



**SCHOOL OF BIOMEDICAL  
ENGINEERING**  
COLORADO STATE UNIVERSITY



E-Days' capstone projects inspire SBME Advisory Board members to award cash prizes.

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Summer hands-on learning programs enhance student skills outside the classroom.

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Award-winning SBME core faculty and their trailblazing research capture national attention.

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Volume 7, Issue 1 Fall 2019

## MESSAGE FROM DIRECTOR

### Interdisciplinary roots 150 years strong

Supported by four colleges—Engineering, Health and Human Sciences, Natural Sciences, and Veterinary Medicine and Biomedical Sciences—the School of Biomedical Engineering provides a unique interdisciplinary focus on bioengineering research and education with over 60 faculty members representing 14 departments. Twelve years ago, the School may have been brand new, but the strength of the engineering, medical, and science disciplines at Colorado State University were already long recognized.

This year, CSU celebrates its sesquicentennial. Looking back, we are reminded of the University's strong commitment to science and engineering. The Colorado Agricultural College (now CSU) began offering classes in 1879, providing a single course of study for all students. Ainsworth Blount, one of the two original professors, taught practical agriculture and the mechanical arts and by 1882, the department of mechanics and drawing was created. A year later, a Hall of Mechanical Arts was opened and housed a mechanics shop. The first undergraduate engineering degree was awarded in 1889.

Among the first hires were faculty in the sciences. In fact, President Edwards, the very first president of the University, was a professor of physics and natural history. In 1883, the college hired veterinary surgeon George Faville and the Department of Biology, which included Veterinary Medicine, was formed. However, when Faville departed in 1887, the department languished until the turn of the 20<sup>th</sup> century, when studies in veterinary medicine were re-established and the Department of Veterinary Sciences was created. By 1907, enough faculty had been hired to start a veterinary school.

Nearly a half century later, bioengineering started to emerge. By the late 1970's, CSU offered courses in biomedical instrumentation, bioengineering, and biomechanics, to name a few. Wade Troxell ('87 Ph.D. Mechanical Engineering), an SBME associate faculty member and mayor of Fort Collins, was one of the first students to be introduced to this curriculum.

With intense student interest, CSU's biomedical engineering programs and facilities have flourished since 2000, when the Biomedical Engineering Interdisciplinary Studies Program was

established. This program offered certificates to bachelors, masters, and doctoral students enrolled in any degree program. By 2007, the School was formed offering Ph.D. and M.S. degrees in bioengineering. Four years later, the School—housed in the 122,000 square foot Walter Scott, Jr. Bioengineering Building which opened in 2013—launched the first BME bachelor's program in the state of Colorado with a unique twist—students receive two degrees—one B.S. in biomedical engineering and the other B.S. in one of the three traditional engineering areas: chemical and biological, electrical, or mechanical.

Today, CSU is a leader in translational medicine. As such, we continue to expand the medical content in the School's challenging multidisciplinary BME curriculum. New this fall, the Master of Engineering resident program is piloting a biomedical clinical practicum pairing three BME graduate students with two biomedical science graduate students to tackle unmet medical needs as posed by a physician advisory board. To further expand on medical education offerings, CSU is partnering with the University of Colorado School of Medicine to open a medical school branch in Fort Collins beginning Fall 2021. The partnership aims to create a training program that builds on the strengths of both universities.

We are proud of our strong roots and our new programs. Our world-class faculty, with the help of students, have made a significant impact on human health through medical technology. As we look to the future, we see increasing avenues for interdisciplinary collaboration in the areas of data analytics, microbiomes, and the environment as new expertise grows in the CSU community. We embrace the every-changing evolution of biomedical engineering and look forward to pioneering the next generation of revolutionary technologies.

Dr. Stuart Tobet, Director  
Stuart.Tobet@colostate.edu

## CONGRATULATIONS TO THE CLASS OF 2019!

### **Bachelor of Science in Biomedical Engineering and Mechanical Engineering**

Jessia Ashworth  
Natalia Beltran del Rio  
Madison Bernie  
Cristian Bueno  
David Burnett  
Jarrod Cornejo  
Kelli Corrigan  
Zachary Ellis  
Michael Folkers  
Jackie Foss  
Sam Frisz  
Sarah Gormley  
Marianna Haneke  
Kristine Happach  
Noah Ivey  
Erin Kopal  
Ashley Marcolina  
Charles McKeon  
Daniel Merkulovich  
David Meyer  
Madeline Meyers  
Amber Moin  
Luis Monterrosa Zavaleta  
Jonah Orndorff  
Daniel Palmer  
Tyler Parker  
Jake Porter  
Kylie Rembert  
Dolly Ricapor  
Paige Robinson  
Ryan Rykhus  
Megan Sanders  
Madeline Stich  
Aaron Telesz  
Gabriel Tonnessen

