine Blade Vibration by Analyzing Chaotic Behaviour

Technical Publication. DETC2011-48159
Paolo Pennacchi, Nicolò Bachschmid, Politecnico di Milano, Milan, Italy, Steven Chatterton, Politecnico di Milano - Dept. Mechanical Engineering, Milan, Italy, Emanuel Pesatori, Franco Tosi Meccnica S.p.a., Legnano, MI, Italy

Nonlinear Flutter Response for Tilting 4 Pad Bearings-Rotor System

Technical Publication. DETC2011-47574
Gordon Kirk, Jiayang Ying, Virginia Tech, Blacksburg, VA, United States, Yinghou Jiao, Zhaobo Chen, Harbin Institute of Technology, Harbin, China

Nonlinear Dynamic Analysis and Experimental Verification of An Unbalanced Rotor Supported By Ball Bearings

Technical Publication. DETC2011-48940
Sanjay Upadhyay, Satish C. Sharma, Suraj Harsha, Indian Institute of Technology Roorkee, Roorkee, India

VIB-10 NONLINEAR DYNAMICS OF CONTINUOUS SYSTEMS

VIB-10-1 Nonlinear Dynamics of Continuous Systems I

Yosemite 3:40pm–5:20pm

Session Chair: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States
Session Co-Chairs: Bogdan Epureanu, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Marco Amabili, McGill University, Montreal, QC, Canada

Detection of Cracks in Mistuned Bladed Disks using Reduced Order Models and Vibration Data

Keynote Paper. DETC2011-47780
Chulwoo Jung, Akira Saito, Bogdan Epureanu, University of Michigan - Ann Arbor, Ann Arbor, MI, United States

Reduced Order Model of Nanoelectromechanical Systems to Include Casimir Effect

Technical Publication. DETC2011-48367
Dumitru Caruntu, Roberto J. Zapata, Martin W. Knecht, University of Texas Pan American, Edinburg, TX, United States

Nonlinear Force Analysis of Atomic Force Microscopy

Technical Publication. DETC2011-48482
Nima Mahmoodi, The University of Alabama, Tuscaloosa, AL, United States, Amin Salehi-Khojin, University of Illinois at Urbana Champaign, Urbana, IL, United States, Mehdi Ahmadian, Virginia Tech, Blacksburg, VA, United States

Energy Dissipation By Micro-Slip in An Assembly, Analytic and Experimental Approach

Technical Publication. DETC2011-47850
Nicolas Peyret, Pierre Argoul, Université Paris Est, UR Navier, Ecole des Ponts ParisTech, Marne La Vallee, France, Jean-Luc Dion, Gaël Chevallier, Supmeca, Saint Ouen, France
**VIB-11 EXPERIMENTS IN NONLINEAR DYNAMICS AND VIBRATIONS**

**VIB-11-1 Vibration Absorption and Mitigation**

**Congressional A 3:40pm–5:20pm**

Session Chair: Dane Quinn, The University of Akron, Akron, OH, United States
Session Co-Chair: Brian Feeny, Michigan State University, East Lansing, MI, United States

Experimental Investigation of Low Frequency Noise Redirection using a Nonlinear Vibroacoustic Absorber

**Technical Publication. DETC2011-47431**

Sergo Bellizzi, CNRS/LMA, Marseille, France, Bruno Cochelin, Ecole Centrale de Marseille and CNRS, Marseille, France, Philippe Herzog, Pierre-Olivier Mattéi, Cédric Pinnède, Laboratoire de Mécanique et d’Acoustique CNRS, Marseille, France

Experimental investigation and theoretical analysis of a nonlinear energy sink under harmonic forcing

**Technical Publication. DETC2011-48090**

Gourc Etienne, Seguy Sébastien, Université de Toulouse; ICA; INSA, Toulouse, France, Michon Guilhem, Université de Toulouse; ICA; ISAE, Toulouse, France, Berlioz Alain, Université de Toulouse; ICA; UPS, Toulouse, France

An Eccentric Rotator as a Novel Design of a Nonlinear Energy Sink

**Technical Publication. DETC2011-47764**

Oleg V. Gendelman, Technion Israel Institute of Technology, Haifa, Israel, Grigori Sigalov, Mercedes Mane, Lawrence Bergman, Alexander Vakakis, University of Illinois at Urbana Champaign, Urbana, IL, United States, Leonid I. Manevitch, Semenov Institute of Chemical Physics, Russian Academy of Sciences, Moscow, Russia

Designing a New Type of Energy Trap: A Classical Analog of Quantum Landau-Zener Tunneling

**Technical Publication. DETC2011-47690**

Alexander Vakakis, Grigori Sigalov, Mercedes Mane, Lawrence Bergman, University of Illinois at Urbana-Champaign, Urbana, IL, United States, Leonid I. Manevitch, Yury A. Kosevich, Semenov Institute of Chemical Physics, Russian Academy of Sciences, Moscow, Russia

Nonlinear Transient Dynamics of Pendulum Torsional Vibration Absorbers

**Technical Publication. DETC2011-48353**

Ryan Monroe, Michigan State University Department of Mechanical Engineering, East Lansing, MI, United States, Steve Shaw, Michigan State University, East Lansing, MI, United States

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**CIE-12 AMS: ADVANCED MODELING AND SIMULATION, GENERAL**

**CIE-12-2 AMS Session 2 CFD**

**Regency B 3:40pm–5:20pm**

Session Chair: P. Venkataraman, Rochester Institute of Technology, Rochester, NY, United States
Session Co-Chair: Gregory Mocko, Clemson University, Clemson, SC, United States

A Low Cost Micro Scale Cyclone Microparticle separator-Design and CFD analysis

**Technical Publication. DETC2011-48792**

Deval Pandya, University of Texas at Arlington, Arlington, TX, United States, Brian H. Dennis, The University of Texas at Arlington, Arlington, TX, United States

CFD Modelling of Moisture Content, Air Velocity & Thermal Patterns in the Tombs of Horemheb in Valley of Kings

**Technical Publication. DETC2011-47627**

Essam E. khalil, Cairo University, Cairo, Egypt

Flow Regimes and Thermal Comfort in Air Conditioned Squash Courts

**Technical Publication. DETC2011-47629**

Essam E. khalil, ElSayed K. Abou El Kassem, Hesham AbdElMunem, Cairo University, Cairo, Egypt

Performance of an Orifice Compensated Non-Recessed Hole-Entry Hybrid Journal Bearing Operating in Turbulent Regime

**Technical Publication. DETC2011-48341**

Nathi Ram, Devendra Sankla, Arvind K. Rajput, Satish C. Sharma, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India

Drag Minimization on Rear Box of a Simplified Car Model by Robust Parameter Design

**Technical Publication. DETC2011-47824**

Asghar Ramezanl, Sajjad Beigmoradi, Iran University of Science and Technology, Tehran, Iran
CIE-14 AMS: COMPUTATIONAL MULTIPHYSICS APPLICATIONS

CIE-14-1 AMS CMA Session 1

Congressional B 3:40pm–5:20pm

Session Chair: Valeria Krzhizhanovskaya, University of Amsterdam, Amsterdam, Netherlands
Session Co-Chair: John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States

Controlled Kinetic Monte Carlo Simulation of Nanomanufacturing Processes

Technical Publication. DETC2011-48570
Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

Multiscale Modeling for Flood Early Warning Systems: Simulation of Flood Dynamics and Levee Stability under Dynamic Hydraulic Load

Technical Presentation Only. DETC2011-48951
Valeria Krzhizhanovskaya, Natalia Melnikova, Gleb Shirshov, University of Amsterdam, Amsterdam, Netherlands, Ben Gouldby, HR Wallingford, Wallingford, United Kingdom

Efficient Partitioned Time Integration for Thermally Coupled Flows and Structures

Technical Presentation. DETC2011-48344
Vahid Kazemi-Kamyab, Alexander van Zuijlen, Hester Bijl, Delft University of Technology, Delft, Netherlands

Friction Stir Welding Process Parameter Effects on Workpiece Warpage Due to Residual Strains

Technical Publication. DETC2011-47763
John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States, Samuel Lambrakos, Naval Research Laboratory, Washington, DC, United States

Numerical Investigation of Biodiesel Production in Capillary Microreactor

Technical Publication. DETC2011-48765
Wei Han, Rachaneewan Charoenwat, Brian H. Dennis, The University of Texas at Arlington, Arlington, TX, United States

Developing an Integrated Model Framework for the Assessment of Sustainable Agricultural Residue Removal Limits for Bioenergy Systems

Technical Publication. DETC2011-48889
David Muth, Jr., Josh Koch, Jared Abodeely, Idaho National Laboratory, Idaho Falls, ID, United States, Doug McCorkle, Kenneth Bryden, Iowa State University, Ames, IA, United States, Richard Nelson, Kansas State University, Manhattan, KS, United States

CIE-15 PANEL: ADDRESSING THE NAE GRAND CHALLENGES THROUGH RESEARCH IN CIE

CIE-15-1 Panel

Columbia B 3:40pm–5:20pm

Session Chair: Derek Yip-Hoi, Western Washington University, Bellingham, WA, United States
Session Co-Chairs: Krishnan Suresh, University of Wisconsin, Madison, WI, United States, Paul Witherell, National Institute of Standards and Technology, Gaithersburg, MD, United States, Abhishek Seth, Caterpillar Inc., Peoria, IL, United States

Engineering the tools of Scientific Discovery Panel. DETC2011-49056
Nagendra Somanath, United Technologies, Hartford, United States

SEIKM-Addressing NAE Grand Challenges through Research Panel. DETC2011-49058
Christiaan J.J. Paredis, Georgia Institute of Technology, Atlanta, GA, United States

Virtual Reality is Changing the Way We Develop Products Panel. DETC2011-49066
Judy M. Vance, Iowa State University, Ames, IA, United States

CIE-16 SEIKM: PRODUCT LIFECYCLE MANAGEMENT

CIE-16-1 Product Lifecycle Management

Congressional D 3:40pm–5:20pm

Session Chair: Christiaan J.J. Paredis, Georgia Institute of Technology, Atlanta, GA, United States
Session Co-Chair: Sundar Krishnamurty, UMass Amherst, Amherst, MA, United States

Process Objects and Inter-firm Process Integration - a Match Made for Cooperation Projects?

Technical Publication. DETC2011-48082
Christian Kubisch, Oliver Tegel, Ing. h.c. F. Porsche AG, Weissach, Germany, Christiane Beyer, California State University Long Beach, Long Beach, CA, United States, Karl-Heinrich Grote, Otto-von-Guericke University Magdeburg, Magdeburg, Germany

Enterprise Applications Integration using Environment Based Design (EBD)

Technical Publication. DETC2011-48294
Suo Tan, Hamzeh K. Bani Milhim, Andrea Schiﬀauerova, Yong Zeng, Concordia University, Montreal, QC, Canada, Bo Chen, Minicut International Inc., Montreal, QC, Canada

Towards Industrial Implementation of Emerging Semantic Technologies

Technical Publication. DETC2011-48520
Jay Breindel, John Altidor, Jack Wileden, Sundar Krishnamurty, Ian Grosse, University of Massachusetts, Amherst, MA, United States, Seth Trachtenberg, Raytheon Integrated Defense Systems, Sudbury, MA, United States, Paul Witherell, National Institute of Standards and Technology, Gaithersburg, MD, United States
DEXML: A First Step Toward a UML Based Implementation Framework for PLCS
Technical Publication. DETC2011-48600
Sylvere Krima, Roch Bertucat, Engisis, Rome, Italy, Joshua Lubell, Sudarsan Rachuri, National Institute of Standards and Technology, Gaithersburg, MD, United States, Sebti Foufou, University of Burgundy, Dijon, Bourgogne, France

A Standard Analysis Approach to Determine Product Applicability
Technical Publication. DETC2011-48631
Paul Witherell, Anantha Narayanan, Jae Hyun Lee, Sudarsan Rachuri, National Institute of Standards and Technology, Gaithersburg, MD, United States, Prabir Sarkar, IIT Ropar, India, Rupnagar, Punjab, India

PLM Architecture for Optimization of Geometrical Interfaces in a Product Platform
Technical Publication. DETC2011-47801
Christoffer Levandowski, Peter Edholm, Fredrik Ekstedt, Johan S Carlson, Rikard Söderberg, Hans Johannesson, Chalmers University of Technology, Gothenburg, Sweden

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-6 Initialization Issues in Applied Fractional Calculus
Everglades 3:40pm–5:20pm
Session Chair: Carl F. Lorenzo, Glenn Research Center, Cleveland, OH, United States
Session Co-Chair: Jean-Claude Trigeassou, IMS LAPS, Bordeaux, France

An Experimental Validation of the Initialization Response in Fractional-order Systems
Technical Publication. DETC2011-47250
Tom Gambone, Tom Hartley, Jay Adams, Robert Veillette, University of Akron, Akron, OH, United States, Carl Lorenzo, NASA Glenn Research Center, Cleveland, OH, United States

Time-Varying Initialization and Laplace Transform of the Caputo Derivative: with Order Between Zero and One
Technical Publication. DETC2011-47396
Carl F. Lorenzo, Glenn Research Center, Cleveland, OH, United States, Tom Hartley, The University of Akron, Akron, OH, United States

Initialization of Riemann-Liouville and Caputo Fractional Derivatives
Technical Publication. DETC2011-47633
Jean-Claude Trigeassou, IMS LAPS, Bordeaux, France, Nezha Maamri, LAL, Poitiers, France, Alain Oustaloup, University of Bordeaux, Talence Cedex, France

The Initialization Response of Multi-term Linear Fractional-order Systems with Constant History Functions
Technical Publication. DETC2011-48016
Tom Hartley, University of Akron, Akron, OH, United States, Carl Lorenzo, NASA Glenn Research Center, Cleveland, OH, United States

Initialization of Fractional-Order Systems using the Hankel Operator
Technical Publication. DETC2011-48426
Jay Adams, Robert Veillette, Tom Hartley, University of Akron, Akron, OH, United States

MESA-10 THE FIFTH SYMPOSIUM ON EMBEDDED SYSTEMS INFRASTRUCTURE AND THEORY (ESIT’11)

MESA-10-2 Theory and Algorithms for Embedded Systems
Redwood 3:40pm–5:20pm
Session Chair: Jia Xu, York University, Toronto, ON, Canada
Session Co-Chair: Martin Horauer, University of Applied Sciences Technikum Wien, Vienna, Vienna, Austria

Hardware Support for Efficient Testing of Embedded Software
Technical Publication. DETC2011-47139
Thomas Reinbacher, Andreas Steiningen, Vienna University of Technology, Vienna, Austria, Martin Horauer, Tobias Mueller, University of Applied Sciences Technikum Wien, Vienna, Austria Jörg Brauer, Stefan Kowalewski, RWTH Aachen University, Aachen, Germany

A Method for Simultaneously Satisfying Important Constraints and Dependencies for Many Different Types of Processes in Embedded Real-Time Systems
Technical Publication. DETC2011-47928
Jia Xu, York University, Toronto, ON, Canada

Leakage-Conscious DVS Scheduling for (m,k)-Firm Real-Time Systems
Technical Publication. DETC2011-48981
Linwei Niu, Claflin University, Orangeburg, SC, United States, Yuanchang Xie, South Carolina State University, Orangeburg, SC, United States

Evaluation of Communication Induced Checkpointing in Resource Constrained Embedded Systems
Technical Publication. DETC2011-48634
Belal Sababha, Osamah Rawashdeh, Oakland University, Rochester, MI, United States

MSNDC-8 DYNAMICAL SYSTEMS WITH TIME-VARIABILITY, DELAY, OR DISCONTINUITIES

MSNDC-8-2 Dynamical Systems with Time-Variability, Delay, or Discontinuities II
Regency D 3:40pm–5:20pm
Session Chair: Daniel Bachrathy, HAS-BUTE Research Group on Dynamics of Machines and Vehicles, Budapest, Hungary
Session Co-Chair: Tamás Kalmár-Nagy, Texas A&M University, College Station, TX, United States

The Effect of Harmonic Helix Angle Variation on Milling Stability
Student Competition Paper. DETC2011-47745
Zoltan Dombovari, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary
Nonlinear Bifurcation Analysis of a Robotic Arm Subject to Digital Position Control

Technical Publication. DETC2011-47832
Giuseppe Habib, Giuseppe Rega, La Sapienza, Rome, Italy, Italy, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

Investigation of Restitution Coefficient and Spring-Damper Models for the Bouncing Ball Problem

Technical Publication. DETC2011-47870
Alexandre Carbonelli, Jöel Perret-Liaudet, Emmanuel Rigaud, Mohamed-Said Feki, Laboratoire de Tribologie et Dynamique des Systèmes, Ecully Cedex, France

Effects of Bearing Radial Internal Clearance on Dynamic Behavior and Bifurcations in Planetary Gears

Technical Publication. DETC2011-48891
Yi Guo, Robert Parker, Ohio State University, Columbus, OH, United States

On the Dynamics Behavior and a Control Design to a Nonlinear 2-DOF Vibrating Gyroscopic-Mems Problem

Technical Publication. DETC2011-47391
José Manoel Balthazar, UNESP : Univ Estadual Paulista, Rio Claro, SP, Brazil, Nelson José Peruzzi, UNESP Univ Estadual Paulista, Jaboticabal - SP, Brazil, Fábio Roberto Chavarette, UNESP Univ Estadual Paulista, Department of Mathematics, Ilha Solteira, SP, Brazil

MSND-9 FLEXIBLE MULTIBODY DYNAMICS

MSND-9-2 Flexible Multibody Dynamics II

Columbia A 3:40pm–5:20pm

Session Chair: Johannes Gerstmayr, Linz Center of Mechatronics, Linz, Austria
Session Co-Chair: Yoshiaki Terumichi, Sophia University, Tokyo, Japan

Limitations of B-Spline Geometry in the Finite Element/Multibody System Analysis

Technical Publication. DETC2011-47168
Ahmed Shabana, University of Illinois at Chicago, Chicago, IL, United States, Ashraf M Hamed, Abdel-Nasser Mohamed, Department of Mechanical and Industrial Engineering, University of Illinois at Chicago, Chicago, IL, United States, Paramsothy Jayakumar, Michael D Letherwood, U.S. Army RDECOM-TARDEC, Warren, MI, United States

Comparison of Finite Element Solutions of Non-Rational B-Spline and ANCF Elements in the Analysis of Flexible Multibody Systems

Technical Publication. DETC2011-47349
Hiroki Yamashita, Hiroyuki Sugiyama, Tokyo University of Science, Tokyo, Japan

A Spatial Thin Beam Finite Element Based on the Absolute Nodal Coordinate Formulation Without Singularities

Technical Publication. DETC2011-47732
Karin Nachbagauer, Yury Vetyukov, Johannes Kepler University Linz, Linz, Austria, Peter Gruber, Linz Center of Mechatronics GmbH, Linz, Austria, Johannes Gerstmayr, Linz Center of Mechatronics, Linz, Austria

Improvement on Evaluating Axial Elastic Force in Bernoulli-Euler Beam Based on the Absolute Nodal Coordinate Formulation by Accurate Mean Axial Strain Measure

Technical Publication. DETC2011-48021
Tsubasa Wago, Yoshihki Sugawara, Aoyama Gakuin University, Sagamihara-shi Kanagawa-ken, Japan, Nobuyuki Kobayashi, Aoyama Gakuin University, Fuchinobe, Kanagawa, Japan

A Parallel GPU Implementation of the Absolute Nodal Coordinate Formulation with a Frictional/Contact Model for the Simulation of Large Flexible Body Systems

Technical Publication. DETC2011-48816
Naresh Khude, Dan Melanz, University of Wisconsin - Madison, Madison, WI, United States, Dan Negrut, University of Wisconsin-Madison, Madison, WI, United States, Ilincă Stanculescu, Rice University, Houston, TX, United States

MSND-11 RAPID-FIRE POSTER SESSION

MSND-11-2 Rapid-fire Poster Session II

Congressional C 3:40pm–5:20pm

Session Chair: Harry Dankowicz, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Experimental Investigation on Principal Parametric Resonance of Prebuckling Flexible Cantilever Beam with Square Section

Technical Publication. DETC2011-47416
Wei Zhang, Jianen Chen, Dongxing Cao, Qian Zhang, Beijing University of Technology, Beijing, Beijing, China

Hybrid Modeling of Non-Linear Mechanical Systems: The Case of a Vehicle Shock Absorber

Technical Publication. DETC2011-48108
Antonio Di Dino, Francesco Biral, Paolo Bosetti, University of Trento, Trento, Not Available, Italy

Coordinate Free Formulation of Dynamics of a Deformable System with Finite Displacements

Technical Publication. DETC2011-47450
Jean Lerbet, Naoufel Azouz, Said Chaabani, University of Evry Val d’Essonne, Evry, France, Azgal Abichou, LIM, Polytechnic School of Tunis, La Marsa, Tunisia

Static Modes Switching: On-line Variable Static Augmentation for Efficient Flexible Multibody Simulation

Technical Publication. DETC2011-47549
Tommaso Tamarozzi, Katholieke Universiteit Leuven, Leuven, Belgium, Gert H. K. Heirman, Wim Desmet, Kuleuven, Heverlee, Belgium

Experimental Validation and Updating of the Flexible Multibody Model of a Commercial 3R Planar Manipulator

Technical Publication. DETC2011-48202
Stefano Fiorati, Emiliano Mucchi, Giorgio Dalpiaz, University of Ferrara, Ferrara, Italy, Raffaele Di Gregorio, Department of Engineering - University of Ferrara, Ferrara, FE, Italy
A Comparison of Different Multibody System Approaches in the Modeling of Flexible Twist Beam Axles
Technical Publication. DETC2011-48206
Tariq Sinokrot, William Prescott, LMS International, Coralville, IA, United States, Maurizio Nembrini, Alessandro Tosso, LMS International, Leuven, Belgium

Multi-Pulse Chaotic Dynamics of a Cantilever Plate By using Extended Melnikov Method
Technical Publication. DETC2011-47355
Wei Zhang, Yutong Huang, Beijing University of Technology, Beijing, Beijing, China

Influence of Damping on the Vibration of An Inclined Cable Subjected to Support Excitation.
Technical Publication. DETC2011-47323
Vassil Tzanov, Simon Neilid, Bernd Krauskopf, David Wagg, University of Bristol, Bristol, United Kingdom

Periodic Solutions and Their Regions of Attraction for Flexible Structures under Multilevel Relay Feedback Control
Technical Publication. DETC2011-47351
Michael Borre, University of Southern California, Glendale, CA, United States, Henryk Flashner, University of Southern California, Los Angeles, CA, United States

DAC-17 GEOMETRIC MODELING AND ALGORITHMS FOR DESIGN AND MANUFACTURING

DAC-17-1 Geometric Modeling and Algorithms for Design and Manufacturing
Capital B 3:40pm–5:20pm
Session Chair: Horea Ilies, University of Connecticut, Storrs, CT, United States
Session Co-Chair: Shuming Gao, Zhejiang University, Hangzhou, Zhejiang, China

Modeling of Geometric Variations for Line-Profiles
Technical Publication. DETC2011-47507
Joseph K. Davidson, Jami J. Shah, Arizona State University, Tempe, AZ, United States

An Approach to Automated Conversion from Design Feature Model to Analysis Feature Model
Technical Publication. DETC2011-47555
Weijuan Cao, Xiaoshen Chen, Shuming Gao, Zhejiang University, Hangzhou, Zhejiang, China

Conceptual Design of Freeform Surfaces from Unstructured Point Sets using Neural Network Regression
Technical Publication. DETC2011-48324
Mehmet Ersin Yumer, Levent Burak Kara, Carnegie Mellon University, Pittsburgh, PA, United States

Shape and Topology Optimization with Medial Zonal
Technical Publication. DETC2011-48363
Ata A. Eftekharian, Horea Ilies, University of Connecticut, Storrs, CT, United States

Evaluating Genetic Algorithms on Welding Sequence Optimization with Respect to Dimensional Variation and Cycle Time
Technical Publication. DETC2011-48393
Johan Segeborn, Volvo Car Corporation, Gothenburg, Sweden, Sweden, Johan Carlson, Fraunhofer-Chalmers Research Centre, Gothenburg, Sweden, Kristina Wärmefjord, Rikard Söderberg, Chalmers University of Technology, Gothenburg, Sweden, Sweden

DAC-18 DESIGN AND MANUFACTURING OF SYSTEMS

DAC-18-1 Design and Manufacturing of Systems
Grand Teton 3:40pm–5:20pm
Session Chair: Bernard Yannou, Ecole Centrale Paris, Chatenay-Malabry, France
Session Co-Chair: Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States

Towards Parametric Environmental Profiles of Complex Industrial Systems in Preliminary Design Stage
Technical Publication. DETC2011-47376
François Cluzel, Bernard Yannou, Yann Leroy, Ecole Centrale Paris, Chatenay-Malabry, France, Dominique Millet, Supmeca Toulon, Toulon, France

An Upper Ontology for Representation of Specific Fixture Configuration Knowledge
Technical Publication. DETC2011-47741
Thomas Gmeiner, Kristina Shea, Institute of Product Development, Virtual Product Development Group, Technische Universität München, Garching, Bavaria, Germany

Product Modular Design for the Life Cycle Based on the Optimization of a Closed-looped Supply Chain
Technical Publication. DETC2011-48148
Wu Hsun Chung, Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States, Richard A. Wysk, NC State, Raleigh, NC, United States

A Function Based Approach for Product Integration
Technical Publication. DETC2011-47922
Vishwa Kalyanasundaram, Department of Mechanical and Aerospace Engineering, Buffalo, NY, United States, Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States
PTG-9 WIND TURBINE GEARSSS

PTG-9-1 Wind Turbine Gears

Regency C 3:40pm–5:20pm

Session Chair: Alfred Pettinger, ESI, Foothill Ranch, CA, United States

A Study of Gear Root Strains in a Multi-Stage Planetary Wind Turbine Gear Train using a Three Dimensional Finite Element/Contact Mechanics Model and Experiments

Technical Publication. DETC2011-47451
Phillip Prueter, Robert Parker, Ohio State University, Columbus, OH, United States, Frank Cunliffe, Orbital2 Ltd., Leamington Spa, Warwickshire, United Kingdom

On the Use of 2 DOF Planetary Gears as SpeedIncreasers in Small Hydros and Wind Turbines

Technical Publication. DETC2011-47042
Radu Saulescu, Codruta Jaliu, Oliver Climescu, Dorin Valentin Diaconescu, Transilvania University of Brasov, Brasov, Romania

