



## **7<sup>th</sup> Symposium on International Design and Design Education (DEC)**



**Conference Chair:**  
 Dr. Dirk Schaefer  
 Georgia Institute of Technology  
 E-mail: [dirk.schaefer@me.gatech.edu](mailto:dirk.schaefer@me.gatech.edu)  
 T: +1 (912) 966 7946  
 F: +1 (912) 966 7928



**Program Chair:**  
 Dr. Katie Grantham, Missouri  
 University of Science and  
 Technology  
 E-mail: [kag@mst.edu](mailto:kag@mst.edu)  
 T: +1 (573) 341-4598  
 F: +1 (573) 341 6593

## Call for Papers

With the success of the 2009 DEC Symposium, the theme for the 2010 Symposium is continuing the emphasis on scholarship in design education and the creation of archival literature in this area. Three strands of paper topics that fall under the scholarship of design education umbrella include: 1) Scholarly Research in Design Education, 2) Student Engagement in Design Education, and 3) Best Practices in Design and Design Education. Thirteen sessions for the conference that highlight these areas are described in the detailed topic announcements below. These have been selected to emphasize fundamentals and quantification in the design education field. Authors are encouraged to submit their best work to the topic that makes the best fit – topics and sessions will later be adjusted to create the most effective conference program. Key papers will be advanced to the Journal of Mechanical Design. In addition to the technical paper program, a keynote speaker will address funding opportunities for research in design education. Further, panel speakers will join the symposium to enhance and encourage dissemination of design education scholarship through journal publications. To encourage new scholars in this area, a student paper competition is offered with awards and the potential for travel funding. The organizers look forward to your taking part in the scholarly exchange, and to seeing you in Montreal!

### **Topic DEC-1: Innovation and Entrepreneurship in Design**

The Design Education Committee will hold a symposium that addresses innovation and entrepreneurship in design as part of the 2010 IDETC. The abstracts are invited on issues associated with the following three major categories:

- Developing Business Plans as a part of The Product Realization Process
- Emphasizing Innovation and Ideation in the Design Curriculum
- Marketing, Patents and the Design Process

The committee is interested in papers that compare international approaches to topics of interest listed below:

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|---|--|--|
| • Multidisciplinary Teams – Engineering, Business, Law...                     | • Engineers who are Entrepreneurs                                | • The essence of Intra- and Entrepreneurial Engineering  |
| • Entrepreneurial Design: A New Paradigm for Engineering Education            | • Technical Fundamentals and Customer Awareness                  | • Design engineering in service to support societal values.                                    |
| • Challenges facing Students in an Innovative Environment                     | • Business Acumen and Societal Values                            | • Porter’s Five Forces as a Design Criteria  |
| • Establishing an entrepreneurial mindset in Engineering Students and Faculty | • Engineering and Innovation in an environment of ambiguity      | • Approaches to design engineering and product development – costs, market surveys and patents |
|   | • Innovation Extra-Curricular: Business Plans, Internships, etc. |  |

*Topic organizer:* Dr. Phil Doepker, University of Dayton, [doepker@udayton.edu](mailto:doepker@udayton.edu)

### Topic DEC-2: Best Practices and Lessons Learned in Design Education

For a number of years – especially since the advent of ABET 2000, engineering education has sought ways of identifying, achieving, and assessing learning outcomes and the activities to achieve them. This paradigm is consistent with the discipline of engineering itself, the essence of which is design. This session is being organized to invite the sharing of best practices in learning activities with an emphasis on assessment. What learning activities have you found that really worked in achieving worthwhile learning outcomes and how do you *know* they really work? How well are students really being prepared for what they will need to *be able to do* once they leave the academy as engineering graduates?

*Topic organizer:* Albert V. Karvelis, Exponent Engineering and Scientific Consulting: [akarvelis@exponent.com](mailto:akarvelis@exponent.com)

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### Topic DEC-3: International Practices and Cultural Issues in Design and Design Education

The International Activities Committee of the Design Education Committee will hold a symposium as part of the 2010 IDETC. The committee invites abstracts on issues associated with the following three major categories:

- Global Collaborative Design
- Management of Global Project Design Teams
- International Drivers and Practice for Product Life Cycle

The committee is interested in papers that compare international approaches to example topics listed below:

