



# Department of Bioengineering

UNIVERSITY OF COLORADO

**DENVER | ANSCHUTZ MEDICAL CAMPUS**

## Student Handbook 2020-2021

\*The year of this guide corresponds to the year of regular entry into the program. It will also be the “catalog year” for the student’s major.

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College of Engineering, Design and Computing  
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## **How to use this Handbook**

This guide is intended to provide information, rules, regulations, policies and procedures for the Bachelor of Science (B.S., M.S., and Ph.D.) in Bioengineering, the College of Engineering, Design and Computing, and CU Denver | Anschutz Medical Campus. It is recommended that students interested in pursuing a degree in Bioengineering contact either the Undergraduate or Graduate Program Manager, respectively, prior to applying to CU Denver and registering for classes.

A copy of this Student Guide is available to every student in the Bioengineering Program. Each student is responsible for reading, understanding, and complying with all rules, regulations, and policies stated in this publication for their degree program of interest. The Guide is also available to those who are considering applying to CU Denver and/or are categorized as pre-engineering students in the College of Engineering, Design and Computing. Students are expected to be familiar with and abide by all rules and regulations presented in this guide.

A revised copy of this Guide will be provided to each degree-seeking student annually. Addenda to the Guide will be published and distributed as necessary. The Department of Bioengineering, with consultation from other University staff and administration, will address issues not explicitly mentioned in this Guide as needed.

CU Denver, the College of Engineering, Design and Computing, and the Bioengineering program reserves the right to revise information, requirements, policies, rules, and regulations at any time. Whenever changes occur, every effort will be made to notify students who may be impacted.

## **Important Acronyms**

AMC = Anschutz Medical Campus

AY = Academic Year

BIOE = Bioengineering

BS = Bachelor of Science

DC = Downtown Campus

MS = Master's in Bioengineering

PhD= Doctorate in Bioengineering

BMES = Biomedical Engineering Society

BUAC = Bioengineering Undergraduate Affairs Committee

GAC = Graduate Affairs Committee

GPA = Grade Point Average

## About the Program

### **The Department of Bioengineering Mission**

The mission of the CU Denver | Anschutz Department of Bioengineering is to improve human health through the application of engineering principles, ideas, methods and inventions in order to solve important clinical problems.

### **The Department of Bioengineering Program**

The Department of Bioengineering is the first program of its kind in Colorado, offering students unparalleled opportunities as they learn and work on Colorado's only academic medical campus. The combination of technical learning, immersive experiences in the clinical and biomedical enterprise beyond the classroom, and out-of-classroom opportunities to learn about cutting-edge patient care and research, is provided by only a handful of universities across the United States.

Bioengineering is a true dual-campus department and program. Administratively, the Department of Bioengineering is within the College of Engineering, Design and Computing, located on the Downtown Campus (DC) in Denver. Physically, the department is located on the Anschutz Medical Campus (AMC) in Aurora. Undergraduate students complete the first portion of their studies on the Downtown Campus, and then complete their degree at AMC. Graduate students will spend the majority of their time on the medical campus; however, they may choose to and are permitted to enroll in classes on the downtown or Boulder campuses.

The consolidation of the Downtown Campus (DC) and the Anschutz Medical Campus (AMC) provides unprecedented instructional resources in bioengineering and research opportunities in health sciences. Students have opportunities to learn from clinicians and engineers and to perform research or medical device design in world-class hospitals and clinical research labs.

The Department of Bioengineering is housed in Bioscience 2 at AMC. This state of the art facility offers specialized teaching spaces including a Biomechanics and Bioinstrumentation Lab, a Biophotonics Lab, a Design and Prototyping Lab, a Light Machine Shop, a Biomaterials with Cell/Tissue Culture Lab, and a Clinical Simulation and Assistive Technology suite. The building also offers students several community spaces to meet, collaborate, study, and socialize.

### **Academic Calendar**

The Department of Bioengineering follows the Downtown Campus academic and holiday calendars, which are sometimes different from the Anschutz Medical Campus calendar. Please pay close attention to the appropriate calendars and check with professors or program administrators if you have any questions or concerns. Students may find the Academic Calendars on CU Denver Registrar's website.

### **Faculty & Staff**

The program strives to create an atmosphere that is respectful and inclusive, with an emphasis on the student. All faculty and staff have open-door policies and will communicate office hours; scheduling a one-on-one meeting is the best way to ensure staff availability.

## **Bioengineering Events**

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The University of Colorado Denver and the Anschutz Medical Campus are continually hosting events across disciplines; students are encouraged to attend events that may deepen their understanding of a particular topic of interest, and engage in the greater CU Denver community through involvement in clubs, academic honor societies, and other organizations. The Department of Bioengineering and its chapter of the Biomedical Engineering Society host several events as well.