Characteristics Analysis of Wind Turbine Gearbox Considering Fatigue Loads Caused by Wind Fluctuation

Technical Publication. DETC2011-47316
Youngjun Park, Geunho Lee, Jinsop Song, Yongyun Nam, Korea Institute of Machinery & Materials, Daejeon, Korea (Republic)

Redesign of a Load Gearbox for 5MW Wind Turbines

Technical Publication. DETC2011-47492
Urs Viktor Giger, GDC Urs Giger GmbH, Mühlau, AG, Switzerland, Kiril Borisov Arnaudov, Institute of Mechanics, Academy of Sciences, Sofia, Bulgaria

RSAFP-3 FAILURE ANALYSES AND MODELING

RSAFP-3-1 Failure Analyses and Modeling

Sequoia 3:40pm–5:20pm

Session Chair: Erol Sancaktar, University of Akron, Akron, OH, United States
Session Co-Chair: Toshiyuki Sawa, Hiroshima university, Hiroshima, Japan

Failure Mode and Effects Analysis of Compressor Blade of Aeroengine using Dempster-Shafer Evidence Theory

Technical Publication. DETC2011-47343
Jian-Ping Yang, Hong-Zhong Huang, Li-Ping He, Shun-Peng Zhu, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, Dunwei (Grant) Wen, Athabasca University, Athabasca, AB, Canada

A Fuzzy Similarity-Based Approach to Reliability Allocation of Diesel Engine

Technical Publication. DETC2011-47378
Zhong-Zhe Chen, Yu Liu, Hong-Zhong Huang, Dan Ling, Li-Ping He, University of Electronic Science and Technology of China, Chengdu, Sichuan, China

An Improved Risk Based Design Method Based on a Novel Upper Bound Formulation

Student Competition Paper. DETC2011-48413
Hami Golbayani, University of Connecticut, Coventry, CT, United States, Kazem Kazerounian, University of Connecticut, Storrs, CT, United States

A Method for Inferring Conditional Stochastic Failure Rates from the Time-History of Observed Failures

Technical Publication. DETC2011-47485
David Thompson, Philippe Pebay, Sandia National Laboratories, Livermore, CA, United States

Fuzzy Dynamic Fault Tree Analysis of Hydraulic System of Cnc Machining Center

Technical Publication. DETC2011-47583
Yan-Feng Li, Jian Sun, Haigeng Li, Hong-Zhong Huang, Yu Liu, University of Electronic Science and Technology of China, Chengdu, Sichuan, China

MECH-8 COMPLIANT MECHANISMS

MECH-8-3 Synthesis Methods

Yellowstone 3:40pm–5:20pm

Session Chair: Mary Frecker, Pennsylvania State University, University Park, PA, United States
Session Co-Chair: Charles Kim, Bucknell University, Lewisburg, PA, United States

Design of Small-Scale Statically Balance Compliant Joints

Technical Publication. DETC2011-47482
Cesare H. Jenkins, Brian Jensen, Brigham Young University, Provo, UT, United States

Synthesizing Parallel Flexure Concepts That Mimic theComplex Kinematics of Serial Flexures using Displaced Screw Systems

Technical Publication. DETC2011-47335
Jonathan Hopkins, Lawrence Livermore National Laboratory, Livermore, CA, United States

Synthesis of Actuation Spaces of Multi-Axis Parallel Flexure Mechanisms Based on Screw Theory

Technical Publication. DETC2011-48252
Chen Qiu, Jingjun Yu, Shouzhong Li, Beihang University, Beijing, China, Hai-Jun Su, University of Maryland Baltimore County, Baltimore, MD, United States, YanZhang Zeng, Higher Education Press, Beijing, China

A Pseudo-Rigid-Body Model Approach for theDesign of Compliant Mechanism Springs for Prescribed Force-Deflections

Technical Publication. DETC2011-47590
Levi C. Leishman, Mark B. Colton, Brigham Young University, Provo, UT, United States

An Energy Approach to the Design of Single Degree of Freedom Gravity Balancers with Compliant Joints

Technical Publication. DETC2011-47783
Boaz Rijff, Just Herder, Delft University of Technology, Delft, Netherlands, Giuseppe Radaelli, InteSpring B. V., Delft, Netherlands
MECH-9 MECHANISM ANALYSIS AND SYNTHESIS

MECH-9-3 Planar Synthesis II

Lexington 3:40pm–5:20pm

Session Chair: Qiaode Jeffrey Ge, Stony Brook University, Stony Brook, NY, United States
Session Co-Chair: Mark Yim, University of Pennsylvania, Philadelphia, PA, United States

Synthesis of Coupler-Drivers for Four Position Planar Synthesis
Technical Publication. DETC2011-48170
David Perkins, Andrew P. Murray, University of Dayton, Dayton, OH, United States

Accuracy Analysis Considering Clearances and Elastic Deformations in Parallel Manipulators
Technical Publication. DETC2011-47892
Jokin Aginaga, Jon Olza, Public University of Navarre, Pamplona, Spain, Oscar Altuzarra, Erik Macho, University of the Basque Country, Bilbao, Spain

Kinematic Synthesis of Planar, Shape-Changing Rigid-Body Mechanisms with Prismatic Joints
Technical Publication. DETC2011-48503
Kai Zhao, Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States, Andrew P. Murray, University of Dayton, Dayton, OH, United States

Kinematic Optimization of a Robotic Joint with Continuously Variable Transmission Ratio
Technical Publication. DETC2011-48443
Martin Grenier, Clement Gosselin, Université Laval, Quebec, QC, Canada

Synthesis of a Variable Displacement Linkage for a Hydraulic Transformer
Technical Publication. DETC2011-47339
Shawn Wilhelm, James Van de Ven, Worcester Polytechnic Institute, Worcester, MA, United States

MECH-10 PARALLEL MANIPULATORS

MECH-10-1 Translational Manipulators

Columbia Foyer 3:40pm–5:20pm

Session Chair: Jian Dai, King’s College London, University of London, London, United Kingdom
Session Co-Chair: Xianwen Kong, Heriot-Watt University, Edinburgh, United Kingdom

Static Balancing of Translational Parallel Mechanisms
Technical Publication. DETC2011-47525
Teunis van Dam, Patrice Lambert, Just Herder, Delft University of Technology, Delft, Netherlands

Closed-form Solutions to the Kinematics of a Parallel Locomotion Mechanism with Actuated Spoke Wheels
Technical Publication. DETC2011-48557
Ping Ren, University Laval, Quebec City, QC, Canada, Dennis Hong, Virginia Tech, Blacksburg, VA, United States

Quantitative Performance Analysis of Haptic Devices with Parallelogram Subsystems
Technical Publication. DETC2011-47725
Leng-feng Lee, University of Massachusetts Amherst, Amherst, MA, United States, Venkat Krovi, SUNY Buffalo, Buffalo, NY, United States, Xiao Bo Zhou, University at Buffalo, Buffalo, NY, United States

Irsbot-2: A Novel Two-Dof Parallel Robot for High-Speed Operations
Technical Publication. DETC2011-47564
Germain Coralie, Ecole Centrale Nantes, I ReCyN, Nantes, France, Sébastien Briot, Stéphane Caro, Philippe Wenger, Research Institute in Communication and Cybernetics of Nantes (IRCCyN), Nantes, France, Victor Glazunov, Mechanical Engineering Research Institute, Russian Academy of Sciences, Moscow, Russia

Solving the Forward Kinematic Problem of 4-DOF Parallel Mechanisms (3T1R) with Identical Limb Structures and Revolute Actuators using the Linear Implicitization Algorithm
Technical Publication. DETC2011-47884
Mehdi Tale Masouleh, Clement Gosselin, Laval University, Quebec, QC, Canada, Dominic R. Walter, Manfred Husty, University of Innsbruck, Innsbruck, Austria

On the S-(nSP)-SPU and S-(nSPU)-2SPU Under-Actuated Wrists
Technical Publication. DETC2011-47541
Raffaele Di Gregorio, Department of Engineering - University of Ferrara, Ferrara, FE, Italy
MNS-6 SYMPOSIUM ON DYNAMICS OF MEMS AND NEMS

MNS-6-2 Nonlinear Dynamics of MEMS and NEMS I

Columbia C 3:40pm–5:20pm

Session Chair: David Blocher, Cornell University, Ithaca, NY, United States

Nonlinear Dynamics in a Mems Device with Axial Load
Technical Publication. DETC2011-48601
Laura Ruzzicoli, Stefano Lenci, Polytechnic University of Marche, Ancona, Ancona, Italy, Mohammad Younis, SUNY Binghamton, Binghamton, NY, United States

Multiple Limit Cycles in Laser Interference Transduced Resonators
Student Competition Paper. DETC2011-47289
David Blocher, Richard H. Rand, Alan Zehnder, Cornell University, Ithaca, NY, United States

Modeling and Analysis of a Parametric Resonance-Based Micro-Resonator
Technical Publication. DETC2011-47506
Pooya Ghaderi, Andrew Dick, Rice University, Houston, TX, United States

Nonlinear Free Vibration of Nanobeams with Surface Effects Considerations
Technical Publication. DETC2011-48373
Ali Fallah, Sharif University of Technology, School of Mechanical Engineering, Tehran, Tehran, Iran, Keikhosrow Firoozbakhsh, Mohammad Hossein Kahrobaian, Abdolreza Pasharavesh, Sharif University of Technology, Tehran, Iran

Nonlinear Vibration Analysis of Nano to Micron Scale Beams under Electric Force using Nonlocal Theory
Technical Publication. DETC2011-47615
Abdolreza Pasharavesh, Mohammad Ahmadian, Reza Moheimani, Sharif University of Technology, Tehran, Iran, Youness Alizadeh Vaghasloo, Amirkabir University of Technology, Tehran, Iran

DEC-5 TEACHING DESIGN FOR SUSTAINABILITY

DEC-5-1 Teaching Design for Sustainability

Thornton B 3:40pm–5:20pm

Session Chair: Wim Zeiler, TU Eindhoven, Eindhoven, Netherlands
Session Co-Chair: Jeffrey R. Mountain

The Status of Design for Sustainability in Mechanical Engineering Design Education
Technical Publication. DETC2011-48454
Jeffrey Mountain, The University of Texas at Tyler, Tyler, TX, United States

The Integration of Sustainability, Systems, and Engineering Design in the Engineering Curriculum At James Madison University
Technical Publication. DETC2011-47847
Robert Nagel, Olga Pierrakos, Eric C. Pappas, Adebayo Ogundipe, James Madison University, Harrisonburg, VA, United States

Building Bridges for Engineering Education: The Experience of Partnership with Building Industry for Sustainable Solutions
Technical Publication. DETC2011-47577
Wim Zeiler, TU Eindhoven, Eindhoven, Netherlands

Cultivating Students Ability of Applying Knowledge in Engineering Design Through Course Project
Technical Publication. DETC2011-48859
Jining Qiu, Bo Zhang, Huimin Dong, Yuan Gao, Dalian University of Technology, Dalian, Liaoning, China

DTM-8 UNCERTAINTY AND RISK IN DESIGN

DTM-8-1 Uncertainty and risk in design
Concord 3:40pm–5:20pm

Session Chair: Carolyn Seepersad, The University of Texas at Austin, Austin, TX, United States
Session Co-Chair: Christopher Hoyle, Oregon State University, Corvallis, OR, United States

Time-based Modeling of Linguistic Preference to Preferential Probability
Technical Publication. DETC2011-47074
Andy Dong, The University of Sydney, Sydney, NSW, Australia, Tomonori Honda, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

On Measuring Engineering Risk Attitudes
Technical Publication. DETC2011-47106
Douglas Vanbossuyt, Irem Tumer, Oregon State University, Corvallis, OR, United States, Lucia Carvalho, Andy Dong, The University of Sydney, Sydney, NSW, Australia

Probabilistic Life Prediction for High Temperature Low Cycle Fatigue using Energy-Based Damage Parameter and Accounting for Model Uncertainty
Technical Publication. DETC2011-47296
Shun-Peng Zhu, Hong-Zhong Huang, Li-Ping He, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, Victor Ontiveros, Mohammad Modarres, University of Maryland, College Park, MD, United States

Towards Failure Free Design: An Analysis of Risk Mitigation Communication
Technical Publication. DETC2011-47675
Daniel Krus, Katie Grantham, Missouri University of Science and Technology, Rolla, MO, United States

Early Design Stage Reliability Analysis using Function-flow Failure Rates
Technical Publication. DETC2011-48823
Bryan M. O’Halloran, Robert Stone, Irem Tumer, Oregon State University, Corvallis, OR, United States
DFMLC-8 DESIGN FOR MASS CUSTOMIZATION, DESIGN FOR SERVICE, DESIGN FOR LAYERED MANUFACTURING & DESIGN

DFMLC-8-2 Design for Mass Customization, Design for Service, Design for Layered Manufacturing & Design II

Bunker Hill 3:40pm–5:20pm

Session Chair: Linda Newnes, University of Bath, Bath, Bath, United Kingdom

An Efficient Conflict Detecting Method for Service Design
Technical Publication. DETC2011-48035
Takumi Ota, Yoshiki Shimomura, Tokyo Metropolitan University, Tokyo, Japan, Koji Kimita, Tokyo Metropolitan University, Hino-shi, Japan, Shigeru Hosono, NEC Corporation, Tokyo, Japan

Treatise of Opportunities and Challenges in Optimal Design for Additive Manufacturing
Technical Publication. DETC2011-48131
Zjenja Doubrovski, Jouke Verlinden, Jo M.P. Geraedts, Delft University of Technology, Delft, Netherlands

Service Design Methodology for Cooperative Services
Technical Publication. DETC2011-48180
Kentaro Watanabe, Satoshi Mikoshiba, Takeshi Tateyama, Yoshiki Shimomura, Tokyo Metropolitan University, Tokyo, Japan, Koji Kimita, Tokyo Metropolitan University, Hino-shi, Japan

A Customization Approach for Design using Commercially Available Laminated Composite Materials
Technical Publication. DETC2011-48461
Soumitra Nandi, Zahed Siddique, University of Oklahoma, Norman, OK, United States, M. Cengiz Altan, University of Oklahoma, School of Aerospace and Mechanical Engineering, Norman, OK, United States

Petri Net-Based Affective-Cognitive Modeling for Product Ecosystem Design
Technical Publication. DETC2011-48916
Roger Jiao, Feng Zhou, Georgia Institute of Technology, Atlanta, GA, United States, Qianli Xu, Institute for Infocomm Research, Singapore, Singapore

AVTT-3 ADVANCES IN METHODS FOR VEHICLE SYSTEMS DESIGN AND TIRE MODELING

AVTT-3-2 Advances in Methods for Vehicle Systems Design and Tire Modeling II

Thornton C 3:40pm–5:20pm

Session Chair: Massimiliano Gobbi, Politecnico di Milano, Milan, Italy
Session Co-Chair: Moustafa El-Gindy, University of Ontario Institute of Technology, Oshawa, ON, Canada

Finite Element Nonlinear Material Modeling of a Tire-Pavement Interaction
Student Competition Paper. DETC2011-47290
Kwangwon Kim, Doo-Man Kim, Swangwa Rhie, Korea Aerospace University, Goyang, Kyungki, Korea (Republic), Jaehyung Ju, Clemson University, Clemson, SC, United States

Separable Polyurethane Solid Tires for a Folding Bike
Student Competition Paper. DETC2011-47293
Sarom Ryu, Doo-Man Kim, Hyeonu Heo, Korea Aerospace University, Goyang, Kyungki, Korea (Republic), Jaehyung Ju, Clemson University, Clemson, SC, United States

Comparative Experimental Studies on Prototyped Traction Concepts
Technical Publication. DETC2011-47480
James Mathieson, Matthew Thompson, Heather Satterfield, Zachary Satterfield, Elisabeth Kraus, Joshua Summers, Clemson University, Clemson, SC, United States

Indoor Vibration Testing for High-frequency Modal characterization of tyres
Technical Publication. DETC2011-47580
Gianpiero Rocca, Bart Peeters, Herman Van der Auweraer, LMS International, Leuven, Belgium, Peter Kindt, Jason Middelberg, Cristóbal González Diaz, Goodyear - European Innovation Center, Colmar-Berg, Luxembourg

Optimization of a Non-Pneumatic Tire for Reduced Rolling Resistance
Technical Publication. DETC2011-48730
Malikarjun Veeramurthy, Jaehyung Ju, Lonny Thompson, Joshua Summers, Clemson University, Clemson, SC, United States
WEDNESDAY, AUGUST 31

VIB-9 ROTOR DYNAMICS AND CONTROL

VIB-9-3 Rotor Dynamics and Control III - Analysis
Thornton A 8:40am–10:20am
Session Chair: Paolo Pennacchi, Politecnico di Milano, Milan, MI, Italy
Session Co-Chair: Seshandri Sekhar

Transient Forward and Backward Whirl of Beam and Solid Rotors with Stiffening and Softening Effects
Technical Publication. DETC2011-47704
JS Rao, Altair India, Bangalore, Karnataka, India

Finite Element Rotor-Support Coupling Dynamic Model and Its Verification
Technical Publication. DETC2011-47683
Chen Guo, Nanjing University of Aeronautics and Astronautics, Nanjing, China

Dynamic Analysis of a Direct-Driven Permanent Magnet Generator Drive Train Including Flexible Turbine Blades
Technical Publication. DETC2011-47812
Janne E. Heikkinen, Vesa V. Ruuskani, Janne K. Nerg, Lappeenranta University of Technology, Lappeenranta, Finland, Jussi T. Sopanen, Saimaa University of Applied Sciences, Lappeenranta, Finland

Start-Up Simulations for Induction and Synchronous Motor Driven Compressor Trains
Technical Publication. DETC2011-47672
Anand Srinivasan, Peter J. Weber, Cameron Process & Compression Systems, Buffalo, NY, United States

A Highly Accurate Beam Finite Element for Curved and Twisted Helicopter Blades
Technical Publication. DETC2011-47055
Yan Skladanek, Eurocoper Dynamics Departement / Université Lyon , CNRS, INS-A-Lyon, LaMCoS UMR5259, Marignane, France, Paul Cranga, Eurocoper, Marignane, France, Guy Ferraris Besso, Georges Jacquet-Richardet, Régis Dufour, Université Lyon , CNRS, INS-A-Lyon, LaMCoS UMR5259, Villeurbanne, France

VIB-10 NONLINEAR DYNAMICS OF CONTINUOUS SYSTEMS

VIB-10-2 Nonlinear Dynamics of Continuous Systems II
Columbia B 8:40am–10:20am
Session Chair: Marco Amabili, McGill University, Montreal, QC, Canada
Session Co-Chairs: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States, Ebrahim Esmailezadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

Multi-Modal Nonlinear Forced Vibrations of Circular Cylindrical Shells of Arbitrary Shapes
Student Competition Paper. DETC2011-47682
Galyna Pilgun, Marco Amabili, McGill University, Montreal, QC, Canada

Analytical Solutions for Oscillation of Plate on a Nonlinear Winkler Foundation
Technical Publication. DETC2011-48043
Davood Younesian, Hassan Askari, Iran University of Science and Technology, Tehran, Iran, Zia Saadatnia, Iran University of Science and Technology, Narmak, Tehran, Iran, Ebrahim Esmailezadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

Nonlinear Dynamics of an Extensible Flexible Pipe Conveying Fluid and Subjected to External Axial Flow
Technical Publication. DETC2011-47128
F.A. Ghaith, Heriot Watt University, Dubai, United Arab Emir, Y.A. Khulief, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

Nonlinear Thermo-Mechanical Vibration Analysis of Functionally Graded Beams
Technical Publication. DETC2011-48399
Ali Fallah, Sharif University of Technology, School of Mechanical Engineering, Tehran, Tehran, Iran, Keikhosrow Firoozbaksh, Abdoreza Pasharavesh, Sharif University of Technology, Tehran, Iran

Stability of a Pivoting Fluid-Filled Container
Technical Publication. DETC2011-47997
Si Mohamed Sah, Brian Mann, Duke University, Durham, NC, United States

VIB-11 EXPERIMENTS IN NONLINEAR DYNAMICS AND VIBRATIONS

VIB-11-2 Nonlinear Modal Analysis
Congressional A 8:40am–10:20am
Session Chair: Brian Mann, Duke University, Durham, NC, United States
Session Co-Chair: Brian Feeny, Michigan State University, East Lansing, MI, United States

Effective Modal Derivatives Based Reduction Method for Geometrically Nonlinear Structures
Technical Publication. DETC2011-48315
Paolo Tiso, Delft University of Technology, Delft, Netherlands

Construction and Use of the Frequency-Energy Plot for a System with Two Essential Nonlinearities
Technical Publication. DETC2011-48576
Sean Hubbard, Alexander Vakakis, Lawrence Bergman, D. Michael McFarland, University of Illinois at Urbana-Champaign, Urbana, United States

Identification of Equivalent Modal Damping and Frequencies in Multi Degree-of-Freedom Nonlinear Systems
Technical Publication. DETC2011-48956
Dane Quinn, Richard Ott, The University of Akron, Akron, OH, United States, Sean Hubbard, D. Michael McFarland, Lawrence Bergman, Alexander Vakakis, University of Illinois at Urbana Champaign, Urbana, IL, United States

Autoparametric Resonances of Elastic Structures Coupled with Two Sloshing Modes in a Square Liquid Tank
Technical Publication. DETC2011-47808
Takashi Ikeda, Masaki Takashima, Yuji Harata, Hiroshima University, Higashi-Hiroshima, Hiroshima, Japan
Proper Orthogonal Decomposition for Nonlinear Radiative Heat Transfer Problems

**Technical Publication.** DETC2011-48339
Daryl Hickey, Luc Masset, Olivier Brüls, Gaetan Kerschen, University of Liege, Liege, Belgium

**VIB-12 VIBRATION AND CONTROL OF SMART STRUCTURES**

**VIB-12-1 Vibration and Control of Smart Structures I**

**Grand Teton** 8:40am–10:20am

Session Chair: **Amin Karami**, University of Michigan, Ann Arbor, MI, United States
Session Co-Chair: **Rifat Sipahi**, Northeastern University, Boston, MA, United States

Characterization of Structural Dynamics with Uncertainty By using Gaussian Processes

**Technical Publication.** DETC2011-48804
Zeping Xia, Jiong Tang, University of Connecticut, Storrs, CT, United States

Vibration Analysis of Thin Plates Subject to Piezoelectric Actuation: A New Perspective in Modeling and Experiment

**Technical Publication.** DETC2011-47988
Parikshit Mehta, Clemson University, Clemson, SC, United States, Nader Jalili, Northeastern University, Boston, MA, United States

Vibration Characteristics of Smart Electrorheological Sandwich Shell

**Student Competition Paper.** DETC2011-47619
Maryam Zabarjad Shiraz, Mohsen Saghafian, Isfahan University of Technology, Isfahan, Iran, Seyyed M. hasheminejad, Iran University of Science and Technology, Tehran, Iran

Piezoelectric Properties of a PZT Ceramic Multilayer Stack for Energy Harvesting under Dynamic Forces

**Technical Publication.** DETC2011-47720
Tian-Bing Xu, Jin Ho Kang, National Institute of Aerospace, Hampton, VA, United States, Emilie J. Siochi, NASA Langley Research Center, Hampton, VA, United States, Lei Zuo, Wanlu Zhou, Xudong Tang, State University of New York at Stony Brook, Stony Brook, NY, United States, Xianing Jiang, North Carolina State University, Raleigh, NC, United States

Designing a Movable Vibration Absorber for an Euler-Bernoulli Beam under Moving Distributed Harmonic Excitation

**Technical Publication.** DETC2011-47003
Moradi Hamed, Sharif University of Technology, Tehran, Iran, Firooz Bakhtiarie-Nejad, Mojtaba Sadighi, AmirKabir University of Technology, Tehran, Iran

**CIE-9 CAPPD: EMOTIONAL ENGINEERING**

**CIE-9-3 CAPPD: Emotional Engineering III**

**Regency B 8:40am–10:20am**

Session Chair: **Roger Jiao**, Georgia Tech, Atlanta, GA, United States
Session Co-Chair: **Keiichi Watanuki**, Saitama University, Saitama, Japan

Estimating Ease of Single-Fingered Operations of Hand-held Appliances with Digital Hand

**Technical Publication.** DETC2011-48838
Satoshi Kanai, Seiya Suzuki, Hokkaido University, Sapporo, Japan

Development of System for High Quality Wood Grain Design

**Technical Publication.** DETC2011-48892
Takuya Mori, Satoshi Shibasaki, Hideki Aoyama, Keio University, Yokohama, Kanagawa, Japan

Affect Prediction for Affective Design

**Technical Publication.** DETC2011-48914
Roger Jiao, Georgia Tech, Atlanta, GA, United States, Feng Zhou, Georgia Institute of Technology, Atlanta, GA, United States, Xingda Qu, Martin G. Helander, Nanyang Technological University, Singapore, Singapore

Virtual Reality-Based Lathe Skills Transfer Based on Brain Activity Assessment using Functional Near-Infrared Spectroscopy

**Technical Publication.** DETC2011-48992
Keiichi Watanuki, Lei Hou, Saitama University, Saitama, Japan

Embodiment of Emotions through Wearable Technologies

**Technical Publication.** DETC2011-47845
Monica Bordegoni, Secil Ugur, Marina Carulli, Raffaella Mangiarotti, Politecnico di Milano, Milano, Italy, Stephan A. G. Wensveen, Technische Universiteit Eindhoven, Eindhoven, Netherlands

**CIE-17 CAPPD: MODELING TOOLS AND METRICS FOR SUSTAINABLE MANUFACTURING**

**CIE-17-1 CAPPD MTMSM Session 1**

**Yosemite 8:40am–10:20am**

Session Chair: **Gaurav Ameta**, Washington State University, Pullman, WA, United States
Session Co-Chair: **Mahesh Mani**, National Institute of Standards and Technology, Gaithersburg, MD, United States

Simulation and Analysis for Sustainability in Manufacturing Processes

**Technical Publication.** DETC2011-47327
Alexander Muroyama, University of Maryland, Bethesda, MD, United States, Mahesh Mani, , Kevin Lyons, National Institute of Standards and Technology, Gaithersburg, MD, United States, Bjorn Johansson, Chalmers University of Technology, Gothenburg, Sweden
Sustainable Manufacturing Indicator Repository

