ICTIEE AP 2018
International Speakers

Bevlee Watford
Virginia Tech College of Engineering

Student Support Programs in a College of Engineering

There is no doubt that there is a perception that we do not graduate enough engineers and computer science bachelors to fill our national needs. The national 5 year graduation rate hovers at 50%. A small increase in this value can result in thousands of additional graduates, hence many researchers look for ways to increase the retention to graduate of entering freshman engineering and computer science students. For many years the pathway to address this problem has had two points of entry from the perspective of engineering education researchers. We can "fix the system" meaning we make changes to the way we educate our students. This can include altering both classroom instructional content and pedagogy. Substantial changes have been made by instructors within the classroom that have resulted in more hands-on and engaging activities for students, leading to increased student success.

A second approach is to provide students with the tools and support they need to navigate the existing engineering educational environment. This can include fundamental activities such as tutoring and study groups. It can also include residence hall based living learning communities, peer and alumni mentoring programs and summer bridge programs. This talk will describe Virginia Tech's efforts to create an environment that gives students the support they need to successfully matriculate through the engineering and computing curriculums.

Cynthia J. Atman
University of Washington

Doing and Teaching Design: Using Research Results to Inform Design Teaching

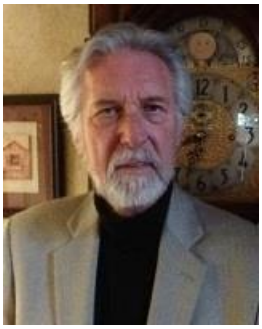
What does design look like? What does it sound like? How do designers spend their time scoping out a problem, discovering user needs, developing alternative solutions and communicating about design decisions? Does amount of prior experience make a difference in how designers choose to spend time in these aspects of the design process? How can insights from the answers to these questions inform design teaching and learning? What can classroom reflection activities tell us about what students think is important about the design process?

In this presentation, I will present findings from research undertaken for two decades that can inform answers to these questions.

David Voltmer
Rose-Hulman Professor Emeritus of ECE

Why aren't computer simulations in agreement with laboratory measurements?

Simulation tools enable engineering undergraduates to "design" complex systems with the availability of increasing computer power. But, too often these simulations are not in agreement with performance tests and measurements of prototype systems. Without adequate "real world" experiences through laboratory course work or design/build/test projects students place too much confidence in simulations. More importantly, they are ill-prepared to understand or explain the shortcomings of simulations. This presentation advocates for integration of laboratory and design projects in undergraduate engineering curricula as imperative in educating engineers for the future.



Duane L. Abata
South Dakota School of Mines and Technology

Developing Ties with Universities in the United States

There is no doubt that engineering is a global profession. Almost all international corporations employ engineers from countries all over the world. It stands to reason that engineering education is global as well. Thus, there is a continuing need for engineering students to be prepared to work on an international level. To this end, international collaboration between universities in India, the United States, and elsewhere is vital to the health, well being, and growth of the engineering profession and, in an altruistic sense, economic development of the world. Developing student and faculty exchange programs are essential components in this healthy international environment. This presentation will discuss the best ways to achieve successful international collaboration and exchange of students and faculty members between schools and universities across international boundaries.

Jenna Carpenter
Campbell University

Professional Development: Providing Engineering Graduates with Key 21st Century Skills

Since the turn of the century, numerous high level reports have called for universities around the world to teach engineering majors a variety of 21st century skills that have not traditionally been part of the undergraduate engineering curriculum. From the US National Academy of Engineering Reports on “The

Engineer of 2020," "Educating the Engineer of 2020" and the "Grand Challenges for Engineering," to the United Nations "Millennium Development Goals" for 2015 and newer UN "Sustainable Development Goals" for 2030 and ABET's newly revised Student Outcomes for engineering graduates, it is clear that universities must prepare engineers to work in a very different, rapidly changing and increasingly global world. We will examine successful strategies using both curricular and extracurricular experiences to embed this type of training in the curriculum and thereby graduate engineers prepared to work in the 21st century world.