### **Bachelor of Science in Biomedical Engineering and Electrical Engineering**

Zachary Black  
Erin Fincher  
Grant Wulf

### **Bachelor of Science in Biomedical Engineering and Chemical and Biological Engineering**

Ryan Baeverstad  
Mathew Beardt  
Ryan Boudreau  
Tyler Daniel  
Elliot Djokic  
Jacob Grady  
Sara Igli  
Courtney Mautz  
Nicolas Meis  
Andy Pettinger  
Kelly Scharlau  
Rachel Von Seggern

### **Master of Engineering - Biomedical Engineering Specialization**

Sarah Condio  
Jacob DeRoo  
Jeremy Primus

### **Master of Engineering Online - Biomedical Engineering Specialization**

Ahmed Aki  
Tyler Johnson

### **Master of Science, Bioengineering**

Daniel Sutherland

### **Doctor of Philosophy, Bioengineering**

Saleh Alzahrani  
Hieu Bui  
Zach Fox  
Bryce Schroder

## SUMMER STAND OUT: MICHELLE HEFNER

Michelle Hefner (BME+CBE) spent her summer in Aachen, Germany, on an 11-week research internship funded by the German government. Her research was conducted at the Psychiatric, Psychotherapy, and Psychosomatics department at the Rheinisch-Westfälische Technische Hochschule Aachen University hospital.

“I analyze fMRI scans of depressive patients, half of whom receive neurofeedback and half who do not,” Hefner said. “I attempt to map when and where the patients’ brains observe activity of aggression or impulsivity, and further, we will explore machine learning applications if this neurofeedback paradigm proves to be effective.”

Prior to her trip to Germany, Hefner concluded a semester studying abroad in Edinburgh, Scotland.

Full story: <https://engr.source.colostate.edu/summertime-standouts-michelle-hefner/>

### THE COMPANY WE KEEP

Each semester, the School of Biomedical Engineering invites distinguished guests from around the world to speak on biomedical engineering research and related disciplines for its weekly seminar series. The Spring 2019 speakers included:

#### **DUKE UNIVERSITY**

**Dr. Ashutosh Chilkoti**  
*Translating Molecular Bioengineering from the Lab to the Patient*

#### **UNIVERSITY OF TEXAS**

**Dr. Johnny Huard**  
*Stem Cell & Regenerative Medicine Strategies that Delay Aging & Age-Related Disorders*

#### **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

**Dr. Cullen R. Buie**  
*Microfluidic Bacterial Phenotyping and Genetic Transformation Using Electric Fields*

## BIOMEDICAL ENGINEERING AWARDS AT E-DAYS

On April 19, 2019, members of the SBME Advisory Board—Julie Dunn, Gary Johnson, Stephanie Salazar, and Dennis Schlaht—served as judges and provided three biomedical engineering teams with cash awards at Engineering Days (E-Days). This annual event provides undergraduate engineering students an opportunity to showcase their completed senior design projects to faculty, family, industry representatives, and peers. The capstone senior design project teaches students how to succeed in a well-integrated, interdisciplinary engineering design environment and allows students to develop practical, hands-on skills.

This year, thirteen industry members representing various companies including AlloSource, Beckman-Coulter, BD, Medtronic, Osypka Medtec, UC Health, and Terumo BCT, also served as BME judges and critically evaluated student projects on technical content, presentation, creativity, and overall impression. The following BME student senior design projects were awarded:

### **First Place: Smart Bandage** (faculty advisor: Christie Peebles)

**Group Members:** Ryan Boudreau (BME+CBE), Kelli Corrigan (BME+ME), Tyler Daniel (BME+CBE), Jacob Grady (BME+CBE), Neil Rettedal (Microbiology)



This team set out to create a living medicine bandage that contains genetically engineered cells which are able to sense and destroy infectious bacteria in wounds. This novel therapeutic kills tough strains of bacteria that are typically unaffected by many modern antibiotics on the market today. Because the engineered cells only release therapeutic agents when it is absolutely necessary, the chances of bacteria becoming resistant to our treatment is greatly reduced.