**Technical Publication.** DETC2011-47491

Shaw Feng, Che/Bong Joung, NIST, Gaithersburg, MD, United States, John Carrell, Texas Tech University, Lubbock, TX, United States, Prabir Sarkar, IIT Ropar, India, Rupnagar, Punjab, India

Using Economic Input-Output Life Cycle Assessment to Guide Sustainable Design

**Technical Publication.** DETC2011-47664

Jeremy Michalek, Chris Hendrickson, Jonathan Cagan, Carnegie Mellon University, Pittsburgh, PA, United States

Manufacturing Footprint Computation from Detailed Machining Plans for Sustainability Assessment in Manufacturing Enterprises

**Technical Publication.** DETC2011-47984

Ananth Turaga, Utpal Roy, Syracuse University, Syracuse, NY, United States

Sustainability Metrics for Waste Management

**Technical Publication.** DETC2011-48117

QZ Yang, SIMTech, Singapore, Singapore, Fengyu Yang, Shenzhen Batian Ecotypic Engineering Co., Ltd, Shenzhen, China

CIE-18 AMS: ENERGY SYSTEMS - ENERGY EFFICIENT MANUFACTURING

CIE-18-1 AMS ES Session 1

Congressional B 8:40am–10:20am

Session Chair: Kevin Lyons, NIST, Gaithersburg, MD, United States
Session Co-Chair: Wenwu Zhang, GE, Schenectady, NY, United States

Study of Uniform Heating and Efficiency of Paper Mill Drying Procedures

**Technical Publication.** DETC2011-47604

Ryo Amano, University of Wisconsin-Milwaukee, Glendale, WI, United States, Krishna Guntur, Scott Greely, Grover Bennett, University of Wisconsin-Milwaukee, Milwaukee, WI, United States, Shyam Singh, SSEEI, Inc., Rockford, IL, United States

Study of Air Bubble Formation for Watewter Treatment

**Technical Publication.** DETC2011-47065

Ryo Amano, University of Wisconsin-Milwaukee, Glendale, WI, United States, Ammar Alkhalidi, Bryan Miletta, Jin Li, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

Hammer Drill Efficiency

**Technical Publication.** DETC2011-47066

Ryo Amano, Sourabh Kumar, University of Wisconsin-Milwaukee, Glendale, WI, United States, Michael Konkel, Ryan Fargen, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

Design of Thermoacoustic Engine

**Technical Publication.** DETC2011-47067

Ryo Amano, Pradeep MohanDas, University of Wisconsin-Milwaukee, Glendale, WI, United States, Evan Wind, Dave Wattenford, Paul Michael Sisneros, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

CIE-19 AMS: APPLICATIONS OF SYMBOLIC COMPUTATION IN ENGINEERING

CIE-19-1 Applications of Symbolic Computation in Engineering

Sequoia 8:40am–10:20am

Session Chair: P. Venkataraman, Rochester Institute of Technology, Rochester, NY, United States
Session Co-Chair: John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States

Leveraging Symbolic Programming in Engineering Courses - An Example

**Technical Publication.** DETC2011-47659

P. Venkataraman, Rochester Institute of Technology, Rochester, NY, United States

Symbolic Algebra and Theorem Proving for Failure Criteria Reduction

**Technical Publication.** DETC2011-47737

John G. Michopoulos, Athanasios Iliopoulos, SAIC/co Naval Research Laboratory, Washington, DC, United States

Aerodynamic Design Exploration for Reusable Launch Vehicle using Multi-Objective Genetic Programming

**Technical Publication.** DETC2011-48154

Tomoaki Tatsukawa, University of Tokyo, Sagamihara, Kanagawa, Japan, Taku Nonomura, Akira Oyama, Kozo Fujii, Institute of Space and Astronautical Science/JAXA, Sagamihara, Kanagawa, Japan

A New Approach to Obtaining Closed-Form Solutions using Modern Computer Algebra Systems

**Technical Publication.** DETC2011-48406

Sara McCaslin, The University of Texas at Tyler, Tyler, TX, United States, Brian H. Dennis, Panos S. Shiakolas, Kent L. Lawrence, The University of Texas at Arlington, Arlington, TX, United States
MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-7 Fractional Order Signal Processing Techniques and Applications

Everglades 8:40am–10:20am

Session Chair: YangQuan Chen, Utah State University, Logan, UT, United States
Session Co-Chair: Masataka Fukunaga, Nihon University, Kooriyama, Fukushima, Japan

Digital Fractional Order Savitzky-Golay Differentiator and Its Application
Technical Publication. DETC2011-47864
Dali Chen, Dingyu Xue, Northeastern University, Shenyang, Liaoning, China, YangQuan Chen, Utah State University, Logan, UT, United States

Impulse Response of a Generalized Fractional Second Order Filter
Technical Publication. DETC2011-47867
Zhuang Jiao, Tsinghua University, Beijing, Beijing, China, YangQuan Chen, Utah State University, Logan, UT, United States

Multifractional Property Analysis of Human Sleep EEG Signals
Technical Publication. DETC2011-47878
Hu Sheng, Dalian University of Technology, Dalian, Liaoning, China, YangQuan Chen, Utah State University, Logan, UT, United States

Effects of Median Filtering on Fractional Processes
Technical Publication. DETC2011-47880
Hu Sheng, Dalian University of Technology, Dalian, Liaoning, China, YangQuan Chen, Utah State University, Logan, UT, United States

High Speed Algorithm for Computation of Fractional Differentiation and Integration
Technical Publication. DETC2011-47408
Masataka Fukunaga, Nihon University, Kooriyama, Fukushima, Japan, Nobuyuki Shimizu, Iwaki Meisei University, Iwaki, Fukushima, Japan

MESA-11 THE THIRD SYMPOSIUM ON AUTONOMOUS SYSTEMS & AMBIENT INTELLIGENCE (ASAI'11)

MESA-11-1 Autonomous Systems

Thornton C 8:40am–10:20am

Session Chair: Hyo-Sung Ahn, GIST, Gwangju, Korea (Republic)
Session Co-Chair: Yu Zhou, State University of New York at Stony Brook, Stony Brook, NY, United States

Establishing and Maintaining Wireless Communication Coverage among Multiple Mobile Robots via Fuzzy Control
Technical Publication. DETC2011-47989
Xu Zhong, Yu Zhou, State University of New York at Stony Brook, Stony Brook, NY, United States

Mobile Agent-Based Computing Resource and Usage Monitoring at Large Scale Computer Centers
Technical Publication. DETC2011-48699
Zhixin Tie, Zhejiang Sci-Tech University, Hangzhou, Zhejiang, China, David Ko, Harry H. Cheng, University of California, Davis, CA, United States

Tip-Tilt Motion Control of Fast Steering Mirror in the Giant Magellan Telescope.
Student Competition Paper. DETC2011-48041
Tae-kyung Lee, Hyo-Sung Ahn, Gwangju Institute of Science and Technology, Gwangju, Korea (Republic), Young-Soo Kim, Kwijong Park, Korea Astronomy and Space Institute (KASI), Daejeon, Korea (Republic)

Ground Antenna Scheduling Algorithm for Multi-satellite Tracking
Student Competition Paper. DETC2011-48042
Sanghyuk Yun, Hyo-Sung Ahn, Gwangju Institute of Science and Technology (GIST), Gwangju, Korea (Republic), Sun-Ju Park, Ok-Chul Jung, Dae-Won Chung, Korea Aerospace Research Institute (KARI), Daejeon, Korea (Republic)

Coalition Formation for Unmanned Quadrotors
Technical Publication. DETC2011-48904
Adriano Mancini, Alessandro Benini, Emanuele Frontoni, Primo Zingaretti, Sauro Longhi, Università Politecnica delle Marche, Ancona, Italy

MESA-12 THE FOURTH SYMPOSIUM ON ROBOTICS & MOBILE MACHINES (RMM’11)

MESA-12-1 Robotics & Mobile Machines I

Columbia C 8:40am–10:20am

Session Chair: Mohammad-Amin Jarrah, American University of Sharjah, Sharjah, United Arab Emir
Session Co-Chair: Xianwen Kong, Heriot-Watt University, Edinburgh, United Kingdom

Wheeled, Kinematically Redundant Locomotion System for Mobility-Oriented Research and Experimentation
Technical Publication. DETC2011-47194
Patrick Labenda, Marc Neumann, Tim Sadek, Ruhr-University Bochum, Bochum, Germany

Modeling and Kinematic Analysis of a Gait Generation Method for Biomimetic Walking Robot
Technical Publication. DETC2011-47438
Masood Jawad, Matteo Zoppi, Rezia Molfino, University of Genova, Genova, Genova, Italy

Multi-Terrain Vehicle Active Suspension Control Design and Synthesis
Technical Publication. DETC2011-47468
Umar Asif, NUST, Islamabad, Pakistan, Javaid Iqbal, National University of Sciences and Technology, Rawalpindi, Pakistan

Vision Based Autonomous Tracked Sorting Robot
Technical Publication. DETC2011-48203
Mohammad-Amin Jarrah, Ahmad Al-Nabulsi, Jamil Fayyad, Mohamad Ismail, Ayman Zein Alabedin, American University of Sharjah, Sharjah, United Arab Emir
Conceptual Design and Analysis of Spherical Mobile Robots with an Omni-wheel Based Internal Driving Unit

Technical Publication. DETC2011-48857
Xianwen Kong, Ross Doak, Heriot-Watt University, Edinburgh, United Kingdom

MSNDC-9 FLEXIBLE MULTIBODY DYNAMICS

MSNDC-9-3 Flexible Multibody Dynamics III

Columbia A 8:40am–10:20am

Session Chair: Aki Mikkola, Lappeenranta University of Technology, Lappeenranta, Finland
Session Co-Chair: Hiroyuki Sugiyama, Tokyo University of Science, Tokyo, Japan

Comparison of Transient and Steady-state Behaviors in Unwinding Mechanism

Technical Publication. DETC2011-47246
Wan-Suk Yoo, Deuk-Man An, Kun-Woo Kim, Pusan National University, Busan, Korea (Republic), Jae-Wook Lee, Hyundai Heavy Industry, Yongin, Korea (Republic)

Dynamical Modeling of Flexible Linear Robots

Technical Publication. DETC2011-47442
F. Johannes Kilian, Hubert Gattringer, Hartmut Bremer, Johannes Kepler University, Linz, Austria

The Applicability of the Floating-Frame Based Component Mode Synthesis to High-Speed Rotors

Technical Publication. DETC2011-47800
Astrid Pechstein, Johannes Kepler University Linz, Linz, Austria, Austria, Daniel Reischl, Johannes Gerstmayr, Linz Center of Mechatronics, Linz, Austria, Austria

Analyzing Overconstrained Design of Compliant Mechanisms

Technical Publication. DETC2011-48548
Ronald Aarts, S.E. Boer, J.P. Meijaard, D.M. Brouwer, J.B. Jonker, University of Twente, Department of Mechanical Automation and Mechatronics, Enschede, Netherlands

Dynamic Simulation and Vibration Analysis of a Mechanical Piano Key Actuator

Technical Publication. DETC2011-48709
Ramin Masoudi, Stephen Birkett, Armaghan Salehian, University of Waterloo, Waterloo, ON, Canada

MSNDC-10 DYNAMICS OF LAND, SEA, AIR, AND SPACE VEHICLES

MSNDC-10-2 Dynamics of Vehicles II

Congressional C 8:40am–10:20am

Session Chair: Arend L. Schwab, Delft University of Technology, Delft, 0, Netherlands
Session Co-Chair: Jose Escalona, University of Seville, Seville, Spain

A Review on Handling Aspects in Bicycle and Motorcycle Control

Technical Publication. DETC2011-47963
Arend L. Schwab, J.D.G. Kooijman, Delft University of Technology, Delft, 0, Netherlands

Benchmarking Bicycle and Motorcycle Equations of Motion

Technical Publication. DETC2011-47344
Andrew Dressel, Adeeb Rahman, University of Wisconsin-Milwaukee, Milwaukee, WI, United States
### Identification of the Structural Modes of High Performance Bicycles in the Perspective of Wobble Control

**Technical Publication.** DETC2011-47030  
Alberto Doria, Matteo Formentini, University of Padova, Padova, Veneto, Italy

### Simulation of Differentials in Four-Wheel Drive Vehicles using Multibody Dynamics

**Technical Publication.** DETC2011-48313  
Geoffrey Virlez, Olivier Brüls, Pierre Duysinx, University of Liège, Liège, Belgium, Nicolas Poulet, Jtekt Torsen Europe S.A., Strépy-Bracquegnies, Belgium

### Unicycle Lateral Control by Body Positioning

**Technical Publication.** DETC2011-47463  
Werner Schiehlen, Robert Seifried, Thomas Glaser, University of Stuttgart, Stuttgart, Germany

### DAC-16 SIMULATION-BASED DESIGN UNDER UNCERTAINTY

### DAC-16-2 Simulation-based Design Under Uncertainty

**Bryce**  
8:40am–10:20am

Session Chair: K.K. Choi, The University of Iowa, Iowa City, IA, United States  
Session Co-Chair: Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States

### An Importance Sampling Approach for Time-Dependent Reliability

**Technical Publication.** DETC2011-47200  
Amandeep Singh, US Army RDECOM-TARDEC, Warren, MI, United States, Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States, Efstratios Nikolaidis, University of Toledo, Toledo, OH, United States

### A variable-size Local Domain Approach for Concurrent Design Optimization and Model Validation using Parametric Bootstrap

**Technical Publication.** DETC2011-47234  
Dorin Drignei, Zissimos P. Mourelatos, Vijitashwa Pandey, Grzegorz Koscik, Oakland University, Rochester, MI, United States, Michael Kokkolaras, University of Michigan, Ann Arbor, MI, United States

### Equivalent Standard Deviation to Convert High Reliability Model to Low Reliability Model for Efficiency of Sampling-based RBDO

**Technical Publication.** DETC2011-47537  
Ikjin Lee, K.K. Choi, Ikjin Lee, Liang Zhao, The University of Iowa, Iowa City, IA, United States, David Gorsich, US Army RDECOM/TARDEC, Warren, MI, United States

### Adaptive Virtual Support Vector Machine for the Reliability Analysis of High-Dimensional Problems

**Technical Publication.** DETC2011-47538  
Hyeongjin Song, K.K. Choi, Ikjin Lee, Liang Zhao, The University of Iowa, Iowa City, IA, United States, David Lamb, TARDEC, Warren, MI, United States

### Reliable Kinetic Monte Carlo Simulation based on Random Set Sampling

**Technical Publication.** DETC2011-48575  
Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

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### TECHNICAL SESSIONS

### Regency C  8:40am–10:20am

#### An Investigation into the Dynamic Response of Seat-occupant Models Incorporating Foam Properties Identified through Quasi-static Compression Tests

**Technical Publication.** DETC2011-48006  
Gauri Joshi, Yousof Azizi, Patricia Davies, Anil K. Bajaj, Purdue University, West Lafayette, IN, United States

#### Nonlinear Dynamics of Piecewise Smooth Systems and Damage Identification

**Technical Publication.** DETC2011-48901  
Fabrizio Vestroni, Paolo Casini, Olivierio Giannini, Sapienza Università di Roma, Rome, Italy

#### Advanced System Identification of Plates using a Higher-Order-Spectral Approach: Theory and Experiment

**Technical Publication.** DETC2011-47975  
Michele Pasquali, Walter Lacarbonara, La Sapienza University of Rome, Rome, Italy, Pier Marzocca, Clarkson University, Potsdam, NY, United States

#### Multi-Sensor Health Diagnosis using Deep Belief Network based State Classification

**Technical Publication.** DETC2011-48352  
Prasanna Tamilselvan, Pingfeng Wang, Wichita State University, Wichita, KS, United States, Byeng D. Youn, Seoul National University, Seoul, Korea (Republic)

#### Nonlinear Finite Element-Based Path Following of Periodic Solutions

**Technical Publication.** DETC2011-48673  
Andrea Arena, Walter Lacarbonara, Sapienza University of Rome, Rome, Rome, Italy, Giovanni Formica, University of Rome 3, Rome, RM, Italy, Harry Dankowicz, University of Illinois at Urbana-Champaign, Urbana, IL, United States
DAC-19 PRODUCT DESIGN AND EXPLORATION

DAC-19-1 Product Design and Exploration

Congressional D 8:40am–10:20am

Session Chair: Matthew Campbell, University of Texas at Austin, Austin, TX, United States
Session Co-Chair: Jonathan Cagan, Carnegie Mellon University, Pittsburgh, PA, United States

Return on Investment Analysis for Implementing Barriers to Reverse Engineering

Technical Publication. DETC2011-47094
Darren Knight, Christopher Mattson, Brigham Young University, Provo, UT, United States

A Novel Search Algorithm for Interactive Automated Conceptual Design Generator (Acdg)

Technical Publication. DETC2011-47743
Rahul Rai, Pranay Kilaru, Ravi Valleppalli, California State University at Fresno, Fresno, CA, United States, Matthew Campbell, University of Texas at Austin, Austin, TX, United States

Object-Oriented Modeling of Industrial Manipulators with Application to Energy Optimal Trajectory Scaling

Technical Publication. DETC2011-48390
Giovanni Berselli, University of Modena, Modena, Italy, Francesco Leali, Alberto Vergnano, University of Modena and Reggio Emilia, Modena, Italy, Marcello Pellicciari, DIMEC University of Modena and Reggio Emilia, Modena, Italy, Bengt Lennartson, Chalmers University of Technology, Gothenburg, Sweden

Analysis and Design of an In-Pipe System for Water Leak Detection

Technical Publication. DETC2011-48395
Dimitris Chatzigeorgiou, Kamal Youcef-Toumi, Massachusetts Institute of Technology, Cambridge, MA, United States, Atia Khalifa, Rachad Ben-Mansour, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

A Design Exploration of Genetically Engineered Myosin Motors

Technical Publication. DETC2011-48568
Paul Egan, Philip LeDuc, Jonathan Cagan, Carnegie Mellon University, Pittsburgh, PA, United States, Christian Schunn, University of Pittsburgh, Pittsburgh, PA, United States

PTG-1 GEAR SYSTEM DESIGN AND ANALYSIS

PTG-1-4 Gear System Design and Analysis IV

Capital A 8:40am–10:20am

Session Chair: Neil Anderson, Pratt & Whitney, East Hartford, CT, United States

Influence of Tooth Modifications on Load Distribution in Face-Hobbed Spiral Bevel Gears

Technical Publication. DETC2011-47090
Vilmos Simon, Budapest University of Technology and Economics, Budapest, Hungary

Computerized Design and Tooth Contact Analysis of Spiral Bevel Gears Generated by the Duplex Helical Method

Technical Publication. DETC2011-47108
Ignacio Gonzalez-Perez, Alfonso Fuentes, Polytechnic University of Cartagena, Cartagena, Murcia, Spain, Kenichi Hayasaka, Yamaha Motor Company, Iwata, Shizuoka, Japan

Designing and Manufacturing Spiral Bevel Gears

Technical Publication. DETC2011-47166
Qi Fan, The Gleason Works, Rochester, NY, United States

Multi-objective Ease-off Optimization of Hypoid Gears for Their Efficiency, Noise and Durability Performances

Technical Publication. DETC2011-47715
Alessio Artoni, Marco Gabiccinì, Massimo Guiggiani, University of Pisa, Pisa, Italy, Ahmet Kahraman, The Ohio State University, Columbus, OH, United States

MECH-8 COMPLIANT MECHANISMS

MECH-8-4 Synthesis Tools for Special Purpose Applications

Yellowstone 8:40am–10:20am

Session Chair: Just Herder, Delft University of Technology, Delft, Netherlands
Session Co-Chair: Brian Jensen, Brigham Young University, Provo, UT, United States

On the Classification of Compliant Mechanisms and Synthesis of Compliant Single-Strip Mechanisms

Technical Publication. DETC2011-48845
Ashok Midha, Missouri University of Science and Technology, Rolla, MO, United States, Sharath Kolachalam, Foro Energy, Inc., Littleton, CO, United States, Yuvaraj Annamalai, AIRBUS North America Engineering, Inc., Wichita, KS, United States
A Preliminary Study of Actuation Approaches for Lamina Emergent Mechanisms

Technical Publication. DETC2011-48350
Paul S. Gollnick, Justin D. Black, Emily E. Savage, Landen A. Bowen, Spencer Magleby, Larry L. Howell, Brigham Young University, Provo, UT, United States, Lifang Qiu, University of Science and Technology Beijing, Beijing, China

Design Concepts for Shape-Shifting Surfaces

Technical Publication. DETC2011-47402
Craig Lusk, The University of South Florida, Tampa, FL, United States, Paul Montalbano, University of South Florida, Saint Cloud, FL, United States

Design of Multistage Contact-aided Compliant Mechanisms

Technical Publication. DETC2011-48637
Milton Aguirre, Mary Frecker, Pennsylvania State University, University Park, PA, United States

Stiffness Design for Compliant Manipulators Based on Dynamics Analysis of the Impact Configuration

Technical Publication. DETC2011-47636
Dongming Gan, Nikos.G. Tsagarakis, Darwin Caldwell, Italian Institute of Technology, Genova, Italy, Italy, Jian Dai, King’s College London, University of London, London, United Kingdom

MECH-9 MECHANISM ANALYSIS AND SYNTHESIS

MECH-9-4 Robot Mechanisms

Lexington 8:40am–10:20am
Session Chair: Andrew P. Murray, University of Dayton, Dayton, OH, United States
Session Co-Chair: Vincenzo Parenti-Castelli, DIEM - University of Bologna, Bologna, Italy

On the Development of a Piezoelectric-Actuated Compliant Brake Mechanism for Modular Robots

Technical Publication. DETC2011-48799
Chris E. Thorne, Paul J. White, Mark Yim, University of Pennsylvania, Philadelphia, PA, United States

Underactuated Part Alignment System (UPAS) for Industrial Assembly Tasks

Technical Publication. DETC2011-48267
Brian Slaboch, Phil Voglewede, Marquette University, Milwaukee, WI, United States

Design of Non-Anthropomorphic Robotic Hands for Anthropomorphic Tasks

Technical Publication. DETC2011-47818
Edgar Simo-Serra, Francesc Moreno-Noguer, Institut de Robotica i Informatica Industrial, Barcelona, Spain, Alba Perez-Gracia, Idaho State University, Pocatello, ID, United States

A Design Methodology Based Process for Robotic Gripper Design

Technical Publication. DETC2011-47673
David Streusand, Cameron Turner, Colorado School of Mines, Golden, CO, United States
MNS-6 SYMPOSIUM ON DYNAMICS OF MEMS AND NEMS

MNS-6-3 Nonlinear Dynamics of MEMS and NEMS II

Capital B 8:40am–10:20am

Session Chair: Mohammad Younis, SUNY Binghamton, Binghamton, NY, United States

Bistable Threshold Sensor with Mechanically Nonlinear Self-Limiting Suspension and Electrostatic Actuation

Student Competition Paper. DETC2011-47575
Shila Rabanim, Slava Krylov, Emil Amir, Tel Aviv University, Tel Aviv, Middle_East, Israel

Enhancing the Sensitivity of Electrostatically Actuated Resonator for Earthquake Detection

Technical Publication. DETC2011-48597
Abdallah Ramini, Mohammad Younis, SUNY Binghamton, Binghamton, NY, United States

Modeling, Analysis, and Experimental Validation of a Bifurcation-Based Microsensor

Student Competition Paper. DETC2011-48199
Vijay Kumar, J William Boley, Yushi Yang, Hendrik Ekowaluyo, Jacob K Miller, George T.-C. Chiu, Jeffrey F. Rhoads, Purdue University, West Lafayette, IN, United States

The Dynamics of Mems Arches of Non-Ideal Boundary Conditions

Technical Publication. DETC2011-48501
Sami Alkharabsheh, Mohammad Younis, SUNY Binghamton, Binghamton, NY, United States

Application of Nonlocal Theory in Dynamic Pull-In Analysis of Electrostatically Actuated Micro and Nano Beams

Technical Publication. DETC2011-48862
Mohammad Ahmadian, Abdolreza Pasharavesh, Sharif University of Technology, Tehran, Iran, Ali Fallah, Sharif University of Technology, School of Mechanical Engineering, Tehran, Tehran, Iran

MNS-7 SYMPOSIUM ON MEASUREMENT AND CONTROL IN MICRO- AND NANO-SYSTEMS

MNS-7-1 Measurement and Control in Micro- and Nano-Systems I

Glacier 8:40am–10:20am

Session Chair: Laxman Saggere, University of Illinois at Chicago, Chicago, IL, United States
Session Co-Chair: Larry L. Howell, Brigham Young University, Provo, UT, United States

Measurements of Piezoelectric Coefficient d33 of Lead Zirconate Titanate (PZT) Thin Films using a Mini Force Hammer

Student Competition Paper. DETC2011-47512
Qing Guo, Guozhong Cao, Steve Shen, University of Washington, Seattle, WA, United States

Ultra Low Power Energy Storage Circuit for Piezoelectric Nano Generator

Technical Publication. DETC2011-48734
Galos Richard, Xi Chen, Yong Shi, Stevens Institute of Technology, Hoboken, NJ, United States

Integrated Piezoresistive Flexure Model in Polysilicon

Technical Publication. DETC2011-47902
Gerrit Larsen, Larry L. Howell, Brian Jensen, Brigham Young University, Provo, UT, United States

Measurement and Characterization of Stiction Force in Microstructures with Tapered Features

Technical Publication. DETC2011-48848
Christopher A. Pelzmann, Laxman Saggere, University of Illinois at Chicago, Chicago, IL, United States

DEC-4 EXPERIENTIAL LEARNING AND NEW PEDAGOGY FOR ENGINEERING EDUCATION

DEC-4-2 Experiential Learning and New Pedagogy for Engineering Education

Thornton B 8:40am–10:20am

Session Chair: Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States
Session Co-Chair: Katie Grantham, Missouri University of Science and Technology, Rolla, MO, United States

Using Product Archaeology to Integrate Global, Economic, Environmental, and Societal Factors in Introductory Design Education

Technical Publication. DETC2011-48438
Phil Cormier, Erich Devendorf, Department of Mechanical and Aerospace Engineering, Buffalo, NY, United States, Deborah Moore-Russo, Department of Learning and Instruction, Buffalo, NY, United States, Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States
Lean Value Creation in the Product Development Process with Principle of Set Based Concurrent Engineering

**Technical Publication.** DETC2011-48693
Tianyi Cai, Theodor Freiheit, University of Calgary, Calgary, AB, Canada

A Behavior Based Approach to Multi-Agent Adaptive System Design

**Technical Publication.** DETC2011-48833
Chang Chen, Yan Jin, University of Southern California, Los Angeles, CA, United States