### **New Anschutz Student Camp and Orientation**

The week before fall classes begin, all students starting coursework at the Anschutz Medical Campus are invited to New Major Orientation. This one-day event includes an orientation to students' academic program and the medical campus, as well as an opportunity to speak to continuing students, hear from faculty and learn more about the department's culture, opportunities and resources.

### **Recruitment and Community Events**

As part of the bioengineering community, students may be asked to participate in recruitment and community events sponsored by the department. These may include open houses, high school visits, laboratory tours, conferences etc.

### **Other Department Events**

The Department hosts events during the lunch hour (12:15-2:00pm) nearly every Tuesday during the semester. These may be a Lunch & Learn, where a lecturer comes in to share exciting information and opportunities for students. Lunch & Learns feature a variety of speakers, from industry professionals to career preparation experts to biomedical nonprofit leaders. Research in Progress lectures are presented by graduate students, and showcase their Master's or PhD research work. All undergraduate students are highly encouraged to attend.

The Department also hosts a Bioengineering Seminar Series that typically occurs on Fridays during the lunch hour. These feature prominent bioengineering research faculty from around the country and are a great way to learn more about the field.

### **BMES Events**

The CU Denver BMES Student Chapter strives to develop understanding and promote integration of bioengineering through discussion amongst students, faculty, and guest lecturers from industry and academia. For more information, contact [cathy.bodine@cuanschutz.edu](mailto:cathy.bodine@cuanschutz.edu).

The university chapter of BMES hosts numerous events throughout the year. In the fall semester, they coordinate Pitch Night, with the goal of connecting current students to projects in research and industry. In the spring semester, BMES hosts a symposium focused on career paths, networking, and professional development. Current students are encouraged to contact the BMES officers for information about chapter membership.



## Academic Integrity Policy & Expectations of Students

### Academic Integrity

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#### Research Honesty and Integrity

As a future bioengineer, students should adhere to the highest standards of professionalism in research and conduct. Examples of unprofessional conduct include misrepresenting effort, credentials, or achievement in either an academic or professional setting; any action that compromises the quality or safety of patients, research subjects or colleagues; violation of patient or student confidentiality; and falsification of data. Lab benches and equipment set up for research should be respected at all times. Read the full [Academic Integrity Policy](#) effective as of January 1, 2020.

#### College of Engineering, Design and Computing Honor Code for Students

The Honor Code outlined below is the College of Engineering and Applied Science statement on academic integrity. The Code articulates the College's expectations of its students and faculty in establishing and maintaining the highest standards in academic work.

#### **The Honor Code of the College of Engineering, Design and Computing is a statement of its students, individually and collectively:**

- Students will not give or receive aid during examinations.
- Students will not use any prohibited electronic devices during examinations.
- Students will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading.
- Students will uphold the spirit and letter of the Honor Code and they will take an active role to ensure that others uphold the Honor Code and if they observe violations of the Honor Code they must report violations to their Department Chair.
- The Faculty of the College will do its part to ensure its confidence in the honor of its students. Faculty must ensure that precautions are in place to prevent the forms of dishonesty mentioned above. Faculty will also avoid, as far as practical, academic procedures that create temptations to violate the Honor Code. Faculty alone has the right and obligation to set academic requirements. However, the students and faculty will work together to establish optimal conditions for honorable academic work.

#### **Violations of the Honor Code Examples of conduct that will be regarded as being in violation of the Honor Code include:**

- Copying from another's examination paper or allowing another to copy from one's own paper.
- Plagiarism in any shape or form. Plagiarism is defined as the use, without giving reasonable and appropriate credit to or acknowledging the author or source, of another person's original work, whether such work is made up of code, formulas, ideas, language, research, strategies, writing or other form(s).
- Giving or receiving unpermitted aid either in person or via electronic devices.
- Engaging in unauthorized collaboration on academic assignments or examinations.
- Representing as one's own work the work of another.

### **Penalties for Violating the Honor Code**

Most student disciplinary cases have involved Honor Code violations. Of these, most cases arise when a student submits another's work as his or her own, gives or receives unpermitted aid, or engages in unauthorized collaboration. If a violation occurs during a quiz or on a homework assignment, the student will receive a zero for that quiz or assignment. If a violation occurs on an examination, the student will receive a failing grade for the course. The standard penalty for a first offense may include suspension from the College of Engineering, Design and Computing for a severe infraction of the Honor Code. The penalty for a second violation will be expulsion from the College of Engineering, Design and Computing.

