

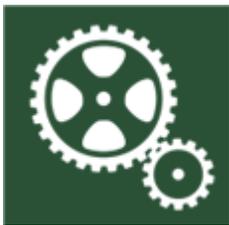


**SCHOOL OF BIOMEDICAL  
ENGINEERING**  
COLORADO STATE UNIVERSITY

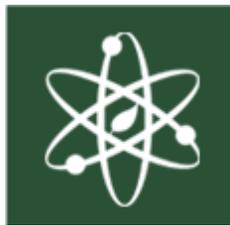


## **Undergraduate Program Book**

**Our program is built on strong faculty and research programs.**



Walter Scott,  
Jr. College of  
Engineering



College of  
Natural  
Sciences



College of  
Health and  
Human  
Sciences



College of  
Veterinary  
Medicine &  
Biomedical  
Sciences

Dear Prospective Student:

We are excited you have chosen to explore the School of Biomedical Engineering degree program. SBME built its foundation on collaborative relationships and discussions among CSU faculty from around the University. While these conversations were driving the creation of SBME, discussions with professionals in industry revealed the need companies had for freshly-minted engineers with biomedical engineering knowledge. From this need arose an innovative BME undergraduate degree program focused on partnering with traditional engineering disciplines: electrical, mechanical, and chemical and biological. Our students earn two bachelor's degrees, giving them a competitive advantage when seeking employment.

Our undergraduate student enrollment is growing (currently, over 400 students), and we continue to seek partnerships with biomedical engineering companies to sponsor multidisciplinary team capstone projects. This year, we have partnerships with AlloSource, Applied Medical, Sharklet Technologies, and Terumo BCT. By utilizing students' natural curiosity and problem-solving skills, these companies are not only exploring new concepts, but are also building relationships with our graduating engineers.

An important question posted to all faculty interested in joining SBME is who they are collaborating with in the program and who they look forward to collaborating with in the future. That spirit has led to projects that include SBME faculty from the other three colleges that comprise SBME in addition to Engineering. We try to remain open to as many possibilities as we can.

As SBME matures we pride ourselves on finding creative ways to share knowledge and resources in our backyard and around the world. Recently, we partnered with the Range of Motion Project (ROMP), an international nonprofit organization based in Denver, to take a group of undergraduate students to Ecuador in spring 2018. We have also started conversations with faculty in Rwanda interested in starting a new degree program in biomedical engineering, people with interests in helping underserved communities in Colorado and surrounding states, and Zubaida Bai, the CEO of Ayzh, Inc., a social venture providing health and livelihood solutions to impoverished women worldwide. The power of collaboration is key to expanding our students' real-world experience, creating new knowledge among scientists, and helping industry see new solutions through the creative minds of our students.

With international service-learning opportunities; an interdisciplinary focus on improving health, fighting disease, and aiding persons with disabilities; and the career flexibility of earning two engineering degrees, our undergraduate biomedical engineering program may be a great fit for your needs.

Sincerely,



Stuart Tobet  
Director



Kevin Lear  
Director, Undergraduate Programs

## MISSION

The Colorado State University School of Biomedical Engineering (SBME) combines the university's strengths in veterinary medicine, engineering and the sciences to provide an interdisciplinary focus on improving health, fighting disease and aiding persons with disabilities.

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**FIRST ACCREDITED  
UNDERGRADUATE BIOMEDICAL  
ENGINEERING PROGRAM IN THE  
STATE OF COLORADO.**

## INTRODUCTION

The Colorado State University School of Biomedical Engineering was established at CSU at the graduate level in 2007 by Susan James, professor of mechanical engineering, who also planted the seed for an undergraduate program that welcomed its first students in 2010.

A truly multidisciplinary program, our undergraduate program allows students to pursue research and education at the intersection of the life sciences, engineering, and medicine. At CSU, your undergraduate experience will integrate the breadth of a biomedical engineering degree and depth of a traditional engineering degree in five years. You will develop and use transdisciplinary skills in classroom, hands-on, and senior design experiences. Many students also obtain additional experience in co-ops, internships and/or faculty research laboratories. The combination of two full engineering degrees, the emphasis on hands-on problem solving, and working in multidisciplinary teams provides our students a robust educational experience and an extra 'edge' in their next career steps.