**DFMLC-9 DESIGN FOR SUPPLY CHAIN**

**DFMLC-9-1 Design for Supply Chain**
Bunker Hill 8:40am–10:20am

Session Chair: Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States

Investigation of Product Modularity and Supply Chain Performance at the Product Design Stage

**Technical Publication.** DETC2011-47240
Ming-Chuan Chiu, Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States

An Investigation on Centralized and Decentralized Supply Chain Scenarios at the Product Design Stage to Increase Performance

**Technical Publication.** DETC2011-47241
Ming-Chuan Chiu, Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States

Design for Supply Chain Requirements - An Approach to detect the capabilities to postpone

**Technical Publication.** DETC2011-48287
Max Brosch, Dieter Krause, Hamburg University of Technology, Hamburg, Germany

Sustainable Manufacturing Analysis for Titanium Components

**Technical Publication.** DETC2011-48854
Dane D. Eastlick, Misha V. Sahakian, Karl R. Haapala, Oregon State University, Corvallis, OR, United States

Variable Screening using Restricted Maximum Likelihood Kriging Method with Application to Gunner Joint Stiffness Variables

**Technical Publication.** DETC2011-47582
Guang Dong, Zheng-Dong Ma, Gregory Hulbert, Noboru Kikuchi, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Sudhakar Arepally, Madan Vunnam, U.S. Army TARDEC, Warren, MI, United States, Ken-An Lou, ArmorWorks LLC, Chandler, AZ, United States

A Distributed Pool Architecture for Highly Constrained Optimization Problems in Complex Systems Design

**Technical Publication.** DETC2011-48620
Vijitashwa Pandey, Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States

**DTM-9 COMPLEXITY AND ADAPTABILITY IN DESIGN**

**DTM-9-1 Complexity and Adaptability in Design**
Concord 8:40am–10:20am

Session Chair: Richard Malak, Texas A&M University, College Station, TX, United States
Session Co-Chair: Tolga Kurtoglu, Palo Alto Research Center, Palo Alto, CA, United States

Complexity as a Surrogate Mapping Between Function Models and Market Value

**Technical Publication.** DETC2011-47481
James Mathieson, Aravind Shanthakumar, Chiradeep Sen, Joshua Summers, Clemson University, Clemson, SC, United States, Robert Stone, Ryan Arlitt, Oregon State University, Corvallis, OR, United States

Variable Screening using Restricted Maximum Likelihood Kriging Method with Application to Gunner Joint Stiffness Variables

**Technical Publication.** DETC2011-47582
Guang Dong, Zheng-Dong Ma, Gregory Hulbert, Noboru Kikuchi, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Sudhakar Arepally, Madan Vunnam, U.S. Army TARDEC, Warren, MI, United States, Ken-An Lou, ArmorWorks LLC, Chandler, AZ, United States

A Distributed Pool Architecture for Highly Constrained Optimization Problems in Complex Systems Design

**Technical Publication.** DETC2011-48620
Vijitashwa Pandey, Zissimos P. Mourelatos, Oakland University, Rochester, MI, United States

Lean Value Creation in the Product Development Process with Principle of Set Based Concurrent Engineering

**Technical Publication.** DETC2011-48693
Tianyi Cai, Theodor Freiheit, University of Calgary, Calgary, AB, Canada

A Behavior Based Approach to Multi-Agent Adaptive System Design

**Technical Publication.** DETC2011-48833
Chang Chen, Yan Jin, University of Southern California, Los Angeles, CA, United States
VIB-9 Rotor Dynamics and Control

VIB-9-4 Rotor Dynamics and Control IV - Nonlinear Dynamics

Thornton A 10:40am–12:00pm

Session Chair: Albert Luo, Southern Illinois University Edwardsville, Edwardsville, IL, United States
Session Co-Chair: C. Nat Nataraj, Villanova University, Villanova, PA, United States

Self-Excited Oscillations of a Rotor with a Radial Clearance between a Bearing Holder and Housing
Technical Publication. DETC2011-48052
Mizuho Inagaki, Toyota Central R&D labs, inc., Aichi-gun, Japan, Yukio Ishida, Nagoya University, Nagoya, Aichi, Japan

1/2-Order Subharmonic Resonances in Horizontally Supported Jeffcott Rotor
Student Competition Paper. DETC2011-47605
Nao Yoshida, Tomoyuki Takano, Hiroshi Yabuno, Keio University, Yokohama, Kanagawa, Japan, Tsuyoshi Inoue, Yukio Ishida, Nagoya University, Nagoya, Japan

A Fuzzy Approach for the Analysis of Rotor Bearing Systems with Uncertainties
Technical Publication. DETC2011-48528
Singiresu Rao, Yazhao Qiu, University of Miami, Coral Gables, FL, United States

VIB-11 Experiments in Nonlinear Dynamics and Vibrations

VIB-11-3 Nonlinear Dynamic Characterization

Congressional A 10:40am–12:00pm

Session Chair: Brian Feeny, Michigan State University, East Lansing, MI, United States
Session Co-Chair: Brian Mann, Duke University, Durham, NC, United States

Experimental and Numerical Investigations of an Untethered, Nonlinear Spherical Buoy in a Wave Tank
Technical Publication. DETC2011-48401
Zach Ballard, Brian Mann, Duke University, Durham, NC, United States

Dynamic Characteristics of a Machine Tool At Working Positions in Operating Test
Technical Publication. DETC2011-48899
Huimin Dong, Yang Tan, Delun Wang, Yali Ma, Dalian University of Technology, Dalian, Liaoning, China

Horizontal Pendulum with Sudden Changes in Platform Tilt
Student Competition Paper. DETC2011-48423
Clark C. McGehee, Zach C. Ballard, Brian Mann, Duke University, Durham, NC, United States

On force control for the vibration testing of a bladed disk with friction contacts
Technical Publication. DETC2011-47255
Christian M. Firrone, Muzio M. Gola, Dept. of Mechanical Engineering, Politecnico di Torino, Torino, Italy, Teresa Berruti, Politecnico di Torino, Torino, Italy

VIB-13 Dynamics of Phononic Materials and Structures

VIB-13-1 Dynamics of Phononic Materials and Structures

Thornton C 10:40am–12:00pm

Session Chair: Mahmoud Hussein, University of Colorado at Boulder, Boulder, CO, United States
Session Co-Chairs: Ruzzene Massimo, Georgia Institute of Technology, Atlanta, GA, United States, Katia Bertoldi, Harvard University, Cambridge, MA, United States, Chiara Daraio

Molding the Flow of Sound by Acoustic Metamaterials
Technical Publication. DETC2011-48456
Nick Fang, Jun Xu, Massachusetts Institute of Technology, Cambridge, MA, United States, Shinhu Cho, Melicent M. Stossel, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Soft Metamaterials: Tuning Functionalities Through Deformation
Technical Publication. DETC2011-48481
Katia Bertoldi, Harvard University, Cambridge, MA, United States, Lifeng Wang, Massachusetts Institute of Technology, Cambridge, MA, United States

Analysis of Elastic Wave Propagation in Nonlinear Beams
Technical Publication. DETC2011-48672
Mohammad Abedinnasab, Nanyang Technology University, Singapore, Singapore, Mahmoud Hussein, University of Colorado at Boulder, Boulder, CO, United States

Wave Propagation in Membrane-Based Nonlinear Periodic Structures
Technical Publication. DETC2011-48700
Raj Kumar Narisetti, Michael Leamy, Ruzzene Massimo, Georgia Institute of Technology, Atlanta, GA, United States
VIB-14 VIBRATIONS AND CONTROLS OF MANUFACTURING SYSTEMS

VIB-14-1 Cutting Dynamics and Vibration

Regency D 10:40am–12:00pm

Session Chair: Steve Suh, Texas A&M University, College Station, TX, United States
Session Co-Chair: Hamid R. Hamidzadeh, Tennessee State University, Nashville, TN, United States

Switchability Conditions of Motions in a Nonlinear, Friction-Induced Oscillator
Technical Publication. DETC2011-47384
Albert Luo, Jianzhe Huang, Southern Illinois University Edwardsville, Edwardsville, IL, United States

Optimal Control of the Regenerative Chatter in Nonlinear Milling Process
Technical Publication. DETC2011-47527
Moradi Hamed, Mohammad R. Movahhedy, Gholamreza Vossoughi, Hassan Salarieh, Sharif University of Technology, Tehran, Iran

Control of High Speed Milling Chatter in Simultaneous Time-Frequency Domain
Technical Publication. DETC2011-47921
Meng-Kun Liu, Steve Suh, Texas A&M University, College Station, TX, United States

Modeling and Control of Active Vibration Isolation system taking the Dynamics of Elastic Load into Account by using the Reduced order physical model
Technical Publication. DETC2011-48109
Keisuke Sudo, Toru Watanabe, Nihon University, Tokyo, Japan, Kazuto Seto, Seto Vibration Control Laboratory, Kanagawa, Japan

VIB-15 VIBRATION AND MECHANICS OF JOINTED STRUCTURES


Congressional D 10:40am–12:00pm

Session Chair: Dane Quinn, The University of Akron, Akron, OH, United States

Modelling Damping in Computer Simulations: Is All Damping Viscous?
Technical Publication. DETC2011-47225
Hugh G.D. Goyder, Cranfield University, Swindon, United Kingdom

Development of a method for measuring damping in bolted joints
Technical Publication. DETC2011-47230
Hugh G.D. Goyder, Cranfield University, Swindon, United Kingdom, Philip Ind, Dan Brown, AWE, Reading, United Kingdom

Improvement of the Calculation of Hydrodynamic Systems By Considering the Dynamic Deformation Caused By Vibration
Technical Publication. DETC2011-47302
Sebastian Kukla, Tim Sadek, Ruhr-University Bochum, Bochum, Germany

Multiparametric Analysis of Resonance Peak Vibrations for Nonlinear Jointed Structures
Technical Publication. DETC2011-48123
Evgeny Petrov, Imperial College London, London, United Kingdom

CIE-18 AMS: ENERGY SYSTEMS - ENERGY EFFICIENT MANUFACTURING

CIE-18-2 AMS ES Session 2

Congressional B 10:40am–12:00pm

Session Chair: Wenwu Zhang, GE, Schenectady, NY, United States
Session Co-Chair: Kevin Lyons, NIST, Gaithersburg, MD, United States

Low-Speed Wind Turbine Design and Fabrication
Technical Publication. DETC2011-47068
Ryo Amano, Pradeep MohanDas, University of Wisconsin-Milwaukee, Glendale, WI, United States, Michael Zeamer, Matthew D. Zeamer, Andrew David Welsh, Brian Polly, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

A Decision-Guided Energy Management for Sustainable Manufacturing
Technical Publication. DETC2011-47454
Shao Guodong, National Institute of Standards and Technology, Gaithersburg, MD, United States, Alexander Brodsky, Daniel Menasce, Paul Ammann, George Mason University, Fairfax, VA, United States, Jorge Arinez, General Motors Company (GM), Warren, MI, United States

Optimization of Wind Turbine Placement in Offshore Wind Farms
Technical Publication. DETC2011-47935
Simeng Li, J. Iwan D. Alexander, Case Western Reserve University, Cleveland, OH, United States

Energy Model of Transceiver in Wireless Sensor Nodes
Technical Publication. DETC2011-48382
zhenhuan zhu, S Olutunde Oyadiji, University of Manchester, Manchester, United Kingdom
CIE-20 PANEL: FUNDING OPPORTUNITIES FOR RESEARCH

CIE-20-1 Panel

Columbia A  10:40am–12:00pm

Session Chair: Ram Sriram, National Institute of Standards and Technology, Gaithersburg, MD, United States
Session Co-Chair: John G. Michopoulos, Naval Research Laboratory, Washington, DC, United States

Funding Opportunities from NIST Panel. DETC2011-49059
Vijay Srinivasan, National Institute of Standards and Technology, Gaithersburg, MD, United States

Funding Opportunities from NSF Panel. DETC2011-49060
Steven McKnight, NSF, Arlington, United States

Funding Opportunities from DARPA Panel. DETC2011-49061
Todd Hughes, DARPA, Arlington, United States

Funding Opportunities from OSD Panel. DETC2011-49062
Robert Neches, OSD, Arlington, United States

Unifying Directions for Systems Engineering Panel. DETC2011-49064
Frederica Darema, AFOSR, Arlington, United States

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-8 Keynotes - Fractional Derivatives and Their Applications

Everglades  10:40am–12:00pm

Session Chair: YangQuan Chen, Utah State University, Logan, UT, United States
Session Co-Chair: Changpin Li, Shanghai Univ, Shanghai, China

FDTA11 Plenary Lecture: Fractional Optimal Control: An Overview
Keynote. DETC2011-48986
Om P Agrawal, Southern Illinois University, Carbondale, IL, United States

Fractional Diffusion and the Origin of Allometry Relations
Keynote. DETC2011-47281
Bruce West, Army Research Office, Research Triangle Park, NC, United States

MSNDC-7 KEYNOTES

MSNDC-7-2 d’Alembert Award Keynote Session

Regency B  10:40am–12:00pm

Session Chair: Ahmed Shabana, University of Illinois at Chicago, Chicago, IL, United States

Multibody Systems Made Simple and Efficient
Keynote. DETC2011-47054
Javier García de Jalón, Universidad Politécnica de Madrid, Madrid, Madrid, Spain

DAC-20 DESIGN OF MULTISCALE ENGINEERING SYSTEMS

DAC-20-1 Design of Mutlscale Engineering Systems

Columbia C  10:40am–12:00pm

Session Chair: Carolyn Seepersad, The University of Texas at Austin, Austin, TX, United States
Session Co-Chair: Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

Managing Uncertainty in Multiscale Systems Via Simulation Model Refinement
Technical Publication. DETC2011-47655
Ayan Sinha, Georgia Tech, Atlanta, GA, United States, Jitesh Panchal, Washington State University, Pullman, WA, United States, Janet Allen, Farrokh Mistree, University of Oklahoma, Norman, OK, United States

Loci Surface Guided Crystal Phase Transition Pathway Search
Technical Publication. DETC2011-47750
Edin Crnkic, Lijuan He, Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

Microstructure Reconstruction for Stochastic Multiscale Material Design
Technical Publication. DETC2011-48323
Yu Liu, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, M. Steven Greene, Wei Chen, Dmitriy Dikin, Wing Kam Liu, Northwestern University, Evanston, IL, United States

Identifying Product Scaling Principles: A tool for Bioinspired Design and Beyond
Technical Publication. DETC2011-48404
Angel Perez, Texas A&M University, College Station, TX, United States, Julie Linsey, Texas A&M University, College Station, TX, United States
DAC-21 MULTI-OBJECTIVE OPTIMIZATION AND SENSITIVITY ANALYSIS

DAC-21-1 Multi-objective Optimization and Sensitivity Analysis

Bunker Hill 10:40am–12:00pm

Session Chair: David Romero, University of Toronto, Toronto, ON, Canada
Session Co-Chair: Masataka Yoshimura, Kyoto University, Kyoto, Japan

Fundamental Concepts for Product Designs Based on Pareto Optimum Solutions
Technical Publication. DETC2011-47247
Masataka Yoshimura, Kyoto University, Kyoto, Japan

Tracing the Envelope of the Objective-Space in Multi-Objective Topology Optimization
Technical Publication. DETC2011-47329
Inna Turevsky, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

Simultaneous Requirement and Design Optimization of an Industrial Family using Multi-Objective Optimization
Technical Publication. DETC2011-47819
Daniel Wappling, Jakob Weström, ABB Robotics, Västerås 72168, Sweden, Xiaolong Feng, Hans Andersson, Marcus Pettersson, Björn Lunden, ABB Corporate Research, Västerås 72178, Sweden

Live: A Work-centered Approach to Support Visual Analytics of Multi-dimensional Engineering Design Data with Interactive Visualization and Data-mining
Technical Publication. DETC2011-48333
Xin Yan, Mu Qiao, Tim Simpson, Jia Li, Xiaolong Zhang, Pennsylvania State University, University Park, PA, United States

DAC-22 PRODUCT FAMILY AND PRODUCT PLATFORM DESIGN

DAC-22-1 Product Family and Product Platform Design

Bryce 10:40am–12:00pm

Session Chair: Seung Ki Moon, Nanyang Technological University, Singapore, Singapore
Session Co-Chair: Ritesh Khire, United Technologies Research Center (UTRC), East Hartford, CT, United States

Identification of Product Family Platforms using Pattern Recognition
Technical Publication. DETC2011-47472
Dane Freeman, Dimitri Mavris, Georgia Institute of Technology, Atlanta, GA, United States, Dongwook Lim, Elena Garcia, Aerospace Systems Design Laboratory, Atlanta, GA, United States

Recent Advancements in Product Family Design and Platform-Based Product Development: A Literature Review
Technical Publication. DETC2011-47959
Zhila Pirmoradi, Wang Gary, Simon Fraser University, Surrey, BC, Canada

Platform Strategy for Product Family Design using Particle Swarm Optimization
Technical Publication. DETC2011-48060
Seung Ki Moon, Nanyang Technological University, Singapore, Singapore, Kyoung Jong Park, Gwangju University, Gwangju, Korea (Republic), Tim Simpson, Pennsylvania State University, University Park, PA, United States

A Platform Selection Approach Based on Product Family Ontology Modeling
Technical Publication. DETC2011-48194
Ying Liu, NUS, Singapore, Singapore, Soon Chong Johnson Lim, Wing Bun Lee, Hong Kong Polytechnic University, Hong Kong, China

DAC-23 PANEL: DESIGN FRONTIERS

DAC-23-1 Design Frontiers: Panel Session

Capital A 10:40am–12:00pm

Session Chair: Tim Simpson, Pennsylvania State University, University Park, PA, United States

Design Frontier: Challenges and Opportunities Panel. DETC2011-49051
Panos Y. Papalambros, University of Michigan, Ann Arbor, MI, United States

Design Frontier: Challenges and Opportunities Panel. DETC2011-49052
Ritesh Khire, United Technologies Research Center (UTRC), East Hartford, CT, United States

Design Frontier: Challenges and Opportunities Panel. DETC2011-49053
Katja Holtta-Otto, University of Massachusetts Dartmouth, North Dartmouth, MA, United States

Design Frontier: Challenges and Opportunities Panel. DETC2011-49054
Conrad Tucker
**TECHNICAL SESSIONS**

**PTG-10 PANEL DISCUSSION**

**PTG-10-1 Panel**

**Capital B** 10:40am–12:00pm

Session Chair: **Avinash Singh**, General Motors Company, Pontiac, MI, United States

**View of Industry - Power Transmission Research Trends**

Panel. DETC2011-49038  
**Timothy Krantz**, NASA, Cleveland, OH, United States

**MECH-8 COMPLIANT MECHANISMS**

**MECH-8-5 Theory: Motion and Force Design**

**Yellowstone** 10:40am–12:00pm

Session Chair: **Ashok Midha**, Missouri University of Science and Technology, Rolla, MO, United States  
Session Co-Chair: **Hong Zhou**, Texas A&M University-Kingsville, Kingsville, TX, United States

**Spatial-Beam Large-Deflection Equations and Pseudo-Rigid-Body Model for Axisymmetric Cantilever Beams**

Technical Publication. DETC2011-47389  
**Issa A. Ramirez, Craig Lusk**, The University of South Florida, Tampa, FL, United States

**Nonlinear Strain Energy Formulation to Capture the Constraint Characteristics of a Spatial Beam Flexure**

Technical Publication. DETC2011-47716  
**Shiladitya Sen, Shorya Awtar**, University of Michigan, Ann Arbor, MI, United States

**Curve Decomposition Analysis for Fixed-Guided Beams with Application to Statically Balanced Compliant Mechanisms**

Technical Publication. DETC2011-47829  
**Charles Kim**, Bucknell University, Lewisburg, PA, United States

**Mobility Analysis of Flexure Mechanisms via Screw Algebra**

Technical Publication. DETC2011-48012  
**Hai-Jun Su**, University of Maryland Baltimore County, Baltimore, MD, United States

**MECH-9 MECHANISM ANALYSIS AND SYNTHESIS**

**MECH-9-5 Protein Kinematics and Screws**

**Lexington** 10:40am–12:00pm

Session Chair: **Jahangir Rastegar**, Stony Brook University, Stony Brook, NY, United States  
Session Co-Chair: **David Myszka**, University of Dayton, Dayton, OH, United States

**Kinematic Motion Constraints of the Protein Molecule Chains**

Technical Publication. DETC2011-48519  
**Zahra Shahbazi, Horea Ilies, Kazem Kazerounian**, University of Connecticut, Storrs, CT, United States

**Kinematic Modeling and Internal Motion Analysis of Proteins from a Robot Kinematics Viewpoint**

Technical Publication. DETC2011-47970  
**Keisuke Arikawa**, Kanagawa Institute of Technology, Kanagawa, Japan

**A Line Geometric Foundation for Finite Screw Systems Associated with Spatial Linkages**

Technical Publication. DETC2011-48115  
**Chintien Huang, Tzu-Cheng Hsing**, National Cheng Kung University, Tainan, Taiwan

**Characteristics of the Screw Transformation Matrix and Their Effect on Chasles’ Motion**

Technical Publication. DETC2011-48613  
**Jian Dai**, King’s College London, University of London, London, United Kingdom

**MECH-10 PARALLEL MANIPULATORS**

**MECH-10-3 Synthesis**

**Columbia Foyer** 10:40am–12:00pm

Session Chair: **Andreas Müller**, University Duisburg-Essen, Duisburg, Germany  
Session Co-Chair: **Stéphane Caro**, Institut de Recherche en Communications et Cybernétique de Nantes, Nantes, France

**Visual Synthesis of RRR- and RPR-legged Planar Parallel Manipulators using Constraint Manifold Geometry**

Technical Publication. DETC2011-48830  
**Anurag Purwar**, Stony Brook University, Stony Brook, NY, United States, **Aditya Gupta**, LabCrafters Inc., Ronkonkoma, NY, United States

**Geometry and Constraint Based Design of Metamorphic Parallel Mechanisms**

Technical Publication. DETC2011-47703  
**Ketao Zhang, Jian Dai**, King’s College London, University of London, London, United Kingdom, **Yuefa Fang**, Jiaotong University, Beijing, China

**Type Synthesis of 3-DOF Parallel Manipulators with Both Planar and Spatial Translational Operation Modes**

Technical Publication. DETC2011-48510  
**Xianwen Kong**, Heriot-Watt University, Edinburgh, United Kingdom

**Conceptual Design, Performance Evaluation and Dimensional Optimization of a Compact Acceleration Sensor Based on Flexure Parallel Mechanism**

Technical Publication. DETC2011-48089  
**Dan Zhang, Zhen Gao**, University of Ontario Institute of Technology, Oshawa, ON, Canada
MNS-8 KEYNOTE

MNS-8-1 International Conference on Micro- and Nanosystems Keynote

Regency C 10:40am–12:00pm

Session Chair: SV Sreenivasan, University of Texas at Austin, Austin, TX, United States
Session Co-Chair: Brian Jensen, Brigham Young University, Provo, UT, United States

Encapsulation for MEMS Resonators: How Packaging Enabled a Technology

Keynote. DETC2011-49024

Thomas Kenny, Stanford University, Stanford, United States

DEC-6 BROAD ADAPTATION/ADOPTION OF DESIGN TOOLS IN ENGINEERING EDUCATION - ISSUES AND LESSONS LEARNED

DEC-6-1 Broad Adaptation/Adoption of Design Tools in Engineering Education - Issues and Lessons Learned

Thornton B 10:40am–12:00pm

Session Chair: Daniel A. McAdams, Texas A&M University, College Station, TX, United States
Session Co-Chair: Robert Nagel, James Madison University, Harrisonburg, VA, United States

Augmented Books Applied to Engineering. An Attractive Tool for the Student & Useful for Learning

Technical Publication. DETC2011-48163

Jorge Martín-Gutiérrez, University of La Laguna, La Laguna, Tenerife, Spain, Manuel Contero, Universidad Politécnica de Valencia, Valencia, Spain

Concepts in Biomimetic Design: Methods and Tools to Incorporate into a Biomimetic Design Curriculum

Technical Publication. DETC2011-48571

Michael Glier, Daniel A. McAdams, Julie Linsey, Texas A&M University, College Station, TX, United States

On Teaching Functionality and Functional Modeling in an Engineering Curriculum

Technical Publication. DETC2011-47852

Robert Nagel, James Madison University, Harrisonburg, VA, United States, Matt Bohm, University of Louisville, Louisville, KY, United States

Mechanix: A Sketch Recognition Truss Tutoring System

Technical Publication. DETC2011-48439

Olufunmilola Atiola, Martin Field, Julie Linsey, Tracy Hammond, Erin McCutie, Texas A&M University, College Station, TX, United States

DTM-10 UNDERSTANDING INNOVATION

DTM-10-1 Understanding Innovation

Concord 10:40am–12:00pm

Session Chair: Robert Stone, Oregon State University, Corvallis, OR, United States
Session Co-Chair: Daniel Frey, MIT, Cambridge, MA, United States

Exploring Innovation Opportunities in Energy Harvesting using Functional Modeling Approaches

Technical Publication. DETC2011-48387

Jason Weaver, Kristin Wood, Richard Crawford, University of Texas at Austin, Austin, TX, United States, Dan Jensen, United State Air Force Academy, USAF Academy, CO, United States

Creativity and Long-term Potentiation: Implications for Design

Technical Publication. DETC2011-48595

Gregory Hallihan, Li Shu, University of Toronto, Toronto, ON, Canada

Understanding Innovation: A Study of Perspectives and Perceptions in Engineering

Technical Publication. DETC2011-48741

Jarden Krager, Kristin Wood, Richard Crawford, Christina White, The University of Texas at Austin, Austin, TX, United States, Dan Jensen, United State Air Force Academy, USAF Academy, CO, United States, Jonathan Cagan, Carnegie Mellon University, Pittsburgh, PA, United States, Christian Schunn, University of Pittsburgh, Pittsburgh, PA, United States, Julie Linsey, Texas A&M University, College Station, TX, United States

Rethinking Design: The Formal Integration of Engineering Innovation into a Design Process

Technical Publication. DETC2011-48381

Aziz Naim, Department of Mechanical and Aerospace Engineering, Buffalo, NY, United States, Kemper Lewis, University at Buffalo - SUNY, Buffalo, NY, United States