As a proof of concept, this team chose to target MRSA, a strain of *Staphylococcus aureus* that has become resistant to a wide variety of antibiotics. The engineered cells contained within the bandage are suspended in a hydrogel which provides the nutrient necessary for the cells to remain active. The portion of the bandage that contacts the skin will allow proteins and small molecules to diffuse through, while keeping modified cells in place.

### **Second Place: Sensor Technology for Enhanced Prosthesis Production** (faculty advisor: Steve Simske)

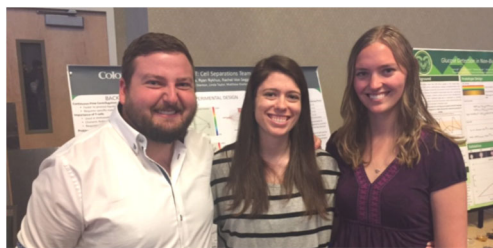
**Group members:** Jackie Foss (BME+ME), Luis Monterrosa Zavaleta (BME+ME), Tyler Parker (BME+ME), Dolly Ricapor (BME+ME), and Grant Wulf (BME+EE)

Sensor Technology for Enhanced Prosthesis Production (S.T.E.P.P.) is a two-part design project focused on quantifying the artisanal methods normally employed by a prosthetist. The first half of the project is focused on delivering a handheld probe for tissue stiffness. The probe data will then be translated onto a 3D scan of the limb generating the intensity map, recording the locations of soft versus harder tissue. This information is translated to a 3D-printed socket which can be shaped to match the intensity map generated by the probe. The second half of the design project involved generating data on the performance of the 3D-printed prosthetic sockets and investigating ways to enhance performance.



### **Third Place: Cell Separations** (Sponsor: Terumo BCT)

**Group Members:** Ryan Rykhuis (BME+ME), Ashley Marcolina (BME+ME), and Rachel Von Seggern (BME+CBE)



Current product lines use continuous flow centrifugation while maintaining functionally closed (sterile) systems. This team was interested in increasing fluid flow rates throughout centrifuges while maintaining the same or better cell recoveries. This project used an existing centrifuge design to develop single use disposable prototypes to increase throughput for more efficient cell separations. Increasing flow rates can be done by increasing G's via higher RPM's or larger radius; however, this team looked to achieve the same effect using more intelligent design methods. Higher G's may negatively affect machine or disposable reliability. By predicting fluid flow characteristics using computation

fluid dynamics software, it has been possible to predict fluid behavior within the centrifuge.

### **Join us Next Year**

If you are interested in viewing biomedical engineering senior design projects and interacting with our students, please join us for next year's E-Days event on Friday, April 24, 2020 in the CSU Lory Student Center Ballrooms.

## SUMMER HANDS-ON LEARNING PROJECTS

### Clinical Immersion Program

By Michael Benedict

Joint replacements, bone fracture repairs, open heart bypass surgery—these may not be experiences that come to mind when you think of the life of an SBME undergrad, but they're exactly what a group of students experienced via observation this summer, as part of SBME's clinical immersion program. Now in its second year, this program offers a seven-week, full-time immersion at the University of Colorado Health Medical Center of the Rockies. Students also visit the University of Colorado Health Clinical Education and Innovation Center, where they participate in clinical simulation for these high-level emergency situations. The program is co-directed by Ellen Brennan-Pierce, SBME's senior design instructor, and Julie Dunn, Medical Director of Trauma Research at the medical center (and chair of SBME's Industry Advisory Board).

During their time in the program, students rotate through specific specialty areas that rely on medical devices and biomedical technology, such as interventional radiology, intensive care, and a wide variety of surgeries. Annie Elefante, a fifth-year biomedical student, was one of this summer's participants. "One of my favorite rotations was in the operating room because it encompassed a plethora of medical devices and instruments," Elefante said. "In speaking to the medical teams...I learned more about biomaterials and the significance of clinical heritage when considering implant design. The summer flew by with everything we were exposed to at the hospital." The clinical immersion program offers a level of hands-on experience that's an excellent supplement to the classroom education students get on campus.

Another student participant, Meghan Morrill, spoke to other benefits of the experience: "This program showed how difficult the medical procedures are, giving [the students] ideas on how to improve them, all while forming connections that only improved the experience." What better way for students to learn about medical devices than to interact with the patients and doctors who use them? Morrill continued, "The medical staff [explained] the faults in even the most successful medical devices in the operating room. I was so humbled and excited for the program."