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|--|---|--|
| • Cooperative arrangements and projects between universities in different countries. | • Development of interdisciplinary teams.           | • Sustainability and renewable energy projects in an academic environment                              |
| • Design projects through industry and academic collaboration.                       | • Design of Medical Equipment                       | • Design management  |
| • Sustainable design.  | • Design for the elderly and physically challenged. | • Design engineering in service to humanity.   |
| • Design projects conducted by teams around the world.                               | • Product life cycle as a design criterion.         | • The role of ergonomics in a design.  |
| • Communication techniques used to facilitate international team participation.      | • Product life cycle costing                        | • Approaches to design engineering and product development – the cultural similarities and mismatches. |
|  | • Educating Engineers for a Global Economy          |  |

*Topic organizers:* Dr. Phil Doepker, University of Dayton, and Dr. Chris McMahon, University of Bath: [doepker@udayton.edu](mailto:doepker@udayton.edu), [c.a.mcmahon@bath.ac.uk](mailto:c.a.mcmahon@bath.ac.uk)

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### Topic DEC-4: Young Design Engineer's Paper Competition

The purpose of this competition is to emphasize the importance of clear technical communication while providing an introduction to technical society (ASME) paper publication. The International Design Engineering Technical Conference is the ideal venue for exemplary student capstone design projects. The paper submission process is the same as that required for practicing engineers and design professionals. Technical sessions will be dedicated to this competition during the 2010 IDETC to be held Montreal, August 15-18, 2010. The competition is for undergraduates who are members of ASME. One author may be the faculty mentor on the project. Authors and presenters must be undergraduates or must have received their bachelor's degree no longer than 6 months from the date of submission of the final paper.

#### Guidelines for Submission

1. **Abstract** (150 words or less) describes the project or problem to be solved. Submitted by February 5, 2010.
2. **Paper Submission** (10 pages or less) follows the recommended format for an ASME Paper. Submitted by February 5, 2010.

3. **Paper Review by ASME Members.** Review decisions and comments provided by March 5, 2010
4. **Submission of Copyright Form (1903).** April 2, 2010.
5. **Paper Revision.** All papers must be received in final form by April 30, 2010.
6. **Author Notification.** Authors will be notified by May 21, 2010. Finalists and Alternates will be identified.
7. **Finalists.** Five (5) teams will be selected to present their papers in one session at the IDETC. The final placement and awards will be announced at the end of the student sessions.
8. **Alternates.** Up to five (5) teams/presenters will be featured at the second student paper session. One or more of these could move up to be one of the five finalists should one of those selected in (6) above not be able to be present.

The Design Education Committee of The Design Engineering Division recognizes that the timing of the paper submission process is not compatible with the completion of the semester and quarter system. Thus, the paper submitted should be as complete as possible for the publication (a work in progress including the project plan, preliminary results, etc.) while final results will be provided at the student session at the IDETC.

### **Paper Organization**

A suggested approach is for the paper would be to follow the Product Realization Process. This could include the following components:

1. Establish Need
2. Develop Specifications
3. Develop Conceptual Designs
4. Perform a Decision Analysis
5. Establish an Embodiment Design
6. Final Design
7. Build the prototype
8. Testing and Test Results
9. Marketing and Business Plan

### **Awards**

Each of the top 5 teams are eligible to send up to 3 team members to the conference with an award as listed below. To receive the award at least one person from the team must attend and present the paper at the conference. Financial Awards will be provided to the top 5 teams. This will be a modest amount and should be used to help defray some expenses for presenters. No grants or funds are available to pay for student travel or conferences. An engraved plaque will be presented to all teams presenting in the sessions.

### **Judging Criteria**

Projects will be judged based on the following criteria:

1. Solution to the design problem creativity and sound use of engineering principles used in producing a design that solves the problem both effectively and efficiently.
2. Design Process: This includes a demonstration of the use of various design principles and methods in formulating the solution such as peer review of ideas, brainstorming, customer needs assessments, searching of the existing art, etc.
3. Quality of the written project summary clearly and efficiently describes the important aspects of the design including the problem solved, method of solution, and any experimental verification of the design. This should be produced with an eye toward submission to an ASME conference or publication. The target audience is other engineers. Spend your time and effort on mechanical design.
4. Quality of the oral presentation at the IDETC. This will be based on visual aids, preparation, organization and depth of engineering content.

