Engineering Education Research Networking Session

Connecting Engineering Education Research Programs from Around the World

sponsored by the
ASEE International Division

in partnership with
Rigorous Research in Engineering Education Initiative
CLEERhub.org
And the *Journal of Engineering Education*

ASEE Annual Conference – June 22, 2010 – Session 2123

Facilitated By

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Purdue University and University of Minnesota

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Michigan State University

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ASEE

Agenda

What are we going to do?

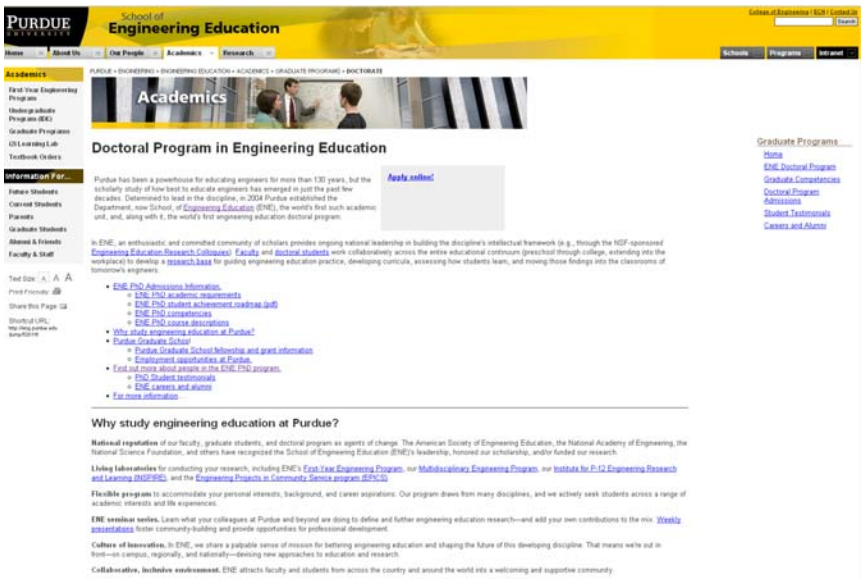
- **Welcome and Overview (~10 min)**
- **Introductions and Brief Statement from Representative of Established EER PhD Programs (~20 min) – Ten Briefings, ~2 min each**
  - When the PhD program was started
  - Where it is located
  - Number of PhD students and graduates
- **Participant Networking Activity (~30 min)**
- **Brainstorming Strategies to Connect, Expand, and Sustain the Emerging EER Community (~10 min)**
- **Wrap Up and Next Steps (~5' min)**

EER PhD Program Briefings

- **Utah State University – Kurt Becker**
- **Purdue University – David Radcliffe & Robin Adams**
- **Universidad de las Americas, Puebla, Mexico – Enrique Palou**
- **Virginia Tech – Maura Borrego**
- **Universiti Teknologi Malaysia – Zaini Ujang**
- **Clemson University – Lisa Benson**
- **NITTTRs – India – R. Natarajan**
- **Arizona State University – Tirupalavanam Ganesh & Chell Roberts**
- **University of Washington – Cindy Atman**
- **Ohio State University – Lisa Abrams**
- **Carnegie Mellon University – Paul Steif**
- **University of Michigan – Cindy Finelli**
- **Washington State University – Denny Davis**
- **University of Georgia – Nadia Kellam & Joachim Walther**
- **Michigan State University – Jon Sticklen**
- **University of Colorado – Boulder – Daria Kotys-Schwartz**

Kurt Becker – Utah State University

http://www.engineering.usu.edu/htm/information/phd-engineering-education



Robin Adams – Purdue University

https://engineering.purdue.edu/ENE/Academics/Graduate/Doctorate/index.html

Universidad de las Américas Puebla
Mexico

Doctoral Program in Science, Engineering, and Technology Education

UDLAP

- **Fall 2003**
  - *Center for Science, Engineering, and Technology Education*
- **Fall 2006**
  - PhD program
- **Spring 2008**
  - program accredited by the National Council of Science and Technology (CONACyT) of Mexico
- **Fall 2009**
  - first graduate
- **Fall 2010**
  - ≈ 40 PhD students

GOALS

•Conduct world-class research on teaching and learning of science, engineering and technology
- *Scholarship of discovery*

•Use the results of that research to continually improve instruction at UDLAP, Mexico and other Ibero-American countries to better support the learning process of our students
- *Scholarship of application, integration, and teaching*

•Support the educational needs of science, engineering and technology teachers and learners at the P-12, University, and continuing professional development levels
- *Scholarship of application, integration, and teaching*

