

# Campus Conference

## 2016



**COLORADO**SCHOOL**OF MINES**  
EARTH • ENERGY • ENVIRONMENT

# FACULTY AWARDS CERSE

**ROEL SNIEDER, GP:**

Society of Exploration Geophysicists  
2016 Outstanding Educator + 2016 Beno  
Gutenberg Medal, European Geophysical  
Union (EGU)

**LINDA BATTALORA, PE:**

Society of Petroleum Engineers Rocky  
Mountain Section 2015 Distinguished  
Achievement Award

**TERRY YOUNG, GP (EMERITUS):**

Society of Exploration Geophysicists Lifetime  
Membership Award

**ILYA TSVANKIN, GP:**

Society of Exploration Geophysicists  
Honorary Membership Award

**MURRAY HITZMAN, GE:**

Society of Exploration Geophysicists 2016  
International Exchange Lecturer + Des  
Pretorius Award from the Geological Society  
of South Africa + 2016 Haddon Forrester King  
Medal by Australian Academy of Science

**KAMINI SINGHA, GE:**

National Ground Water Research and  
Educational Foundation 2016 Darcy Lecturer

**JON LEYDENS, LAIS:**

IEEE Professional Communication Society  
2015 Ronald S. Bliq Award

**HAZIM ABASS, PE:**

2015 Society of Petroleum Engineers  
Honorary Member



# FACULTY AWARDS CERSE

**ALEXIS SITCHLER, GE:**

NSF CAREER Award

**GRAHAM DAVIS, EB:**

Named GERENS Graduate School's first honorary professor

**PRISCILLA NELSON, MN:**

Recognized in Top 100 Global Inspirational Women in Mining, 2015 by Women in Mining, UK

**STEVE SONNENBERG, GE:**

2016 Honorary Member of the House Award, House of Delegates, American Association of Petroleum Geologists

National Academy of Engineering  
Exemplar in Engineering Ethics  
Education Honorees, LAIS:

**SARAH JANE HITT**

**JESSICA SMITH**

**JUAN LUCENA**

**JON LEYDENS**



**Women in Science,  
Engineering and Mathematics  
(WISEM) Program and  
Halliburton** receive Women  
in Engineering ProActive  
Network (WEPAN)

## **2016 Women in Engineering Initiative Award**



# Largest Society of Women Engineers (SWE) Collegiate Section in the United States with **over 720 members**



# Honors **Expansion** Project

## First Year Honors Experience

- Integration and Discovery in Engineering, Arts and Sciences (IDEAS) core course
- Priority admission to McBride
- Themed learning community
- Gateway to other opportunities

**explore your world**

[inside.mines.edu/MCB-firstyear](https://inside.mines.edu/MCB-firstyear)





94% freshman  
persistence rate



**American Indian Science  
and Engineering Society  
(AISES) Student Chapter**

**Won the top prize at  
the 2015 First Nations  
Launch Competition**

Hosted by NASA's Wisconsin  
Space Grant Consortium







**All the cool kids read**

**THE DAILY BLAST**

**DELIVERED DAILY TO YOUR INBOX  
DURING THE ACADEMIC YEAR**

**[webapps.mines.edu/dailyblast](https://webapps.mines.edu/dailyblast)**





Even greater emphasis on new students' transition to Mines driven primarily by Residence Life, CASA and Student Activities





Counseling Center created a new triage system for potential crisis and urgent walk-in requests

# MINES FOUNDATION



In October, Mines celebrates the successful completion of Transforming Lives: The Campaign for Colorado School of Mines.

## **DURING THE CAMPAIGN, DONORS FUNDED:**

- **Nearly half a billion dollars invested in Mines**
- **10 new faculty positions**
- **4 new buildings with the fifth — CoorsTek Center for Applied Science and Engineering — going up now**
- **An 18% increase in the total number of donors over last year**





## Fall 2016 Entering Class

1,000 new freshmen

140 transfer students

1,337 avg. SAT / 31 avg. ACT

3.8 avg. high school GPA

28.5% women

52% Colorado residents

5% international students





## Fall 2016 Entering Class

118 first-generation students

11 graduates of Mines

Summer Multicultural  
Engineering Training  
program

36 new Harvey, Boettcher,  
Daniels and Denver  
Scholarship Foundation  
Scholars

50% of new transfer  
students transferring via  
articulation agreement













67% increase in new clubs and organizations, allowing for more opportunities for student growth and involvement





Celebrating the  
100<sup>th</sup> anniversary  
of ROTC







# 1: APPLIED SPATIAL VISUALIZATION FOR ENGINEERS

## Students With Opportunities to Develop Spatial Skills for Success in Engineering

### ADDRESSING CHALLENGES

#### TARGET POPULATION

**Goal:** First year students with poor spatial visualization skills, as determined by PSVT:R pretest.

**Plan:** To get these students into CSM 151 we will

- Encourage new freshmen to take PSVT:R in early July.
- Encourage students who score below 70% to enroll.
- Open 5 sections of CSM 151 in mid-July.

#### NEW COURSE STRUCTURE

- Weekly in-class activities support targeted skill (see schedule below)
- Workbook moved to homework (checked weekly as formative assessment)
- Two exams for summative assessment
- Team research project to explore the importance of spatial skills in a selected course or industry

### INTENDED OUTCOMES

- Revised communication and marketing should allow for better identification and participation of the target audience.
- Student performance on PSVT:R should continue to increase from pre to post test.
- End of semester student evaluation results should increase over previous semesters.
- Students should gain a better understanding of the importance of spatial skills to their future courses and careers.
- Students should enjoy and fully participate in the class, and feel that they are learning and truly benefiting from the class.



