

Special Session – Connecting and Expanding the Emerging Engineering Education Research (EER) and Engineering Education Innovation (EEI) Communities

Karl A. Smith and Ruth A. Streveler
ksmith@umn.edu, Streveler@purdue.edu

Abstract – Currently there is a lot of emphasis on engineering education research (EER) and engineering education innovation (EEI). In the EER domain, several universities have established or are considering establishing engineering education research centers and PhD programs. In the EEI domain, the National Academy of Engineering launched the Frontiers of Engineering Education (FOEE) symposium and NSF recast CCLI as TUES. The growth of interest in the scholarship of teaching and learning (SoTL) has great potential to contribute to EER and EEI. A recent NSF Webinar series is featuring SoTL. The aim of this special session is to provide an opportunity for representatives of these three communities to network with one another, to welcome representatives from emerging programs, and to provide guidance to colleagues who are considering establishing initiatives in these areas. We will set up a space on the *Collaboratory for Engineering Education Research* (CLEERhub.org) where we will post the program descriptions (and links). We will encourage participants to use CLEERhub.org as a means for following up after the session.

Index Terms – engineering education research, engineering education innovation, scholarship of teaching and learning, networking

INTRODUCTION

The engineering education research community is growing rapidly and needs to be connected and more closely integrated with the engineering education innovation and scholarship of teaching and learning communities.

SESSION CONTENT

In 2004, the National Science Foundation sponsored three projects to build capacity in engineering education research: Rigorous Research in Engineering Education: Creating a Community of Practice (RREE) [DUE-0341127], Strengthening HBCU Engineering Education Research Capacity, [HRD-0411994], and the Institute for Scholarship in Engineering Education (ISEE), an element of the Center for the Advancement of Engineering Education [ESI-0227558]. These programs attracted tremendous interest,

with participant applications outweighing available slots by a ratio of approximately 3 to 1. The engineering education research communities that RREE and ISEE helped to foster have expanded and now have global reach. Capacity building has also been aided by the creation of PhD-granting departments of Engineering Education at several US and international institutions.

NSF recently funded a new project to continue and expand the work done by RREE and ISEE. *Expanding and sustaining research capacity in engineering and technology education: Building on successful programs for faculty and graduate students* (which we will call the REEE2) (DUE-0817461) broadens the Community of Practice (COP) model successfully used to develop the RREE and ISEE programs.

The National Academy of Engineering (NAE) has sponsored the Frontiers of Engineering Education symposium the past two years and the focus is on engineering education innovation (EEI). Many of the over 80 participants in these two symposia had little or no familiarity with the state of the art of engineering education research and this networking session will provide opportunities to connect the two communities.

Several universities have formed centers that are focused on engineering education innovation such as Ohio State University's Engineering Education Innovation Center (<http://eic.osu.edu/about>) and the Hong Kong University of Science and Technology's Center for Engineering Education Innovation (<http://www.seng.ust.hk/e2i/index.html>) and we hope representatives of these communities will join us

In January 2011 NSF changed the emphasis of the CCLI program to TUES as noted in the Program Solicitation (NSF 10-544) – The title of the program was changed from "Course, Curriculum and Laboratory Improvement CCLI" to "Transforming Undergraduate Education in STEM [Science, Technology, Engineering, and Mathematics] (TUES)" in order to emphasize the special interest in projects that have the potential to transform undergraduate STEM education. The additional review criteria have been modified to emphasize the desire for projects that (1) propose materials, processes, or models that have the potential to enhance student learning and to be adapted easily by other sites and (2) involve a significant effort to facilitate adaptation at other sites – and hence bringing together the EER and EEI communities is key to succeeding.

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Rising interest in the scholarship of teaching and learning (SoTL) is congruent with the emerging EER and EEI communities and has tremendous potential to strengthen the overall effort.

Faculty and graduate students interested in engineering education research and innovation are widely distributed and often isolated in their department and institution. Many are eager to meet and interact with colleagues who have similar interests. This session provides the opportunity for people who have been involved in engineering education research and innovation to reconnect, and to welcome new folks into these emerging communities.

Tentative Session Agenda

Activity	Time Allotted (min)
Introduction of session and facilitators	10
Brief report on status of RREE project and NAE FOEE	
Update on CLEERHub.org (Collaboratory for Engineering Education Research)	10
Update on EER workshops and JEE collaboration	5
Update on EEI – NAE FOEE & NSF TUES	10
Participant Networking	
Rapid introductions around guided questions – Four to five conversations in groups of 3 – as a way to meet many people	25
Identification of “intellectual neighborhoods” around research and innovation questions and opportunities – individual reflection and writing	5
Brainstorming on strategies to connect, expand, and sustain the emerging EER and EEI communities	15
Summary of ideas for (1) local, (2) national – conferences, etc. and (3) virtual community	5
Individuals share reflections with the large group, facilitators sum up the session and participants complete feedback forms	10

SESSION GOALS

This session will provide participants with an opportunity to meet and interact with people interested in engineering education research (EER), and contribute to future plans by:

- Increasing familiarity with activities and people involved in engineering education research
- Actively participating in EER community building
- Participating in the planning for next steps

ANTICIPATED AUDIENCE

The anticipated audience includes educators who are interested in strengthening their involvement or exploring becoming more involved with the emerging engineering education research and/or innovation communities. Noting the success of past special sessions and workshops where participants actively engaged in exploring engineering education research, participants interested in engaging in a lively networking and brainstorming session may also enjoy and benefit from attending.

EXPECTED OUTCOMES

At the completion of this special session, it is anticipated that participants will be able to:

- Articulate the current status of the emerging engineering education research and innovation communities
- Describe key aspects of current efforts at face-to-face and virtual community building
- Identify interested colleagues with whom they will continue the conversation
- Clearly articulate their interest in engineering education research and innovation

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REFERENCES

- [1] Streveler, R.A., Magana, A.J., Smith, K.A., and Douglas, T.C. “CLEERhub.org: Creating a digital habitat for engineering education researchers”, *American Society for Engineering Education Annual Conference Proceedings*, 2010.

AUTHOR INFORMATION

Karl A. Smith School of Engineering Education, Purdue University, smith511@purdue.edu; and Civil Engineering (Emeritus), University of Minnesota, ksmith@umn.edu

Ruth A. Streveler School of Engineering Education, Purdue University, Streveler@purdue.edu