DFMLC-10 KEYNOTES

DFMLC-10-1 Design for Manufacturing and the Life Cycle Conference Keynotes

Columbia B 10:40am–12:00pm

Session Chair: Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States

Design and Manufacturing - Sustaining the Connection

Keynote. DETC2011-49026

Christina Bloebaum, University of Buffalo, Buffalo, United States

Design and Manufacturing - Sustaining the Connection

Keynote. DETC2011-49027

Russell Barton, Pennsylvania State University, State College, United States
VIB-9 ROTOR DYNAMICS AND CONTROL

VIB-9-5 Rotor Dynamics and Control V - Bearings & Diagnostics

Thornton A 1:40pm–3:20pm

Session Chair: Gordon Kirk, Virginia Tech, Blacksburg, VA, United States
Session Co-Chair: Emanuel Pesatori, Franco Tosi Meccnica S.p.A., Legnano, MI, Italy

Mutual Information Based Feature Selection from Data Driven and Model Based Techniques for Fault Detection in Rolling Element Bearings
Technical Publication. DETC2011-47822
Karthik Kappaganthu, Cummins Inc, Columbus, IN, United States, C. Nat Nataraj, Villanova University, Villanova, PA, United States

A Composite Vibration Spectrum for a Machine for a Vibration Based Condition Monitoring
Technical Publication. DETC2011-47368
Keri Elbhbah, Jyoti Sinha, The University of Manchester, Manchester, United Kingdom

Five Pad Tilting Pad Bearing Design and Lateral Vibration Characteristics of Small Gas Turbine Supported by it and Roller Bearing
Technical Publication. DETC2011-47269
Jin Woong Ha, Ji Ho Myung, Jhin Ik Suk, Doosan Heavy Industries & Construction, Daejeon, Korea (Republic)

Multiphysics Modeling of a Tilting Pad Thrust Bearing: Comparison Between White Metal and Polymeric Layered Pads
Technical Publication. DETC2011-48171
Roberto Ricci, Steven Chatterton, Andrea Vania, Politecnico di Milano - Dept. Mechanical Engineering, Milan, MI, Italy, Paolo Pennacchi, Politecnico di Milano, Milan, MI, Italy

Characterization of Five-pad Tilting-pad Journal Bearings using an original test rig
Technical Publication. DETC2011-48166
Steven Chatterton, Andrea Vania, Ezio Tanzi, Roberto Ricci, Politecnico di Milano - Dept. Mechanical Engineering, Milan, MI, Italy, Paolo Pennacchi, Politecnico di Milano, Milan, MI, Italy

VIB-10 NONLINEAR DYNAMICS OF CONTINUOUS SYSTEMS

VIB-10-3 Nonlinear Dynamics of Continuous Systems III

Columbia B 1:40pm–3:20pm

Session Chair: Jean-Luc Dion, Supmeca, Saint Ouen, France
Session Co-ChairS: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States, Matthew Brake, Sandia National Laboratories, Albuquerque, NM, United States

Optimization of the Spectral Kurtosis for Harmonic Component Detection
Technical Publication. DETC2011-47534
Jean-Luc Dion, Gaël Chevallier, Franck Renaud, Hugo Festjens, Supmeca, Saint Ouen, France, Nicolas Peyret, Université Paris Est, UMR Navier, Ecole des Ponts ParisTech, Marne la Vallée, France

A New Approach to Modeling Discrete Nonlinear Constraints in Continuous Systems: The Method of Discontinuous Basis Functions
Technical Publication. DETC2011-47181
Matthew Brake, Daniel Segalman, Sandia National Laboratories, Albuquerque, NM, United States

Modeling of Plasticity in Spectral Methods for Fatigue Damage Estimation of Narrowband Random Vibrations
Technical Publication. DETC2011-48342
Hervé Rognon, Imad Tawfiq, Tony Dasilva, Supmeca, Saint Ouen, France, André Galtier, Mohamed Bennebach, CETIM, Senlis Cedex, France

Limit Cycle Analysis of Planar Rotor/Autobalancer System Supported on Hydrodynamic Journal Bearing
Technical Publication. DETC2011-48723
Dae-yi Jung, Hans DeSmit, University of Tennessee at Knoxville, Knoxville, TN, United States

Multi-Degree-of-Freedom Modeling of Mechanical Snubbing Systems
Technical Publication. DETC2011-47144
Sudhir Kaul, University of Pretoria, Pretoria, South Africa

VIB-12 VIBRATION AND CONTROL OF SMART STRUCTURES

VIB-12-2 Vibration and Control of Smart Structures II

Grand Teton 1:40pm–3:20pm

Session Chair: Nima Mahmoodi, The University of Alabama, Tuscaloosa, AL, United States
Session Co-Chair: Jiong Tang, University of Connecticut, Storrs, CT, United States

Free Vibration Analysis of FGM Beams with Different Boundary Conditions using RKPM Meshless Method
Student Competition Paper. DETC2011-47640
Reza Saljooghi, Mohammad Ahmadian, Sharif university of Technology, Tehran, Iran

Vibration Suppression Device having Variable Inertia Mass by MR-Fluid
Technical Publication. DETC2011-47020
Taichi Matsuoka, Meiji University, Kawasaki, Kanagawa, Japan
System Identification of Smart Structures using ANFIS
\textbf{Technical Publication.} DETC2011-47340
Ryan Mitchell, Yeosock Kim, Tahar El-Korchi, Worcester Polytechnic Institute (WPI), Worcester, MA, United States

Suppression of Machine Tool Chatter using Nonlinear Energy Sink
\textbf{Technical Publication.} DETC2011-48502
Amir Nankali, Surampalli Harshaeta, Young S. Lee, New Mexico State University, Las Cruces, NM, United States, Tamás Kalmár-Nagy, Texas A&M University, College Station, TX, United States

Research on Complementary Connected Control Method of Two-axes for a Combination of Base-isolated and Conventional Structures
\textbf{Technical Publication.} DETC2011-48110
Syunsuke Fukuchi, Toru Watanabe, Nihon University, Tokyo, Japan, Kazuto Seto, Seto Vibration Control Laboratory, Kanagawa, Japan

\textbf{CIE-12 AMS: ADVANCED MODELING AND SIMULATION, GENERAL}

\textbf{CIE-12-3 AMS Session 3 Meshless Methods}

Regency B 1:40pm–3:20pm
Session Chair: Alex Fedoseyev, CFD Research Corporation, Huntsville, AL, United States
Session Co-Chair: Ashok Kumar, University of Florida, Gainesville, FL, United States

A Meshfree B-Spline Finite Element Formulation for Unilateral Contact Problems
\textbf{Technical Publication.} DETC2011-47776
Alex Grishin, PADT, Temp, AZ, United States, Jami J. Shah, Arizona State University, Tempe, AZ, United States

Application of Meshless Integral Method in Soil Mechanics
\textbf{Technical Publication.} DETC2011-47046
J. Ma, Saint Louis University, Saint Louis, MO, United States, Joshua Summers, Paul F. Joseph, Clemson University, Clemson University, SC, United States

Exponentially Convergent Simulations of 3D Electrostatic Potential Problems
\textbf{Technical Publication.} DETC2011-49010
Alex Fedoseyev, CFD Research Corporation, Huntsville, AL, United States

Adaptive Moving Least-Squares Surfaces for Multiple Point Clouds Registration
\textbf{Technical Publication.} DETC2011-47792
Yunbao Huang, Linchi Zhang, Zhihui Tan, Qifu Wang, Liping Chen, Huazhong University of Science and Technology, Wuhan, Hubei, China

Design of Compliant Structural Mechanisms using B-spline Elements
\textbf{Technical Publication.} DETC2011-48615
Ashok Kumar, Anand Parthasarathy, University of Florida, Gainesville, FL, United States

\textbf{CIE-17 CAPPD: MODELING TOOLS AND METRICS FOR SUSTAINABLE MANUFACTURING}

\textbf{CIE-17-2 CAPPD MTMSM Session 2}

Yosemite 1:40pm–3:20pm
Session Chair: Kevin Lyons, NIST, Gaithersburg, MD, United States
Session Co-Chair: Mahesh Mani, National Institute of Standards and Technology, Gaithersburg, MD, United States

Development of Sustainable Indicators for Processes and Products
\textbf{Technical Publication.} DETC2011-48273
Han Bao, Sundeer Bodapati, Old Dominion University, Norfolk, VA, United States

Integration of Life Cycle Inventories Incorporating Manufacturing Unit Processes
\textbf{Technical Publication.} DETC2011-48500
Mark B. Campanelli, Sudarsan Rachuri, National Institute of Standards and Technology, Gaithersburg, MD, United States, Jonatan K. Berglund, Chalmers University of Technology, Gothenburg, Sweden

Lca Study and Comparison of Two Multispeed Blenders
\textbf{Technical Publication.} DETC2011-48612
Bryant Hawthorne, Gaurav Ameta, Washington State University, Pullman, WA, United States

An Information Modeling Methodology for Standards
\textbf{Technical Publication.} DETC2011-48632
Anantha Narayanan, Jae Hyun Lee, Paul Witherell, Sudarsan Rachuri, National Institute of Standards and Technology, Gaithersburg, MD, United States, Prabir Sarkar, IIT Ropar, India, Rupnagar, Punjab, India

\textbf{CIE-21 SEIKM: SYSTEMS ENGINEERING, INFORMATION AND KNOWLEDGE MANAGEMENT, GENERAL}

\textbf{CIE-21-1 SEIKM Knowledge and Information in the Engineering Enterprise}

Regency D 1:40pm–3:20pm
Session Chair: Gregory Mocko, Clemson University, Clemson, SC, United States
Session Co-Chair: Matt Bohm, University of Louisville, Louisville, KY, United States

A New Approach to Trust and Reputation Based Rights Management in Product Development Collaboration
\textbf{Technical Publication.} DETC2011-47825
Diana Völz, Anselm L. Schüle, Technische Universität Darmstadt, Darmstadt, Hesse, Germany

Business Objects for Industrial Data Standards
\textbf{Technical Publication.} DETC2011-47965
Keith A. Hunten, Lockheed Martin Aeronautics, Fort Worth, TX, United States, Allison Barnard Peene, National Institute of Standards and Technology, Gaithersburg, MD, United States
Detecting Risk of Intellectual Property (IP) Leakage due to Re-design in Collaborative Product Development Environments

**Technical Publication.** DETC2011-48278
Xinlin Cao, Yong Zeng, Concordia University, Montreal, QC, Canada

A Knowledge Discovery in Databases (KDD) Approach for Extracting Causes of Iterations in Engineering Change Orders

**Technical Publication.** DETC2011-48335
Fatos Elezi, Armin Sharafi, Alexander Mirson, Helmut Krclmar, Udo Lindemann, Technical University in Munich, Garching, Germany, Germany, Petra Wolf, Technische Universität München, Garching, Germany

Tuple-Based Morphisms for E-Procurement Solutions

**Technical Publication.** DETC2011-48997
Miguel Beca, João Sarraipa, Carlos Agostinho, Ricardo Goncalves, UNINOVA, Caparica, Portugal

CIE-22 AMS: ADVANCES IN UNDERSTANDING AND MODELING OF CORROSION

CIE-22-1 Advances in Understanding and Modeling of Corrosion

Capital A 1:40pm–3:20pm
Session Chair: Virginia DeGiorgi, Naval Research Laboratory, Washington, DC, United States
Session Co-Chair: Stephanie Wimmer, Naval Research Laboratory, Washington, DC, United States

Modelling of Impressed Current Cathodic Protection Anode Arrangements for Storage Tank Bottoms

**Technical Publication.** DETC2011-47192
Robert Adey, BEASY, Billerica, MA, United States, John Baynham, BEASY, Southampton, Hampshire, United Kingdom, Cristina Peratta, C M BEASY Ltd, Southampton, United Kingdom

Initial Modeling of Material Phase Driven Localized Corrosion

**Technical Publication.** DETC2011-47215
Stephanie Wimmer, Virginia DeGiorgi, Naval Research Laboratory, Washington, DC, United States

A Review of Microstructural Effects on Pitting Corrosion in Stainless Steels

**Technical Publication.** DETC2011-47571
Siddiq M. Qidwai, SAIC, Washington, DC, United States, Virginia G. DeGiorgi, Alan C. Leung, US Naval Research Laboratory, Washington, DC, United States

Evaluation of Designs of Shipboard Cathodic Protection Systems using Boundary Element Modelling Technique

**Technical Publication.** DETC2011-48739
Yueping Wang, Defence R&D Canada - Atlantic, Halifax, NS, Canada

Review of Sensitivity Studies for Cathodic Protection Systems

**Technical Publication.** DETC2011-48937
Virginia DeGiorgi, Naval Research Laboratory, Washington, DC, United States, Stephanie Wimmer, Naval Research Laboratory, Washington, DC, United States

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-9 Numerical Methods of Fractional Calculus

Everglades 1:40pm–3:20pm
Session Chair: Fawang Liu, Queensland University of Technology, Brisbane, Qld., Australia
Session Co-Chair: HongGuang Sun, Hohai University, Nanjing, China

Analytical and Numerical Solutions of the Space and Time Fractional Bloch-Torrey Equation

**Student Competition Paper.** DETC2011-47613
Qiang Yu, Fawang Liu, Ian Turner, Queensland University of Technology, Brisbane, Queensland, Australia, Kevin Burrage, COMLAB and OCISB, Oxford, Oxford, United Kingdom

Stability and Convergence of Implicit Numerical Methods for a Class of Fractional Advection-Dispersion Models

**Technical Publication.** DETC2011-47071
Fawang Liu, Queensland University of Technology, Brisbane, Qld., Australia, Pinghui Zhuang, Xiamen University, Xiamen, Fujian, China, Kevin Burrage, COMLAB and OCISB, Oxford, Oxford, United Kingdom

Discrete Fractional Calculus: Non-equidistant Grids and Variable Step Length

**Technical Publication.** DETC2011-47623
Igor Podlubny, Tomas Skovranek, Ivo Petras, Technical University of Kosice, Kosice, Slovakia, Viktor Vrbickij, Odessa National University, Odessa, Ukraine, YangQuan Chen, Utah State University, Logan, UT, United States, Blas Vinagre, University of Extremadura, Badajoz, Spain

About the F_N Approximation to Fractional Neutron Transport Equation in Slab Geometry

**Technical Publication.** DETC2011-47731
Dumitru Baleanu, Cankaya University, Ankara, Turkey, Abdelouahab Kadem, University of Setif, Setif, Algeria

A Novel Finite Element Method for a Class of Time-fractional Diffusion Equations

**Student Competition Paper.** DETC2011-48079
HongGuang Sun, Wen Chen, Hohai University, Nanjing, China, K.Y. Sze, The University of Hong Kong, Hong Kong, China
MESA-12 THE FOURTH SYMPOSIUM ON ROBOTICS & MOBILE MACHINES (RMM’11)

MESA-12-2 Robotics & Mobile Machines II

Columbia C 1:40pm–3:20pm

Session Chair: Jian Dai, King’s College London, University of London, London, United Kingdom

Self-Repairing Process in Self-Reconfigurable Robots Based on Geometrical Characteristics
Technical Publication. DETC2011-47198
Yanqiong Fei, Xin Zhang, Shanghai Jiaotong University, Shanghai, China

Visual PID Control of a Redundant Planar Parallel Robot
Technical Publication. DETC2011-47201
Miguel A. Trujano, Rubén A. Garrido, Alberto Soria, CINVESTAV-IPN, Mexico City, Mexico

Slam using 3d Reconstruction Via a Visual Rgb & Rgb-D Sensory Input
Technical Publication. DETC2011-47735
Evangelos Georgiou, Helge Würdemann, Jian Dai, King’s College London, University of London, London, United Kingdom, Lei Cui, Carnegie Mellon University, Pittsburgh, PA, United States

An Online Genetic Algorithm for Automated Disassembly Sequence Generation
Student Competition Paper. DETC2011-48635
Ahmed ElSayed, Elif Kongar, Tarek Sobh, University of Bridgeport, Bridgeport, CT, United States, Surendra Gupta, Northeastern University, Boston, MA, United States

Distributed Collision-Avoiding Deployment Control of Multiple Nonholonomic Mobile Robots
Technical Publication. DETC2011-47991
Xionghui Lu, Yu Zhou, Xu Zhong, State University of New York at Stony Brook, Stony Brook, NY, United States

MESA-13 THE FIFTH SYMPOSIUM ON SENSORS AND ACTUATORS (SA’11)

MESA-13-1 Sensors and Actuators I

Congressional B 1:40pm–3:20pm

Session Chair: Jachoon Koo, Sungkyunkwan University, School of Mechanical Engineering, Suwon, Korea (Republic)

An In-pipe leak Detection Sensor: Sensing Capabilities and Evaluation
Technical Publication. DETC2011-48411
Dimitris Chatzigeorgiou, Kamal Youcef-Toumi, Massachusetts Institute of Technology, Cambridge, MA, United States, Atia Khalifa, Rached Ben-Mansour, King Fahd University of Petroleum & Minerals, Dharan, Saudi Arabia

MESA-13-2 Sensors and Actuators II

Congressional C 3:20pm–5:00pm

Session Chair: Jian Dai, King’s College London, University of London, London, United Kingdom

A Flexible Tactile Capacitive Sensor for Slip Detection
Technical Publication. DETC2011-48893
Jinah Chung, Jachoon Koo, Sungkyunkwan University, School of Mechanical Engineering, Suwon, Korea (Republic), B.C. Kim, H.R. Choi, H.P. Moon, School of Mechanical Engineering, Sungkyunkwan University, Suwon-si, Gyeonggi-do, Korea (Republic), Y.K. Lee, School of Chemical Engineering, Sungkyunkwan University, Suwon, Korea (Republic), J.D. Nam, School of Polymer Science and Engineering, Sungkyunkwan University, Suwon-si, Gyeonggi-do, Korea (Republic)

Mechanical Sensing for Reformer Internal Diameter Data Capturing
Technical Publication. DETC2011-48970
Liqiong Tang, Morio Fukuoka, Massey University, Palmerston North, New Zealand, Peter Tait, Methanex Corporate, New Plymouth, New Zealand

Microcontroller-based Reformer Tube Internal Diameter Data Acquisition
Technical Publication. DETC2011-48976
Liqiong Tang, Morio Fukuoka, Massey University, Palmerston North, New Zealand, Peter Tait, Methanex Corporate, New Plymouth, New Zealand

Sensor Agent Cloud: A Cloud-Based Autonomic System for Physical Sensor Nodes Management
Technical Publication. DETC2011-48732
Yu-Cheng Chou, Chung Yuan Christian University, Zhongli, Taiwan

MSNDC-12 EMERGING FRONTIERS

MSNDC-12-2 Stability, Dynamics, and Control

Regency C 1:40pm–3:20pm

Session Chair: Giuseppe Rega, La Sapienza, Rome, Italy
Session Co-Chair: Friedrich Pfeiffer, Technical University Munich, D-85748 Garching, Bavaria, Germany

Terramechanics Modeling of Mars Surface Exploration Rovers for Simulation and Parameter Estimation
Technical Publication. DETC2011-48770
Karl Iagnemma, Carmine SENatore, Massachusetts Institute of Technology, Cambridge, MA, United States, Brian P. Trease, NASA Jet Propulsion Laboratory, Pasadena, CA, United States, Raymond E. Arvidson, Keith Bennett, Amy Shaw, Lauren Van Dyke, Washington University, St. Louis, MO, United States, Feng Zhou, Washington University, Earth and Planetary Science Department, Saint Louis, MO, United States, Randel Lindemann, California Institute of Technology, Instrument Mechanical Engineering Section, Pasadena, CA, United States

Practical Stability of Systems in a Dynamical Integrity Perspective
Technical Publication. DETC2011-47887
Stefano Lenci, Polytechnic University of Marche, Ancona, Ancona, Italy, Giuseppe Rega, La Sapienza, Rome, Italy
Fall on Backpack: Damage Minimizing Humanoid Fall on Targeted Body Segment using Momentum Control

**Technical Publication.** DETC2011-47153

Sung-Hee Lee, Gwangju Institute of Science and Technology, Gwangju, Korea (Republic), Ambarish Goswami, Honda Research Institute, Mountain View, CA, United States

Initial Implementation of the Mobility Mechanics Modeling Tool Kit (M3Tk-Lite)

**Technical Publication.** DETC2011-48664

Rudranarayan Mukherjee, Marc Pomerantz, NASA Jet Propulsion Laboratory, Pasadena, CA, United States

Model Transitions and Optimization Problem in Multi-flexible-body Modeling of Biopolymers

**Technical Publication.** DETC2011-48386

Mohammad Poursina, Imad Khan, Kurt Anderson, Rensselaer Polytechnic Institute, Troy, NY, United States

MSNDC-13 EDUCATION AND INDUSTRIAL TOOLS

MSNDC-13-1 Education and Industrial Tools

Glacier 1:40pm–3:20pm

Session Chair: Javier García de Jalón, Universidad Politécnica de Madrid, Madrid, Spain
Session Co-Chair: James Critchley, BAE Systems, Troy, MI, United States

Interpretations of the Principles of Mechanics

**Technical Publication.** DETC2011-47147

James Critchley, BAE Systems, Troy, MI, United States

Herbie: Demonstration of Gyroscopic Effects by Means of a RC Vehicle

**Technical Publication.** DETC2011-47183

Robert Huber, Heinz Ulbrich, TU München, Garching, Germany, Jan Clauberg, Institute of Applied Mechanics, Technische Universität München, Garching, Germany

Teaching undergraduate Numerical Methods through a practical Multibody Dynamics project

**Technical Publication.** DETC2011-48351

Alfonso Callejo, INSIA-UPM, Madrid, Madrid, Spain, Javier García de Jalón, Technical University of Madrid, Madrid, Madrid, Spain

A Framework for Modeling and Simulation of Tracked Vehicles of High Mobility

**Technical Publication.** DETC2011-48355

Song Peilin, Peter Melick, James Horchner, AMSAA, US Army, Aberdeen Proving Ground, MD, United States

Real-time Explicit Flexible Multibody Dynamics Solver with Application to Virtual-Reality based E-learning

**Technical Publication.** DETC2011-48743

Tamer Wasfy, Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States, Hatem M Wasfy, Jeanne M Peters, Advanced Science and Automation Corp., Hampton, VA, United States

Stabilization of Aeroelastic Instabilities of Panels using Bifurcation Control with Piezoelectric Actuation

**Technical Publication.** DETC2011-47982

Oluseyi Onawola, Subhash Sinha, Auburn University, Auburn, AL, United States

The Neimark-Sacker Bifurcation of Simply Laminated Piezoelectric Rectangular Beam with One-To-Nine Internal Resonance

**Technical Publication.** DETC2011-48103

H.Q. Zhou, Wei Zhang, Beijing University of Technology, Beijing, China, S.M. Chen, Zhejiang Normal University, Jinhua, Zhejiang, China

DAC-12 DESIGN AND OPTIMIZATION OF SUSTAINABLE ENERGY SYSTEMS

DAC-12-2 Design and Optimization of Sustainable Energy Systems

Congressional D 1:40pm–3:20pm

Session Chair: Karim Hamza, University of Michigan, Ann Arbor, MI, United States
Session Co-Chair: Wang Gary, Simon Fraser University, Surrey, BC, Canada

Optimal Hybridization of Battery, Engine and Motor for PHEV20

**Technical Publication.** DETC2011-47960

Shashi Shahi, Wang Gary, Simon Fraser University, Surrey, BC, Canada, Liqiang An, North China Electric Power University, Baoding, Hebei, China, Eric Bibeau, University of Manitoba, Winnipeg, MB, Canada


**Technical Publication.** DETC2011-48513

Whitefoot John, Abigail R. Mechtenberg, Diane L. Peters, Panos Y. Papalambros, University of Michigan, Ann Arbor, MI, United States
Optimal Scheduling of Parabolic Heliostats Aim Targets in a Mini-Tower Solar Concentrator System

Technical Publication. DETC2011-48582
Karim Hamza, Kazuhiro Saitou, University of Michigan, Ann Arbor, MI, United States, Umesh Gandhi, Toyota Research Institute-North America, Ann Arbor, MI, United States

Optimization of Parabolic Heliostat Focal Lengths in a Mini-Tower Solar Concentrator System

Technical Publication. DETC2011-48591
Karim Hamza, Kazuhiro Saitou, University of Michigan, Ann Arbor, MI, United States, Umesh Gandhi, Toyota Research Institute-North America, Ann Arbor, MI, United States

DAC-16 SIMULATION-BASED DESIGN UNDER UNCERTAINTY

DAC-16-3 Simulation-based Design Under Uncertainty

Bryce 1:40pm–3:20pm
Session Chair: Xiaoping Du, Missouri University of Science and Technology, Rolla, MO, United States
Session Co-Chair: Wei Chen, Northwestern University, Evanston, IL, United States

Robustness of Residual Stresses in Brake Discs by Metamodelling

Technical Publication. DETC2011-47437
Magnus Hofwing, University of Jönköping, Jönköping, Sweden

Robustness Metrics for Time-Dependent Quality Characteristics

Technical Publication. DETC2011-47855
Xiaoping Du, Missouri University of Science and Technology, Rolla, MO, United States

Resilience-Driven System Design of Complex Engineered Systems

Technical Publication. DETC2011-48314
Byeng D. Youn, Seoul National University, Seoul, Korea (Republic), Chao Hu, University of Maryland, College Park, MD, United States, Pingfeng Wang, Wichita State University, Wichita, KS, United States

Improving Identifiability in Model Calibration using Multiple Responses

Technical Publication. DETC2011-48623
Paul Arendt, Daniel Apley, Wei Chen, Northwestern University, Evanston, IL, United States

PTG-4 GEAR SYSTEM DYNAMICS AND NOISE

PTG-4-3 Gear System Dynamics and Noise III

Congressional A 1:40pm–3:20pm
Session Chair: Jacob Lin, John Deere, Waterloo, IA, United States

Multibody Dynamics Model for Predicting the Vibration Response and Transient Tooth Loads for Planetary Gear Systems

Technical Publication. DETC2011-48814
Tamer Wasy, Michael Lee Stark, Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States

A Research for the Planetary Gear Noise Development in FF 6th Speed Automatic Transmission

Technical Publication. DETC2011-47129
Hyun-Ku Lee, Koo-Tae Kang, Moo-Suk Kim, Jin-Wook Hur, Hyundai Motor Company, Gyeonggi-Do, Korea (Republic)

Planetary Gear Modal Properties and Dynamic Response: Experiments and Analytical Simulation

