2017-18 Strategic Instructional Innovations Program
College of Engineering, University of Illinois at Urbana-Champaign

Competitively awarded grants enable faculty teams to accelerate best practices for teaching, develop new best practices, and reimagine what it means to educate our students.

Implementation & Exploration Track

A Project-Based Introduction to Aerospace Engineering
This project is the beginning of an effort to implement project-based learning and student portfolios across the curriculum. Initial changes are in AE100 (Introduction to Aerospace Engineering).
Brian Woodard (PI), Tim Bretl, Phillip Ansell, Laura Gerhold. Liaison: Jeff Roesler

Improving Student Learning Experiences through Algorithmic Methods of Team Formation in Large Engineering Courses
The vision of this project is to integrate, study, sustain, and champion the use of a criterion-based algorithmic method for organizing students into effective teams in large project-based engineering courses. The CATME software tool will provide the team formation testbed.
Brian Bailey (PI), Darko Marinov, Ranjitha Kumar, Wai-Tat Fu, Karrie Karahalios (CS). Liaison: Elif Ertekin

Growing the PrairieLearn Community
PrairieLearn is a framework for online learning that was built at Illinois. This team plans to grow the community of instructors who use and think critically about PrairieLearn, in order to extend its positive impact across the College.
Tim Bretl (AeroE) (PI), Jenny Amos (BioE), Geoffrey Herman, Mariana Silva, Craig Zilles (CS), Dave Mussulman (Engr IT), Tim Stelzer (Physics), Dallas Trinkle (MatSE), Matt West (MechSE). Liaison: Jeff Roesler

Nurturing Design Thinking in Engineering Courses
This team is developing multidisciplinary activities that engage students from Mechanical Engineering, Computer Science, and Art & Design in design thinking and the studio critique method.
Sam Tawfick (MechSE) (PI), Brian Bailey (CS), Eric Benson (Art & Design). Liaison: Elif Ertekin

Engineers SPEAK: Just-in-Time Delivery of Presentation Instruction
Graduate students in the Communications department run clinics for senior design students in Electrical and Computer Engineering and Agricultural and Biological Engineering.
Jonathan Makela (ECE), Grace Giorgio, Ann Bryan, Katie Bruner (Communications), Steve Zahos (ABE), Kelly Cross (BioE), Blake Johnson (MechSE). Liaison: Jeff Erickson

iDesign: Integrated MechSE Design Curriculum
This project aims to encompass and integrate MechSE design courses for freshmen through seniors. The objectives are to: (1) Produce engineers with competitive design skills, (2) Increase student/faculty interaction, (3) Increase student satisfaction with design courses, (4) Enlarge the pool of faculty willing and able to teach design, and (5) Facilitate ABET accreditation for design classes.
Elizabeth Hsiao-Wecksler (PI), Alison Dunn, Bruce Flachsbart, Emad Jassim, Blake Johnson, Seok Kim, Ralf Moller, Hae-Won Park, Michael Philpott, Sam Tawfick, Aimy Wissa. Liaison: Geoffrey Herman

Developing Instruction in Technical Writing for Freshman Engineering Students through ILEE
This team is developing a co-taught writing-in-the-disciplines course for first-year engineering students and relevant training modules for graduate assistants.
Karin Jensen (PI), Marcia Pool (BioE), Dallas Trinkle (MatSE), James Hutchinson (ECE), Patricia Watts (Linguistics). Liaison: Tim Bretl

Improving the Writing Skills of Undergraduate Engineering Students: Empowering Engineering Faculty and Teaching Assistants
This team is developing and implementing a writing-across-the-curriculum program for Engineering faculty, and preparing an NSF proposal on integrating writing across the engineering curricula.
Julie Zilles (PI) and John Popovics (CEE), Lance Cooper, Celia Elliott, and John Yoritomo (Physics), John Gallagher, Paul Prior, and Nicole Turnipseed (English and Center for Writing Studies). Liaison: Jenny Amos
Teaching Assistant Training: Engineering Leadership Initiative for Teaching Enhancement (ELITE)
This team is developing a course to prepare teaching assistants in the College of Engineering for their instructional and leadership responsibilities.
Yuting Chen (ECE), Matthew Goodman (MatSE), Blake Johnson (MechSE) (co-PIs), Lucas Anderson and Hannah Choi (Center for Innovation in Teaching and Learning, Chris Migotsky (AE3). Liaison: Brian Bailey

Developing Intervention Methods that Improve Visuospatial Skills of Engineering Students
The objective of this project is to develop computerized training modules that enhance students’ visuospatial skills, and implement them in three large engineering design courses.
Wai-Tat Fu (PI), Geoffrey Herman, Ziang Xiao, Yuqi Yao, Xu Zhe (CS), Jim Leake (ISE), Brian Woodard (AeroE), Angie Wolters (Women in Engineering); Mike Philpott (MechSE). Liaison: Jeff Erickson

Creativity, Innovation, and Vision: Online Course Development
This team is creating modules and materials for an online course on creativity.
Bruce Elliott-Litchfield (ABE and TEC) (PI), Esteban Gast, Keilin Deahl, Marianne Alleyne, Arif Nelson. Liaison: Brian Bailey

Start-Up Track

Physics 213 and 214 Data Gathering and Improvement
The objective of this proposal is to focus PHYS 213 (Thermal Physics) and 214 (Quantum Physics) on core concepts to better prepare engineers for classes that depend on them.
Lucas Wagner (PI), Bryce Gadway, Taylor Hughes, Paul Kwiat (Physics). Liaison: Jonathan Makela

Open-Source Curriculum Development
The purpose of this project is to explore the possibility that curriculum development for university courses can operate as well as open-source software development does. Faculty will develop and share materials on GitHub.
Katy Huff (NPRE) (PI), Neal Davis (CS), colleagues across the country. Liaison: Jenny Amos

Bioprocess Control Systems
This team will develop a hands-on, multi-departmental course on designing and implementing control systems for bioprocessing applications. They will develop course materials including hardware and software demonstrations, outlines for project-based learning, and plan for a coordinated, seamless teaching / facilitation process among instructors.
Kaustubh Bhalerao (PI) and Tony Grift (ABE), Chris Rao (ChBE), Scott Morris (ABE/FSHN). Liaison: Jonathan Makela

Adaptation Track

Providing Bi-weekly Assessments with Retake Utilizing the Computer-Based Testing Facility in Physics 100
This project aims to improve the performance of students taking physics 100 by providing them with more frequent exams, including the opportunity to retake an exam to improve their score, and to evaluate the impact of these changes.
Tim Stelzer (PI), Morten Lundsgaard, Gary Gladding, Brianne Guttmann (Physics. Collaborator: Matt West