The two engineering B.S. degrees provide a flexible base to launch you into a variety of industries; medical, veterinary, or graduate school; or many other professional career choices. Explore the three BME pathways to discover which one is right for you (see "Partner Majors" on page 7). Under the leadership of undergraduate program director Dr. Kevin Lear, SBME has grown to an enrollment of over 400 students as of fall 2016. Graduates of CSU's unique double-degree undergraduate program have gone on to pursue careers at local and national companies such as Medtronic, AstraZeneca, Terumo, Genentech, Sharklet Technologies, and EPIC Healthcare. Others have pursued advanced degrees at various institutions, including Stanford University School of Medicine and Massachusetts Institute of Technology.

## ACCREDITATION

SBME at CSU is proudly the first accredited undergraduate biomedical engineering program in the state of Colorado.

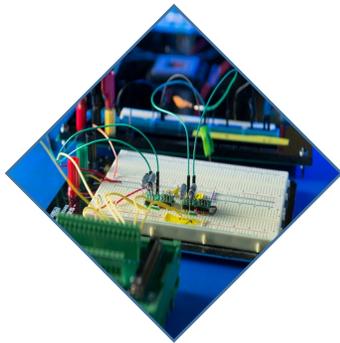
The Accreditation Board for Engineering and Technology (ABET) ensures that the program meets the quality standards that produce graduates prepared to enter a global workforce. After more than 80 years, ABET's standards play a fundamental role in creating strong engineers and have become the basis of quality for over 40 disciplines all over the world. Developed by technical professionals from ABET's member societies, ABET's criteria focus on what students experience and learn. Sought worldwide, ABET's voluntary peer-review process is highly respected because it adds critical value to academic programs in the technical disciplines, where quality, precision, and safety are of the utmost importance. Graduating with an ABET-accredited degree is an important step in becoming a licensed professional engineer. (Adapted from <http://www.abet.org/>)

## PARTNER MAJORS



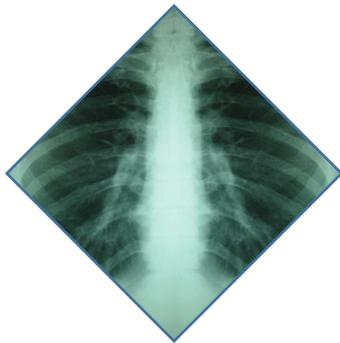
### *BME+ Chemical and Biological Engineering*

The biomedical engineering (BME) degree combined with a chemical and biological engineering (CBE) degree typically draws students interested in using biology and chemistry in engineering. Our BME+CBE program emphasizes process engineering and prepares students to diagnose and/or treat diseases (such as cancer or tuberculosis) using medical devices that incorporate biology or chemistry (e.g., blood oxygenators or biocompatible materials in advanced wound-healing techniques), or to work with advanced BME technologies such as artificial organs.



### *BME+ Electrical Engineering*

The biomedical engineering (BME) combined with an electrical engineering (EE) degree provides a strong background in applied physics and biomedical signal and image processing. Using biomedical devices and related areas, BME+EEs may work in a broad range of medical device and/or equipment applications such as imaging, patient monitoring, and therapeutic applications (e.g., neural interfaces for controlling prosthetic devices, robotics that operate surgical equipment, devices that open and cauterize wounds, x-rays).



### *BME+ Electrical Engineering, Concentration in Lasers and Optics*

The biomedical engineering (BME) combined with electrical engineering (EE) with a concentration in lasers & optics further refines electrical engineering principles with additional physics, optics and lasers courses, and specialization in areas such as optics, biosensors, or ultra-fast lasers that help image and/or treat biological systems (e.g., radiation therapy, electro-chemical microfluidics).



### *BME+ Mechanical Engineering*

With a biomedical engineering (BME) degree and a mechanical engineering (MECH) degree, students apply mechanical engineering principles to biological systems to analyze and design devices such as exercise equipment, prosthetic limbs, and exoskeletons that work outside the body to enhance functionality, or work to engineer technologies like orthopaedic implants or biocompatible materials that work inside the body to enhance or replace bone or soft tissues.

