



SCHOOL OF BIOMEDICAL ENGINEERING

COLORADO STATE UNIVERSITY



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Volume 10, Issue 2 Fall 2022

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 COLORADO STATE UNIVERSITY

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/>



COLLEGE OF VETERINARY MEDICINE AND BIOMEDICAL SCIENCES COLORADO STATE UNIVERSITY

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://cvmb.ssource.colostate.edu/sue-vandewoude-dean-announcement/>



COLLEGE OF HEALTH AND HUMAN SCIENCES COLORADO STATE UNIVERSITY



Although not new, now in her third year as dean of the College of Health and Human Sciences, Lise Youngblade 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 Youngblade.

Full story: <https://chhs.source.colostate.edu/guest-column-looking-toward-a-new-academic-year-with-optimism-excitement-and-hope/>



COLLEGE OF NATURAL SCIENCES COLORADO STATE UNIVERSITY



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/>

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, UCHHealth 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.

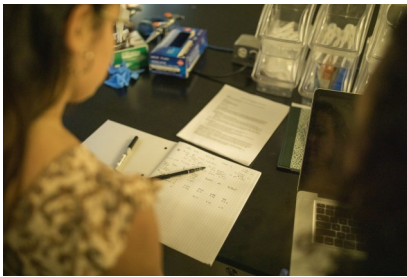
View Past Projects

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/>. 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 programing; 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 PITTSBURGH

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'Brian. 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'Brian (BME+CB)

Photochemical device boosts CSU infectious disease research on vaccine-making

By Anne Manning



The VacciRAPTOR's custom engineering includes a coil system through which the virus solution flows while being exposed to UV light.

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/>

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 Recaido
Nick Robinson
Tyler Ross
Brandon Rouault

Alex Scott
Turner Solheim
Matt Steichen
Grace Taylorgoodall
Corgan Thomas
Isabel Valdez
Sarah Verderame
Owen Wahl
Sierra Williams

Bachelor of Science in Biomedical Engineering and Electrical Engineering

Niko Alexenko
Servando Calderon Felix
Katie Graham
Alfredo Macha
Luke Rhone
Aaron Roelfson
Nathan Simonson
Nathan You

Bachelor of Science in Biomedical Engineering and Electrical Engineering—Lasers & Optics

Macklin Harrington

Bachelor of Science in Biomedical Engineering and Chemical and Biological Engineering

Sydney Alderfer
Justin Duff
Sarah Ehrlick
Michelle Hefner
Ashley Helton
Cara Leone
Emma Maclaughlin
Wendy Perez
Alycia Pisano

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



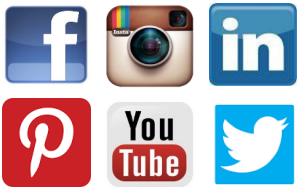


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SAVE THE DATES

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