It is the responsibility of the student to seek clarification from the instructor when in doubt about these guidelines.

### **College of Engineering, Design and Computing Honor Code – Faculty Responsibilities**

Academic honesty is one of the foundations of the educational mission of our College and University. Academic dishonesty as outlined in the College of Engineering, Design and Computing Student Honor Code is corrosive to the intellectual principles and is inconsistent with the ethical standards of our University. Academic dishonesty damages the sense of trust and community among students, faculty and administrators. The Faculty of the College must assume responsibility for ensuring academic integrity in their classrooms and develop tools to ensure the success of this mission.

The Student Honor Code sets forth the standards of honesty which student members of the College are expected to follow. Faculty members of the College are bound to adhere to the strictest standards of academic honesty and must enforce the Honor Code when they observe violations. All members of our academic community have an obligation to familiarize themselves with these standards and to conduct themselves in accordance with both their letter and their spirit. Our College has committed to implementing these standards and to educate all faculty, staff and students on the importance of academic honesty and on the application of these standards in a variety of academic settings.

Accompanying this policy are procedures that set forth a system for enforcement of these standards, including the application of sanctions where violations have been found. Sanctions are necessary to demonstrate that the College treats violations of academic honesty seriously and will act aggressively, when necessary, to deter wrongdoing. The effectiveness of the enforcement scheme depends in large measure on the conscientious cooperation of faculty members in the implementation of the standards. Faculty members are therefore charged with the responsibility assuring student compliance with the requirements of the Student Honor Code and initiating enforcement proceedings where appropriate.

Faculty members have the responsibility to:

- Report all incidences of academic dishonesty to the Department Chair.
- Review classroom expectations regarding academic honesty with their students and clearly state the academic consequence of a student's academic dishonesty.
- Describe these expectations clearly in the class syllabus.

- State clearly in the course syllabus that any student seen with an electronic device (cell phone, iPad, etc.) of any kind on their person or within reach during an examination or quiz will be in violation of the Student Honor Code and will be reported to the Department Chair for academic dishonesty.
- Distribute two or three different examinations during testing.
- Inform the student immediately and directly of any charges of academic dishonesty.
- Require (for large classes) their Proctor or TA to assist in ensuring academic honesty. If the Proctor or TA observes cheating, they must notify the Instructor immediately.
- Submit separate allegation reports if academic dishonesty is suspected or observed for each suspected student, unless the suspicion is that the students colluded in the incident.
- Keep the suspected student's original examination as well as any students sitting near the student if academic dishonesty occurs during the examination or quiz.
- Report all of the students when multiple students are suspected of academic dishonesty in order to allow the process to unfold fairly. Allegations made against students who are determined not to have been involved can be withdrawn.

## **Conduct Expectations**

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The Bioengineering program strives to create an atmosphere that is respectful and inclusive, with an emphasis on student growth and learning. To create such an environment, it is critical that all members of the bioengineering community and degree program understand and aim to meet clearly defined expectations.

### **Alcohol and Drug Use**

Students must adhere to current University policy governing alcohol consumption on campus and at official functions. Access to University of Colorado Hospital and the Children's Hospital Colorado require passing a standard drug test. In addition, the Anschutz Medical Campus is a smoke-free zone.

Alcohol and/or drug abuse compromises the student's ability to learn and to practice as a researcher and is thus considered unprofessional conduct. Students who attend class and appear to be cognitively impaired as a result of drug or alcohol intoxication may be dismissed from class and/or referred to University Student Services for further action.

### **Respect for the Rights and Property of Others**

Students should conduct themselves in a manner that recognizes the rights and property of others. Examples of inappropriate behavior include theft, damages to University or personal property of others, disruption of educational or other activities on campus, illegal use of University facilities, sexual harassment, physical assault, and any conduct that threatens the health or safety of others.

## **Undergraduate Students**

The University's Student Code of Conduct binds all University of Colorado Denver students. In addition, the Bioengineering program expects that students conduct themselves with integrity and professionalism in academics, research, service and outreach. Mutual respect and understanding is critical as students regularly work in a collaborative team environment. Regular class attendance and participation are the standard. In addition to engagement in the classroom, it is expected that students will become an active part of the bioengineering community by participating in out-of-classroom activities and events. These include research and internship opportunities as well as department and college-wide events. Students who have issues or concerns regarding a class, faculty, staff or another student in the program may address such concerns with the persons involved. If an issue cannot be resolved and/or such an approach is inappropriate or uncomfortable, students may also contact the Undergraduate Program Manager, the Department Chair, or a representative on the Bioengineering Undergraduate Affairs Committee (BUAC) for assistance.