"Encouraging students to work more in pairs or groups could really help the dynamic of the class."  
-Spring 2016 student (from end of semester evaluation)

"... if you do not focus and try to learn the new ways of thinking, it will not get you very far at all."  
-Spring 2016 student (from end of semester evaluation)



"Individuals can dramatically improve their spatial visualization skills with training and that female engineers with poorly developed spatial visualization training are at a disadvantage in engineering than their male counterparts."  
-Sheryl Sorby

"Deliberate practice in spatial visualization skills acquired gradually and through repeated exposure to performance requirements. Training tasks that are mastered sequentially – typically through repetition – done by a teacher or a coach, who presents performers with tasks that are outside their current realm of ability, yet can be mastered through repeated practice."  
-K. Anders Ericsson

"Neu"

## Revision of the Geology Curriculum Undergraduate

### BACKGROUND

#### Overview

Mining Engineering undergraduates currently take 10 credits of geology coursework as part of the ABET accredited bachelor's degree. The students have been struggling to connect geological concepts to mining-specific applications, and key topics such as mining geology and mineral exploration have not been adequately taught. The goal of this revision is to redistribute the content, and focus on the geological concepts that are directly to the mining industry. In addition, the pedagogy will emphasize active, interactive and collaborative learning to improve the student learning experience.

### WHAT IS CHANGING

#### New Courses in This Revision

GEOL 101 (4 credits): Retain as currently taught

MNGN XXX (3 credits): Mining Geology I, with laboratory  
Mineralogy  
Petrology  
Structural geology (eliminating repetition with other MNGN classes)

MNGN XXX (3 credits): Mining Geology II, with laboratory  
One deposits, taught directly through case studies  
Mineral exploration  
Mining geology



CSM students study rock characteristics in an underground mine

Week	Topic	Activity
1	Introduction	Syllabus, expectations, pre-writing, research project
2	Research project work	Work with group to plan research project focus
3	Combining Solid Objects	Activities: Calc 3 Applications, Tangrams and Tetris
4	Isometric Drawings and Coded Plans	Activity: Building with Snap Cubes
5	Orthographic Drawings	Activity: Working with an Ortho-Box
6	Inclined and Curved Surfaces	Activity: Ortho-Boxes for Complex Objects
7	Flat Patterns	Activity: Working with Paper Patterns
8	Cutting Planes and Cross Sections	Activity: Play-doh and Floss Cross Sections
9	Exam 1 – 2D and 3D Sketching	In-class exam
10	Surfaces and Solids of Revolution	Activity: Drawing Revolved Objects
11	Rotation of Objects about a Single Axis	Activity: Connecting Rotations with Ortho Sketches
12	Rotation of Objects about Multiple Axes	Activity: Solving a Rubik's Cube
13	Object Reflections and Symmetry	Activity: Fold and Cut Theorem
14	Exam 2 – Mental Rotations	In-class exam
15	Final presentations	Half the student teams present
16	Final presentations	Half the student teams present

Lead Instructor

or in the Department of Mining Engineering, Professor  
Mining Engineering Design and Mining Graduate Sem

Trefny





Largest Fall Career Day  
with 240 companies and  
3,447 student attendees

# ATHLETICS



**RMAC All-Sports Cup**

**3.139 GPA, 82% grad rate**

**11 Academic All-Americans**  
(most ever in a year for Mines)

**5 Brechler Awards** (given to RMAC teams with highest GPA in their sport)

**13 of 16 teams had a 3.0 GPA or above**





Traditional halls renovation will conclude end of summer 2016 which completes the renovation or new construction of every residence hall on campus in approximately 6 years.



Growth (quantity)  
and diversification  
(quality) of our  
Housing Themed  
Learning  
Communities



# Who are your **STARS?**

Udall

Goldwater

THE STUDENTS WHO OUTSHINE THE REST?

THE CREATIVE, INQUISITIVE ONES?

THE PASSIONATE ONES?

**Encourage your best students to apply for a nationally competitive scholarship**  
or contact the Office of International Programs (OIP) and we will help them apply!