## CURRICULUM

The SBME's undergraduate curriculum is developed by faculty and is guided by the standards set by ABET. In addition, to assist in ensuring that the curriculum is up-to-date and relevant, the school and our partner departments have advisory boards that allow for interaction with the engineering and professional communities.

The curriculum affords both important breadth and depth of knowledge necessary to prepare students in traditional engineering fields as well as in biomedical engineering. This includes coursework in math, physics, biology, physiology, chemistry, and engineering. Students are also required to complete the university's All University Core Curriculum (AUCC), which includes classes in arts and the humanities, social and behavioral sciences, history, global and cultural awareness, writing and communication.

Beyond the core coursework and the AUCCs, a depth of knowledge is achieved through advanced courses in both biomedical engineering AND the partner major (Chemical and Biological Engineering, Electrical Engineering, or Mechanical Engineering).

BME students may elect to supplement their degree program by pursuing certificates and/or minors in other fields outside of engineering, such as (but not limited to) math, mathematical biology, chemistry, business, entrepreneurship, etc.

We have compiled important information about the BME program in this Program Book for your easy reference. However, programs and requirements evolve with time to meet emerging needs. Please check CSU websites and/or speak with your academic advisor for the most up-to-date information.

## COURSE OF STUDY – UNDERGRADUATE MAJOR

Graduates of the unique five-year BME undergraduate program at the School of Biomedical Engineering are well positioned to contribute in this transdisciplinary field because they receive two bachelor of science degrees: a B.S. in biomedical engineering and a B.S. in one of three traditional engineering areas: chemical and biological engineering (CBE), electrical engineering (EE), or mechanical engineering (MECH). For our most current curriculum guides and checksheets, please visit our website at [www.engr.colostate.edu/sbme/undergraduate-programs/](http://www.engr.colostate.edu/sbme/undergraduate-programs/).

## BME MINOR

Not sure engineering or a major in BME is right for you?

The School of Biomedical Engineering offers undergraduate students who are in good academic standing the opportunity to earn credits in a minor program to complement their primary major. This 21-credit minor is open to all majors. It is designed to introduce you to biomedical engineering and strengthen your skills in engineering and science without the 5-year commitment of CSU's BME dual-BS-engineering program.

BME is one of the fastest growing industries in the U.S. and a minor can help give you a competitive edge over your other non-BME colleagues. Biomedical engineers typically require training in both a

traditional engineering field and life sciences. Therefore, students majoring in engineering will focus their remaining minor elective courses on life sciences. Conversely, those with a science or other academic background will concentrate on strengthening their engineering knowledge.

When pursuing the Biomedical Engineering minor, you may need an additional semester to reach graduation, however, you may be able to count some of the [Biomedical Engineering minor](#) requirements toward your specific degree requirements. We encourage you to work with your academic advisor(s) to find what fits best for you.

## BME GRADUATE PROGRAMS

The School of Biomedical Engineering offers four graduate programs: [Master of Engineering](#) with a specialization in biomedical engineering (also offered [online](#)), [Master of Science in bioengineering](#), or [Ph.D. in bioengineering](#). CSU's BME graduate programs combine strengths in veterinary medicine, engineering, and the sciences to provide an interdisciplinary focus on improving health, fighting disease, and aiding persons with disabilities.

SBME faculty display academic excellence across diverse fields converging on many research areas, including medical devices and therapeutics, imaging and diagnostics, and regenerative and rehabilitative medicine.

### Regenerative and Rehabilitative Medicine

Much work in SBME focuses on the study of orthopedics ranging from horses to humans. Clinical relevance stretches from spinal mechanics and disc replacements, to arthritis and joint functions that include legs and hips. Stem cells, biologics, and small molecules are all on the list of novel approaches to problems in regenerative medicine.



### Medical Devices and Therapeutics

Significant research in SBME focuses on the study of materials that modify surfaces used for medical devices. This can range from modifications to materials that carry fluids and need special properties (e.g. anti-coagulant) to the modification of materials that are used in implants of things that range from joints to heart valves. Extensive expertise in biochemical engineering further helps expand syntheses to potential molecular therapeutics.



