MESSAGE FROM THE DIRECTOR

SBME—Home to Leaders and Innovators

In a recent survey conducted by the SBME, hiring managers and human resource professionals from Colorado bioscience companies noted that the top two needs for industry advancement among biomedical engineers were communication and leadership skills. Understanding the importance of these transferable skills, the SBME has incorporated activities within its curriculum to help students further develop these essential strengths, but we are particularly proud of our students who bring strong foundations to build upon.

In 2014, after seeing our biomedical engineering students present their senior design capstone projects, the SBME Industry Advisory Board created the SBME Scholarship for Leadership and Innovation. Impressed by the caliber of our students, they wanted to ensure these bright-minded individuals had opportunities to secure funding for their education (a five-year commitment). Students who vie for this award need to prepare an essay and video highlighting how they have shown leadership and innovation. Year after year, the quality of our student applicants for this award impresses our advisory board members so much that this scholarship was endowed to bring annual scholarships to BME students in perpetuity. Past winners of this award can be viewed here: engr.colostate.edu/sbme/collaboration.

Many of our diverse and talented biomedical engineering students have held or currently hold the role of president in several CSU student chapters of national organizations. Examples include: Abigail Fennell (BME+CBE), Society for Women Engineers; Josh Cook (BME+CBE), National Society of Black Engineers; Robert Ortega (BME+MECH), Society for Hispanic Professional Engineers; and Sebastian Lawton (BME+CBE), Biomedical Engineering Society.

We are particularly proud of the efforts of the local chapter of the Biomedical Engineering Society (https://www.engr.colostate.edu/organizations/bmes). They took the initiative to develop and run a strong outreach program to K-12 students that has run continuously for the last five years, including during the pandemic in a virtual format. They introduce youth in Northern Colorado to activities that illustrate multiple aspects of biomedical engineering ranging from a do-it-yourself heart rate monitor to 3D-printed models of human vertebrae. Last year, they expanded beyond their local community and partnered with the BMES Student Chapter at North Carolina A & T to run a joint panel on jobs and careers in biomedical engineering.

In a recent article from MindTools.com, four characteristics that make good leaders are discussed. They include (1) creating a vision of future, (2) working well in teams, (3) enabling team success, and (4) being flexible. These four characteristics describe all engineers that successfully complete senior design capstone projects. What is noticeable about students in the SBME is that they do this particularly well. Further, many students look for these opportunities in projects for the BMES local chapter and in laboratories around CSU before they hit their senior year.

As always, I welcome your participation, insights, questions, and ideas. You can reach me at Stuart.Tobet@colostate.edu.

Dr. Stuart Tobet
Director, SBME
Leadership changes among partner colleges

One of the many strengths of the School of Biomedical Engineering is its interdisciplinary focus on improving health, fighting disease, and aiding persons with disabilities. Our faculty members and their research laboratories span four colleges: Health & Human Sciences, Engineering, Natural Sciences, and Veterinary Medicine & Biomedical Sciences. The strong leadership of these four colleges has served us well, and we are excited to embrace these new changes.

**WALTER SCOTT, JR. COLLEGE OF ENGINEERING**

Dean David McLean recently announced his intent to retire at the end of the fiscal year. McLean has served as dean since 2013, joining CSU from Washington State University.

During his tenure as dean, the college received a $53.3 million commitment in 2016 from alumnus Walter Scott, Jr., the largest gift in the University's history.

Full story: [https://enr.source.colostate.edu/engineering-dean-david-mclean-announces-plans-to-retire-next-summer/](https://enr.source.colostate.edu/engineering-dean-david-mclean-announces-plans-to-retire-next-summer/)

**COLLEGE OF VETERINARY MEDICINE AND BIOMEDICAL SCIENCES**

Dr. Sue VandeWoude, a CSU distinguished professor and world-renowned veterinary virologist, has been named the next dean of the College of Veterinary Medicine and Biomedical Sciences.

VandeWoude will be the 11th dean and first woman to hold the position since CSU launched its Doctor of Veterinary Medicine program in 1907.