The Clinical Immersion Program is supported by the National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health. It will enter its third year next summer.



Photo courtesy of Ellen Brennan-Pierce

### Making a difference: CSU students travel to Ecuador to engineer prosthetics

By Russell Dickerson

Students in engineering and science majors often hear that their work can change the world.

For a group of Colorado State University students on a summer study abroad course in Ecuador, they put the extraordinary amount of knowledge they had learned in their courses to the test by helping create prosthetic devices.

Designing and engineering prosthetic limbs, creating molds and casts, and helping with physical therapy for amputees was all in a day's work. But far more powerful lessons faced the students in Ecuador — the astounding perseverance of those who have lost so much and how technology could help patients lead an ordinary life.

#### Creating prosthetic devices in a developing country

The senior design project evolved from a study abroad course in the summer of 2018, originally developed by biomedical engineering undergraduate advisor Deb Misuraca and research scientist Ellen Brennan-Pierce. Collaborating with the Range of Motion Project (ROMP), Misuraca, Brennan-Pierce, and 24 students worked at a clinic in Quito, Ecuador, creating prosthetic devices and interacting with patients.



Student Brooke Landoch, works alongside David Krupa, ROMP co-founder and CEO.



CSU students create mold for prosthetic device

Several students from the 2018 program took their experience from Ecuador and began a biomedical engineering senior design project over the 2018-2019 academic year. Four of the members of the project returned to Ecuador this summer, along with a second study abroad cohort, to test their prototype and ideas with ROMP.

Students interviewed amputees and took measurements of the patient’s limbs. They then created molds of the limb, and began work on casting. During each step of the process, students manually sculpted, sanded, and created the prosthetic socket, all the way through manufacturing and adjusting the final plastic versions. At the end of the process, they worked with patients to make sure the prosthetic limb was comfortable and fit correctly.

“It was thrilling, I learned so much more from participating than I think we would have from simply observing,” Foss said. “I was shocked by the artisanal nature of the prosthetic creation process — it really is like sculpting.”

Full story: <https://enr.source.colostate.edu/making-a-difference-csu-students-travel-to-ecuador-to-design-and-engineer-prosthetics/>

## 2019/20 SCHOLARSHIP WINNERS

### SBME Scholarship for Leadership and Innovation

Sarah Maclean received the SBME Scholarship for Leadership and Innovation. This scholarship was created to support biomedical engineering students who excel as creative problem-solvers and show a commitment to leadership.

Maclean was elected to serve on the BMES Student Chapter executive board in her first semester at CSU. Since then, she has held several executive positions leading up to the role of vice president. In her leadership roles, she created the BMES Faculty Meet and Greet that eventually grew into a very successful networking mixer, bridging the gap between CSU students, faculty, and local industry members. In addition, she led her sorority, Kappa Delta.



Maclean

### Joan C. King Memorial Scholarship Award



Hoffman

Awarded to students with an interest in biomedical sciences or engineering, this year’s Joan C. King Memorial Scholarship Award was given to Emily Hoffman and Jamie Pang at the Women of Vision Gala in July, hosted by the Colorado Women of Influence.

Emily Hoffman is pursuing two bachelor degrees: biomedical engineering and mechanical engineering. She is interested in the field of biomimetics and plans to attend graduate school. In her free time, she participates in distance running and enjoys traveling, especially after spending a semester abroad in Swansea, Wales.

Jamie Pang is pursuing a bachelor’s degree in biomedical sciences and is a member of the CSU Honors Program. With extensive involvement in the Colorado Science and Engineering fair, St. Jude Up ’til Dawn Fundraising Executive Committee, and the El Centro Children’s mentoring program, she strives to gain exposure in the medical field. Jamie hopes to venture into the realm of medicine and science, and ultimately pursue a career in pediatric medicine.



Pang

### Samson Design Biotechnology Innovation Scholarship



Nelson

Anna-Laura Nelson is this year’s Samson Design Biotechnology Innovation Scholarship recipient. Nelson had completed her Masters of Bioengineering at the University of Colorado Denver | Anschutz Medical Campus, where her primary research focus was tissue engineering. Her current research focuses on further understanding cellular senescence and various age-related diseases. She is co-advised by Dr. Nicole Ehrhart from CSU and Dr. Chelsea Bahney from Steadman Philippon Research Institute (SPRI), where she works as a research associate.