### Imaging and Diagnostics

Imaging and diagnostics in SBME revolves around the development of a new generation of novel biosensors incorporating everything from lab-on-a-chip technologies to the use of lasers and optics in state-of-the-art microscopy. The range of targets



runs from ions crossing channels in membranes detected electrophysiologically to oxidizable molecules detected by electrochemistry or larger peptides or proteins detected by immunochemistry. Additional approaches including aptamers on one end and various forms of spectroscopy on another are in constant development.

### *Integrated Degree Program (IDP+)*

Do you have plans to go to graduate school after you complete your undergraduate degree? Do you love research? Are you interested in pursuing a graduate degree in BME?

Would you like to double count some of your undergraduate credits towards a master's degree? In addition to traditional graduate programs, where students finish the Bachelor's degree first, then proceed to graduate school, CSU's IDP+ (Integrated Degree Program) allows students to double count up to 9 credits of 500-level courses towards their undergraduate and graduate programs while they finish their undergraduate program. When students apply and are admitted to an IDP+ program, students typically begin their graduate program (see below for specific BME graduate programs) the final semester of their undergraduate program.

### *Master of Engineering with a Specialization in Biomedical Engineering*

A 30-credit, coursework-only (non-research based) resident or online degree program for advancement in the biomedical engineering industry. The curriculum focuses on developing a foundation in biomedical engineering, gaining more knowledge in a particular interest area, and advanced or applied mathematics. This program can be helpful for people already working in the field who need to augment their skillset or for people who would like to be in the BME field and need additional education to be competitive for a career move.

### *Master of Science in Bioengineering*

A 30-credit, research-based degree that requires you to complete a research project leading to the successful defense of a thesis. Core courses include bioengineering and biomolecular technology, advanced mathematics and statistics, as well as technical electives chosen from numerous engineering and life science courses. The curriculum is designed to provide flexibility and support your research specialty. This program can be helpful for people who would like to conduct research and/or hold management/leadership positions in industry. It can also be helpful in preparing or bridging and educational gaps that may exist for people considering more advanced degrees, such as the PhD or professional degrees (e.g. M.D., D.V.M, etc.).

### *Ph.D. in Bioengineering*

Our Ph.D. in Bioengineering provides you an opportunity to conduct research in state-of-the-art facilities. The curriculum is designed to provide flexibility and support your research specialty, which will be guided by your advisor. You are required to complete 72-credit hours, present a research plan in a preliminary exam, and defend completed research in a final exam/dissertation defense. This program is helpful for people wanting to conduct research and/or teach at a university or hold higher leadership/lab/management positions in industry or research facilities.

The department highly recommends checking with your Financial Aid Advisor to see if/how your financial aid will be affected before applying to any BME graduate program. For more information on any of the CSU Graduate Programs in BME, contact BME Graduate Program Advisor Sara Mattern, [Sara.Mattern@colostate.edu](mailto:Sara.Mattern@colostate.edu).

## DECIDING WHICH BME PROGRAM IS RIGHT FOR YOU

See the pros and cons of each “flavor” of BME below to help you decide which program is right for you!

### *BME Double Degree 5-Year Undergraduate Program*

<i>PROS</i>	<i>CONS</i>
<ul style="list-style-type: none"> <li>• Depth of traditional engineering major PLUS the breadth of BME</li> <li>• Employers like this approach, as they don't have to provide extensive additional training in either engineering or life sciences – our graduates already have this!</li> <li>• Flexibility of two degrees</li> <li>• One additional year gives a full additional degree - ‘Buy one degree, get one ¾ off’</li> <li>• More time for internships, research involvement</li> <li>• Knowledge is integrated</li> <li>• Senior design experience is multidisciplinary</li> <li>• Many CSU scholarships and financial aid can go for 5 years</li> </ul>	<ul style="list-style-type: none"> <li>• More time and money than a single degree</li> <li>• Not typically able to complete program in less than five years, even with substantial transfer credits, because of the tight sequencing/availability of engineering classes</li> </ul>