Churchill

DAAD

Marshall

Gilman

Fulbright

OPPORTUNITIES FOR UNDERGRADUATES AND GRADUATE STUDENTS







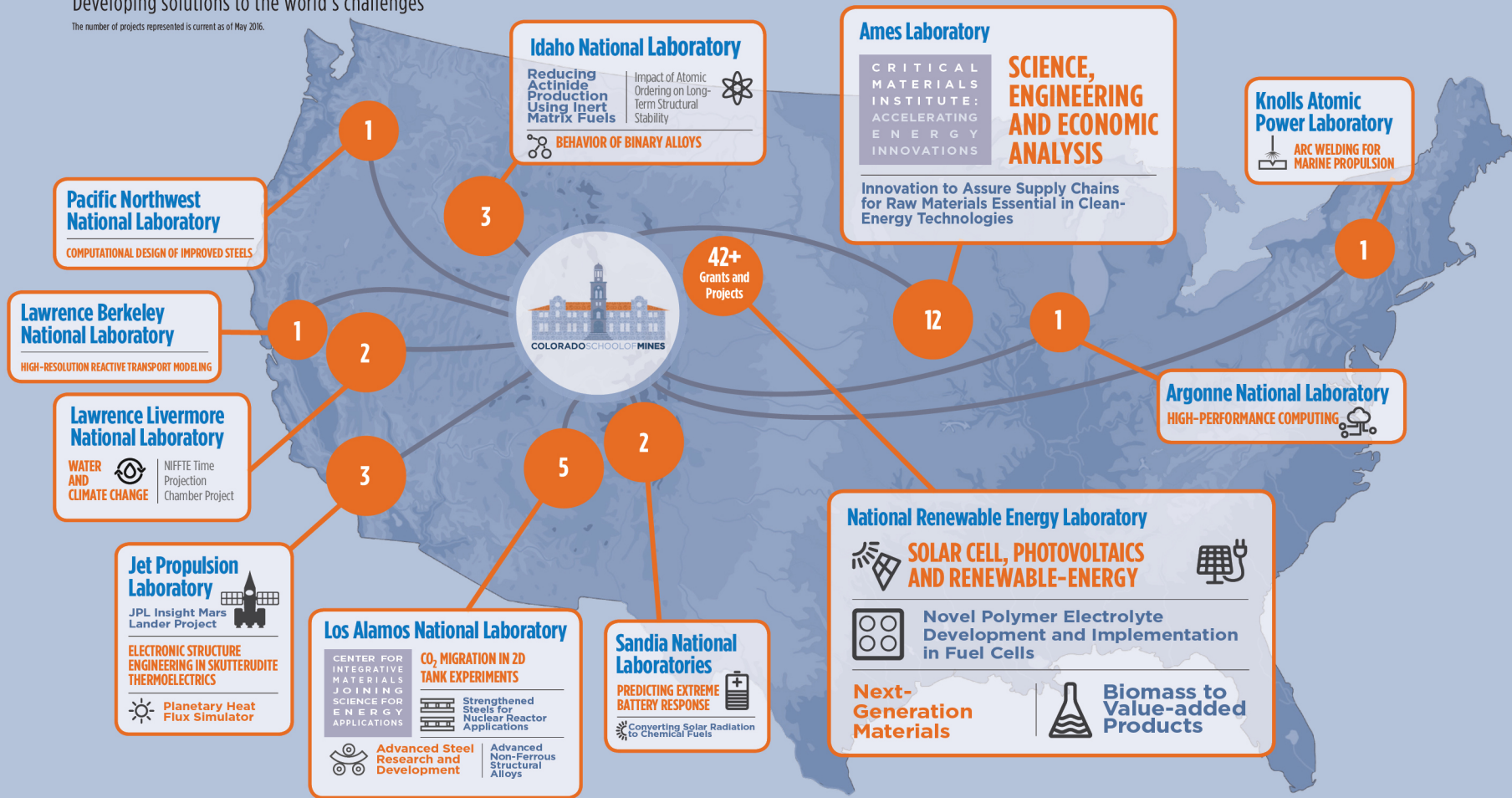




# Research connections: Mines and the U.S. National Laboratories

Developing solutions to the world's challenges

The number of projects represented is current as of May 2016.













# FACULTY AWARDS

# CASE

**CORBY ANDERSON, MME**

EPD Distinguished Lecturer Award, The Minerals, Metals and Materials Society

**GEOFF BRENNECKA, MME**

NSF CAREER Award; Du-Co Ceramics Young Professional Award, American Ceramic Society

**EMMANUEL DE MOOR, MME**

Outstanding Young Manufacturing Engineering, Society of Manufacturing Engineers; Sydney H. Melbourne Award for Excellence in the Advancement of Automotive Sheet Steel, SAE International and the American Iron and Steel Institute

**ANDREW HERRING, CBE**

ENFL Distinguished Service Award, American Chemical Society

**GEORGE KRAUSS, MME (EMERITUS)**

Benjamin F. Fairless Award, Association for Iron & Steel Technology

**DAVID MATLOCK, MME (EMERITUS)**

2015 Henry Clifton Sorby Award, International Metallographic Society; Distinguished Member and Fellow, Association for Iron & Steel Technology

**JOHN SPEER, MME**

Sydney H. Melbourne Award for Excellence in the Advancement of Automotive Sheet Steel, SAE International and the American Iron and Steel Institute

**ERIK SPILLER, MME (RESEARCH FACULTY)**

Distinguished Member, Class of 2017, Society for Mining, Metallurgy and Exploration

**ERIC TOBERER, PHYSICS**

NSF CAREER Award

**CHESTER VAN TYNE, MME**

Fellow, ASM International





# 2016 **New Faculty**



**ABD A. ARKADAN**

Teaching Professor,  
Electrical Engineering and  
Computer Science



**MICHAEL BARANKIN**

Teaching Assistant  
Professor, Chemical and  
Biological Engineering



**MELANIE BRANDT**

Teaching Assistant  
Professor, Liberal Arts and  
International Studies



# 2016 New Faculty



**AMY CLARKE**

Associate Professor,  
Metallurgical and Materials  
Engineering



**KESTER CLARKE**

Assistant Professor,  
Metallurgical and Materials  
Engineering



**CHRIS COULSTON**

Teaching Associate Professor,  
Electrical Engineering and  
Computer Science

# 2016 New Faculty



**KRISTINE CSAVINA**  
Teaching Professor,  
Mechanical Engineering



**BRANDON DUGAN**  
Associate Professor,  
Geophysics



**GREGORY FASSHAUER**  
Professor and  
Department Head, Applied  
Mathematics and Statistics

# 2016 **New Faculty**



**TULAY FLAMAND**  
Assistant Professor,  
Economics and Business



**DIEGO ARMANDO  
GOMEZ-GUALDRON**  
Assistant Professor,  
Chemical and Biological  
Engineering



**RICHARD HUNT**  
Assistant Professor,  
Economics and Business



# 2016 New Faculty



**KRISTOPH-DIETRICH  
KINZLI**

Teaching Professor,  
Civil and Environmental  
Engineering



**ADRIANNE KROEPSCH**

Assistant Professor, Liberal  
Arts and International  
Studies



**KARIN LEIDERMAN**

Assistant Professor,  
Applied Mathematics and  
Statistics



# 2016 New Faculty



**ALEXEI MILKOV**

Professor, Geology and  
Geological Engineering



**JENNIFER MISKIMINS**

Associate Professor and  
Assistant Department  
Head, Petroleum  
Engineering

# 2016 New Faculty



**ASHLYN MUNSON**

Teaching Associate  
Professor, AMS



**OYVIND NILSEN**

Teaching Associate  
Professor, Mechanical  
Engineering



# 2016 New Faculty



**ANDREW PEDERSON**  
Teaching Associate  
Professor, Economics and  
Business



**ANDREW PETRUSKA**  
Assistant Professor,  
Mechanical Engineering



**ANGUS ROCKETT**  
Professor and Department  
Head, Metallurgical and  
Materials Engineering

# 2016 New Faculty



**JAMAL ROSTAMI**

Associate Professor  
and Timothy J. Haddon/  
Alacer Gold Chair, Mining  
Engineering



**GREG RULIFSON**

Teaching Assistant  
Professor, Liberal Arts and  
International Studies



**JOSEPH SAMANIUK**

Assistant Professor,  
Chemical and Biological  
Engineering



# 2016 **New Faculty**



**MEENAKSHI SINGH**

Assistant Professor,  
Physics



**BETHANY WILCOX**

Teaching Assistant  
Professor, Physics



**JENNIFER WILCOX**

Associate Professor,  
Chemical and Biological  
Engineering





















# FACULTY AWARDS **CECS**

**TRACY CAMP, EECS:**

IEEE Fellow

**LINDA FIGUEROA, CEE:**

American Society of Civil Engineering Fellow

**D. VAUGHAN GRIFFITHS, CEE:**

Suzanne Lacasse 2016 Lecturer International Society for Soil Mechanics and Geotechnical Engineering