Full story: [https://cvmbs.source.colostate.edu/sue-vandewoude-dean-announcement/](https://cvmbs.source.colostate.edu/sue-vandewoude-dean-announcement/)

**COLLEGE OF HEALTH AND HUMAN SCIENCES**

Although not new, now in her third year as dean of the College of Health and Human Sciences, Lise Youngblad continues to lead the college on its mission to promote the health and well-being of people, their communities, and the environments in which they live.

“We are a college of problem-solvers, change-makers, and inspirational leaders whose passion is to transform lives,” said Youngblad.


**COLLEGE OF NATURAL SCIENCES**

Dr. Simon Tavener, former executive associate dean for academics, has been appointed to interim dean of the College of Natural Sciences and will serve in this role during the 2022-2023 academic year.

Tavener supported CNS as associate dean for more than a decade, helping to elevate its standing as one of the premier colleges of foundational sciences in the nation.

Full story: [https://source.colostate.edu/simon-tavener-interim-dean-csu-college-natural-sciences/](https://source.colostate.edu/simon-tavener-interim-dean-csu-college-natural-sciences/)
2022/23 BME Senior capstone design projects

Senior capstone design challenges students to think creatively and empowers them to take responsibility for all phases of their project, from design and manufacturing to documentation and marketing. In their fifth year, students work in small multidisciplinary teams to complete a project that they showcase at Engineering Days (E-Days) at the end of the spring semester.

The following projects will be on display at E-Days on Monday, April 24, 2023:

**Blood Warming/Cooling Heat Exchanger Bag**  
Sponsor: Terumo BCT

**Automated Sterile Tubing Weld Opener**  
Sponsor: Terumo BCT

**Ankle Bracing System for Arthritis**  
Sponsor: RK Innovations

**Neonatal Automatic Oxygen Adjustment Device**  
Sponsors: Baretich Engineering, UCHealth clinicians, and NIH

**Self-Cleaning Laparoscopic Camera**  
Sponsors: Applied Medical, Dr. Mike Stanton, and NIH

**In-House Manufacturing Method for Pediatric Prosthetic Feet**  
Advisor: James Tillotson

**SnifTek**  
Sponsors/Advisors: Neuvatek, Bert Vermeulen, and Kevin Lear

**Custom Prostheses for Upper Limbs**  
Sponsors/Advisors: Sam Bechara, Quorum Prosthetics, Stu Tobet, Steve Johnson, and James Tillotson

**Physical and Electrical Model of Pupil Reflexes**  
Advisors: Leslie Stone-Roy and Kirk McGilvray

**Biosensor for Detecting Viral Infections**  
Advisors: Chuck Henry, Brian Geiss, David Dandy

**Scalable Manufacturing of Mesenchymal Stem Cell/Stromal Cells for Cartilage Regeneration**  
Advisor: Soham Ghosh

**Low-Cost Diagnostic for Detecting RNA Based Viruses**  
Advisor: Christie Peebles

**Corporate Sponsorship**

The School of Biomedical Engineering continues to seek new corporate senior design sponsors. To participate as a sponsor, companies are expected to make a financial contribution toward project materials and overall operations of senior design. Corporate sponsors can protect their company’s intellectual property in the work done by students. All students engaged in company-sponsored projects will sign intellectual property (IP) and non-disclosure agreements (NDA). Corporate project advisors must review the Project Plan Report and give each student on the team a score at the end of each semester. To learn more or to pursue a senior design project idea, please contact Senior Design Instructor Ellen Brennan-Pierce at Ellen.Brennan-Pierce@colstate.edu.

**View Past Projects**

For the past three years, project posters and videos have been available on our website. If you are interested in learning more about our biomedical engineering projects, we invite you to view our E-Days webpage at [https://www.engr.colostate.edu/sbme/e-days/](https://www.engr.colostate.edu/sbme/e-days/). Feel free to share this link with science teachers and high school counselors. A downloadable teacher’s guide is available providing tips for integrating this event into classes. In addition, you can access the posters and videos of projects from all Walter Scott, Jr. College of Engineering departments (civil and environmental engineering, chemical and biological engineering, electrical and computer engineering, and mechanical engineering).
New undergraduate BME pathway: Computer Engineering (CpE)

The School of Biomedical Engineering has added another pathway option for undergraduate students. In addition to its current options, including biomedical engineering with chemical and biological engineering (BME+CBE), electrical engineering (BME+EE), and mechanical engineering (BME+MECH), the SBME now offers a dual degree with computer engineering (BME+CpE).