### *BME Minor*

<i>PROS</i>	<i>CONS</i>
<ul style="list-style-type: none"> <li>• Depending on your major, many courses can count as technical electives in your major, so you can ‘double count’ them, and it typically does not add time to your degree completion</li> <li>• ‘Flavor of BME’ without the time &amp; financial commitment of double degree</li> <li>• Can take BIOM courses if space permits</li> <li>• Can sculpt it to your interests</li> </ul>	<ul style="list-style-type: none"> <li>• Not the same depth and integration as double degree</li> <li>• Some BIOM courses may not be available due to space restrictions (e.g., BIOM 300, 486)</li> <li>• Engineering-related courses have prerequisites that limit non-engineers’ ability to take them</li> </ul>

*Integrated Degree Program (IDP+) vs. BME Undergraduate Degree*

<i>PROS</i>	<i>CONS</i>
<ul style="list-style-type: none"><li>• Can double-count up to 9 credits of 500-level work at both the undergraduate and the graduate level (thus reducing your time in graduate school by a semester)</li><li>• 'Fast track' approach allows a jumpstart on graduate-level research if you're in a lab as an undergrad</li><li>• Depth of study and research in BME at the graduate level</li></ul>	<ul style="list-style-type: none"><li>• Undergraduate and graduate BME work is not as integrated as the double-degree approach</li><li>• Sometimes scholarships cannot carry over to graduate school classes</li><li>• Graduate programs are more focused on specific research, so if you're interested in working in industry that is not related to your graduate research, it could be questioned during the interview process</li><li>• Oftentimes, an engineering faculty member will pay for your graduate school; sometimes they cannot, so you pay on your own. However, there are sometimes other ways to receive financial aid/loans for graduate school</li></ul>

## ACADEMIC ADVISING

Each semester, you will meet with your BME academic advisor. Depending on your partner major, you may also meet with an undergraduate academic advisor from your partner major department.

At your advising meetings, you will have the opportunity to check in, discuss current courses, talk about the courses you'll take in subsequent terms (including summer classes), and discuss anything else you'd like – your advisor can help you navigate the university system, help clarify your classes/curriculum, and help refer you to various resources.

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### ADVISING DESCRIPTION

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Advisors in the SBME assist students in making well-informed decisions regarding course selection, obtaining accurate information regarding academic programs of study, making connections with faculty, assessing career goals in relation to interests, skills and values and accessing other sources of assistance and student support provided by Colorado State University.

The advisee/advisor relationship seeks to support and cultivate the following elements of student's academic experience:

**Personal Growth:** Develop communication, decision-making, and problem-solving skills. Understand the University's expectation to be an active and self-directed learner, and embrace self-authorship for education and post-graduation life.

**Cultural Navigation:** Develop skills in locating and effectively using information and resources that help achieve personal goals.

**Curriculum Integration:** Understand the relationship between classroom experiences and personal goals.

**Experiential Learning:** Understand the importance of including experiences outside of the classroom in the educational plan, and synthesize these experiences with coursework.

**Relational Development:** Understand the importance of cultivating personal, collegial, and professional relationships. Develop an awareness of self within the educational experience so the student can intentionally make connections with faculty in the major department based on shared academic interests.

*Meet Your Advisor*



**BRETT EPPICH BEAL**  
**Senior Undergraduate Advisor**

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3<sup>rd</sup> – 5<sup>th</sup> year students (Classes of 2017 – 2020) - Last Names M-Z  
2<sup>nd</sup> year students (Classes of 2021 and beyond) - Last Names I-Z  
[brett.beal@colostate.edu](mailto:brett.beal@colostate.edu)



**ROBYN JEEP ERNST**  
**Undergraduate & Minor Advisor**

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First-year Students  
BME Minor Students  
[robyn.jeep\\_ernst@colostate.edu](mailto:robyn.jeep_ernst@colostate.edu)



**DEBRA MISURACA**  
**Undergraduate Advisor**

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3<sup>rd</sup> – 5<sup>th</sup> years students (Classes of 2017 – 2020) - Last Names A-L  
2<sup>nd</sup> year students (Classes of 2021 and beyond) - Last Names A-H  
[debra.misuraca@colostate.edu](mailto:debra.misuraca@colostate.edu)

## DEGREE-ENHANCING OPPORTUNITIES

In today's competitive engineering environment, it is imperative that students gain career-related experience prior to graduation. Recognizing this necessity, the Engineering Success Center, located on the first floor of the Scott Bioengineering Building, assists students with resume building, mock interviews, internship and co-op placement, and offers tied to industry, including career fairs.