**TISSA ILLANGASEKARE, CEE:**

Soil Science Society of America Fellow, and 2015 Langbein Lecture Award from the American Geophysical Union

**KATHRYN JOHNSON, EECS:**

Exemplar in Engineering Ethics Education Award, National Academy of Engineering

**ROBERT KEE, ME:**

Bernard Lewis Gold Medal, Combustion Institute

**NING LU, CEE:**

ASCE's Engineering Mechanics Institute Fellow

**JOHN MCCRAY, CEE:**

ASCE's Environmental and Water Resource Institute Fellow

**MARCELO SIMÕES:**

IEEE Fellow

**KAMINI SINGHA, CEE:**

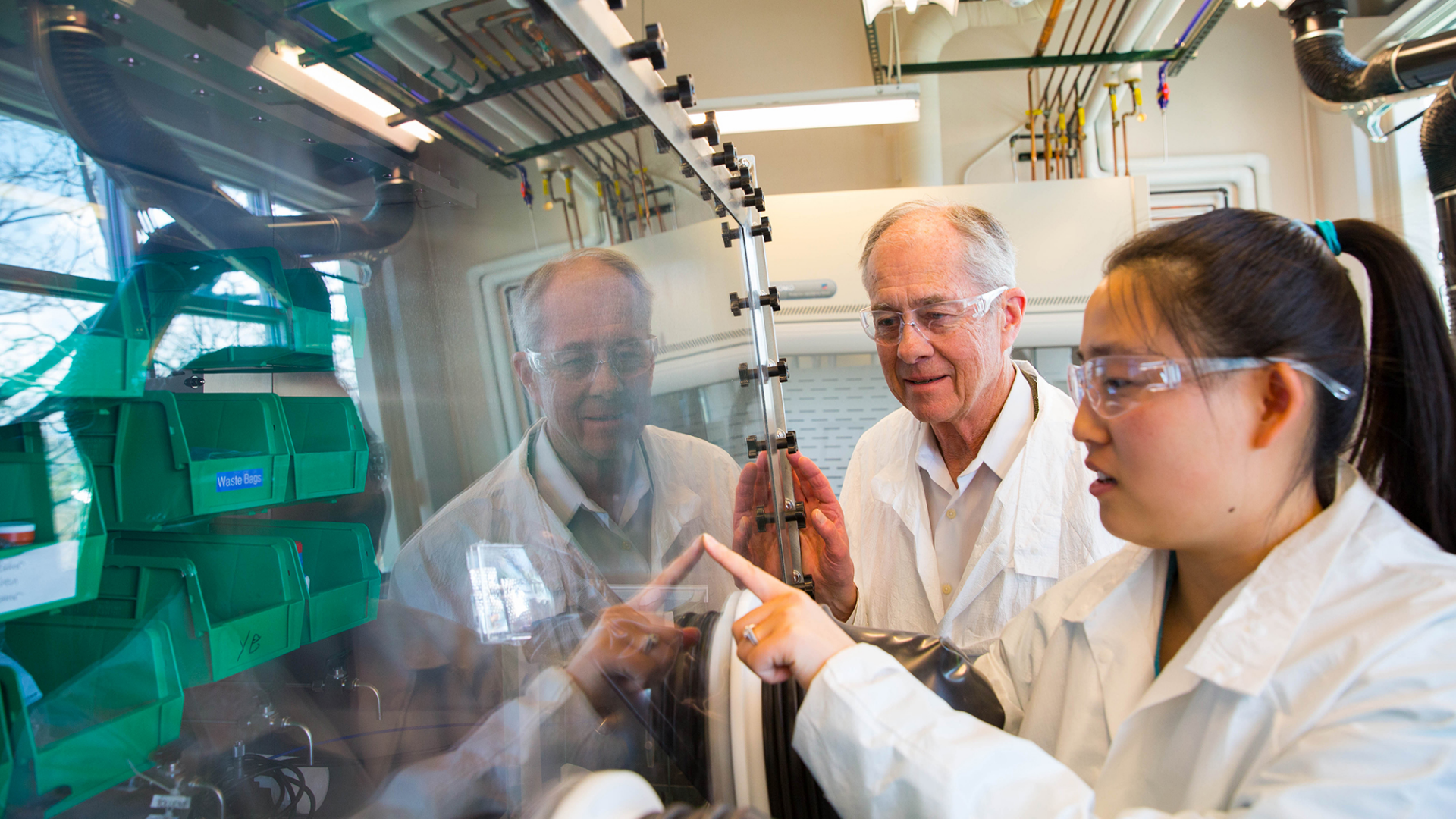
National Ground Water Research and Educational Foundation's 2017 Darcy Lecturer