This annual \$2,500 scholarship was created to support a new SBME graduate student who demonstrates an interest and talent in biotechnology innovation and shows promise in innovative thinking.

## DISCOVERIES, AWARDS, & APPOINTMENTS OF SBME RESEARCHERS



### McIlwraith receives lifetime research excellence award from national veterinary association

By Mary Guiden

Wayne McIlwraith was honored July 27 by the American Veterinary Medical Association, which presented him with its Lifetime Excellence in Research Award. This award recognizes a veterinary researcher on the basis of lifetime achievement in basic, applied, or clinical research.  
<https://cvmbms.source.colostate.edu/dr-wayne-mcilwraith-receives-lifetime-research-excellence-award-from-national-veterinary-association/>



### Antibiotic clothing, a new approach to fighting bacteria

By Lauren Albin

In a recent Newsweek article, Associate Professor Melissa Reynolds, discusses the research that she and her team are performing, developing new bacteria-resistant materials to fight infection. Through a collaboration with a major medical-supply company, Reynolds proved this process is cost-effective. Her research will continue with making other hospital materials bacteria-free.  
<https://www.newsweek.com/2019/05/31/death-antibiotics-running-out-effective-drugs-fight-superbug-army-1423712.html>



### Dynamics of key viral attack strategy visible for first time

By Anne Manning

Many infectious viruses rely on a fundamental biological process called frameshifting to maximize their attack. Identified as a key mechanism that viruses use to proliferate inside their hosts, the real-time dynamics of frameshifting had never been directly observed, until now. Assistant Professors Brian Munsy and Tim Stasevich have developed detailed imaging technology and computation analysis to visualize and quantify frameshifting mechanisms at the level of single molecules in living cells.  
<https://natsci.source.colostate.edu/dynamics-of-key-viral-attack-strategy-visible-for-first-time/>



### Puttlitz appointed as the Mechanical Engineering department head

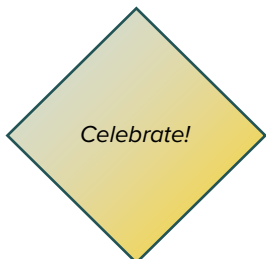
Congratulations to Christian Puttlitz who has been appointed as the Mechanical Engineering department head. Professor Puttlitz is a core faculty member of the School of Biomedical Engineering and the Director of the CSU Orthopaedic Biomechanics Laboratory and a nationally recognized leader in the investigation of diseased and treated orthopaedic conditions in animals and humans using engineering mechanics.



### Demo Day winners receive \$46,000 in cash prizes

By Anne Manning

Several companies and research projects were honored with more than \$46,000 in cash prizes April 23 at Demo Day, Colorado State University's annual celebration of entrepreneurship. Hosted by CSU Ventures, Demo Day drew more than 450 people and showcased the work of eight colleges and 31 departments, the Colorado School of Public Health and CSU-Pueblo. Attendees browsed 106 posters, as well as displays for 30 CSU-affiliated startup companies. Five SBME core faculty received prizes.  
<https://source.colostate.edu/demo-day-winners-receive-46000-in-cash-prizes/>



### Celebrate! Colorado State award winners for 2019

By CSU External Relations Staff

CSU celebrates the teaching, research and service achievements of CSU students, alumni and friends, academic faculty, administrative professionals, and classified staff as part of the *Celebrate!* Colorado State Awards. The 2019 event recognized more than 60 people from across the university including three SBME core faculty members—Christian Puttlitz, Kirk McGilvray, and Ross Palmer—who received the Interdisciplinary Scholarship Individual Team Award.  
<https://source.colostate.edu/celebrate-awards/>

# CSU partners with CU School of Medicine to open medical school branch

By Mike Hooker

A partnership between Colorado's two major universities will create new educational opportunities for medical students in the state. The University of Colorado School of Medicine is in the planning stages of establishing a medical school branch in Fort Collins in partnership with Colorado State University.

The partnership aims to create a training program that builds on the strengths of both universities, joining CU School of Medicine's leading medical education and research programs with CSU's expertise in human, animal, and public health. The partners expect to enroll the first students in the program in 2021.

"We are pleased to forge this partnership with CSU to expand the opportunities for medical education in the state of Colorado," said Donald Elliman, Jr., chancellor for the University of Colorado Anschutz Medical Campus. "Together, we are able to offer an education based on outstanding programs at both campuses and to improve the quality of health care for all in Colorado."