### *Internships*

Internships are typically structured situations where classroom learning meets with practical, career-related work experience. Internships provide students with opportunities to learn in a real work environment alongside practicing professionals in the field.

The length/timing of an internship varies; however, most of our student internships are full- or part-time paid summer positions. Typically, BME students will apply for an internship around their 3<sup>rd</sup> year, and if a summer internship is local, students may continue in a part-time capacity with the company throughout the school year.

Many companies prefer students have some breadth and depth in engineering via coursework and/or on-campus experience, such as working in a lab; however, we encourage our students to apply for any opportunity they believe will advance their education and practical experience no matter their year in school and skill level.

### *Cooperative Education (CO-OP)*

Our cooperative education program allows students to work (and get paid!), for two semesters and two summers, in a position related to their major. CO-OP participants gain at least a year's worth of experience with the same employer and earn a competitive salary while working. CO-OPs allow participants to further explore their chosen engineering discipline, build a powerful resume, develop a network of professional contacts, and help support their academic expenses.

How is a CO-OP different from an internship?

#### *Time Commitment:*

CO-OPs are at least three work terms alternated with school (typically a summer/fall and a spring/summer), while internships are only one work term of about 12 weeks.

## INTERNSHIP BENEFITS

- ✓ Explore BME and career goals
- ✓ Develop knowledge and key skills
- ✓ Gain practical employment experiences
- ✓ Establish a network of professional contacts
- ✓ Build your resume
- ✓ Practice professional behavior and learn how organizations function
- ✓ Strengthen your candidacy for post-graduation employment
- ✓ Achieve personal growth and build confidence as you take on new challenges
- ✓ Practice employment interviewing skills and the hiring process
- ✓ Experience being an independent learner

### *Eligibility with Companies:*

Students can be eligible to participate in CO-OPs after 1 ½ years of engineering courses, whereas most companies are looking for students in their 3<sup>rd</sup> or 4<sup>th</sup> years to fill internship positions.

### *Job Diversity:*

Because of multiple rotations, students in CO-OPs can be given different assignments within a company, whereas internships may be limited to one area of responsibility, depending on the organization.

### *Graduation Impact:*

By participating in a CO-OP, students typically extend graduation, providing the student with at least one full year's worth of experience. However, this full-time income may help a student pay for the collegiate experience. Internships typically have no impact on time to graduation, and financial assistance earned from internships is mostly nominal.

For more information about internships and CO-OPs, stop by the Engineering Success Center on the first floor of the Walter Scott Bioengineering Building.

### *Education/Studying Abroad*

It is possible for BME students to study abroad without extending their time to graduation. However, students must carefully plan the timing of a study abroad experience as well as the courses to be taken abroad. While it is not recommended that students study abroad during their first year, this is the perfect time to begin planning. Interested in studying abroad? Check out the [Education Abroad](#) website.

Some of the most popular destinations for BME students (due to the number of transferable courses) include Southern Australia, New Zealand, and the United Kingdom. We have also had students participate in summer experiences in Ecuador, Ireland, the Czech Republic, and Greece (among others), allowing them a cultural experience and some academic credit but without the added stressors of a full-on engineering course load abroad. Find what fits for you!

The [Office of International Programs](#) (OIP) is your central resource for information on opportunities abroad. The OIP maintains reference materials on a wide variety of study abroad and internship programs, short-term work and volunteer opportunities, and grants and scholarships. Education Abroad coordinators are available to assist you in learning how to research programs, identify programs that meet University requirements for credit transfer, and answer questions you may have.

If you're interested in studying abroad, we recommend the following steps:

**Step 1:** Meet with a Peer Advisor in Laurel Hall

**Step 2:** Meet with an Education Abroad and Financial Aid Coordinator. Contact the Education Abroad Office to schedule an appointment with an Education Abroad Coordinator. Also, check the education abroad website for walk-in hours.