Universidad de las Américas Puebla

- Mexican private institution of higher learning
  - accredited in the US since 1959 by SACS

www.udlap.mx/ofertaacademica_eng/doctorados/educacioncienciasingenieria/Default.aspx

Maura Borrego – Virginia Tech

http://www.enge.vt.edu/

UTM
UNIVERSITI TEKNOLOGI MALAYSIA
www.utm.my

UTM in brief: **From imperial technical school to national research university**

by Zaini UJANG, UTM President

- The oldest university in Malaysia
- Alumni more than 200,000
- More than 43% enrolment at graduate levels in engineering and technology in Malaysia
- 10 engineering schools
- 2000 tenured academics
- 5000 students Global Outreach Program
- 2,800 foreign students
- 2010 Initiatives with Oxford, Imperial College, MIT, Harvard, Tokyo, Caltech, Pann State etc
- Prof. Richard R. Ernst *Nobel Laureate in Chemistry 1991 "…fulfills a major … highly qualified graduate engineers and professionals … become an **international center of knowledge and education**."*

UTM student profile

Year	Bachelor	Graduate
1984	3,886	2
1990	5,348	175
2004	17,897	3,291
2007	14,792	3,942
2008	14, 456	4,850
2009	14,245	6,432
2010	**13,000**	**8,000**
2011	**11,500**	**9,000**
2012	**10,000**	**10,000**



zaini@utm.my and
http://www.utm.my/vc

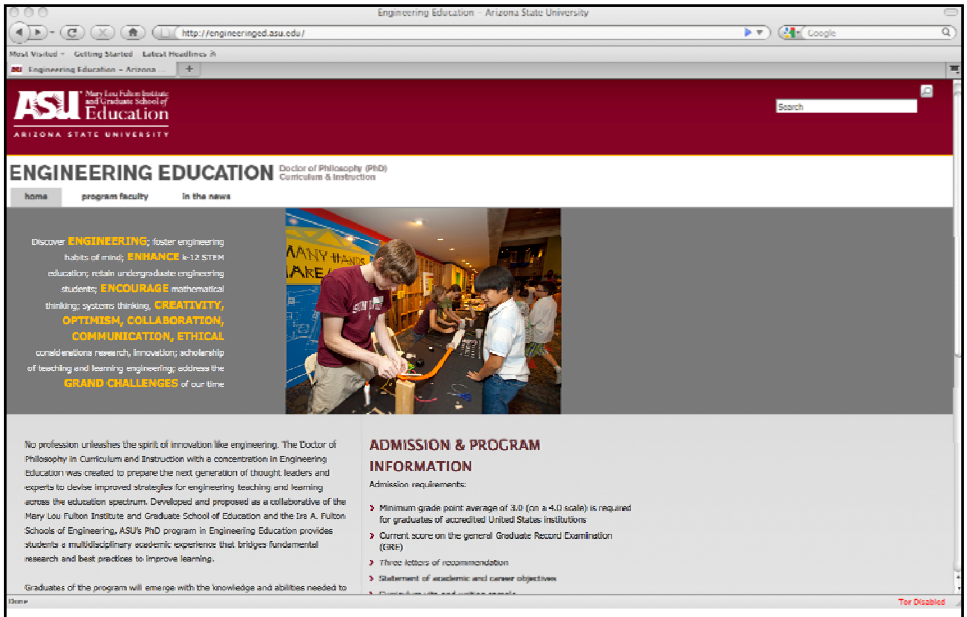
INSPIRING CREATIVE AND INNOVATIVE MINDS

PHD PROGRAMS IN ENGINEERING EDUCATION IN INDIA

- **Doctoral Programs in Engineering Education are offered in the four NITTTRs (National Institutes of Technical Teachers' Training Institutes) at Bhopal(West zone), Chandigarh(North zone), Chennai(South zone), and Kolkata(East zone).**

- **The candidates are essentially from Engineering Colleges, Polytechnics, NITTTRs and Industry. The Guides are from the host NITTTRs. The degrees are conferred by a neighboring University .**

R. Natarajan – IIT Madras



Arizona State University: Engineering Education Doctoral Program
http://engineeringed.asu.edu
Program Coordinator: Tirupalavanam Ganesh, tganesh@asu.edu

TWO PATHS

PHD Mechanical Engineering (Engineering Education Concentration)

