

# NORTHWESTERN CENTER FOR ENGINEERING EDUCATION RESEARCH

**Newsletter No. 11**

**April 12, 2019**

## News

The Northwestern Center for Engineering Education Research (NCEER) advances evidence-based engineering education and engineering education research at Northwestern. NCEER is interested in collaborating on projects that further engineering education, and sponsors seminars and discussions on these topics. We are interested in your ideas for new projects that NCEER can assist with.

**Want to stay in the loop?** Please contact Tara Sadera ([tara.sadera@northwestern.edu](mailto:tara.sadera@northwestern.edu)) to be added to the NCEER mailing list.

## Notable Faculty Activities

- Civil and Environmental Engineering department's Professor James Hambleton has been named a 2019 recipient of The Alumnae of Northwestern University's Award for Curriculum Development. Hambleton will be creating an optional course module to compliment EA2, containing hands-on activities, real-world examples, and competitions designed to enhance learning of engineering mechanics and help with retention of freshmen engineers. [Read more](#)
- Chemical and Biological Engineering department's Professor Michael Jewett and graduate student Jessica Stark teamed up with Jim Collins of MIT to develop synthetic biology experimental kits for K-12 classrooms for less than \$100 each. The goal of BioBits is to introduce students to experiments and concepts of synthetic biology that until now required equipment too costly or complicated for the classroom. [Read more](#)

## Upcoming events

### **Symposium on Computer Science and Learning Sciences**

April 28-30

The inaugural Symposium on Computer Science and Learning Sciences is a celebration of the launch of the Center for Computer Science and Learning Sciences at Northwestern University. The symposium will feature a series of insightful discussions led by scientists at the intersection of computing and the learning sciences and engage in a range of dialogues about the opportunities, challenges, and innovative solutions to education and learning for STEM and computer science fields. For more details and a link to registration (by April 15) see <https://www.cslsymposium.northwestern.edu/>

### **Graduate Learning and Teaching Spring Symposium**

Wednesday June 12, 3-6pm in Pancoe Café and Auditorium

This event is sponsored jointly by CIRTL at Northwestern and the Northwestern Center for Engineering Education Research. It will feature graduate students and postdocs presenting posters about their education projects, and a seminar at 4 PM by Professor Alice Pawley from the School of Engineering Education at Purdue. Prof. Pawley is well-known for her research on inclusion and social justice as it applies to education.

### **American Society for Engineering Education**

June 16 – 19 in at the Tampa Convention Center

If you are going to the [ASEE conference](#), please let Rob Linsenmeier or Jennifer Cole know. NCEER will be hosting a dinner for NU attendees on Tuesday, June 18. Details to come.

### **INSIGHT XII – save the date!**

Insight XII, a workshop on an education topic of interest to McCormick faculty, will be held the week after fall quarter final exams, probably December 17, 2019. The topic has not yet been determined, so please contact us if you have an idea.

## Recent work with Centers at NU

**Launch of the Center for Computing and Learning Sciences.** The new Northwestern Center for Computer Science and Learning Sciences recognizes and expands Northwestern's pioneering leadership at the intersection of computer science, education, cognitive science, and engineering. Through its academic, research, and event-based programming, the Center, which is a joint effort of McCormick and SESP and is directed by Professors Chris Riesbeck and Uri Wilensky, seeks to develop the next generation of leaders at the intersection of computer

science and learning sciences and connect researchers and practitioners to create the broadest possible impact. In case you miss the inaugural symposium, you can still learn about it [here](#).

Jennifer Cole has been working as Northwestern's education liaison for the **Center for Innovative and Strategic Transformation of Alkane Resources (CISTAR) NSF Engineering Research Center (ERC)**. The ERC connects Northwestern University, Purdue University, University of Notre Dame, University of Texas, and University of New Mexico on a mission to create modular solutions for processing shale gas into useful light hydrocarbons, like methane and propane.

The education team from the CISTAR ERC has been working on three main initiatives. 1. To improve the connection between graduate students and industry through activities such as internships, brown-bag lunches with Center industry members, industry judged poster and presentation competitions, and a networking "Industry Day" at the annual meeting. 2. Add to the curricular experiences of undergraduate and graduate students through new coursework on light hydrocarbons and REU programs. 3. Develop educational materials about chemical engineering concepts such as catalysis, separation, energy, and petroleum, aimed at K-12 students and their teachers in the form of outreach activities, classroom modules, and university research experiences for high school students and teachers.

## In case you missed it...

Here are some highlights of recent events.

### **NCEER Workshop: Helping Your Students Learn via Sketching**

April 9, 2019

Presenter: Kenneth Forbus

This workshop allowed interested faculty and grad students to try out Sketch Worksheets, an educational software developed at Northwestern design to provide feedback on sketches and improve students' spatial skills. Students use Sketch Worksheets to complete a specific exercise and get feedback from an automatic comparison of their sketch with a hidden solution sketch. The software uses rubrics to help instructors with grading. Geoscience classes at NU and UW-Madison are already using Sketch Worksheets, however their potential is farther reaching. They are domain-independent, requiring only that the exercise involves visual distinctions that the software can understand. They are scalable and customizable. Some examples are available [here](#), or search "CogSketch" at <http://serc.Carleton.edu/index.html>

## **INSIGHT XI Workshop: 3D Printing and Maker Skills as Educational Tools**

December 18, 2018

Special thanks to Presenters Mike Beltran, Nick Marchuk, and Pam Daniels

The most recent Insight Workshop explored the idea of using 3D printing and other maker skills in the classroom in a variety of ways. Faculty are using these tools to engage students in coursework, demonstrate concepts, and teach skills necessary to move from idea to prototype. Panelists discussed some of the ways they have used 3D printing and other fabrication methods in their own classrooms. These ranged from an instructor-centered demonstration of a fabricated part to provide a visual illustration of a difficult engineering concept, to student independent exploration of fabrication techniques and rapid testing of design concepts. In the latter, students have the ability to make multiple prototypes quite rapidly, varying physical features to see how those modifications affect the performance of the prototype. The Insight workshop included a hands on portion in which audience members had the opportunity to create a CAD design and use the 3D printer to make it.

If you'd like to know more about some of NU's Maker Spaces, here are some resources to get you started.

The [Rapid Prototyping and Fabrication Lab](#) in the Segal Design Institute

The [Corner Makery](#) in the Ford Building

[Mudd Library Maker lab](#)

[Mudd Lightboard](#)

And [more](#)

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