**Step 3:** Meet with your academic advisor once you have narrowed down a location and have a list of potential courses.

## Focus on First Generation Students



If you will be the first person in your family to receive a bachelor's degree or higher, you're what we call a "First Generation" student. (If your sibling(s) are on track to receive or have received a bachelor's degree, you are still 1<sup>st</sup> Gen.) As such, you may face challenges that other students may not. For example, you may not be able to call home to find out how to 'do college'; you may have additional family responsibilities that other students don't; you are used to figuring things out on your own. Your intelligence and tenacity have brought you to CSU, and we're glad you're here!

The college and the SBME are here to connect you to resources to help you succeed. SBME began a mentoring program in the fall of 2017 where 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> year First Gen students are mentors for 1<sup>st</sup> and 2<sup>nd</sup> year first generation students. These relationships are partnerships where first generations students can freely ask questions, share success strategies, or just go to coffee and hang out. Our mentors have found ways to succeed here and want to help other BME students. SBME also hosts events throughout the year, such as the SBME 1<sup>st</sup> Gen Dinner in early spring.

### Student Organizations

Joining a student organization or group on campus offers many benefits, including opportunities to network with fellow students, faculty, staff, and industry representatives. Students can also gain leadership skills, valuable knowledge related to working in groups, improve presentation abilities, have fun and/or contribute to worth community efforts such as [Cans Around the Oval](#).



The [Student Leadership, Involvement, and Community Engagement \(SLICE\)](#) office at Colorado State provides an important link between students and their surrounding communities. More than 400 [campus organizations](#) reflect interests such as academic, political, religious, sports clubs, programming/service, governance, social, Greek, and special interests.

Student organization involvement can be a resume booster and can help you stay up-to-date on what's going on in your program. Several organizations are popular among BME students.

American Indian Science and Engineering Society (AISES)

<http://www.aises.org/>

American Institute of Chemical Engineers (AIChE)

<https://www.aiche.org/>

American Society of Mechanical Engineers (ASME)

<https://www.asme.org/>

Biomedical Engineering Society (BMES)

<http://www.bmes.org/>

Institute of Electrical and Electronics Engineers (IEEE)

<https://www.ieee.org/>

Institution of Mechanical Engineers (IMechE)

<http://www.imeche.org/>

International Society for Pharmaceutical Engineers (ISPE)

<https://www.ispe.org/>

National Society of Black Engineers (NSBE)

<http://www.nsbe.org/home.aspx>

Out in STEM (oSTEM)

<https://www.ostem.org/>

Society of Asian Scientists and Engineers (SASE)

<http://www.saseconnect.org/>

Society of Hispanic Professional Engineers (SHPE)

<http://www.shpe.org/>

Society of Women Engineers (SWE)

<http://societyofwomenengineers.swe.org/>

## ADDITIONAL STUDENT RESOURCES

Admission for Competitive Majors

<https://admissions.colostate.edu/competitive-majors/>

All-University Core Curriculum (AUCC)

<http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/>

Career Resources

[www.career.colostate.edu](http://www.career.colostate.edu)

Collaborative for Student Achievement (support services/pre-med/vet advising)

<http://studentachievement.colostate.edu/>

Counseling/Mental Health Services

<http://health.colostate.edu/>

Diversity at CSU

<https://diversity.colostate.edu/>

Engineering Success Center

<http://www.engr.colostate.edu/engineering-success-center/>

General Catalog

[www.catalog.colostate.edu](http://www.catalog.colostate.edu)

Office of Financial Aid

<https://financialaid.colostate.edu/>

Parent and Family Programs

<https://parentsandfamily.colostate.edu/>

Personalized Access Center to Student Info

[www.ramweb.colostate.edu](http://www.ramweb.colostate.edu)

Registrar

<https://registrar.colostate.edu/>

Scholarships

<https://financialaid.colostate.edu/scholarships/>

Transfer Coursework

[www.transferology.com](http://www.transferology.com)

Walter Scott, Jr. College of Engineering Tours

<https://www.engr.colostate.edu/tours.php>

CSU BME GRADUATE DATA (as of spring 2017)