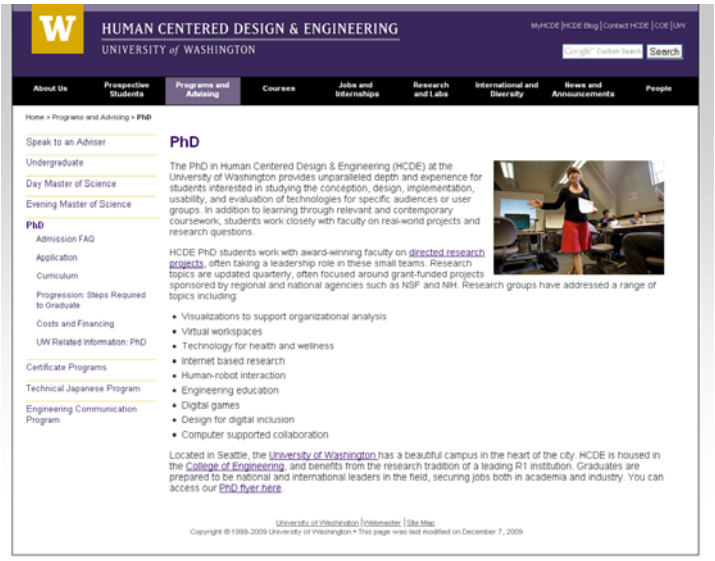
The engineering education concentration is interdisciplinary and will combine research in engineering with research in education. The concentration provides students with an opportunity to explore pedagogy, methodology, curriculum and instruction and apply it to engineering.

PHD Curriculum and Instruction (Engineering Education Concentration)

The concentration in engineering education within the Ph.D. in curriculum and instruction provides opportunities for interdisciplinary research in the teaching and learning of engineering, pre-K to college, by integrating research methods in learning theory, curriculum development, assessment, evaluation and education with a particular understanding of engineering content and practice in a variety of contexts.

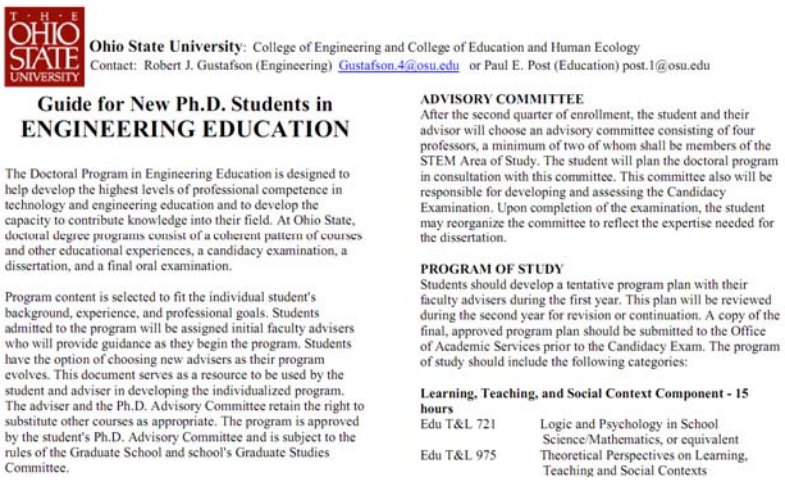
Chell Roberts – Arizona State University

http://technology.asu.edu/engineering



Cindy Atman – University of Washington

http://www.hcde.washington.edu/nav-prog-advise/phd



Ohio State University: College of Engineering and College of Education and Human Ecology
Contact: Robert J. Gustafson (Engineering) Gustafson.4@osu.edu or Paul E. Post (Education) post.1@osu.edu

Guide for New Ph.D. Students in ENGINEERING EDUCATION

The Doctoral Program in Engineering Education is designed to help develop the highest levels of professional competence in technology and engineering education and to develop the capacity to contribute knowledge into their field. At Ohio State, doctoral degree programs consist of a coherent pattern of courses and other educational experiences, a candidacy examination, a dissertation, and a final oral examination.

Program content is selected to fit the individual student's background, experience, and professional goals. Students admitted to the program will be assigned initial faculty advisers who will provide guidance as they begin the program. Students have the option of choosing new advisers as their program evolves. This document serves as a resource to be used by the student and adviser in developing the individualized program. The adviser and the Ph.D. Advisory Committee retain the right to substitute other courses as appropriate. The program is approved by the student's Ph.D. Advisory Committee and is subject to the rules of the Graduate School and school's Graduate Studies Committee.

ADVISORY COMMITTEE
After the second quarter of enrollment, the student and their advisor will choose an advisory committee consisting of four professors, a minimum of two of whom shall be members of the STEM Area of Study. The student will plan the doctoral program in consultation with this committee. This committee also will be responsible for developing and assessing the Candidacy Examination. Upon completion of the examination, the student may reorganize the committee to reflect the expertise needed for the dissertation.