Technical Publication. DETC2011-47136
Kuo Jao Huang, Shou Ren Zhang, Chung Hua University, Hsin Chu, Taiwan

A study on Planetary Gear Dynamics with Tooth Profile Modification

Technical Publication. DETC2011-47346
Cheon-Jae Bahk, Robert Parker, Ohio State University, Columbus, OH, United States

PTG-11 GEAR MANUFACTURING

PTG-11-1 Gear Manufacturing

Congressional C 1:40pm–3:20pm
Session Chair: Richard Dippery, Kettering University, Flint, MI, United States

Development of Cutting Force Measurement System Used in Gear Hobbing

Technical Publication. DETC2011-48121
Abebayehu Seifu Alazar, Mathias Werner, Cornel Mihai Nicholescu, Royal Institute of Technology (KTH), Stockholm, Sweden

On the Identification of Machine Settings for Gear Surface Topography Corrections

Technical Publication. DETC2011-47727
Marco Gabiccini, Alessio Artoni, Massimo Guiggiani, University of Pisa, Pisa, Italy
DETC2011-49760
Kazumasa Kawasaki, Niigata University, Niigata, Japan, Isamu Tsuji, Iwasa Tech Co., Ltd., Tokyo, Koutou-ku, Japan, Hiroshi Gunbara, Matsue National College of Technology, Matsue, Japan

Machining and Running Test of High-Performance Face Gear Set
Technical Publication. DETC2011-48824
Isamu Tsuji, Iwasa Tech Co., Ltd., Tokyo, Japan, Hiroshi Gunbara, Akiyasu Takami, Matsue National College of Technology, Matsue, Japan, Kazumasa Kawasaki, Niigata University, Niigata, Japan

Generating of Worm Gears of an Arbitrary Profile
Technical Publication. DETC2011-48297
Tadeusz Nieszporek, Politechnika Cz?stochowska, Cz?stochowa, Poland

MECH-8 COMPLIANT MECHANISMS

MECH-8-6 Analysis Tools for Special Purpose Applications
Yellowstone 1:40pm–3:20pm
Session Chair: Hai-Jun Su, University of Maryland Baltimore County, Baltimore, MD, United States
Session Co-Chair: Shorya Awtar, University of Michigan, Ann Arbor, MI, United States

Modeling and Parameter Study of Bistable Spherical Compliant Mechanisms
Technical Publication. DETC2011-47397
Chester Smith, Craig Lusk, The University of South Florida, Tampa, FL, United States

Collinear-Type Statically Balanced Compliant Micro Mechanism (SB-CMM): Experimental Comparison Between Pre-Curved and Straight Beams
Technical Publication. DETC2011-47678
Nima Tolou, Just Herder, Pablo Estevez, Delft University of Technology, Delft, Netherlands

Modeling and Control of a Compliantly Engineered Anthropomimetic Robot in Contact Tasks
Technical Publication. DETC2011-47256
Veljko Potkonjak, Kosta Jovanovic, Dusan Mikicic, Faculty of Electrical Engineering, University of Belgrade, Belgrade, Serbia, Bratislav Svetozarevic, Automatic Control Laboratory, Swiss Federal Institute of Technology-ETH, Zurich, Switzerland, Owen Holland, School of Informatics, University of Sussex, Brighton, United Kingdom

A Family of Butterfly Flexural Joints: Q-LITF Pivots
Technical Publication. DETC2011-48394
Xu Pei, Jingjun Yu, Shusheng Bi, Guanghua Zong, Beihang University, Beijing, China

Accuracy Evaluation of PRBM for Predicting Kinetostatic Behavior of Flexible Segments in Compliant Mechanisms
Technical Publication. DETC2011-47117
Guimin Chen, Xidian University, Xi’an, China, Aimei Zhang, Xidian University, Xi’an 710071, Shaanxi, China

MECH-9 MECHANISM ANALYSIS AND SYNTHESES

MECH-9-6 Planar Analysis
Lexington 1:40pm–3:20pm
Session Chair: Kazem Kazerounian, University of Connecticut, Storrs, CT, United States
Session Co-Chair: Chintien Huang, National Cheng Kung University, Tainan, Taiwan

On the Minimum Harmonic Trajectory Pattern for Point-To-Point Motion
Technical Publication. DETC2011-47724
Jahangir Rastegar, Dake Feng, Stony Brook University, Stony Brook, NY, United States

Free-Form Conjugation Theory
Technical Publication. DETC2011-48337
Bowen Yu, Kwun-Lon Ting, Tennessee Tech University, Cookeville, TN, United States

The Grublers Correction for Calculating the Correct Degrees of Freedom of Mechanisms
Technical Publication. DETC2011-48146
Offer Shai, Tel-Aviv university, Tel Aviv, Israel

Checking Mobility and Decomposition of Linkages via Pebble Game Algorithm
Technical Publication. DETC2011-48340
Adnan Sljoka, Walter Whiteley, York University, Department of Mathematics and Statistics, Toronto, ON, Canada, Offer Shai, School of Mechanical Engineering, Faculty of Engineering, Tel-Aviv University, Tel-Aviv, Israel

MECH-10 PARALLEL MANIPULATORS

MECH-10-4 Control and Applications
Columbia Foyer 1:40pm–3:20pm
Session Chair: Pierre Larochelle, Florida Tech, Melbourne, FL, United States
Session Co-Chair: Damien Chablat, CNRS - IRCCyN, Nantes, France

Adaptive and Singularity-Free Inverse Dynamics Models for Control of Parallel Manipulators with Actuation Redundancy
Technical Publication. DETC2011-47943
Andreas Müller, University Duisburg-Essen, Duisburg, Germany, Timo Hufnagel, Heilbronn University, Heilbronn, Germany

Optimal Trajectory Tracking Control with a 5R Parallel Robot
Technical Publication. DETC2011-47752
Gianmarc Coppola, Dan Zhang, University of Ontario Institute of Technology, Oshawa, ON, Canada

Mobility Analysis and Inverse Kinematics of a Novel 2R1T Parallel Manipulator
Technical Publication. DETC2011-48476
Enrique Cuan, Instituto Tecnológico y de Estudio Superiores de Monterrey, Monterrey, Mexico, Ernesto Rodriguez Leal, Tecnológico de Monterrey, Monterrey, NL, Mexico, Jian Dai, King’s College London, University of London, London, United Kingdom
More Flexibility and Versatility in Automated Handling Processes with an Alterable Parallel Manipulator

Technical Publication. DETC2011-47929
Martin Riedel, IGM, RWTH Aachen University, Aachen, Germany, Tom Mannheim, Burkhard Corves, IGM, RWTH Aachen Technical University, Aachen, Germany

Machining with Redundant Kinematics

Technical Publication. DETC2011-47440
Steffen Ihlenfeldt, Welf Drossel, Reimund Neugebauer, Fraunhofer IWU, Chemnitz, Saxony, Germany, Hendrik Rentzsch, Chemnitz University of Technology, Chemnitz, Germany

MNS-6 SYMPOSIUM ON DYNAMICS OF MEMS AND NEMS

MNS-6-4 Dynamics of MEMS and NEMS II: Multi-Modal Systems and the Effects of Damping

Capital B 1:40pm–3:20pm
Session Chair: John A. Judge, The Catholic University of America, Washington, DC, United States

Inverse Eigenmode Method for Identifying and Locating Added Mass in Mechanically Diverse Coupled Microresonator Arrays

Technical Publication. DETC2011-48552
Aldo A. Glean, John A. Judge, Joseph F. Vignola, The Catholic University of America, Washington, DC, United States

Identification of Mass Distribution of Nominally Identical Microresonator Arrays in the Presence of Measurement Noise

Technical Publication. DETC2011-48562
Teresa J. Ryan, John A. Judge, Joseph F. Vignola, The Catholic University of America, Washington, DC, United States

The Effects of Geometric Asymmetry on the Dynamic Response of Silicon Nanowires

Student Competition Paper. DETC2011-47978
Molly Nelis, Saeed Mohammad, Jeffrey F. Rhoads, Purdue University, West Lafayette, IN, United States

Analytical Modeling of Squeeze Film Damping in Micromirrors

Technical Publication. DETC2011-47125
Hamid Moeneendar, Mohammad Taghi Ahmadian, Sharif University of Technology, Tehran, Iran, Anoushiravan Farshidianfar, Ferdowsi University of Mashhad, Mashhad, Iran

Deformation, Stress and Natural Frequency Analysis of the Fullerene By Finite Super Element Method

Technical Publication. DETC2011-47791
Masoud Nasiri Sarvi, Mohammad Ahmadian, Sharif University of Technology, Tehran, Iran

DEC-7 INNOVATION AND ENTREPRENEURSHIP IN DESIGN

DEC-7-1 Innovation and Entrepreneurship in Design

Thornton B 1:40pm–3:20pm
Session Chair: Chris Williams, Virginia Tech, Blacksburg, VA, United States
Session Co-Chair: Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States

Nurturing Creativity and Design Teaching: Are we doing all we can?

Technical Publication. DETC2011-47837
Gül E. Okudan Kremer, Hyun Ro, Alexander Yin, Pennsylvania State University, University Park, PA, United States, Ann F. McKenna, Arizona State University, Mesa, AZ, United States, Carolyn Plumb, Montana State University, Bozeman, MT, United States

Interactive Scenario Based Teaching of Metal Casting Process

Technical Publication. DETC2011-48265
Zahed Siddique, Mrinal Saha, Bipul Barua, Shaiful M. Arif, University of Oklahoma, Norman, OK, United States, Firas Akasheh, Tuskegee University, Tuskegee, OK, United States

Guidelines for Engineering Design Creativity: Design of Experiments

Technical Publication. DETC2011-48402
Salvador M. Rodriguez, Rafael Gonzalez Macias, Miguel Mendoza, Noe Vargas Hernandez, University of Texas - El Paso, El Paso, TX, United States, Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States, Linda Schmidt, University of Maryland- College Park, College Park, MD, United States

Design for Patentability (DFP)

Technical Publication. DETC2011-48609
Prakash CRJ Naidu, TechnoDevelop Corp. (Canada) and Yantric Inc. (USA), West Newton, MA, United States, Kshirsagar CJ Naidu, TechnoDevelop Corporation, Ottawa, ON, Canada
DTM-11 CHALLENGES IN COMPLEX/SUSTAINABLE SYSTEM DESIGN

DTM-11-1 Challenges in Complex/Sustainable System Design

Concord 1:40pm–3:20pm
Session Chair: Joshua Summers, Clemson University, Clemson, SC, United States
Session Co-Chair: Rahul Rai, Cal State Fresno, Fresno, CA, United States

A Hierarchical Bayesian Method for Market Positioning in Environmentally Conscious Design
Technical Publication. DETC2011-47898
Yuan Zhao, Jianfeng Xu, Deborah Thurston, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Grammatical and Semantic Disambiguation of Requirements at Elicitation and Representation Stages
Technical Publication. DETC2011-48139
François Christophe, Eric Coatanea, Aalto University School of Engineering, Espoo, Finland, Min Wang, Yong Zeng, Concordia University, Montreal, QC, Canada, Alain Bernard, CENESI, Universite Cote d’Azur, Nice, France

Mechatronic Design- Still a Considerable Challenge
Technical Publication. DETC2011-48306
Jonas Morkeberg Torry-Smith, Sofiane Achiche, Technical University of Denmark, Kgs. Lyngby, Copenhagen, Denmark, Ahsan Qamar, Jan Wikander, Carl During, KTH Royal Institute of Technology, Stockholm, Sweden, Niels Henrik Mortensen, Department of Management Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark

Encouraging Environmentally Conscious Behavior through Product Design: The Principle of Discretization
Technical Publication. DETC2011-48618
Jayesh Srivastava, Li Shu, University of Toronto, Toronto, ON, Canada

DFMLC-11 INTEGRATED ASSEMBLY DESIGN AND PLANNING

DFMLC-11-1 Integrated Assembly Design and Planning

Bunker Hill 1:40pm–3:20pm
Session Chair: Iraj Mantegh, National Research Council Canada, Montreal, QC, Canada

Optimization of Fixture and Joint Positions in Sheet Metal Assembly: The Effect of Fixture Numbers and Constraints
Technical Publication. DETC2011-47958
Kambiz Haji Hajikolaei, Wang Gary, Simon Fraser University, Surrey, BC, Canada

Thermal Modeling for Control of Friction Stir Welding Process in Automated Manufacturing
Technical Publication. DETC2011-48774
Iraj Mantegh, National Research Council Canada, Montreal, QC, Canada

AVTT-6 ADVANCES IN DYNAMICS AND CONTROL OF VEHICLE SYSTEMS AND SUBSYSTEMS

AVTT-6-1 Advances in Dynamics and Control of Vehicle Systems and Subsystems I

Thornton C 1:40pm–3:20pm
Session Chair: Beshah Ayalew, Clemson University, Greenville, SC, United States
Session Co-Chair: Constantin Ciocanel, Northern Arizona University, Flagstaff, AZ, United States

Traction Control using an Anthropomimetic Approach
Student Competition Paper. DETC2011-47279
William Kirchner, Steve Southward, Virginia Polytechnic & State University, Danville, VA, United States

Model Predictive Control of Gear Shift Process in Amt Trucks
Technical Publication. DETC2011-47369
Bingzhao Gao, Xiaohui Lu, Hong Chen, Jilin University, Changchun, China, Jun Li, FAW Group Corporation, Changchun, China

Property Analysis of an Electro-Mechanical Regenerative Damper Concept
Technical Publication. DETC2011-47386
Changmiao Yu, Weihua Wang, Qingnian Wang, Jilin University, Changchun City, Jilin Province, China, Subhash Rakheja, Concordia University, Montreal, QC, Canada

Smooth Shutdown Control Strategy of Hybrid Engines for Commercial Vehicle Hotel Mode
Technical Publication. DETC2011-47548
Xubin Song, Eaton Corp, Southfield, MI, United States

Profile Optimization of Table Top Speed Hump for Speed Control
Technical Publication. DETC2011-48062
Theunis Botha, Pieter Schalk Els, Rudolf R. Bester, University of Pretoria, Pretoria, Gauteng, South Africa, Petronella/P.E. Uys, Klydon, Pretoria, Gauteng, South Africa
VIB-9 Rotor Dynamics and Control VI - Analysis
Thornton A 3:40pm–5:20pm

Analysis of a Flexibly Mounted Shaft Incorporating a Non-Constant Velocity Coupling with Dynamic Misalignment
Technical Publication. DETC2011-48421
David Johnson, Kon-Well Wang, University of Michigan, Ann Arbor, MI, United States

Modally-Tuned Influence Coefficients for Low-Speed Balancing of Flexible Rotors
Technical Publication. DETC2011-47150
Y.A. Khulief, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia, M.A. Mohiuddin, Schlumberger, Dhahran, Saudi Arabia

Analysis, Design, and Testing of a Control System for an Air Turbine Rotor Drive
Technical Publication. DETC2011-47182
Robert Jantz, George Flowers, Auburn University, Auburn, AL, United States

FEM Modeling of a Rotor System with the Open Crack and Vibration Diagnosis (Case of the Anisotropic Support Stiffness)
Technical Publication. DETC2011-47821
Nobuhiro Nagata, Tsuyoshi Inoue, Yukio Ishida, Nagoya University, Nagoya, Japan

Some Remarks on the Dynamic Behaviour of Integrally Shrouded Blade Rows
Technical Publication. DETC2011-48320
Nicolò Bachschmid, Politecnico di Milano, Milan, Italy, Simone Bistolfi, Michele Ferrante, Franco Tosi Meccanica, Legnano, Italy, Steven Chatterton, Politecnico di Milano - Dept. Mechanical Engineering, Milan, Italy, Emanuel Pesatori, Franco Tosi Meccanica S.p.A., Legnano, MI, Italy

VIB-10 Nonlinear Dynamics of Continuous Systems
Columbia B 3:40pm–5:20pm

In-Plane Nonlinear Dynamic Analysis of Wind Turbine Blades
Technical Publication. DETC2011-48219
Venkatanarayanan Ramakrishnan, Brian Feeny, Michigan State University, East Lansing, MI, United States

Viscoelasticity Measurement and Identification of Viscoelastic Parametric Models
Technical Publication. DETC2011-47545
Franck Renaud, Gaël Chevallier, Jean-Luc Dion, Supmeca, Saint Ouen, France, Remi Lemaire, Bosch CBI/ETF4, Drancy, France (Metro)

Design of Circularly Towed Cable-Body Systems
Technical Publication. DETC2011-47465
Siva Sankara Varma Gottimukkala, Christopher D. Rahn, Pennsylvania State University, University Park, PA, United States

Output Only Modal Analysis of a Non-Uniform Beam Experiment by using Decomposition Methods
Technical Publication. DETC2011-47344
Rickey Caldwell Jr, Brian Feeny, Michigan State University, East Lansing, MI, United States

Response of a Beam on Nonlinear Viscoelastic Unilateral Foundation and Numerical Challenges
Technical Publication. DETC2011-48776
Udbhau Bhattiprolu, Patricia Davies, Anil K. Bajaj, Purdue University, West Lafayette, IN, United States

VIB-14 Vibrations and Controls of Manufacturing Systems
Regency D 3:40pm–5:20pm

Complex Motions in Horizontal Impact Pairs with Periodic Excitation
Student Competition Paper. DETC2011-47385
Yu Guo, Albert Luo, Southern Illinois University Edwardsville, Edwardsville, IL, United States

Analytical Model, Multibody Simulation and Validation Tests for Dynamical Instability Reduction of a Grinding Machine with Dampers
Technical Publication. DETC2011-47712
Luca Landi, Filippo Cianetti, Claudio Braccesi, University of Perugia, Perugia, Italy
Analytical Solution of the Drive Vibration with Time Varying Parameters
Technical Publication. DETC2011-47830
Jan Dupal, Martin Zajicek, University of West Bohemia in Plzen, Plzen, Czech Republic

Impact of Coupled Whirling and Tool Geometry on Machining Dynamics
Technical Publication. DETC2011-47885
Steve Suh, Texas A&M University, College Station, TX, United States, Achala V. Dassanayake, Schlumberger Reservoir Completions Technology Center, Rosharon, TX, United States

Surface Vibration of a multilayered elastic medium due to harmonic concentrated force
Technical Publication. DETC2011-48764
Hamid R. Hamidzadeh, Tennessee State University, Nashville, TN, United States, Akindeji Ojetola, Tennessee State University, Department of Mechanical and Manufacturing Engineering, Nashville, TN, United States

VIB-15 VIBRATION AND MECHANICS OF JOINTED STRUCTURES
Congressional D 3:40pm–5:20pm
Session Chair: Michael Starr, Sandia National Laboratories, Albuquerque, NM, United States

Modal Analysis of Jointed Structures
Technical Publication. DETC2011-47705
Dane Quinn, The University of Akron, Akron, OH, United States

Simulation of Nonlinear Systems Having Series and Parallel Friction Elements
Technical Publication. DETC2011-48508
Emad Shahid, Al Ferri, Georgia Tech, Atlanta, GA, United States

A Physics-based Fretting Model with Friction and Integration to a Simple Dynamical System
Technical Publication. DETC2011-48660
Melih Eriten, Andreas A. Polycarpou, Lawrence Bergman, University of Illinois at Urbana-Champaign, Urbana, IL, United States

A Multiscale Approach to Modeling Energy Dissipation in Lap Joints: Comparison of Two Models
Technical Publication. DETC2011-48900
Kambiz Farhang, SIUC, Carbondale, IL, United States, Daniel Segalman, Michael Starr, Sandia National Laboratories, Albuquerque, NM, United States

The Influence of Initial Residual Stress State on the Steady State Behaviour of Cyclically Loaded Coupled
Technical Publication. DETC2011-49017
Robert Flicek, David A. Hills, University of Oxford, Oxford, United Kingdom, Daniele Dini, Imperial College London, London, United Kingdom
CIE-17 CAPPD: MODELING TOOLS AND METRICS FOR SUSTAINABLE MANUFACTURING

CIE-17-3 CAPPD MTMSM  Session 3
Yosemite 3:40pm–5:20pm

Session Chair: Derek Yip-Hoi, Western Washington University, Bellingham, WA, United States
Session Co-Chair: Gaurav Ameta, Washington State University, Pullman, WA, United States

Comparison of Life-Cycle Assessment of Two Toasters
Technical Publication. DETC2011-48772
Raghunathan Srinivasan, Gaurav Ameta, Washington State University, Pullman, WA, United States

Sustainable Manufacturing Analysis using Activity Based Costing in SysML
Technical Publication. DETC2011-48867
Yuri Romaniw, Bert Bras, Tina Guldborg, Georgia Institute of Technology, Atlanta, GA, United States

Environmental Load Evaluation for Machining Process of Small Parts Focusing on Producer Goods
Technical Presentation Only. DETC2011-48896
Sachiko Ogawa, Toshiaki Higaki, Eichi Aoyama, Doshisha University, Kyotanabe-shi, Kyoto, Japan, Shinpei Okumura, Doshisha University, Kyotanabe, Japan

Product Reusability Assessment Based on Function Degradation Analysis
Technical Publication. DETC2011-48907
Shuye Pan, Utpal Roy, Syracuse University, Syracuse, NY, United States

CIE-23 SEIKM: PROGNOSTICS AND HEALTH MANAGEMENT

CIE-23-1 Prognostics and Health Management
Yellowstone 3:40pm–5:20pm

Session Chair: Tolga Kurtoglu, Palo Alto Research Center, Palo Alto, CA, United States
Session Co-Chair: Chris Hoyle, Oregon State University, Corvallis, OR, United States

Electromechanical Actuator Testbed Coupler Design to Reduce Prognostic Model Uncertainty
Technical Publication. DETC2011-47869
Michael Koopmans, Irem Tumer, Oregon State University, Corvallis, OR, United States

Semi-Supervised Learning with Co-Training for Data-Driven Prognostics
Technical Publication. DETC2011-48302
Chao Hu, University of Maryland, College Park, MD, United States, Byeng D. Youn, Tae Jin Kim, Seoul National University, Seoul, Korea (Republic)

Improved MCMC Method for Parameter Estimation based on Marginal Probability Density Function
Technical Publication. DETC2011-48784
Dawn An, Joo-Ho Choi, Korea Aerospace University, Goyang-City, Korea (Republic)

Equivalent Damage Growth Parameters using a Simplified Model
Technical Publication. DETC2011-48801
Alexandra Coppe, University of Maryland, College Park, MD, United States, Matthew J. Pais, Raphael T. Haftka, Nam Kim, University of Florida, Gainesville, FL, United States

MESA-1 THE FIFTH SYMPOSIUM ON FRACTIONAL DERIVATIVES AND THEIR APPLICATIONS (FDTA11)

MESA-1-10 Fractional Order Signal and System Modeling
Everglades 3:40pm–5:20pm

Session Chair: Yan Li, Shandong University, Jinan, China
Session Co-Chair: Ivo Petras, Technical University of Kosice, Kosice, Slovakia

Explicit Fractional Model Order Estimation using Unscented and Ensemble Kalman Filters
Technical Publication. DETC2011-47835
Michailas Romanovas, Lasse Klingbeil, Martin Traechtler, HSG-IMIT - Institut Fur Mikro- und Informationstechnologie der Hahn-Schickard-Gesellschafa e.V., Villingen-Schwenningen, Germany, Yiannos Manoli, Department of Microsystems Engineering (IMTEK), University of Freiburg, Freiburg, Germany

Theory and Implementation of Distributed-Order Element Networks
Technical Publication. DETC2011-48063
Yan Li, Shandong University, Jinan, China, YangQuan Chen, Utah State University, Logan, UT, United States

Modeling Heat Transfer in Heterogeneous Media using Fractional Calculus
Technical Publication. DETC2011-47374
Dominik Sierociuk, Andrzej Dzieliinski, Grzegorz Sarwas, Warsaw University of Technology, Warsaw, Mazowieckie, Poland, Ivo Petras, Igor Podlubny, Tomas Skovranek, Technical University of Kosice, Kosice, Slovakia

Mellin Convolution for Signal Filtering and Its Application to the Gaussianization of Levy Noise
Technical Publication. DETC2011-47392
Gianni Pagnini, CRS4, Italy, Pula (CA), Italy, YangQuan Chen, Utah State University, Logan, UT, United States
MESA-12 THE FOURTH SYMPOSIUM ON ROBOTICS & MOBILE MACHINES (RMM’11)

MESA-12-3 Robotics & Mobile Machines III
Columbia C 3:40pm–5:20pm
Session Chair: Jawad Masood, University of Genova, Genova, Genova, Italy

A Plug and Play Middleware for Sensory Modules, Actuation Platforms and Task Descriptions in Robotic Manipulation Platforms
Technical Publication. DETC2011-47185
Ayssam Elkady, Jovin Joy, Tarek Sobh, University of Bridgeport, Bridgeport, CT, United States

A Rolling Parallelogram Driven by a Crank-Rocker Mechanism
Technical Publication. DETC2011-47711
Changhuan Liu, Yan-an Yao, Beijing Jiaotong University, Beijing, China

Command Strategies for Tele-Operation of Mobile-Manipulator Systems via a Haptic Input Device
Technical Publication. DETC2011-47747
Michael Wrock, Scott Nokleby, University of Ontario Institute of Technology, oshawa, ON, Canada

The Robotic Swarm Concept in Fixtures for Transport Industry
Technical Publication. DETC2011-47816
Rezia Molfino, Matteo Zoppi, University of Genoa, Genoa, Genoa, Italy

MESA-13 THE FIFTH SYMPOSIUM ON SENSORS AND ACTUATORS (SA’11)

MESA-13-2 Sensors and Actuators II
Congressional B 3:40pm–5:20pm
Session Chair: Peter Roessler, University of Applied Sciences Technikum Wien, Wien, Austria

A MATLAB-based Application Development using a 3D PMD Camera for a Mobile Robot
Technical Publication. DETC2011-47873
Mohammad Chami, University of Applied Sciences Ravensburg-Weingarten, Weingarten, Baden Württemberg, Germany, Holger Voos, University of Luxembourg, Luxembourg, Luxembourg, Luxembourg

Identification of Constitutive Parameters for Piezo Stack Actuators Based on Online Capacitance Measurements
Technical Publication. DETC2011-48085
Mohammad Islam, Rudolf Seethaler, UBC, Kelowna, BC, Canada

FR4 Electromagnetic Scanner Based Fourier Transform Spectrometer
Technical Publication. DETC2011-48161
Utku Baran, Kivanc Hedili, Selim Olcer, Hakan Urey, Koç University, Istanbul, Turkey

