Editing Engineering Education Research Handbooks & Institutionalizing an Academic Field

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ABOUT ME

Professor
Department of Information Sciences & Technology
Director, Engineering Education & Cyberlearning Laboratory (EECL)
George Mason University

Previously positions:
Assistant - Associate Professor (2007-2013)
Department of Engineering Education, Virginia Tech
Affiliated Faculty: CS, ISE, STS, Center for HCl & CiBM

Education:
Ph.D., Stanford University, Learning Sciences & Technology Design
Undergrad: Mechanical Engineering
M.S. degrees: Mass Communication, Information Design, Creative Writing

RESEARCH
Interdisciplinary research program; publish largely in engineering education; serve on editorial boards of Advances in Engineering Education & Engineering Studies. Other publications in educational technology and computing journals and proceedings. (ACM CHI, CSCW, ICTD; CSCL, ICLS).
WHAT INFORMED MY INITIAL PERSPECTIVE

SCHOLARLY ENGAGEMENT WITH
THE ENGINEERING EDUCATION COMMUNITY

REPORTS
Contributed to several NSF, NAE, and ASEE reports on different aspects of engineering education,

PUBLICATIONS
Co-editor of the research handbook. Write a regular column for ASEE Prism and have edited several journal special issues (JEE, AEE, Engineering Studies).

SOFTWARE
Co-developed iKNEER, (Interactive Knowledge Networks for Engineering Education Research), a interactive repository of engineering education papers and proposal abstracts. Subsequently developed DIA2, a portal to analyze NSF funding portfolio,

SERVICE
Serve as director of ASEE-ERM, and on editorial boards of AEE & Engineering Studies. Organized a doctoral consortium and participate as mentor in PEER. Part of the organizing team for EEC Awardees conferences.
II. RESEARCH AREAS

The five research areas for the new discipline of Engineering Education consist of one or more interrelated strands of research that can be investigated independently or integrated with other areas of inquiry. The research areas include:

- Engineering Epistemologies
- Engineering Learning Mechanisms
- Engineering Learning Systems
- Engineering Diversity and Inclusiveness
- Engineering Assessment

NAE Special Report (JEE 2006)
INSTITUTIONALIZING A FIELD (circa 2010)

Building legitimacy for EER as a worthwhile field of endeavor

Showcasing a strong rigorous/“scientific” foundation for EER

Creating recognition beyond scholarly community

Attracting new talent into the field

Forward looking and reflective (continuous process for any field)

The field of Learning Sciences as a model as I was familiar with it through my graduate work (master’s and doctoral)

CAMBRIDGE HANDBOOK OF ENGINEERING EDUCATION RESEARCH

70+ authors, 30+ chapters; Shaped NSF solicitation, NAE agenda, used as core volume for engineering education research courses; Best Book Award by AERA Division I (2014).
ENGINEERING EDUCATION IN THE U.S. AND INTERNATIONALLY

1st GEN: CENTERS

2nd GEN: DEPTS

3rd GEN: CENTER+

4th GEN: DEPT EXP

5th GEN

INTERNATIONAL

CAEE

Purdue University

Virginia Tech.

University of Georgia

FIU

University of Cincinnati

University of Nebraska

EERC

Stanford University

Montana State University Engineering Education Research Center

University of Vermont

The Ohio State University

University of Washington

Colorado School of Mines

Clemson University

Arizona State University

University at Buffalo

ASEE

SASEE

SEFI

IFIEE

Indo Universal Collaboration for Engineering Education

9th World Engineering Education Forum 2019

CEE

CEEA

ACCEG
Engineering Education Community Resource

This engineering education wiki is a resource created in 2011 by the American Society for Engineering Education’s Student Division (ASEE SD), in collaboration with the Center For Engineering Learning & Teaching (CELT). The resource primarily consists of links to programs, centers, researchers, societies, publication venues, etc., intended to help in the exploration of engineering and, more broadly, STEM education. We hope that ultimately this wiki will encourage community members to expand this resource as a place to inform students and other interested individuals new to engineering education about the research happening in this field at institutions and centers all over the world.

FYI most site visitors do not need to request access to join this workspace. All site content is public. Only those interested in maintaining the wiki need to request access to join. If you want to suggest a simple addition or edit, feel free to email us (details below).