*Competition organizer:* Dr. Phil Doepker, University of Dayton, [doepker@udayton.edu](mailto:doepker@udayton.edu)

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### **Topic DEC-5: Service Related Design**

For this session, we are accepting papers dealing with Service-Learning Design Projects, Design of Assistive Technology Devices, Design for Third-World Countries, Universal Engineering Design, or Other Service-Related Design Courses or Projects. These could be research papers investigating student engagement, student retention, success in creating patentable devices, impact on student and community relationships, impact on student learning, and impact on diversity. Study Abroad courses that focus on design for community improvement are also applicable.

*Topic organizer:* Dr. Richard M. Goff and Dr. Chris Williams, Virginia Tech: [richgoff@vt.edu](mailto:richgoff@vt.edu) and [cbwilliams@vt.edu](mailto:cbwilliams@vt.edu)

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### **Topic DEC-6: Design Studios**

When teaching design most educators agree that students learn skills by doing. The necessary design skills can be imprinted in students through design experiences; this is when the theory and methodology of design is transformed into design skills through pedagogy (i.e. educational strategy) and didactics (i.e. educational techniques). Design studios vary widely reflecting the points of view of the institutions and educators; some are traditional, resembling a machine shop, while others reflect innovative approaches to education. Research papers are welcome at the intersection of engineering design and engineering education, focusing on the place where it occurs: the design studio. Topics may include: educational modules, pedagogy and didactics, curricula and syllabus, facilities and service, teaching methods, lesson plans, facilitators, project management, design knowledge management, among others.

*Topic organizer:* Dr. Noe Vargas Hernandez, University of Texas El Paso: [nvargas@utep.edu](mailto:nvargas@utep.edu)

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### **Topic DEC-7: Distance Education and Cyber Learning in Engineering Design**

More and more institutions offer engineering degree programs to distance learning students. Key components of such programs include a number of aspects related to Engineering Design and Open Innovation. In addition, companies need to train their design staff at dispersed locations as well. Moreover, we have reached the era of Globalization 3.0, in which individuals have the power to collaborate and compete globally. The internet technologies to facilitate this collaboration are referred to as Web 2.0: a second generation of internet-based services, such as social networking sites, wikis, communication tools, etc. that emphasize online collaboration and sharing among users. Web 2.0 bears a huge potential to support the consolidation of a new paradigm of education. It empowers users and provides a platform to gather, share, and enrich knowledge. Web 2.0 promotes the transformation of learning experiences into personally usable, practical knowledge, and helps learners to present results of this transformation to others. In these regards, the National Science Foundation has defined "cyberlearning" as "the use of networked computing and communications technologies to support learning." and identified cyberlearning as having "...the potential to transform education throughout a lifetime, enabling customized interaction with diverse learning materials on any topic...". – We invite papers that address (but are not limited to) the following questions: Through what approaches can Design and Design projects effectively and efficiently be taught in (globally) dispersed Distance Learning settings? How can the effectiveness of such approaches be evaluated and their efficiency measured? How can design-related physical experiments (a major bottleneck in distance learning in general) be conducted at remote settings? What new technologies are needed to create cyberlearning environments for design education? What educational theories, pedagogies and instructional techniques are needed for design-related cyber learning and teaching?

*Topic Organizer:* Dr. Dirk Schaefer, Georgia Institute of Technology: [dirk.schaefer@me.gatech.edu](mailto:dirk.schaefer@me.gatech.edu)

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### **Topic DEC-8: Design Across the Curriculum**

The Design Education Committee will hold a symposium that addresses issues related to Integrating Design Across the Engineering Curriculum as part of the 2010 IDETC. The committee invites abstracts on issues associated with the following major categories:

- Design Content in Introduction to Engineering Courses
- Innovative Methods for Including Design Content in Reduced Hour Curricula
- Efforts to Increase, or Reduce, Design Content in Existing Curricula

Some example topics of interest are listed below:

- Comparison of Public and Private University Approaches
- Design Content in Laboratory or Analysis Courses
- The Current Relevance of a Design Across the curriculum Approach
- Trends in Freshman Engineering Courses – Can an all discipline “One Size Fit All” approach be effective?
- Design Across the 2-year/4-year Transfer interface
- Can the Product Realization Approach Translate to other Engineering Disciplines?
- International Approaches to the Design Across the Curriculum

*Topic Organizer:* Dr. Jeffrey R. Mountain, The University of Texas at Tyler: [mountain@uttyler.edu](mailto:mountain@uttyler.edu)

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### **Topic DEC-9: Interdisciplinary/Multidisciplinary Design**

Recent advances in engineering design and education and have lead to an emergence of new curriculums focused on product design. These programs, existing at both the undergraduate and graduate level, often offer students an interdisciplinary technical background cemented with product design theory and practice. The 6th annual Symposium on International Design and Design Education at the 2010 ASME Design Engineering Technical Conferences & computers and Information in Engineering Conference will offer and invites authors to submit papers to be presented in a session devoted to this exciting educational topic.