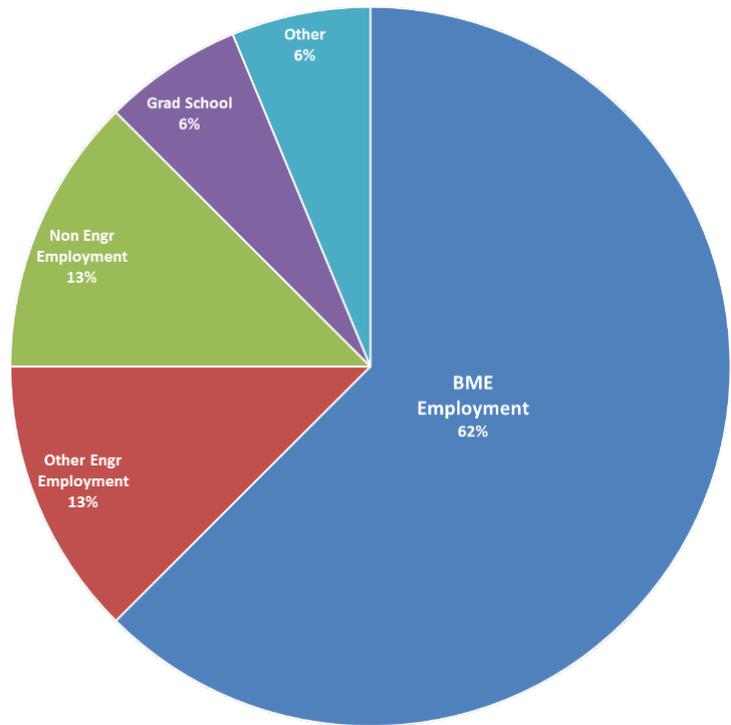
62% BME employed

13% other engineering employment

13% Non-engineering employment

6% Grad School

6% Other



## DID YOU KNOW?

As SBME matures, we remain open to finding creative ways to share knowledge and resources in our backyard and around the world as well as expose our students to new experiences.

### *SBME Offers Short-term Study Abroad Course*

We have recently stepped up efforts at the undergraduate level by developing the [Prosthetic Innovation in Ecuador](#) program, a short-term study abroad course (BIOM382A) that focuses on providing prosthetic and orthotic care to underserved population in Quito, Ecuador. The School is partnering with Range of Motion Project (ROMP), an international, non-profit, mobility organization based on Denver that works to bridge the gap between access and resources available in America to people with amputation in the developing world.

Co-leaders, Deb Misuraca (BME Academic Advisor) and Ellen Brennan-Pierce (BME Research Scientist and Senior Design Instructor), let 24 CSU students to Quito at the end of the Spring 2018 semester, where they experienced hands-on application of machining skills, interacted with patients, and assisted in the design and fabrication of 22 prosthetics devices. Students reported that they were inspired by their experience and their participation solidified their interest in biomedical engineering.

### *Clinical Immersion Program Provides Students with Emergency Simulations*

The [Clinical Immersion Program](#) provides students with an opportunity to visit the University of Colorado Health Clinical Education and Innovation Center, where they participate in clinical simulation for high-level emergency situations and participate in discussions with clinical providers to discuss perceived gaps, potential future directions of medical devices, and unmet needs. These clinical experiences help BME students understand the environment and constraints that must be considered for successful design of medical devices.

### *SBME Boasts High Percentage of Faculty Innovators*

BME students are well equipped to enter industry because biomedical engineering is a strongly translational field; faculty researchers are working to engineer solutions to biomedical problems. Some of these solutions are processed as [inventions](#) via partnerships with CSU Ventures, the technology transfer office for the University.

The School of Biomedical Engineering is proud to boast a high percentage of faculty innovators. Over 25% of inventions disclosed to CSU Ventures between FY2013 and FY2017 were created by SBME faculty.

Find us  
on:



## What can I do with an undergraduate degree in bioengineering?

Our alumni have pursued careers working in industry, academia, and for government agencies. Here is a sampling of companies and job titles:

ACCENTURE: Data Analyst

MEDTRONIC: Associate, CAPA Qualitative Engineer

TERUMO BCT: R&D Engineer

ZIMMER BIOMET: Development Engineer

3D SYSTEMS: BioCAD Engineer

EDWARDS LIFESCIENCES: Quality Engineer

CONMED: New Product Development Engineer

43% women

22% culturally diverse

14% First Generation students

*Based on Fall 2017 BME undergraduate enrollment*