**CATHERINE SKOKAN, EECS:**

American Society for Engineering Education Fellow



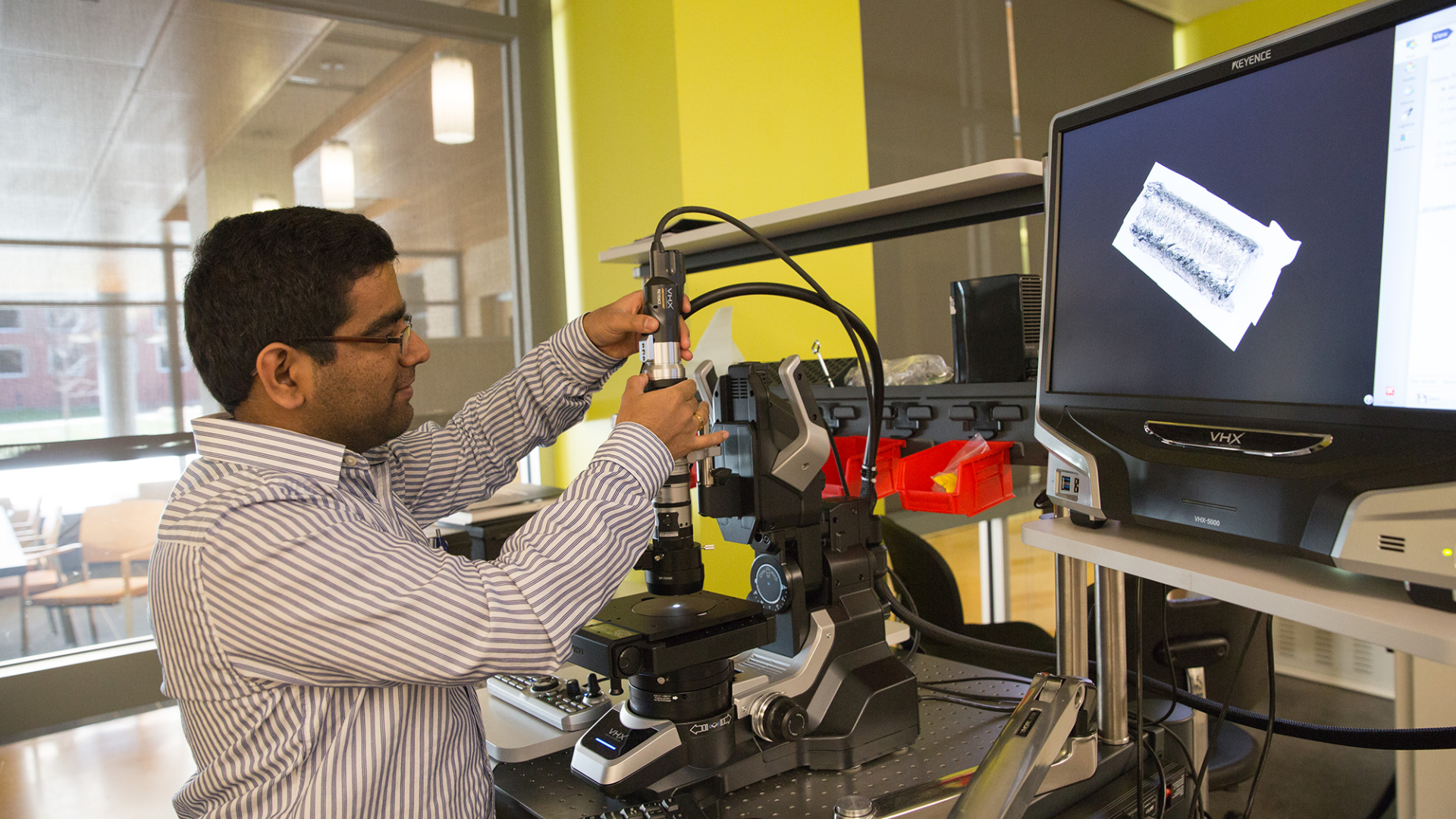




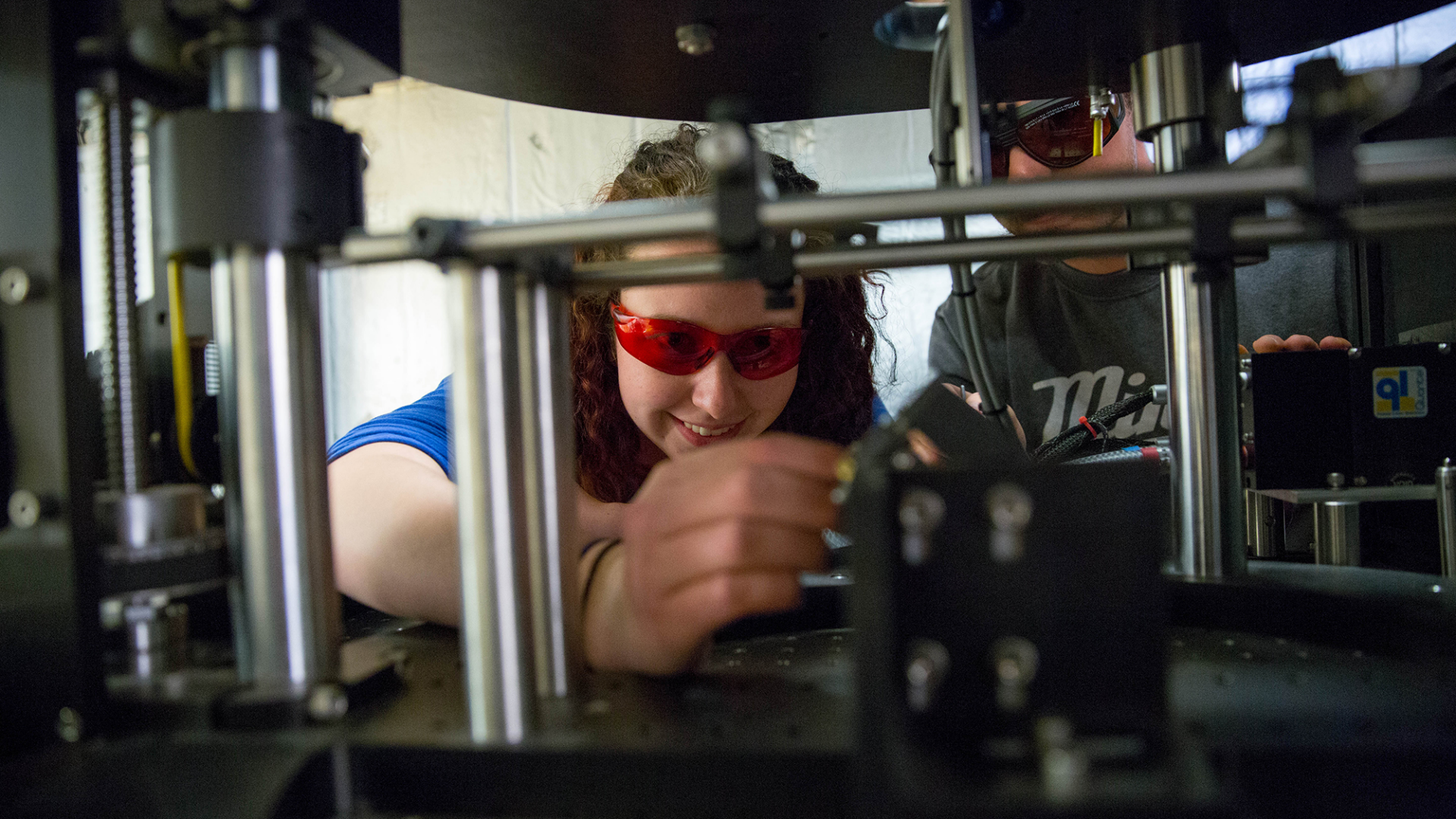




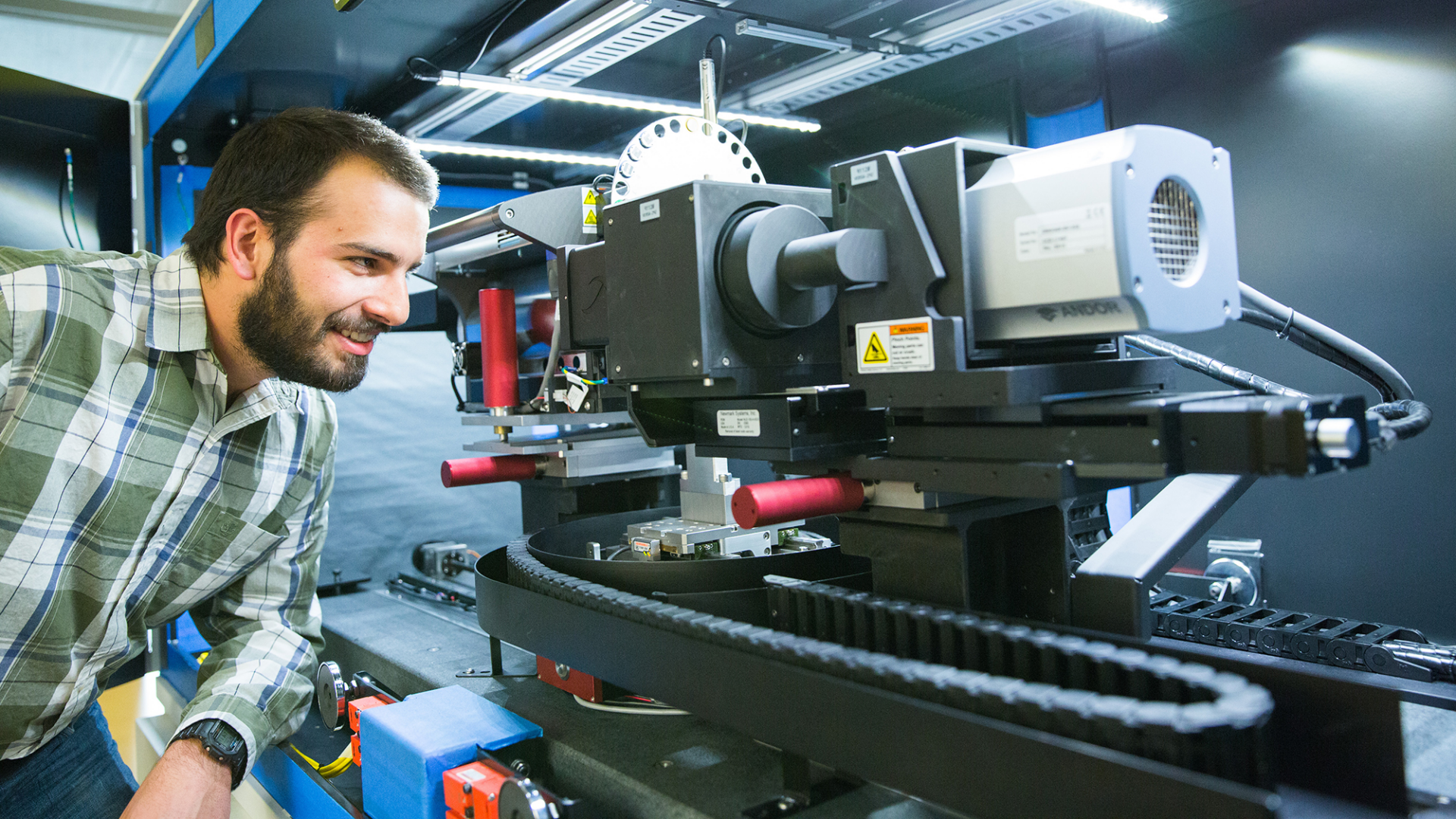














# Inaugural Daniels Fund Faculty Fellows

## **SARAH HITT AND TONI LEFTON**

Liberal Arts and International Studies  
“Ethics Across the Honors Curriculum:  
Using a New First Year Honors Course as  
a Foundational Framework”

## **MELISSA KREBS**

Chemical and Biological Engineering  
“Ethics in Biomedical Engineering”

## **JEFFREY PAONE AND CYNDI RADER**

Electrical Engineering and  
Computer Science  
“Ethics in the Computer Science  
Curriculum”