*Topic organizer:* Dr. Noe Vargas Hernandez, University of Texas El Paso: [nvargas@utep.edu](mailto:nvargas@utep.edu)

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### **Topic DEC-10: Collaboration in Design and Design Education**

We have reached the era of Globalization 3.0, in which individuals have the power to collaborate and compete globally. Globalization 3.0 has led to a new paradigm called mass collaboration. Mass collaboration is the phenomenon that has resulted in breakthrough products such as Linux and Wikipedia. The internet technologies that facilitate mass collaboration are referred to as Web 2.0. A key characteristic of Web 2.0 is the harnessing of collective intelligence. Web 2.0 refers to a second generation of internet-based services, such as social networking sites, wikis, communication tools, etc. that emphasize online collaboration and sharing among users. Web 2.0 bears a huge potential to support the consolidation of a new paradigm of education. It empowers users and provides a platform to gather, share, and enrich knowledge. Web 2.0 is centered in knowledge generation and is not limited to the use and sharing of information. It promotes the transformation of learning experiences into personally usable, practical knowledge, and helps learners to present results of this transformation to others. Web 2.0 applications support the ubiquity of communication and knowledge production, qualities that are essential for globally-distributed education for the 21st century. – We invite papers that address the new paradigm of Mass Collaboration in the context of Engineering Design and pedagogical approaches to Design Education for the near tomorrow.

*Topic Organizer:* Dr. Zahed Siddique, The University of Oklahoma :[zsiddique@ou.edu](mailto:zsiddique@ou.edu)

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### **Topic DEC-11: Professional Development of Design Educators**

In order to be able to provide students or trainees who wish to learn how to design with the best possible education or training, instructors involved in design education need to continuously hone their own skills and gain new competencies related to effective ways of teaching design in various settings (e.g., face-to-face classroom, synchronous/asynchronous distance learning. cyberspace, etc.). While continuous professional development is key in almost any profession, there appears to be a lack of such activities for design educators. – We invite papers that address aspects related to professional development of design educators and any means that help strengthen their performance.

*Topic Organizer:* Dr. Dirk Schaefer, Georgia Institute of Technology: [dirk.schaefer@me.gatech.edu](mailto:dirk.schaefer@me.gatech.edu)

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**Topic DEC-12: Panel Session I, “Defining the Scholarship of Design and Design Education”**

*Topic Organizers:* Dr. Dirk Schaefer, Georgia Institute of Technology: [dirk.schaefer@me.gatech.edu](mailto:dirk.schaefer@me.gatech.edu) , and Dr. Katie Grantham, Missouri University of Science and Technology, [kag@mst.edu](mailto:kag@mst.edu)

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**Topic DEC-13: Panel Session II, “Globalization Issues in Engineering Education”**

Dr. Robert H. Todd and Dr. Spencer Magleby, Brigham Young University: [todd@byu.edu](mailto:todd@byu.edu) , [magleby@byu.edu](mailto:magleby@byu.edu)

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**Publication Schedule:**

**Submission of Abstract and Draft Papers:** **January 29, 2010**

Note: The deadline for submission of full-length draft papers and abstracts is Friday, January 29, 2010. This is a FIRM deadline and will be enforced.

**Paper Reviews Completed:** **March 19, 2010**

**Author Notification of Acceptance:** **March 29, 2010**

**Submission of Copyright Form (1903):** **April 9, 2010**

Copyright transfer forms are requested upon acceptance of the draft and prior to the submittal of the final paper.

**Submission of Final Paper:** **May 3, 2010**

In accordance with ASME final paper requirements. Publication in the conference proceedings is not guaranteed if materials are received after May 15, 2009.

**Submission Procedure:**

Go to [www.asmeconferences.org/IDETC10](http://www.asmeconferences.org/IDETC10) ; “submit paper”; “log in” or “create account”; “submit paper” or “submit abstract”; “select conference” (7<sup>th</sup> Symposium on International Design and Design Education); “select topic” (as appropriate); add abstract/paper information.