According to former CSU President Dr. Tony Frank, "As university leadership, we have long contemplated and discussed bringing together our two world-class medical education programs at CSU and CU. In the last year and half, our teams have worked together on this project, and I am enormously proud of everyone who has worked so diligently to make it a reality."

## Second branch campus

The CU School of Medicine, based on the University of Colorado Anschutz Medical Campus in Aurora, already has a branch campus in Colorado Springs, where about 24 students per year participate in their third- and fourth-year rotations and education. Each year, the School of Medicine matriculates 184 students into its M.D. program.

Initial plans for the new branch call for maintaining current enrollment levels in the CU School of Medicine, with the possibility of expansion of the class size in the future. The first class in the CSU program would include about a dozen students, who would be conducting all four years of their studies on the Fort Collins campus. Eventually, the branch could enroll as many as 48 students per year. Students at the branch would earn medical degrees from the CU School of Medicine.

One of the first tasks is for the CU School of Medicine to hire an assistant dean for its Fort Collins branch. The School also will recruit faculty and prepare the documentation required by the School of Medicine's accrediting body, which must approve the branch before it can open. Suzanne Brandenburg, M.D., professor of medicine at the CU School of Medicine, is coordinating the process of establishing the medical school branch. She has already been working to recruit providers in the Northern Colorado medical community because a successful medical education program will depend on outstanding clinical learning opportunities.

"At the new medical school branch, students will learn in and from the local community alongside of other health professionals," Brandenburg said. "With this expansion, we hope to capitalize on the diverse expertise at CSU, to frame health care broadly, instilling in medical students a comprehensive view of our impact on society, considering not just the patient but also communities, populations and the planet." Brandenburg also serves as director of interprofessional education on the Anschutz Medical Campus, focusing on educating students across health professions to effectively work in teams and tackle the complex health care problems of patients and society.

## Continuing collaboration

CSU and CU have collaborated for many years on health education and research, with partnerships in the Colorado School of Public Health, the CU Cancer Center, and the Colorado Clinical and Translational Sciences Institute. In addition, several graduates from CSU each year matriculate to the CU School of Medicine. "We're looking forward to working even more closely together to help train physicians for Colorado through this collaboration," said Mark Stetter, D.V.M., dean of the College of Veterinary Medicine and Biomedical Sciences at CSU. "There are still an incredible number of details to be worked out, from building out our facilities here in Fort Collins to hiring faculty and assuring that all the programs are accredited and aligned. It's a complex process, but I'm excited to be a part of it."

The process of building out the fourth floor of the CSU Health and Medical Center, opened at the corner of College Avenue and Prospect Street in Fort Collins in 2017, to accommodate classrooms and administrative offices is underway, while the medical school has begun creating the new curriculum. Existing faculty from both CSU and CU will be teaching at the branch, and new positions will be hired as needed.



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## FIND US ON:



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## SAVE THE DATES

### SEPTEMBER 2019

#### CSU Rams Climb for ROMP

Sept. 14 | 8:30 a.m. | <https://www.crowdrise.com/csurams>

#### SBME Seminar: Dr. Cash, Colorado School of Mines

Sept. 16 | 103 Behavioral Sciences | 12-12:50 p.m.

#### BMES Reception with Industry

Sept. 20 | Scott Building Atrium | 5:00-6:30 p.m.

### OCTOBER 2019

#### CSU Homecoming & Family Weekend

Oct. 2-6 | CSU Campus | [homecoming.colostate.edu](http://homecoming.colostate.edu)

#### SBME Seminar: Dr. Ye, SUNY Binghamton

Oct. 7 | 103 Behavioral Sciences | 12-12:50 p.m.

#### SBME Skill Swap for Graduate Students

Oct. 7 | LSC 372-374 | 2:30-4:30 p.m.

#### BMES Annual Meeting

Oct. 16-19 | Philadelphia, PA | [bmes.org/annualmeeting](http://bmes.org/annualmeeting)

### NOVEMBER 2019

#### SBME Seminar: Dr. Bewersdorf, Yale University

Nov. 4 | 103 Behavioral Sciences | 12-12:50 p.m.

### DECEMBER 2019

#### SBME Seminar: Dr. Oakey, University of Wyoming

Dec. 9 | 103 Behavioral Sciences | 12-12:50 p.m.

#### Front Range Neuroscience Group Annual Meeting

Dec. 11 | Hilton Fort Collins | 9:30 a.m.

#### BME Fall Commencement

Dec. 21 | LSC Grand Ballroom | 10:00 a.m.