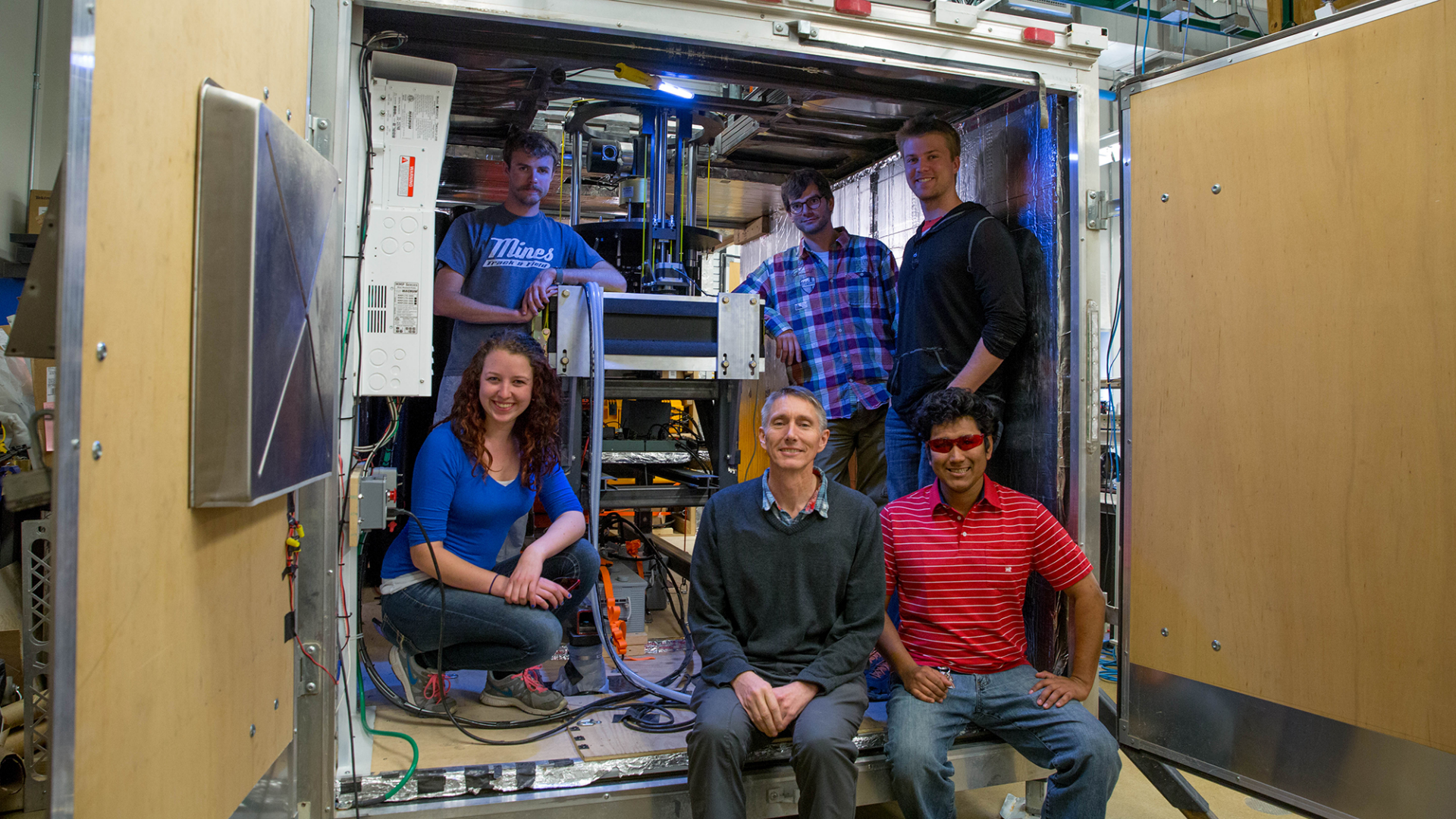
## **PAUL SANTI**

Geology and Geological Engineering  
“Ethics Education for Geological  
Engineers”

## **CHUAN YUE**

Electrical Engineering and  
Computer Science  
“Incorporating Ethics Instruction in  
Security and Privacy Courses”









Becca Flintoft co-authored article on enriching the student learning experience in higher ed journal *About Campus*



## CSCI 261: Programming Concepts

### BACKGROUND

...s time would  
...st of a 20 minute  
... and 30 minute  
... activity  
...cture was a  
...ndant review of  
...ng prior to class  
...cture was not  
...engaging; students in a  
...passive role  
...By end of semester,  
...tudents know  
...cepts

### WHAT IS CHANGING

- Flipping lecture content, more engaging, outside of class, active, and
- Grouping students into smaller, more manageable classroom environment
- Each student has a role to play, increasing ability to solve problem by breaking down into smaller pieces
- Increased interaction, wider breadth of applications and use of technical skills
- Increased student engagement, improvement of team communication

### INTENDED OUTCOMES

- Annual Enrollment: 500+ students

## Integrating Thermodynamics Instruction via Interacting Learning

### WHAT IS CHANGING

### INTENDED OUTCOMES

- Students go beyond solving "standard" thermo problems, apply principles to a wide range of novel problems
- Easily assessed student performance on unsteady problems, common "sticking point" for students

- Course teaches not a "list of steps" to analyze a set of problems, rather an approach to ID and analyze energy flows into and out of system and how system properties change a result of these interactions.

- Varied instructional format and activities will help reach students with different levels of understanding and different learning style preferences.

- The focus on "Big questions" will help students connect content to real-world design considerations and to the molecular interactions which underpin the thermodynamic concepts.

Mechanical Engineering  
numerical simulation of advanced

Center  
for Research







# TREFNY **Innovative Instruction** CENTER

## **2016 Intensive Course Revision Initiative**

29 faculty members participated in focused learning and study about course design, pedagogical practices and ways to engineer learning opportunities throughout June 2016.

They are significantly redesigning their courses and laying the foundation for advancing learning by **Engineering Learning at Mines.**

**Learn more: [trefnycenter.mines.edu/2016.html](http://trefnycenter.mines.edu/2016.html)**

**2017 Applications now being accepted:**

Visit [TrefnyCenter.mines.edu/2017.html](http://TrefnyCenter.mines.edu/2017.html) for more information and to apply.



# **TREFNY** Innovative Instruction **CENTER**

## **SUMMER 2016 COHORT INTENSIVE COURSE REVISION INITIATIVE**

**Yosef Allam**

**Linda Battalora**

**Melanie Brandt**

**Kristine Callan**

**Debra Carney**

**Allison Caster**

**Stephanie Claussen**

**Agata Dean**

**Jered Dean**

**Steven DeCaluwe**

**Holly Ecklund**

**Renee Falconer**

**Elizabeth Holley**

**Joseph Horan**

**Scott Houser**

**Derrick Hudson**

**Mark Kuchta**

**Mirna Mattjik**

**Mike Mikucki**

**Rachael Morrish**

**Mike Nicholas**

**Jeffrey Paone**

**John Persichetti**

**C. Josh Ramey**

**Greg Rulifson**

**Susanta Sarkar**

**Rebecca Swanson**

**Eric Toberer**





**Ran PILOT COURSE (Fall 21 & Spring 2016):**  
•Decreased to <100 students  
•More flexible classroom  
•Increased student accountability  
•In-Class Quizzes  
•"Task Sheets"  
•Learning: guided-inquiry/discovery-based  
•Learning modes  
•Work/discussions  
•Whiteboards  
•Clickers, experiments, charts  
•Guided experiments, videos, iClickers  
•Feedback throughout

**WE STILL WORKING ON?**  
•Chem 1 lectures to active classes  
•Student-Centered Learning Outcomes  
•Modern challenges  
•Physics, Biology, NHV, Epic  
•Level coursework  
•Simple  
•Challenge  
•Advance

**By the numbers...**  
•50 student "active-learning" section compared to concurrent lecture sections of 270 students each  
•All received same exams and online homework assignments  
•**Smaller, active-learning section performed 10-20% better than students in traditional lecture sections**

**Final UCTH8 Grades:**

Grade	Active Learning	Traditional Lecture
A	~15	~10
B	~35	~25
C	~25	~35

**THE STUDENTS' PERSPECTIVE**  
**What they liked...**  
•"The in class activities really helped me understand the material."  
•"I think that compared to first semester, the worksheets are a pain in the neck but my test scores have drastically improved."  
•"I feel that the way lecture was presented, it was more enjoyable but my test scores have drastically improved."  
•"The in class activities really helped me understand the material."  
•"I think that compared to first semester, the worksheets are a pain in the neck but my test scores have drastically improved."  
•"I feel that the way lecture was presented, it was more enjoyable but my test scores have drastically improved."