Design and Simulation of a Compact Electromagnetic Actuator for the Synchronized Segmentally Interchanging Pulley Transmission System (SSIPTS)
Technical Publication. DETC2011-48305
Baoping Wen, Vahid Mashatan, Jean W. Zu, University of Toronto, Toronto, ON, Canada

Design of an Electromagnetic Actuator Suitable for Production by Rapid Prototyping
Technical Publication. DETC2011-48602
Matthew Moses, Gregory S. Chirikjian, Johns Hopkins University, Baltimore, MD, United States

MSNDC-12 EMERGING FRONTIERS

MSNDC-12-3 Biomolecular and Granular Systems
Regency C 3:40pm–5:20pm
Session Chair: Rudranarayan Mukherjee, NASA Jet Propulsion Laboratory, Pasadena, CA, United States
Session Co-Chair: Todd Lillian, Texas Tech University, Lubbock, TX, United States

Efficient Energy Transfer and Redirection in Weakly Interacting Granular Lens
Technical Publication. DETC2011-47083
Yuli Starosvetsky, Md Arif Hasan, Alexander vakakis, University of Illinois at Urbana Champaign, Urbana, IL, United States

Resonance and Anti-Resonance phenomenon in Granular Dimer Chains with no Pre-Compression
Student Competition Paper. DETC2011-47084
Jayaprakash K R, Yuli Starosvetsky, Alexander vakakis, University of Illinois at Urbana Champaign, Urbana, IL, United States

Molecular Replacement for Multi-Domain Structures using Packing Models
Student Competition Paper. DETC2011-48583
Yan Yan, Gregory S Chirikjian, Johns Hopkins University, Baltimore, MD, United States

A Model for Highly Strained DNA in a Cavity
Student Competition Paper. DETC2011-48711
Andrew Hirsh, Noel C. Perkins, University of Michigan, Ann Arbor, MI, United States, Todd Lillian, Texas Tech University, Lubbock, TX, United States

An elastic rod representation for the Lacl-DNA loop complex
Technical Publication. DETC2011-47407
Todd Lillian, Texas Tech University, Lubbock, TX, United States
MSNDC-14 STRUCTURAL DYNAMICS

MSNDC-14-2 Applications

Columbia A 3:40pm–5:20pm

Session Chair: Brian Mann, Duke University, Durham, NC, United States
Session Co-Chair: Michael Leamy, Georgia Institute of Technology, Atlanta, GA, United States

Aeroelastic Limit Cycles as a Small Scale Energy Source
Student Competition Paper. DETC2011-47002
Jared Dunnmon, Samuel C. Stanton, Brian Mann, Earl Dowell, Duke University, Durham, NC, United States

Reduced Order Modeling of a Bladed Rotor with Geometric Mistuning via Estimated Deviations in Mass and Stiffness Matrices
Technical Publication. DETC2011-47495
Yasharth Bhartiya, Alok Sinha, Pennsylvania State University, University Park, PA, United States

Vibration Structure of Gyroscopic Planetary Gears
Technical Publication. DETC2011-48506
Christopher G. Cooley, Robert Parker, Ohio State University, Columbus, OH, United States

Nonlinear Vibration of Gear Pairs with Tooth Surface Modifications at Primary Resonance using a Perturbation Method
Technical Publication. DETC2011-48689
Tugan Eritenel, Robert Parker, Ohio State University, Columbus, OH, United States

High-Fidelity Modeling of Flexible Timing Belts using an Explicit Finite Element Code
Technical Publication. DETC2011-48846
Tamer Wasfy, Indiana University - Purdue University Indianapolis, Indianapolis, IN, United States

MSNDC-15 EXPERIMENTAL DYNAMICS, UNCERTAINTY, AND VALIDATION

MSNDC-15-1 Experimental Dynamics, Uncertainty, and Validation

Concord 3:40pm–5:20pm

Session Chair: Horst Ecker, Vienna University of Technology, Vienna, Austria
Session Co-Chair: Hiroshi Yabuno, Keio University, Yokohama, Japan

On the Identification of Chaos from Frequency Content
Technical Publication. DETC2011-47473
Richard Wiebe, Lawrence Virgin, Duke University, Durham, NC, United States

Stick-Slip and Whirl Motions of Drill Strings: Numerical and Experimental Studies
Technical Publication. DETC2011-47949
Nicholas Vlajic, Chien-Min Liao, Bala Balachandran, University of Maryland, College Park, MD, United States, Hamad Karki, The Petroleum Institute, Abu Dhabi, United Arab Emirates

Damped Transition of a Strongly Nonlinear System of Coupled Oscillators into a State of Continuous Resonance Scattering
Technical Publication. DETC2011-47950
David Andersen, Xingyuan Wang, Yuli Starosvetsky, Mercedes Mane, Sean Hubbard, Kevin Remick, Alexander Yakaikis, Lawrence Bergman, University of Illinois at Urbana-Champaign, Urbana, United States

Effects of a Concentrated Mass on Chaotic Vibrations of a Clamped Circular Plate with Initial Deformation
Technical Publication. DETC2011-48271
Kenji Okada, Kenichi Nagai, Shinichi Maruyama, Takao Yamaguchi, Gunma University, Kiryu, Gunma, Japan

Bifurcations of a High-Frequency Horizontally excited double pendulum
Technical Publication. DETC2011-48815
Hiroshi Yabuno, Kazuya Endo, Keio University, Yokohama, Japan

DAC-14 MULTIDISCIPLINARY DESIGN OPTIMIZATION (MDO)

DAC-14-2 Multidisciplinary Design Optimization (MDO)

Bryce 3:40pm–5:20pm

Session Chair: James Allison, MathWorks, Inc., Natick, MA, United States
Session Co-Chair: Carolyn Seepersad, The University of Texas at Austin, Austin, TX, United States

Multidisciplinary Design Optimization of Modular Industrial Robots
Technical Publication. DETC2011-48196
Mehdi Tarkian, Johan Persson, Johan Ölvander, Linköping University, Linköping, Sweden, Xiaolong Feng, ABB Corporate Research, Västerås, Sweden

Sequential Sampling with Kernel-Based Bayesian Network Classifiers for Set-Based Design
Technical Publication. DETC2011-48318
David Shahan, Carolyn Seepersad, The University of Texas at Austin, Austin, TX, United States

Co-Design of an Active Suspension using Simultaneous Dynamic Optimization
Technical Publication. DETC2011-48521
James Allison, Zhi Han, MathWorks, Inc., Natick, MA, United States

Bounded Target Cascading in Hierarchical Design Optimization
Technical Publication. DETC2011-48614
Xiaoling Zhang, School of Mechatronics Engineering, University of Electronic Science and Technology of China, Chengdu, Sichuan, China, Po Ting Lin, Mechanical and Aerospace Engineering at Rutgers, The State University of New Jersey, Piscataway, NJ, United States, Hae Chang Gea, Rutgers University, Piscataway, NJ, United States, Hong-Zhong Huang, University of Electronic Science and Technology of China, Chengdu, Sichuan, China
Multidisciplinary Design Optimization for Complex Engineered Systems Design: State of the Research and State of the Practice
Report from an NSF Workshop

Technical Publication. DETC2011-47237
Tim Simpson, Pennsylvania State University, University Park, PA, United States, Joaquim Martins, University of Michigan, Ann Arbor, MI, United States

DAC-17 GEOMETRIC MODELING AND ALGORITHMS FOR DESIGN AND MANUFACTURING

DAC-17-2 Geometric Modeling and Algorithms for Design and Manufacturing

Capital A 3:40pm–5:20pm
Session Chair: Levent Burak Kara, Carnegie Mellon University, Pittsburgh, PA, United States
Session Co-Chair: Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

Structural Topology Optimization for Forced Vibration Problem using Level Set Method
Technical Publication. DETC2011-47037
Lei Shu, Zongde Fang, Northwestern Polytechnical University, Xi’an, China, Michael Yu Wang, The Chinese University of Hong Kong, Hong Kong, China, Zheng-Dong Ma, University of Michigan - Ann Arbor, Ann Arbor, MI, United States

Generic Visual Simulation of Manufacturing Equipment
Technical Publication. DETC2011-47908
Sweta Dhaveji Chakravadhanula, Jianzhong Ruan, Todd E. Sparks, Frank Liou, Missouri University of Science & Technology, Rolla, MO, United States

Approximate Surfacing of Curve Clouds for Conceptual Shape Creation and Evaluation
Technical Publication. DETC2011-48414
Erhan Arisoy, Gunay Orbay, Levent Burak Kara, Carnegie Mellon University, Pittsburgh, PA, United States

APIX: Analysis from Pixellated Inputs in Early Design using a Pen-Based Interface
Technical Publication. DETC2011-48680
Sundar Murugappan, fnu Vinayak, Karthik Ramani, Purdue University, West Lafayette, IN, United States, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

PTG-12 BEARINGS

PTG-12-1 Bearings
Congressional A 3:40pm–5:20pm
Session Chair: David Lewicki, NASA Glenn Research Center, Cleveland, OH, United States

Integrated Numerical Model for Thermohydrodynamic Analysis of Bump-Type Foil Bearings
Technical Publication. DETC2011-47626
Kai Feng, Haruo Houjoh, Tokyo Institute of Technology, Yokohama, Japan, Shigehiko Kaneko, University of Tokyo, Tokyo, Japan

Application of Spectral Kurtosis to Acoustic Emission Signatures from Bearings
Technical Publication. DETC2011-48963
David Mba, A Addali, Cranfield University, Cranfield, United Kingdom, Babak Eftekharnejad, Romax Technology Limited, Nottingham, United Kingdom

Effect of Preloads on Vibration Transmission through Double Row Angular Contact Ball Bearings
Technical Publication. DETC2011-47759
Aydin Gunduz, Jason Dreyer, Rajendra Singh, The Ohio State University, Columbus, OH, United States

On Calculation Methods and Results for Straight Cylindrical Roller Bearing Deflection, Stiffness, and Stress
Technical Publication. DETC2011-47930
Timothy Krantz, NASA, Cleveland, OH, United States

MECH-9 MECHANISM ANALYSIS AND SYNTHESIS

MECH-9-7 Planar and Spatial Synthesis
Lexington 3:40pm–5:20pm
Session Chair: Kwun-Lon Ting, Tennessee Tech University, Cookeville, TN, United States
Session Co-Chair: Michael Stanisic, University of Notre Dame, Notre Dame, IN, United States

Reconstruction Synthesis of the Lost Subsystem for the Planetary Motions of Antikythera Mechanism
Technical Publication. DETC2011-47773
Hong S. Yan, Jian L. Lin, National Cheng Kung University, Tainan, Taiwan

Creation Design of Novel 2-DOF Rode Tractors Based on the Atlas Database of Kinematic Chains
Technical Publication. DETC2011-47264
Huafeng Ding, Yanshan University, Qinhuangdao, China, Andrés Kecskeméthy, University of Duisburg-Essen, Duisburg, Germany, Zhen Huang, Yanshan University, Robotics Research Center, Qinhuangdao City, Hebei Province, China
Number Enumeration of Planar Pin-joined Driving Mechanisms

Technical Publication. DETC2011-47056
Peter Mitrouchev, Joseph Fourier University, Grenoble Cedex 1, France, Frédéric Maffray, Slim Amri, Abdelghafour Nafissi, G-SCOP Laboratory, Grenoble Cedex 1, France, Marc Dahan, LMARC - FEMTO-ST Institute, Besançon, France

Optimal Synthesis of the Slider-crank Mechanism for Path Generation Based on the Generalized Kinematic Mapping of Constrained Plane Motions

Technical Publication. DETC2011-48145
Genliang Chen, Hao Wang, Yong Zhao, Shanghai Jiao Tong University, Shanghai, Shanghai, China

A Novel Numerical Method to Solve the Inverse Kinematics of 3R Manipulators

Technical Publication. DETC2011-48436
E.A. Gonzalez-Barbosa, M.A. Gonzalez-Palacios, L.A. Aguilera-Cortes, C.A. Bernal-Martinez, Dicis/Universidad De Guanajuato, Salamanca, Guanajuato, Mexico

MECH-10 PARALLEL MANIPULATORS

MECH-10-5 Analysis and Design

Columbia Foyer 3:40pm–5:20pm
Session Chair: Jim Schmiedeler, University of Notre Dame, Notre Dame, IN, United States
Session Co-Chair: Ou Ma, New Mexico State University, Las Cruces, NM, United States

Prototype Design of a 6-DOF Compliant Parallel Micro-manipulator

Technical Publication. DETC2011-47695
Yi Yue, Feng Gao, Hao Ge, Shanghai Jiaotong University, Shanghai, China

Identifiable Parameter Analysis for the Calibration of a Hybrid Robot

Technical Publication. DETC2011-47573
Yongbo Wang, Huapeng Wu, Heikki Handroos, Lappeenranta University of Technology, Lappeenranta, Finland

A Unified Method for Computing Position and Orientation Workspaces of General Stewart Platforms

Technical Publication. DETC2011-47836
Oriol Bohigas, Lluís Ros, Montserrat Manubens, Institut de Robòtica i Informàtica Industrial, CSIC-UPC, Barcelona, Barcelona, Spain

MNS-6 SYMPOSIUM ON DYNAMICS OF MEMS AND NEMS

MNS-6-5 Dynamics of MEMS and NEMS III: Switches and Related Problems

Capital B 3:40pm–5:20pm
Session Chair: Slava Krylov, Tel Aviv University, Tel Aviv, Middle_East, Israel

Two-directional Switching of Bistable Curved Micro Beams By Fringing Electrostatic Fields

Technical Publication. DETC2011-48544
Slava Krylov, Stella Lulinsky, Tel Aviv University, Tel Aviv, Middle_East, Israel, Bojan R. Ilic, School of Engineering and Applied Physics and Cornell Nanoscale Facility, Cornell University, Ithaca, NY, United States

Comprehensive Reduced-order Models of Electrostatically Actuated Curved MEMS Switches and their Dynamics including Impact and Bounce

Technical Publication. DETC2011-48008
Michael Snow, Anil K. Bajaj, Purdue University, West Lafayette, IN, United States

Uncertainty Quantification of Pull-in Phenomenon in Capacitive RF-MEMS

Technical Publication. DETC2011-47260
Sanjay Mathur, Lin Sun, Shankhadeep Das, Dimitrios Peroulis, Andrew Kovacs, Juan Zeng, Jayathi Murthy, Purdue University, West Lafayette, IN, United States

Modal Characterization of MEMS Switches via Output only and Input/output identification Methods

Technical Publication. DETC2011-48888
Joel M Book, Samuel Asokanthan, The University of Western Ontario, London, ON, Canada

Simulation of Actuation in Micro-Thermal Switches

Technical Publication. DETC2011-47116
Elham Maghsoudi, Michael J. Martin, Louisiana State University, Baton Rouge, LA, United States

Prototype Design of a 6-DOF Compliant Parallel Micro-manipulator

Technical Publication. DETC2011-47695
Yi Yue, Feng Gao, Hao Ge, Shanghai Jiaotong University, Shanghai, China

Identifiable Parameter Analysis for the Calibration of a Hybrid Robot

Technical Publication. DETC2011-47573
Yongbo Wang, Huapeng Wu, Heikki Handroos, Lappeenranta University of Technology, Lappeenranta, Finland

A Unified Method for Computing Position and Orientation Workspaces of General Stewart Platforms

Technical Publication. DETC2011-47836
Oriol Bohigas, Lluís Ros, Montserrat Manubens, Institut de Robòtica i Informàtica Industrial, CSIC-UPC, Barcelona, Barcelona, Spain
MNS-7 SYMPOSIUM ON MEASUREMENT AND CONTROL IN MICRO- AND NANO-SYSTEMS

MNS-7-2 Measurement and Control in Micro- and Nano-Systems II

Glacier 3:40pm–5:20pm

Session Chair: Daniel Cole, University of Pittsburgh, Pittsburgh, PA, United States
Session Co-Chair: Jason Gorman, National Institute of Standards and Technology, Gaithersburg, MD, United States

Effective Mixing in a Microfluidic Channel using a Hybrid Actuation Method
Technical Publication. DETC2011-47956
Sarah Du, Souran Manoochehri, Stevens Institute of Technology, Hoboken, NJ, United States

Solving for Quantum Controls
Technical Publication. DETC2011-48029
Katherine Kime, Dept. of Mathematics and Statistics, Kearney, NE, United States

On Nonlinear Control of Optical Traps using Pulling Trajectory Tracking for Single-molecule Experiments
Technical Publication. DETC2011-48467
Daniel Cole, University of Pittsburgh, Pittsburgh, PA, United States

Exogenous Force Estimation using Disturbance Modelling for Optical Trap Experiments
Student Competition Paper. DETC2011-48472
Jason G. Pickel, Daniel Cole, University of Pittsburgh, Pittsburgh, PA, United States

DEC-8 OPPORTUNITIES AND BARRIERS TO BRINGING CHANGE IN ENGINEERING EDUCATION

DEC-8-1 Opportunities and Barriers to Bringing Change in Engineering Education
Thornton B 3:40pm–5:20pm

Session Chair: Michael Keefe
Session Co-Chair: Maya Chase, Bucknell University, Lewisburg, PA, United States

Analyzing the Meritocratic Periphery: Understanding the Value of Applicable Skills
Technical Publication. DETC2011-47693
Anders Berglund, Royal Institute of Technology, Stockholm, Sweden, Atanu Nath, University of Surrey, Guildford, United Kingdom

Physical Interpretations of Mathematical Expressions, as a Potent Tool of Engineering
Technical Publication. DETC2011-48378
Shmariahu Yedidiah, Centrifugal Pumps Consultant, West Orange, NJ, United States

Developing Engineering Interest in Early Elementary Education Using a Children’s Book on Mechanical Dissection
Technical Publication. DETC2011-48446
Maya Chase, Kevin McCallen, Jackie Martin, Charles Kim, Bucknell University, Lewisburg, PA, United States

Enhancing Experiential Learning in Collaborative-Competitive Student Design Teams
Technical Publication. DETC2011-48648
Zahed Siddique, Keith Hurdelbrink, Bobby Doyle, David Collins, Nic N. Evans, Paul A. Hatch, James W. Kucinskas, Zachary Moorhead-Rosenberg, Thomas Ingram, University of Oklahoma, Norman, OK, United States

DFMLC-6 INTEGRATED PRODUCT AND PROCESS DEVELOPMENT PROCESSES

DFMLC-6-3 Integrated Product Design and Process Development Processes III

Congressional C 3:40pm–5:20pm

Session Chair: Qing Wang, Durham University, Durham, United Kingdom

Definition and Evaluation of Modular Product Structures in the Context of Design for Assembly
Technical Publication. DETC2011-48343
Niklas Halfmann, Steffen Elstner, Dieter Krause, Hamburg University of Technology, Hamburg, Germany

A Review of Design for X Methods for Medical Devices: The Introduction of a Design for FDA Approach
Technical Publication. DETC2011-48348
Lourdes Medina, Gül E. Okudan Kremer, Pennsylvania State University, University Park, PA, United States, Richard A. Wysk, NC State, Raleigh, NC, United States

A New Approach for Explicit Construction of Moldability Based Feasibility Boundary for Polymer Heat Exchangers
Technical Publication. DETC2011-48505
Timothy Hall, Madan Dabbeeru, Satyandra Gupta, University of Maryland, College Park, MD, United States

An Integrated Approach to Design of Enhanced Polymer Heat Exchangers
Technical Publication. DETC2011-48531
Juan Cevallos, Avram Bar-Cohen, Satyandra Gupta, University of Maryland, College Park, MD, United States
DFMLC-7 LIFE CYCLE DECISION MAKING

DFMLC-7-2 Life Cycle Decision Making II

Bunker Hill 3:40pm–5:20pm

Session Chair: Fu Zhao, Purdue University, West Lafayette, IN, United States
Session Co-Chair: Karl R. Haapala, Oregon State University, Corvallis, OR, United States

Modeling Constraints in Design Refresh Planning
Technical Publication. DETC2011-47644
Raymond Nelson III, Peter Sandborn, University of Maryland, College Park, College Park, MD, United States, Janis Terpenny, Liyu Zheng, Virginia Polytechnic Institute & State University, Blacksburg, VA, United States

End of Life Decision Making for Used Products with Uncertain Quantity of Return
Technical Publication. DETC2011-48277
Sara Behdad, Aida Sefic Williams, Deborah Thurston, University of Illinois at Urbana-Champaign, Urbana, IL, United States

Evaluating Eco-Design in a Developing Country from Viewpoint of Manufacturing Companies
Technical Publication. DETC2011-48523
Gülsen Akman, Hamit Piskin, Kocaeli University, Kocaeli, Turkey, Gül Kremer, Pennsylvania State University, University Park, PA, United States

Case Study of Chinese Smes Oriented Environmental Impact Assessment on Refrigerator Production
Technical Publication. DETC2011-48920
Suiran Yu, Shanghai Jiaotong University, Shanghai, China, Jing Tao, School of Mechanical and Power Engineering, Shanghai Jiao Tong University, Shanghai, China, Qingyan Yang, Shanghai, Jianpu Zhang, School of Mechanical and Power Engineering, Shanghai Jiao Tong University, Shanghai, China, Fengfu Yin, Haier Group, Qingdao, China

Sustainable Manufacturing System Focusing on the Natural Growth of Bamboo: Life Cycle Assessment of Binder-free Composites Made from Bamboo Fibers Extracted with a Machining Center
Technical Publication. DETC2011-47300
Keiji Ogawa, The University of Shiga Prefecture, Hikone-shi, Shiga, Japan, Toshiki Higaki, Eiichi Aoyama, Yota Takagi, Sachiko Ogawa, Doshisha University, Kyotanabe-shi, Kyoto, Japan

AVTT-6 ADVANCES IN DYNAMICS AND CONTROL OF VEHICLE SYSTEMS AND SUBSYSTEMS

AVTT-6-2 Advances in Dynamics and Control of Vehicle Systems and Subsystems II

Thornton C 3:40pm–5:20pm

Session Chair: Constantin Ciocanel, Northern Arizona University, Flagstaff, AZ, United States
Session Co-Chair: Beshah Ayalew, Clemson University, Greenville, SC, United States

Refined Design of a Measuring Wheel
Technical Publication. DETC2011-47893
Massimiliano Gobbi, Giorgio Previati, Giampiero Mastinu, Politecnico di Milano, Milan, Italy

Comparison of Numerical Methods for Determining Torsion Stiffness of Automotive Chassis
Technical Publication. DETC2011-48026
Steven Tebby, Ebrahim Esmailzadeh, Ahmad Barari, University of Ontario Institute of Technology, Oshawa, ON, Canada

Down Force Control of the Low Velocity Racing Car using Active Aerodynamic Inverse Wings
Technical Publication. DETC2011-48308
Ahmad Barari, Fereydoon Diba, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

Identification of the Optimal Trajectory for a race driver
Technical Publication. DETC2011-48987
Francesco Braghin, Stefano Melzi, Edoardo Sabbioni, Nicola Poerio, Politecnico di Milano, Milan, Italy

Optimal Choice of Intra Platoon Spacing Based on Mu-jump Maneuvers
Technical Publication. DETC2011-48988
Francesco Braghin, Marco Sbrosi, Andrea Zuin, Gabriele Politi, Luca Bassi, Politecnico di Milano, Milan, Italy
AVTT-2 Advances in Multibody Systems Modeling and Validation for Vehicle Dynamics Applications
Symposium Organizer: Corina Sandu, Virginia Polytechnic Institute and State University
Symposium Co-Organizer: Xiaobo Yang, Oshkosh Corporation
Symposium Co-Organizer: Nilabh Srivastava, University of North Carolina - Charlotte

AVTT-3 Advances in Methods for Vehicle Systems Design and Tire Modeling
Symposium Organizer: Moustafa El-Gindy, University of Ontario Institute of Technology
Symposium Co-Organizer: Massimiliano Gobbi, Politecnico di Milano

AVTT-5 Advances in Alternative Propulsion Systems and Non-conventional, Energy Efficient Vehicles
Symposium Organizer: Ming Cao
Symposium Co-Organizer: Joel Anstrom, Larson Institute Penn State
Symposium Co-Organizer: Hong Yang, General Motors

AVTT-6 Advances in Dynamics and Control of Vehicle Systems and Subsystems
Symposium Organizer: Xubin Song, Eaton Corp
Symposium Co-Organizer: Constantin Ciocanel, Northern Arizona University
Symposium Co-Organizer: Beshah Ayalew, Clemson University

CIE-1 AMS: Material Characterization Methods and Applications
Symposium Organizer: Tomonari Furukawa, Virginia Tech
Symposium Co-Organizer: John Hermanson, Forest Products Laboratory
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin
Symposium Co-Organizer: John G. Michopoulos, Naval Research Laboratory
Symposium Co-Organizer: Yoshitaka Wada, Tokyo University of Science, Suwa

Symposium Organizer: Derek Yip-Hoi, Western Washington University
Symposium Co-Organizer: Charlie C.L. Wang, The Chinese University of Hong Kong
Symposium Co-Organizer: Jitesh Panchal, Washington State University
Symposium Co-Organizer: Cameron Turner, Colorado School of Mines

CIE-3 SEIKM: Design Informatics: Advances of Intelligent Information Processing and Knowledge Management in Engineering Design
Symposium Organizer: Ying Liu, NUS
Symposium Co-Organizer: Chris McMahon
Review Co-Coordinator: Karthik Ramani, Purdue University
Symposium Co-Organizer: Dirk Schaefer, Georgia Institute of Technology
Review Co-Coordinator: Paul Witherell, National Institute of Standards and Technology
Review Co-Coordinator: Richard Malak, Texas A&M University

CIE-4 VES: Virtual Environments and Systems, General
Review Coordinator: Abhishek Seth, Caterpillar Inc.
Symposium Co-Organizer: Sven Kretz, University of Paderborn/Heinz Nixdorf Institute
Symposium Co-Organizer: Hai-Jun Su, University of Maryland Baltimore County

CIE-5 AMS: GPU-based High Performance Computing
Symposium Organizer: Sara McMains
Symposium Co-Organizer: Dan Negru, University of Wisconsin-Madison
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin
Symposium Co-Organizer: Roshan M.D’Souza, University of Wisconsin, Milwaukee

CIE-6 AMS: Modeling and Simulation in Biomechanics
Symposium Organizer: Heidi-Lynn Ploeg, University of Wisconsin - Madison
Symposium Co-Organizer: Jill Schmidt, University of Wisconsin-Milwaukee
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin

CIE-7 AMS: Inverse Problems in Science and Engineering
Symposium Organizer: Brian H. Dennis, The University of Texas at Arlington
Symposium Co-Organizer: George Dulikravich, Florida International University
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin
Symposium Co-Organizer: John G. Michopoulos, Naval Research Laboratory
Review Co-Coordinator: Rajeev Kumar, University of Arizona Tucson

CIE-8 SEIKM: Advances in the Engineering of Complex and Large-Scale Systems
Symposium Organizer: Richard Malak, Texas A&M University
Symposium Co-Organizer: Paul Witherell, National Institute of Standards and Technology
Review Co-Coordinator: Ying Liu, NUS
Review Co-Coordinator: Gregory Mocko, Clemson University

CIE-9 CAPPD: Emotional Engineering
Symposium Organizer: Shuichi Fukuda, Stanford University
Symposium Co-Organizer: Derek Yip-Hoi, Western Washington University
Symposium Co-Organizer: Hideki Aoyama, Keio University
Symposium Co-Organizer: Monica Bordegoni, Politecnico di Milano
Symposium Co-Organizer: Shana Smith, National Taiwan University
Symposium Co-Organizer: Yong Zeng, Concordia University
Symposium Co-Organizer: Tamotsu Murakami
Symposium Co-Organizer: Hideyoshi Yanagisawa, University of Tokyo

CIE-10 SEIKM: Systems Engineering
Symposium Organizer: Richard Malak, Texas A&M University
Symposium Co-Organizer: Paul Witherell, National Institute of Standards and Technology
Review Co-Coordinator: Ying Liu, NUS
Review Co-Coordinator: Jitesh Panchal, Washington State University
Review Co-Coordinator: Gregory Mocko, Clemson University
CIE-11 Panel: Energy Systems - Energy Efficient Manufacturing
Symposium Organizer: Kevin Lyons, NIST
Symposium Co-Organizer: Robert Ivester

CIE-12 AMS: Advanced Modeling and Simulation, General
Symposium Organizer: Krishnan Suresh, University of Wisconsin
Symposium Co-Organizer: Brian H. Dennis, The University of Texas at Arlington
Symposium Co-Organizer: Yan Wang, Georgia Institute of Technology
Symposium Co-Organizer: Gregory Mocko, Clemson University
Symposium Co-Organizer: Richard Malak, Texas A&M University

CIE-13 SEIKM: Knowledge-capture, Reuse, Management
Symposium Organizer: Matt Bohm, University of Louisville
Symposium Co-Organizer: Richard Malak, Texas A&M University
Review Co-Coordinator: Ying Liu, NUS
Review Co-Coordinator: Anantha Narayanan, National Institute of Standards and Technology
Review Co-Coordinator: Gregory Mocko, Clemson University
Symposium Co-Organizer: Paul Witherell, National Institute of Standards and Technology

CIE-14 AMS: Computational Multiphysics Applications
Symposium Organizer: Valeria Krzhizhanovskaya, University of Amsterdam
Symposium Co-Organizer: Ashok Kumar, University of Florida
Symposium Co-Organizer: John G. Michopoulos, Naval Research Laboratory
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin

CIE-15 Panel: Addressing the NAE Grand Challenges through Research in CIE
Symposium Organizer: Derek Yip-Hoi, Western Washington University
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin
Symposium Co-Organizer: Paul Witherell, National Institute of Standards and Technology
Symposium Co-Organizer: Abhishek Seth, Caterpillar Inc.