## **Graduate Students**

The program expects that all graduate students will conduct themselves with the utmost integrity in academics, research, service and outreach. Regular class attendance is key to success in the program. As a graduate student, students will have more freedom in setting their research schedule. Students must respect the lab's culture and requirements, such as lab meetings. There are a number of department events throughout the month and year; please see the Events section of this document for more details.

Students who have issues or concerns regarding a class, faculty, staff or another student in the program may address such concerns with the persons involved. If an issue cannot be resolved and/or such an approach is inappropriate or uncomfortable, students may also contact the Graduate Program Manager, the Department Chair, or a representative on the Graduate Affairs Committee (GAC) for assistance.

## **Grievances**

Any time an issue or concern with an instructor, faculty, staff or fellow student occurs, please try addressing that person directly first. If the students are unable to resolve the problem or feel uncomfortable confronting the person, they may go to the Graduate Program Manager, the advisor, the Department Chair or the Graduate Affairs Committee for advice. If the issue cannot be satisfactorily resolved through those avenues, additional resources are available through the College of Engineering, Design and Computing, the Graduate School and the University (see "Campus Resources" on page 28 and the College of Engineering, Design and Computing website for more information).

## **Email**

Email is the official platform for communication at the university. Students must use their CU Denver email address for all correspondence with university officials including faculty, staff, and administration. Students may expect department faculty and staff to respond to email within 2-3 working days, after which they are encouraged to send a respectful reminder.

## **University Conduct Support**

The Office of Student Conduct and Community Standards serves as a resource to the entire University community through its efforts to meet the developmental and educational needs of students related to community expectations, civility and respect for self and others. A list of resources can be obtained at the Tivoli Student Union, Suite #277 or at <http://www.ucdenver.edu/life/services/standards>.

## **Student Resources**

A complete list of campus life student resources for the Downtown Campus can be found here: <https://www.ucdenver.edu/student-life>. Bioengineering is academically and administratively a downtown department and program, so students have access to resources through the Downtown Campus student services offices.

CU Anschutz student services can be found here:  
<http://www.ucdenver.edu/anschutz/studentresources/student-assistance/Pages/default.aspx>

## **Student Services**

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### **Bioengineering Student Services**

The Department of Bioengineering currently employs two full-time student services professionals, a Graduate Program Manager, located at Anschutz, and an Undergraduate Program Manager on the Downtown Campus.

### **Anschutz Medical Campus' Student Affairs**

The Office of Campus Student Services' mission is to enhance student life at the Anschutz Medical Campus of the University of Colorado Denver by providing excellence in specific non-academic and academic student services. They are located on the Anschutz Medical Campus in Education II North – Third Floor Suite, 3123.

### **University-wide Student Affairs**

The University of Colorado Denver supports students in all aspects of their personal and academic lives. The Office of Student Life, The Learning Resources Center and the Student and Community Counseling Center are just a few of such resources. Student Services within the Department of Bioengineering is prepared to help students navigate the university environment and identify the services best suited to meet their needs.

### **UCDAccess**

The online Student Self-Service Portal allows you to apply for financial aid, search for and enroll in classes on the medical and Denver campuses, pay your tuition bills, order transcripts and more. To log into the UCDAccess portal, you will need your official University username and password.

## **Equal Opportunity and Non-Discrimination**

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### **Notice of Non-Discrimination**

The University of Colorado Denver | Anschutz Medical Campus does not discriminate on the basis of race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy in admission and access to, and treatment and employment in, its educational programs and activities. The University takes affirmative action to increase ethnic, cultural, and gender diversity; to employ qualified disabled individuals; and to provide equal opportunity to all students and employees.

Students may report allegations of discrimination or harassment to the Employment Rights Compliance and Investigation Manager, 303-724-9694.

### **Title IX Notice of Non-Discrimination**

The University of Colorado does not discriminate on the basis of sex, gender or sexual orientation in its education programs or activities. Title IX of the Education Amendments of 1972, and certain other federal and state laws, prohibit discrimination on the basis of sex in all education programs and activities operated by the university (both on and off campus). Title IX protects all people regardless of their gender or gender identity from sex discrimination, which includes sexual harassment and sexual assault.

Title IX requires the university to designate a Title IX Coordinator to monitor and oversee overall Title IX compliance. Your campus Title IX Coordinator is available to explain and discuss: your right to file a criminal complaint; the university's complaint process, including the investigation process; how confidentiality is handled; available resources, both on and off campus; and other related matters.