PROGRAM OF STUDY
Students should develop a tentative program plan with their faculty advisers during the first year. This plan will be reviewed during the second year for revision or continuation. A copy of the final, approved program plan should be submitted to the Office of Academic Services prior to the Candidacy Exam. The program of study should include the following categories:

Learning, Teaching, and Social Context Component - 15 hours

Edu T&L 721	Logic and Psychology in School Science/Mathematics, or equivalent
Edu T&L 975	Theoretical Perspectives on Learning, Teaching and Social Contexts

Lisa Abrams – Ohio State University

http://people.ehe.ohio-state.edu/stem/

Participant Networking Activity (~30 min)

- Introductions with Guided Format
- Four (~7 min) Conversations in Groups of 2-3
  - Your Name & Organization
  - Status of EER PhD Program / Interest in EER PhD Program
  - Suggestions for Starting / Questions About Starting
  - Exchange Business Cards / Contact Information
  - Identify "intellectual neighborhoods" around common research, organization or other questions and interests
  - Talk about ways to follow up
- Bell will ring once after 6 min and twice after 7 min
- Move to a New Group

Connecting, Expanding & Sustaining the Emerging EER Community (~10 min)

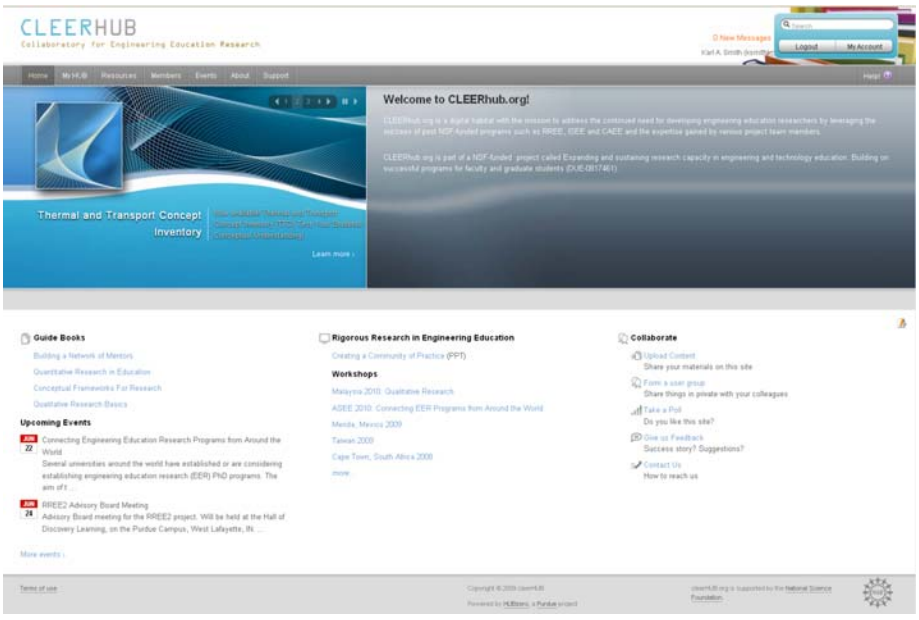
- Small Group (2-3) Brainstorming
  - Ideas for (1) local, (2) national, (3) international Community
  - Ideas for Virtual Community
  - Further Ideas
- Summarize Ideas and Write on 3x5 card

Next Steps (~ 5 min)

- **Silently reflect on your interests and plans for engineering education research**
- **Jot down**
  - **What do you plan to do next?**
  - **What are your longer range plans?**
- **Continue the conversation during the ASEE conference and beyond**
  - **EER Networks – REEN, SEFI, CLEERhub**
  - **Meet again at ASEE / IEEE FIE Conference, October, 2010**

http://grou.ps/reen

http://www.sefi.be/?page_id=1192



http://cleerhub.org

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IEEE/ASEE Frontiers in Education Annual Conference – October, 2010 – Session 1360

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Purdue University and
University of Minnesota

Acknowledgement

- We acknowledge the National Science Foundation for funding Karl Smith & Ruth Streveler's participation (DUE 0817461)
  - COLLABORATIVE RESEARCH: Expanding and sustaining research capacity in engineering and technology education: Building on successful programs for faculty and graduate students
- And the American Society for Engineering Education International Division for Sponsoring

Thank you!

An e-copy of this presentation will be posted to:
http://CLEERhub.org

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