CIE-16 SEIKM: Product Lifecycle Management
Symposium Organizer: Sundar Krishnamurty, UMass Amherst
Symposium Co-Organizer: Paul Witherell, National Institute of Standards and Technology
Symposium Co-Organizer: Richard Malak, Texas A&M University
Review Co-Coordinator: Ying Liu, NUS
Review Co-Coordinator: Christiana J.J. Paredis, Georgia Institute of Technology

CIE-17 CAPPD: Modeling Tools and Metrics for Sustainable Manufacturing
Symposium Organizer: Gaurav Ameta, Washington State University
Symposium Co-Organizer: Mahesh Mani, National Institute of Standards and Technology
Symposium Co-Organizer: Kevin Lyons, NIST
Symposium Co-Organizer: Derek Yip-Hoi, Western Washington University

CIE-18 AMS: Energy Systems - Energy Efficient Manufacturing
Review Coordinator: Kevin Lyons, NIST
Symposium Co-Organizer: Wenwu Zhang, GE
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin

CIE-19 AMS: Applications of Symbolic Computation in Engineering
Symposium Organizer: Ilias Kotsireas
Symposium Co-Organizer: P. Venkataraman, Rochester Institute of Technology
Symposium Co-Organizer: John G. Michopoulos, Naval Research Laboratory
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin

CIE-20 Panel: Funding Opportunities for Research
Symposium Organizer: Ram Sriram, National Institute of Standards and Technology
Symposium Co-Organizer: John G. Michopoulos, Naval Research Laboratory

CIE-21 SEIKM: Systems Engineering, Information and Knowledge Management, General
Symposium Organizer: Paul Witherell, National Institute of Standards and Technology
Symposium Co-Organizer: Richard Malak, Texas A&M University
Review Co-Coordinator: Ying Liu, NUS
Review Co-Coordinator: Richard Crowder, University of Southampton
Review Co-Coordinator: Doug McCormick, Iowa State University
Review Co-Coordinator: Anantha Narayanan, National Institute of Standards and Technology
Review Co-Coordinator: Gregory Mocko, Clemson University
Symposium Co-Organizer: Matt Bohm, University of Louisville

CIE-22 AMS: Advances in Understanding and Modeling of Corrosion
Symposium Organizer: Virginia DeGiorgi, Naval Research Laboratory
Symposium Co-Organizer: Krishnan Suresh, University of Wisconsin

CIE-23 SEIKM: Prognostics and Health Management
Symposium Organizer: Abe Zeid
Symposium Co-Organizer: Paul Witherell, National Institute of Standards and Technology
Symposium Co-Organizer: Richard Malak, Texas A&M University
Review Co-Coordinator: Tolga Kurtoglu, Palo Alto Research Center

DAC-1 Design Optimization Algorithms
Review Coordinator: Mohamed Trabia, University of Nevada, Las Vegas

DAC-2 Application-Tailored Optimization Methods
Review Coordinator: Mohammed Shalaby, General Electric Global Research
Review Co-Coordinator: Ashraf Nassef, American University in Cairo
Review Co-Coordinator: Karim Hamza, University of Michigan

DAC-3 Celebration of K.K. Choi's 65th Birthday
Review Coordinator: Byeng D. Youn, Seoul National University
Review Co-Coordinator: Nam Kim, University of Florida
DAC-5 Formulation of Mass Customization Problems
Review Coordinator: Scott Ferguson, North Carolina State University
Review Co-Coordinator: Tim Simpson, Penn State University
Review Co-Coordinator: Andrew Olewnik, NYS Center for Engineering Design and Industrial Innovation

DAC-6 Q&A with Design Engineering Division's Journal Editors
Symposium Organizer: Shapour Azarm, University of Maryland
Review Co-Coordinator: Kurt Anderson, Rensselaer Polytechnic Institute

DAC-7 Multiscale Mechanics and Design Optimization of Cellular Materials
Review Coordinator: Damiano Pasini, McGill University
Review Co-Coordinator: Wang Gary, Simon Fraser University

DAC-8 Decision Making in Engineering Design
Review Coordinator: Kemper Lewis, University at Buffalo - SUNY

DAC-9 Design for Market Systems
Review Coordinator: Jeremy Michalek, Carnegie Mellon University
Review Co-Coordinator: Joseph Donndelinger, General Motors Company

DAC-10 Applying Large Scale Demand Models in Design Optimization
Review Coordinator: Joseph Donndelinger, General Motors Company
Review Co-Coordinator: Anil Kumar Maddulapalli, General Motors
Review Coordinator: Kenneth Bryden, Iowa State University

DAC-11 Design for the Developing World
Review Co-Coordinator: Christopher Mattson, Brigham Young University

DAC-12 Design and Optimization of Sustainable Energy Systems
Review Coordinator: Karim Hamza, University of Michigan
Review Co-Coordinator: Achille Messac, Syracuse University
Review Co-Coordinator: Souma Chowdhury, Rensselaer Polytechnic Institute
Review Co-Coordinator: Jie Zhang, Rensselaer Polytechnic Institute

DAC-14 Multidisciplinary Design Optimization (MDO)
Review Coordinator: James Allison, MathWorks, Inc.
Review Co-Coordinator: Eliot Winer, Iowa State University
Review Co-Coordinator: Jeongwoon Han, Argonne National Laboratory

DAC-15 Metamodel-Based Design Optimization (MBDO)
Review Coordinator: Rahul Rai, Cal State Fresno

DAC-16 Simulation-Based Design Under Uncertainty
Review Coordinator: Zissimos P. Mourelatos, Oakland University
Review Co-Coordinator: Wei Chen, Northwestern University
Review Co-Coordinator: Mian Li, Shanghai Jiao Tong University
Review Co-Coordinator: Yan Wang, Georgia Institute of Technology
Review Co-Coordinator: Ikjin Lee, The University of Iowa
Review Co-Coordinator: Arda Vanli, FAMU-FSU College of Engineering
Review Co-Coordinator: Byeng D. Youn, Seoul National University
Review Co-Coordinator: Michael Kokkolaras, University of Michigan
Review Co-Coordinator: Xiaoping Du, Missouri University of Science and Technology
Review Co-Coordinator: Sirisha Rangavajhala

DAC-17 Geometric Modeling and Algorithms for Design and Manufacturing
Review Coordinator: Horea Ilios, University of Connecticut

DAC-20 Design of Multiscale Engineering Systems
Review Coordinator: Carolyn Seepersad, The University of Texas at Austin
Review Co-Coordinator: Wei Chen, Northwestern University
Review Co-Coordinator: Yan Wang, Georgia Institute of Technology
Review Co-Coordinator: David Romero, University of Toronto
Review Co-Coordinator: Byeng D. Youn, Seoul National University

DAC-21 Multi-Objective Optimization and Sensitivity Analysis
Review Coordinator: Shapour Azarm, University of Maryland
Review Co-Coordinator: Mian Li, Shanghai Jiao Tong University
Review Co-Coordinator: David Romero, University of Toronto

DAC-22 Product Family and Product Platform Design
Review Coordinator: Tim Simpson, Penn State University
Review Co-Coordinator: Seung Ki Moon
Review Co-Coordinator: Ritesh Khire, United Technologies Research Center (UTRC)

DEC-1 Panel - Building Bridges for Engineering Education Partnership with Industry
Review Coordinator: Zahed Siddique, University of Oklahoma

DEC-2 Best Practices and Lessons Learned in Design Education
Review Coordinator: Katie Grantham, Missouri University of Science and Technology
Review Co-Coordinator: Spencer Magleby, Brigham Young University

DEC-3 Panel - Attracting Future Engineers Best Practices and Lessons Learned
Review Coordinator: Kathy Jacobson, Lockheed Martin

DEC-4 Experiential Learning and New Pedagogy for Engineering Education
Review Coordinator: Zahed Siddique, University of Oklahoma
Review Co-Coordinator: Katie Grantham, Missouri University of Science and Technology

DEC-5 Teaching Design for Sustainability
Review Coordinator: Jeffrey Mountain, The University of Texas at Tyler
Review Co-Coordinator: Katie Grantham, Missouri University of Science and Technology
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<td>MECH-9</td>
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**SYMPOSIUM & SESSION ORGANIZERS**

- DEC-6: Broad Adaptation/Adoption of Design Tools in Engineering Education - Issues and Lessons Learned
  Review Coordinator: Katie Grantham, Missouri University of Science and Technology

- DEC-7: Innovation and Entrepreneurship in Design
  Review Coordinator: Phil Doepker

- DEC-8: Opportunities and Barriers to Bringing Change in Engineering Education
  Review Coordinator: Zahed Siddique, University of Oklahoma

- DFMLC-1: Theoretical Foundations for Design and Manufacturing Integration
  Review Coordinator: Derrick Tate, Texas Tech University

- DFMLC-3: Panels
  Symposium Organizer: Jon Wesner

- DFMLC-4: Manufacturing Cost Estimation and Total Cost of Ownership
  Symposium Organizer: Linda Newnes, University of Bath

- DFMLC-5: Sustainable Design
  Symposium Organizer: Fu Zha, Purdue University

  Symposium Organizer: Qing Wang, Durham University

- DFMLC-7: Life Cycle Decision Making
  Review Coordinator: Mey Goh, Loughborough University

  Review Coordinator: Linda Newnes

- DFMLC-9: Design for Supply Chain
  Symposium Organizer: Gül E. Okudan Kremer, Pennsylvania State University

- DFMLC-11: Integrated Assembly Design and Planning
  Review Coordinator: Iraj Mantegh, National Research Council Canada

- MECH-1: Mobile Robots
  Review Coordinator: Dennis Hong, Virginia Tech

- MECH-2: Tensegrity and Cable-Driven Systems
  Symposium Co-Organizer: Venkat Krovi, SUNY Buffalo

- MECH-3: Mechanisms and Robots in Medicine
  Review Coordinator: Carl A. Nelson, University of Nebraska

- MECH-5: Student Mechanism and Robot Design Competition
  Review Coordinator: David J. Cappelleri, Stevens Institute of Technology

- MECH-6: Robot Dynamics and Control
  Review Coordinator: Anurag Purwar, Stony Brook University

- MECH-7: Mechanisms and Robotics Education
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- MECH-8: Compliant Mechanisms
  Review Coordinator: Hai-Jun Su, University of Maryland Baltimore County

- MECH-9: Mechanism Analysis and Synthesis
  Review Coordinator: David Myszka, University of Dayton

- MECH-10: Parallel Manipulators
  Review Coordinator: Andreas Müller, University Duisburg-Essen

- MECH-11: Challenges in Complex/Sustainable System Designs
  Symposium Organizer: Irem Tumer, Oregon State University

- DEC-8: Opportunities and Barriers to Bringing Change in Engineering Education
  Review Coordinator: Zahed Siddique, University of Oklahoma

- DFMLC-1: Theoretical Foundations for Design and Manufacturing Integration
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- MECH-9: Mechanism Analysis and Synthesis
  Review Coordinator: David Myszka, University of Dayton
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<td>YangQuan Chen, Utah State University</td>
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<td>MESA-2 The Third Symposium on Small Unmanned Aerial Vehicle Technologies and Applications (SUAVTA'11)</td>
<td>YangQuan Chen, Utah State University</td>
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<td>Stephen Nestinger, Worcester Polytechnic Institute</td>
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<td>MESA-4 The Fifth Symposium on Mechatronic and Embedded System Applications (MESA'11)</td>
<td>Emanuele Frontoni, Università Politecnica delle Marche</td>
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<td>MESA-5 Symposium on Sensors and Actuators (SA'11)</td>
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<td>Irene Fassi, CNR-ITIA</td>
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<td>MNS-3 Symposium on Nonlinear Mechanics, Dynamics, and Control in Atomic Force Microscopy</td>
<td>Santiago D. Solares, University of Maryland, College Park</td>
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<td>MNS-4 Symposium on Micro Mechanics, Surface Engineering, and Contact Mechanics/Tribology</td>
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<td>MNS-5 Symposium on BIO MEMS/NEMS</td>
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<td>MNS-6 Symposium on Dynamics of MEMS and NEMS</td>
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<td>MNS-7 Symposium on Measurement and Control in Micro- and Nano-Systems</td>
<td>Daniel Cole, University of Pittsburgh</td>
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<td>MSNDC-1 Computational Methods</td>
<td>Kurt Anderson, Rensselaer Polytechnic Institute</td>
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<td>MESA-6 The Third Symposium on Mechatronic Control and Electrical Vehicular Systems (MCEVS'11)</td>
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<td>Wen Chen, Wayne State University</td>
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<td>MESA-8 The First Symposium on Virtual Prototyping in Mechatronics (VPM'11)</td>
<td>Michele Germani, Polytechnic University of Marche</td>
<td>Maura Mengoni, Polytechnic University of Marche</td>
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<td>MESA-9 The Third Symposium on Bio-Mechatronics - Medical Devices &amp; Technologies (BIOMECH'11)</td>
<td>Shane Xie, The University of Auckland</td>
<td>Lei Zuo, State University of New York at Stony Brook</td>
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<td>MESA-10 The Fifth Symposium on Embedded Systems Infrastructure and Theory (ESIT'11)</td>
<td>Jia Xiu, York University</td>
<td>Martin Horauer, University of Applied Sciences Technikum Wien</td>
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<td>MESA-11 The Third Symposium on Autonomous Systems &amp; Ambient Intelligence (ASAI'11)</td>
<td>Hyo-Sung Ahn, GIST</td>
<td>Yu Zhou, State University of New York at Stony Brook</td>
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<td>MESA-12 The Fourth Symposium on Robotics &amp; Mobile Machines (RMM’11)</td>
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Symposium Organizer: Al Ferri, Georgia Tech
Symposium Co-Organizer: Dan Negrut, University of Wisconsin-Madison
Symposium Co-Organizer: Jeff Trinkle, Rensselaer Polytechnic Institute
Symposium Co-Organizer: Alessandro Tasora, Università degli Studi di Parma

MSNDC-3 Control and Optimization
Symposium Organizer: Olivier Brüls, University of Liège
Symposium Co-Organizer: Peter Eberhard, University of Stuttgart

MSNDC-4 Macro- and Microscale Device and System Design
Symposium Organizer: Carlo Bottasso, Politecnico di Milano
Symposium Co-Organizer: Mohammed Daqaq, Clemson University

MSNDC-5 Student paper competition
Review Coordinator: Aki Mikkola, Lappeenranta University of Technology
Symposium Co-Organizer: Javier Cuadrado, University of La Coruna
Symposium Co-Organizer: Corina Sandu, Virginia Polytechnic Institute and State University
Symposium Co-Organizer: Andrew Dick, Rice University

MSNDC-6 Industry Panel
Symposium Organizer: Bala Balachandran, University of Maryland
Symposium Co-Organizer: József Kövecses, McGill University
Symposium Co-Organizer: Rudranarayan Mukherjee, NASA Jet Propulsion Laboratory

MSNDC-7 Keynotes
Symposium Organizer: Harry Dankowicz, University of Illinois at Urbana-Champaign

MSNDC-8 Dynamical Systems with Time-Variability, Delay, or Discontinuities
Symposium Organizer: Tamás Kalmár-Nagy, Texas A&M University
Symposium Co-Organizer: Subhash Sinha, Auburn University
Symposium Co-Organizer: Rifat Sipahi, Northeastern University
Symposium Co-Organizer: Stefano Lenci, Polytechnic University of Marche

MSNDC-9 Flexible Multibody Dynamics
Symposium Organizer: Aki Mikkola, Lappeenranta University of Technology
Symposium Co-Organizer: Ahmed Shabana, University of Illinois at Chicago
Symposium Co-Organizer: Johannes Gerstmayr, Linz Center of Mechatronics
Symposium Co-Organizer: Yoshiaki Terumichi, Sophia University

MSNDC-10 Dynamics of Land, Sea, Air, and Space Vehicles
Symposium Organizer: Werner Schiehlen, University of Stuttgart
Symposium Co-Organizer: Hiroyuki Sugiymama, Tokyo University of Science
Symposium Co-Organizer: Parviz Nikravesh, University of Arizona
Symposium Co-Organizer: Arend L. Schwab, Delft University of Technology
Symposium Co-Organizer: Khaled Zaazaa, ENSCO, Inc.

MSNDC-11 Rapid-fire Poster Session
Symposium Organizer: Harry Dankowicz, University of Illinois at Urbana-Champaign

MSNDC-12 Emerging Frontiers
Symposium Organizer: Walter Lacarbonara, Sapienza University of Rome
Symposium Co-Organizer: Rudranarayan Mukherjee, NASA Jet Propulsion Laboratory

MSNDC-13 Education and Industrial Tools
Symposium Organizer: James Critchley, BAE Systems
Symposium Co-Organizer: Javier García de Jalón, Universidad Politécnica de Madrid

MSNDC-14 Structural Dynamics
Symposium Organizer: Michael Leamy, Georgia Institute of Technology
Symposium Co-Organizer: David Wagg, University of Bristol
Symposium Co-Organizer: Jonathan Nichols, Naval Research Laboratory
Symposium Co-Organizer: Brian Mann, Duke University

MSNDC-15 Experimental Dynamics, Uncertainty, and Validation
Symposium Organizer: Lawrence Virgin, Duke University
Symposium Co-Organizer: Hiroshi Yabuno, Keio University
Symposium Co-Organizer: Horst Ecker, Vienna University of Technology

PTG-1 Gear System Design and Analysis
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Qi Fan, The Gleason Works
Review Co-Coordinator: Neil Anderson, Pratt & Whitney
Review Co-Coordinator: Jonny Harianto, The Ohio State University
Review Co-Coordinator: Jeremy Wagner, John Deere

PTG-2 Surface Engineering and Tribology
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Al Karvelis, Exponent Inc.

PTG-3 Plastic Gears
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Donald R. Houser, The Ohio State University
Review Co-Coordinator: Ahmet Kahraman, The Ohio State University

PTG-4 Gear System Dynamics and Noise
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Jacob Lin, John Deere
Review Co-Coordinator: Brian Wilson, Romax Technology, Inc.

PTG-5 Power Loss in Gear Systems
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Robert Handschuh, NASA Glenn Research Center

PTG-6 Gear Strength and Durability
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Moshen Kolivand, The Gleason Works

PTG-7 Novel Transmission Concepts and Control
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Review Co-Coordinator: Vance Browne, Minnesota State University, Mankato
PTG-8 Keynote
Symposium Organizer: Avinash Singh, 1
Co-Organizer: Timothy Krantz, NASA

PTG-9 Wind Turbine Gears
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Alfred Pettinger, ESI

PTG-10 Panel Discussion
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Symposium Co-Organizer: Avinash Singh, General Motors Company

PTG-11 Gear Manufacturing
Review Coordinator: Timothy Krantz, NASA
Review Co-Coordinator: Richard Dippery, Kettering University

PTG-12 Bearings
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Review Co-Coordinator: David Lewicki, NASA Glenn Research Center

RSAFP-1 RSAFP Considerations in Design Process and Computer-based Analyses for RSAFP
Symposium Organizer: Erol Sancaktar, University of Akron

RSAFP-3 Failure Analyses and Modeling
Symposium Organizer: Erol Sancaktar, University of Akron

VIB-1 Condition Monitoring and Diagnostics
Symposium Organizer: Steve Wilcox, University of Glamorgan
Symposium Co-Organizer: Min-Chun Pan, National Central University
Symposium Co-Organizer: Chris Mechefske, Queen's University
Symposium Co-Organizer: Peter W. Tse, City University of Hong Kong
Symposium Co-Organizer: Yimin Shao, Chongqing University
Symposium Co-Organizer: Jay Lee

VIB-2 Discontinuous Dynamical Systems and Synchronization
Symposium Organizer: Albert Luo, Southern Illinois University Edwardsville
Symposium Co-Organizer: J.A. Tenreiro Machado, Institute of Engineering of Polytechnic of Porto
Review Co-Coordinator: Ebrahim Esmailzadeh, University of Ontario Institute of Technology

VIB-3 Energy Harvesting
Symposium Organizer: Lei Zuo, State University of New York at Stony Brook
Symposium Co-Organizer: Jeffrey Scruggs, Duke University

VIB-4 Finite Element Modeling, Modal Testing, Model Updating, and Damage Detection
Symposium Organizer: Weidong Zhu, University of Maryland, Baltimore County

VIB-5 Keynotes
Symposium Organizer: Bogdan Epureanu, University of Michigan - Ann Arbor

VIB-6 Vibration and Control of Distributed Structural Systems
Symposium Organizer: Weidong Zhu, University of Maryland, Baltimore County

VIB-7 Dynamics and Control of Bio-Systems
Symposium Organizer: Dumitru Caruntu, University of Texas Pan American
Symposium Co-Organizer: Bogdan Epureanu, University of Michigan - Ann Arbor

VIB-8 Global Nonlinear Dynamics
Symposium Organizer: Jian-Qiao Sun, University of California at Merced
Symposium Co-Organizer: Henry K. Flashner, University of Southern California

VIB-9 Rotor Dynamics and Control
Symposium Organizer: C. Nat Nataraj, Villanova University
Symposium Co-Organizer: Paolo Pennacchi, Politecnico di Milano
Symposium Co-Organizer: Yukio Ishida, Nagoya University

VIB-10 Nonlinear Dynamics of Continuous Systems
Symposium Organizer: Dumitru Caruntu, University of Texas Pan American
Symposium Co-Organizer: Marco Amabili, McGill University
Symposium Co-Organizer: Bogdan Epureanu, University of Michigan - Ann Arbor

VIB-11 Experiments in Nonlinear Dynamics and Vibrations
Symposium Organizer: Gaetan Kerschen, University of Liege
Symposium Co-Organizer: Brian Mann, Duke University
Symposium Co-Organizer: Brian Feeny, Michigan State University

VIB-12 Vibration and Control of Smart Structures
Symposium Organizer: Nima Mahmoud, The University of Alabama
Symposium Co-Organizer: Mehdi Ahmadian, Virginia Tech
Symposium Co-Organizer: Mohammad Elahinia, University of Toledo
Symposium Co-Organizer: Jiong Tang, University of Connecticut
Symposium Co-Organizer: Nader Jallili, Northeastern University
Symposium Co-Organizer: Rifat Sipahi, Northeastern University
Review Co-Coordinator: Qian Tang, Chongqing University

VIB-13 Dynamics of Phononic Materials and Structures
Symposium Organizer: Mahmoud Hussein, University of Colorado at Boulder
Symposium Co-Organizer: Massimo Ruzzene, Georgia Institute of Technology
Symposium Co-Organizer: Chiara Daraio
Symposium Co-Organizer: Katia Bertoldi, Harvard University

VIB-14 Vibrations and Controls of Manufacturing Systems
Symposium Organizer: Albert Luo, Southern Illinois University Edwardsville
Symposium Co-Organizer: Hamid R. Hamidzadeh, Tennessee State University
Symposium Co-Organizer: Steve Suh, Texas A&M University

VIB-15 Vibration and Mechanics of Jointed Structures
Symposium Organizer: Dane Quinn, The University of Akron
Symposium Co-Organizer: Michael Starr, Sandia National Laboratories
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<td>Zuo, Lei</td>
<td>MESA-9-2, VIB-3-1, VIB-12-1</td>
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