**What they didn't like...**  
•"The perfect amount of time to spend in class."  
•"The perfect amount of time to spend in class."

**Why have I tried many new things over the years but now we can implement them in a much more intentional, research-based way?**

**RENEE FALSER**  
Teaching Assistant  
PhD

**Active Instruction**  
**SCHOOL OF MINNESOTA**

# **2017** Intensive Course Revision **TREFNY CENTER**

**APPLY NOW FOR THE 2017 COHORT**

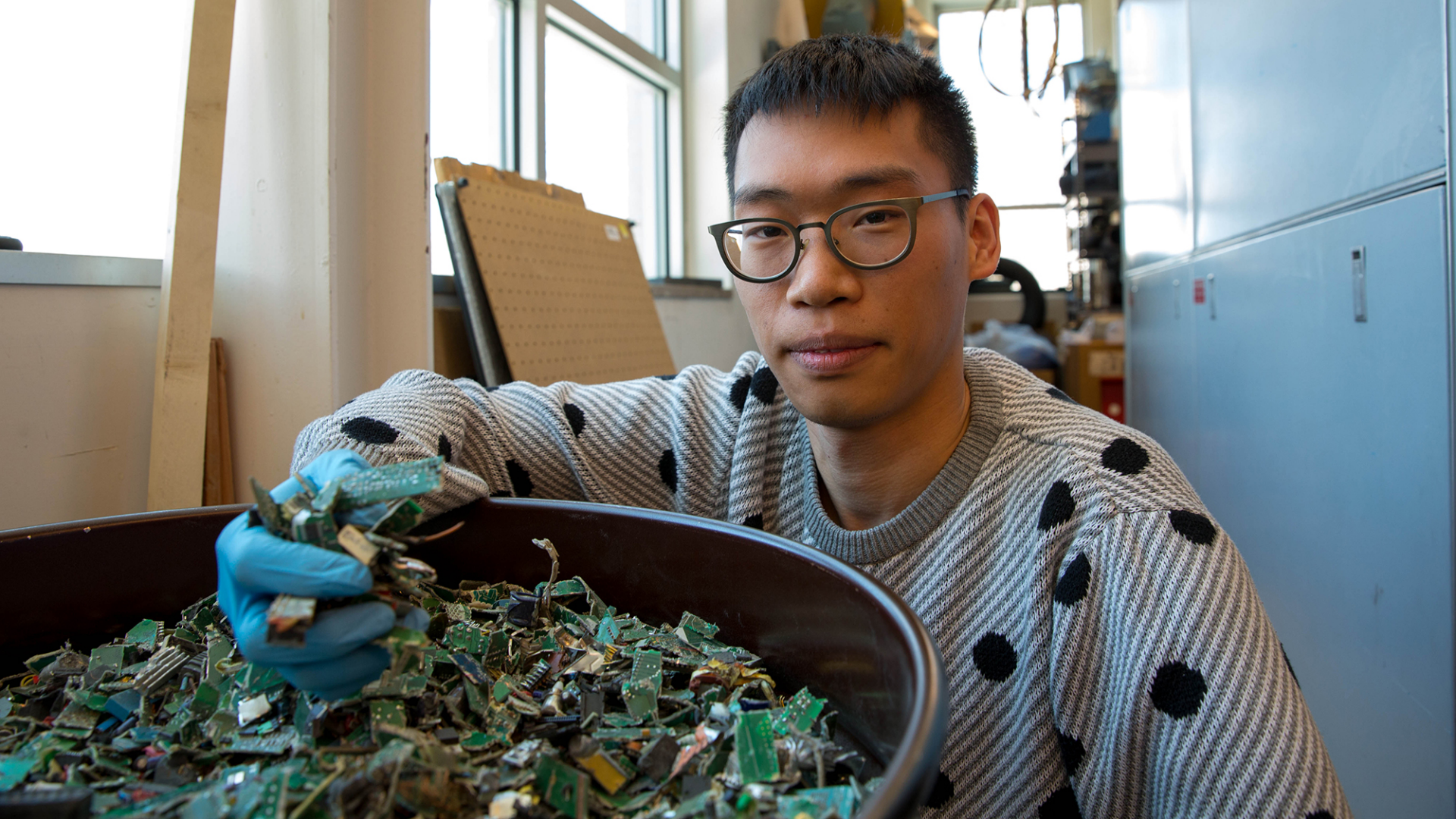
Receive one month's salary, ongoing support and join a cohort of faculty to learn new pedagogy and course design theory while working to redesign a course you will teach.

**DEADLINE TO APPLY: October 11, 2016, 5 p.m.**











# RANKINGS

- #1** engineering school USA TODAY College's "The top 10 engineering colleges in the U.S." (2015)
- #1** public school in the state for best value colleges (average starting salary for graduates: \$66,700), **#6** nationally by New York-based SmartAsset (2016)
- #7** in Brookings' 'value-added' college rankings (2015)
- #18** in the 2015-2016 Learfield Sports Directors' Cup by the National Association of Collegiate Directors of Athletics

## **U.S. News and World Report** (2016)

- #17** Materials Engineering
- #29** in Top Public Schools
- #38** in High School Counselor Rankings
- #41** in Best Undergraduate Engineering Programs
- #55** in Best Graduate Schools — Engineering
- #75** for Best National Universities



















# Connect with Mines



[mines.edu/news](https://mines.edu/news)





**COLORADO**SCHOOL**OF MINES**®  
EARTH ● ENERGY ● ENVIRONMENT