Jim Borgford-Parnell
University of Washington

Moving Beyond Our Legacy Fallacies: A Critical Role for Centers for Teaching and Learning

More attention is being paid to improving the quality of teaching in engineering education than ever before. However, the legacy fallacies that persist in our colleges and universities continue to retard our development as teachers, our students as learners and our institutions as learning communities. Here are some of those legacy fallacies: (a) If a person is expert in something, that person can teach that thing to others; (b) if a person has had some teaching success, that person can teach others to teach successfully; (c) In the teaching profession, ethical practice need not be linked to teaching competence; (d) teaching adults is the same as teaching children; (e) students are learners and faculty are something else; (f) best practices are "best" everywhere; (f) improving teaching doesn't have to involve students; and (g) education is a business, not a caring profession. Centers for Teaching and Learning and the engineering faculty they serve can either ignore and perpetuate these legacy fallacies or they can tackle them head-on. What would that look like?

Lyle D. Feisel
State University of New York at Binghamton

Ethics and Values in Engineering Education

In engineering, most of what we teach falls into the cognitive domain: laws, facts, procedures, analysis, synthesis, problem solving. Traditionally, we do very little in the affective domain where the attitudes, ethics and values of our students are determined. Yet, the success of our graduates, as well as the health and safety of the public, are highly dependent on engineers making the right decision in situations that are ambiguous. This presentation will make the case for paying greater attention to the affective domain and will present some technique for bringing ethics and values into our educational systems.

Matthew W. Ohland
Purdue University

Forming and Managing Student Teams

There are many reasons to put students in teams – teaching them to work in teams, the learning benefits of collaboration, the diversity benefits of finding out other students' perspectives, and the ability to provide a deeper level of feedback on the smaller number of assignments submitted by student teams are among them. For all these benefits, having students work in teams introduces other issues for faculty to manage – from forming teams to dealing with teams in crisis to evaluating how much each student contributed to assignments submitted as a team. This workshop will help participants design, implement, and evaluate team-based learning experiences for their classes. Research-based strategies to address these issues will be discussed, and award-winning online tools that can help will be introduced – tools that also provide opportunities for faculty to engage in research.

Scott Roberts
University of Maryland

Advancing University Climate for Teaching & Learning: Four Essential Elements

Investments in educational programs will only bear fruit if they are made within institutions that have a strong climate for teaching and learning. Scholarly research on this has identified four essential elements, each of which much be address as part of a holistic approach to educational innovation. I will provide an overview of the evidence and some practical examples of how we might establish higher expectations, provide more effective oversight to identify areas for improvement and inform resource allocation, offer timely support at scale through professional development and resources, and acknowledge excellence with meaningful rewards and recognition.

Michael K. J. Milligan
ABET

The role of Accreditation in Preparing Tomorrow's Technical Workforce

Developing future engineers to effectively work in a global environment is critical to solving complex global challenges. We'll explore how program accreditation is helping influence the workforce of tomorrow by helping shape the undergraduate engineering experience.

Victoria L. Dorman
Princeton University

Entrepreneurship and Design Thinking program at the Keller Center

The Keller Center for Innovation in Engineering Education is based in Princeton University's School of Engineering and Applied Science and shares the school's vision for bridging disciplines to ensure that all students are prepared to put science and technology to use in solving critical societal challenges. An innovative educational initiative called EPICS (Engineering Projects in Community Service), which is being modeled after the EPICS program at the Purdue University, is an integral part of the Entrepreneurship and Design Thinking program at the Keller Center. It is an engineering project course that operates in a service-learning context. Students earn academic credit for their participation in design teams that solve technology-based problems for not-for-profit organizations. The teams are: multidisciplinary – drawing students from across engineering and around the university; vertically-integrated – maintaining a mix of freshman through seniors each semester; and long-term – involving students for more than one semester. The continuity, technical depth, and disciplinary breadth of these teams enable delivery of projects of significant benefit to the community.

Yacob Astatke
Morgan State University

Using Active Learning Modules & Portable ECE laboratory Instrumentation to bring Hands-on Experience both inside and outside the Classroom

The ADALM1000 (M1K) Active Learning Module is an easy to use tool designed to introduce the fundamentals of electrical engineering in a self-led or instructor- led setting. By turning any PC into a

powerful electrical engineering workstation, the USB-powered M1K lets you measure, visualize, analyze, record, and control mixed analog and digital signal circuits of various kinds. It is small enough to fit in your pocket, but powerful enough to replace a stack of lab equipment.
Dr. Yacob Astatke will give an overview of how these types of portable laboratory instruments are changing the way we teach electrical engineering concepts at higher education institutions in the USA, Africa, and Asia.

J.P.Mohsen
University of Louisville

Abstract not available

Hans J.Hoyer
IFEES

Abstract not available

William Oakes
Purdue University

Abstract not available