The resource currently consists of lists in the following categories:

- Engineering/STEM Education Departments and Programs
  - Graduate level
  - Undergraduate level
- Engineering/STEM Education Centers, Institutes, and Research Groups
- Engineering Education Communities and Societies
- Engineering Education Research Publication Venues (including Special Issues and Calls for Book Chapters)
- Engineering Education Conferences
- Engineering Education Events (including PhD program open houses and workshops) (last addition: 2021/09/16)
- Engineering Education Accreditation Organizations
- Resources for Engineering Educators
- Engineering Education Scholarship and Funding Sources
- Engineering/STEM Education Job Postings (last addition: 2021/11/16)
- Research Briefs - Engineering Education Podcasts
- Domestique - Support for developing NSF CAREER Proposals

These lists are works in progress. Your contributions help keep them current and complete. If you wish to add anything on this wiki, please contact the list maintainers by e-mailing engineeringeducationlist@uw.edu and providing a link to your addition (Note: The wiki does not post files):

Adam Carberry, Associate Professor @ Arizona State University

http://engineeringeducationlist.pbworks.com/w/page/27578912/Engineering%20Education%20Community%20Resource
Similar efforts in the field of computing education research (CER), as it moves from CSEd, a more practice-oriented community, towards a research-driven field. Changes in journals as well (what they are called and the kinds of papers they accept).

Both EER and CER are following models from others discipline-based education research (DBER) fields such as physics and mathematics education. CER is more international in nature and CER is different than EER in that for many CER contributors, use of technology or computing for education is often a part of their disciplinary work as well.

- Development of tools is characteristic of a lot of CER (e.g., assessment, programming).
- Use of tools found online, such as GitHub or online communities such as StackExchange also a large component of education and learning.

In the U.S., many scholars involved in CER come from schools of education and preK-12 related research is quite common (compared to EER).

- Many researchers come from fields such as Learning Sciences and Cognitive Science and have been funded by NSF programs such as Cyberlearning.

In the U.S., some new engineering education departments are “engineering and computing education” departments as the integration between the field is gaining momentum.

What can the disciplines/fields learn from each other?
International Handbook of Engineering Education Research (IHEER/Routledge)

Update of previous handbook (Cambridge Handbook of Engineering Education Research, 2014) with new content not covered earlier; Almost a decade during the first and second volumes; work on the first started in 2010.

Open access model funded through U.S. National Science Foundation.

Rather than just research, focus also on educational practice and a lot more international than previous version as engineering education field has grown a lot across countries (it is still a little U.S. centric as it has been hard finding authors).

Around 100 authors of which 10% were authors of chapters in volume one.

Process: community-wide survey to get feedback on topics and suggested experts who could write the chapters (~150 complete/usable responses).

Conference inspired review model; 18 Associate Editors helping with the process; EasyChair for managing the process; AEs will also assist with virtual seminar/discussion of chapters through a series of talks.
The Process and Field Building

The process of putting together a volume like this, if done in the right way, is a field building exercise on its own.

It creates collaborations and a network; it brings those on the margins/periphery towards full participation.

It leads to future collaborations among contributors, many of whom have not worked together before.

Leads to new ideas that then results in new papers and projects.

Showcases field maturity to stakeholders.
Process

- Step 1: Figure out what you want to do and if you really want to do it (why?); talk to people, other scholars who have edited handbooks before.

- Step 2: Find an editor and get feedback on the overall idea (publishers’ webpage, conferences, acknowledgement sections of similar books); this is a tricky thing as you don’t really know the person and a lot of trust is required. Easier to trust university presses as opposed to the big ones (for me!).

- Step 2.5: Try to get a sense of authors, chapters, and abstracts before Step 3 for a smoother process but a proposal doesn’t necessarily need that. Every publisher has a template they will send you (you need to be able to justify the need for a book).

- Step 3: Write the book proposal and send it to the editor who will send it out to get reviewed (this process varies but usually 5-10 reviewers are solicited through a single-blind process; reviewers, of course, know editor and proposed authors).
Process

- Step 4: Recruit authors, create a timeline, put together a system for article submission and review; this is a very time-consuming process and often the biggest bottle-neck for the editor (if you really want to do a comprehensive job; for non-handbook edited volumes you can also just invite people you know from within the community). Arrange reviewers.

- Step 5: Send authors instructions including formatting, references, indexing so that the chapter is in as good a shape as possible; try to do it from the first draft itself or there will be a lot to take care of later.

- Step 6: Set a strict timeline to complete everything and send it to the publisher (they will not start their process until everything is completed at your end); they are often likely to comeback with more changes and/or formatting issues.

- Step 7: Plan for post-publishing discussions, events, reviews, etc.; Make a list of people you’d like to send the book to who can influence its uptake.
THANK YOU!