This new computer engineering pathway provides graduates with skillsets to understand the interplay between hardware and software to drive new technologies and engineer solutions to problems of human and animal health.

The program helps students develop skillsets in software development, design, and programming; hardware design and interface; embedded design; signal and image processing, and other solutions for medical devices and equipment.

Faculty research areas include digital systems, computer and communication networks, bioelectronics, biosensors, low power circuit design, and high performance computing.

Gary Johnson receives Distinguished Alumni Award

From the outset of his career, Gary Johnson (B.S., mechanical engineering, ’92) was fortunate to find his professional home at Applied Medical in California. He joined the company as an associate engineer when it had fewer than 100 team members. Since then, Gary has held several senior-level positions as the company has grown to more than 5,000 team members worldwide. He currently serves as the group president of Advanced Energy and Applied Learning. Gary is proud to have invested more than 30 years serving alongside a dedicated team developing innovative technologies, such as the Universal Seal, which helped make minimally invasive surgery possible. He also enjoys mentoring future leaders of the company.

Gary was a first-generation student and many of the good things in his life began at CSU, including meeting his wife, Deena. They reside in Orange County with their four children.

Gary is a staunch advocate of the Walter Scott, Jr. College of Engineering and is pleased to serve as an industry advisory board member for the School of Biomedical Engineering, helping students navigate the exciting world of engineering.

For full list of 2022 alumni award winners, visit https://alumni.colostate.edu/distinguished-alumni-awards/.

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 2022 speakers included:

UNIVERSITY OF PITTSBURG
Dr. Kambez Benam
Bioinspired Engineering Systems for Preclinical Respiratory Research

COLORADO SCHOOL OF MINES
Dr. Nikki Farnsworth
Engineering Insights into Type 1 Diabetes Through Biomaterials Development

UNIVERSITY OF COLORADO, BOULDER
Dr. Daniel Schwartz
Surfaces that Mediate the Structure and Activity of Adsorbed and Tethered Proteins
2022/23 BME student award winners

Left to right: Chloe Brekhus, Nizhoni Hatch, Sam Preuss, Joyce Bohn, Somayeh Baghersad, Anika O’Brien. Not pictured: Abigail Fennell.

2022 Outstanding Junior Researchers
Awards are based on depth of research
Chloe Brekhus (BME+ME)
Abigail Fennell (BME+CB)

Joan C. King Memorial Scholarship
Supports students with an interest in biomedical sciences or engineering and with an eye toward sharing their talents with the world in the context of work/life balance.
Samantha Preuss (BME+ME)
Nizhoni Hatch (BMS)

SBME Scholarship for Leadership and Innovation
Supports graduate and undergraduate students pursuing careers in biomedical engineering who show a commitment to leadership and excel as creative problem-solvers.
Joyce Bohn (BME+ME)

Dorothy and Dennis Bruner Biomedical Engineering Scholarship
Supports biomedical engineering graduate or undergraduate students.
Somayeh Baghersad (Ph.D., Bioengineering)
Anika O’Brien (BME+CB)
Photochemical device boosts CSU infectious disease research on vaccine-making
By Anne Manning

Early in the pandemic, Raymond Goodrich, executive director of the Infectious Disease Research Center and member of the SBME Industry Advisory Board, and colleagues started testing whether an existing pathogen-inactivation technology that combines the vitamin riboflavin and ultraviolet light could be used to develop a coronavirus vaccine. Their goal was to create a vaccine based on an inactivated, intact virus, which would stimulate the immune response but not cause disease in the patient.

The technology is based on two decades of work by Goodrich and colleagues who’d previously invented a pathogen-inactivation technique for blood transfusions using this same photochemistry. Early in 2020, Goodrich and colleagues found that the riboflavin-UV light photochemical reaction that works for blood pathogen reduction also works on SARS-CoV-2, the virus that causes COVID-19. Their subsequent work to demonstrate the effectiveness of this process for human vaccine development has been supported by the National Institutes of Health. That process is now licensed as SolaVAX™ and is exclusively licensed for human vaccine work by Solaris Vaccines, Inc.

Full story: https://engr.source.colostate.edu/vaccine-making-photochemical-device-boosts-csu-infectious-disease-research/

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Encouraging global understanding in engineering through Study Abroad
By Emily Wilmsen

In 2019, undergraduate advisors Toni-Lee Viney, Claire Lavelle, and Deb Misuraca organized the first Celebrate Global Engineering event, which also featured cuisine offered by international students in engineering and local restaurants.

“This interlaces students, staff, and faculty who have gone abroad and our international students, staff, and faculty,” Viney said. “It’s another opportunity for our community members to be better humans and step outside their comfort zone.”

Viney, Lavelle, and Misuraca have worked to reassure students that they have options to accommodate a semester abroad. “You may need a summer class, but is the summer class worth it to have this experience? And 99 percent of the time, the students say yes,” Lavelle said. “The payoff is we’re not adding a year to their degree; we work hard to find programs that fit into their plan of study.”

Full Story: https://engr.source.colostate.edu/encouraging-global-understanding-in-engineering-through-study-abroad/
Congratulations to the Class of 2022!

**Bachelor of Science in Biomedical Engineering and Mechanical Engineering**
Matt Ahern
Owen Anderson
Ethan Barron
Maren Baur
Ashley Bloch
Max Brown
Ben Bunten
Jack Burford
Lee Coonen
Justice Cory
Maddie D’Amato
Sarah Danekind
Ashley Daniels
Leslie Delay
Courtney Doherty
Lauren Egan
Megan Frederes
Michael Hernandez
Brady Hine
Shervin Kazemi
Kile Kelly
Kim King
Eddie Kitahara
Zach Klein
Will Kumpf
Peter Lohrisch
Ross Lohrisch
Benjamin Markworth
Nicole Mitchell
Travis Montoya
Shelby Oke
Aidan Piasentin
Melody Pierro
Ryan Pyfrom
Taylor Recapio
Nick Robinson
Tyler Ross
Brandon Rouault
Alex Scott
Turner Solheim
Matt Steichen
Grace Taylorgoodall
Corgan Thomas
Isabel Valdez
Sarah Verderame
Owen Wahl
Sierra Williams
Ali Rochette
Emily Smith
Nathan Waanders

**Master of Engineering - Biomedical Engineering Specialization**
Christopher Frankson
Robert Humphries
Sydney Sherrick
Cailin Sullivan

**Master of Engineering Online - Biomedical Engineering Specialization**
Kyle Fehn
Jessica Hastings
Dan Kamnikar-Lembcke

**Master of Science, Bioengineering**
Ian McLean

**Doctor of Philosophy, Bioengineering**
Ahmed Aldohbeyb
Michael Nguyen-Truong
SAVE THE DATES

OCTOBER 2022
SBME Seminar: Dr. Chelsea Magin, University of Colorado Denver | Anschutz Medical Campus
Oct. 24 | Weber Bldg., Room 202 | 1:00-1:50 p.m.
https://www.engr.colostate.edu/sbme/seminar-series/

NOVEMBER 2022
SBME Seminar: Katie Weimer, 3D Systems
Nov. 7 | Weber Bldg., Room 202 | 1:00-1:50 p.m.
https://www.engr.colostate.edu/sbme/seminar-series/

DECEMBER 2022
SBME Seminar: Dr. Anne Silverman, Colorado School of Mines
Dec. 6 | Weber Bldg., Room 202 | 1:00-1:50 p.m.
https://www.engr.colostate.edu/sbme/seminar-series/

SPRING SEMESTER 2023
APRIL 2023
Engineering Days (E-Days)
Apr. 24 | Lory Student Center | All-Day
https://www.engr.colostate.edu/sbme/e-days/

SCHOLARSHIPS

Scholarship support at all levels provides critical aid to our students. We strive to help as many students as possible with the financial obligations of their engineering education.

Donate to an SBME scholarship today and know that your gift will make an impact for years to come.

https://advancing.colostate.edu/SBME

Biomedical Engineering Alumni Scholarship
Dorothy and Dennis Bruner Biomedical Engineering Scholarship
Joan C. King-Tobet Memorial Scholarship
Samson Design Biotechnology Innovation Scholarship
SBME Scholarship for Leadership and Innovation