### **Contact the Campus Title IX Offices:**

Phone: 844-288-4853

Email: [equity@ucdenver.edu](mailto:equity@ucdenver.edu)

#### **Anschutz Medical Campus**

Education 2 North  
13120 E. 19<sup>th</sup> Ave,  
Aurora, CO 80045

#### **Denver Campus**

Lawrence Street Center  
1380 Lawrence Street  
Denver, CO 80217

Additional information regarding Title IX is available at: <http://equity.ucdenver.edu/>

### **Disability Resources**

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It is the policy of the University and the Program to provide reasonable accommodations to qualified students with a disability so they are able to meet their program requirements. Whether an accommodation is reasonable is determined on an individual case-by-case basis. Qualified students in need of accommodations must contact the University's Disability Resources and Services Office for eligibility and accommodation determinations. More information may be found on the Disability Resources and Services website located at:.

<https://www.ucdenver.edu/student-services/resources/disability-resources-services/pages/disability-resources-services.aspx>

## **Police and Safety**

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The University of Colorado Denver and the Anschutz Medical Campus are committed to the safety and security of our students, faculty, staff and visitors. Emergency personnel are available on both campuses. Contact information is below.

### **Denver Campus Police:**

Auraria Campus Police  
Department 1201 5th Street  
Auraria Campus Administration Building (1st floor)  
From Cell Phone: 303-556-5000  
From Campus Phone: 9-1-1

### **Anschutz Medical Campus Police:**

The University Police Department, Anschutz Medical Campus Building U-09, 12454 E. 19th Place.  
For an emergency, dial 911.  
For police dispatch and non-emergencies, dial 303-724-4444.

## **Badging & Room Access**

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### **Downtown Campus ID's**

All students on the downtown campus must have their ID encoded for ID access to the Bioengineering Lounge in North Classroom 2204. At the beginning of the Fall and Spring semesters, new students can have their ID encoded with Facilities Management at 1156 7th Street. Students can call to make an appointment at 303-556-4296 or check the walk-in hours in the Bioengineering Lounge.

### **Anschutz Campus Badging**

Students get their University of Colorado Anschutz badge at orientation from the Security Badging Office in the Fitzsimons Building on the Anschutz Medical Campus. Students bear the costs of replacement badges. All campus community members are required to wear their badges visibly at all times.

This badge serves the dual purpose of identification and access to many interior and exterior locations. All Bioengineering students are granted regular student access to campus. All other access is added on a need-only basis, and usually takes some time to get the proper approvals, so please plan ahead!

Additional badges (i.e. hospital badges) may be necessary to conduct research. Badging requests will only be made at the request of the advisor and upon the approval of the badging authority. Badge sharing is not permitted.

### **Room Reservations**

Student Services Staff can assist with room scheduling. Please speak with the office staff should you have questions.

### **Bursar's Office**

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The Bursar is responsible for all financial activities related to student billing, tuition collection, institutionally managed loan programs and coordination with the state. Please contact them at [bursar@ucdenver.edu](mailto:bursar@ucdenver.edu)

#### **Denver Campus**

Student Commons  
Building 303.315.1800

#### **Anschutz Medical Campus**

Education 2 North  
303.724.8032

### **Resources for Books**

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The Anschutz Medical Campus Bookstore is located in Education 2 building. However, most bioengineering instructors do not send their booklists to the Bookstore. They will direct students to other resources prior to or at the start of class. Please contact instructors with specific questions.

Computers can be purchased at academic discount prices, visit the Auraria Campus Bookstore on Downtown Campus. Students may also ask Apple or Dell directly for the discount.

#### **Auraria Campus Bookstore**

Tivoli Building, Suite 105  
303.556.4286

#### **Medical Campus Bookstore**

Ed 2 South  
303.724.2665 (4-BOOK)

There are excellent libraries located on both campuses, and Bioengineering students have access to either one.

#### **Auraria Library**

1100 Lawrence St.  
303.315.7700  
<https://library.auraria.edu>

#### **AMC Health Sciences**

**Library** 12950 E. Montview  
Blvd 303.724.2152  
[hslibrary.ucdenver.edu](https://hslibrary.ucdenver.edu)



## Health and Wellness

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### Campus Gyms

The Lola & Rob Salazar Student Wellness Center, located on the Downtown Denver Campus, is a state-of-the-art facility for students of CU Denver. This brand new facility boasts a rock climbing wall, swimming pool, and more.

The Medical Campus is home to the Anschutz Health and Wellness Center. It offers world-class research, education and wellness services in one facility. In addition to high quality gym facilities and group fitness, both wellness centers host cooking classes and wellness services such as massage.

Student membership to either gym requires a monthly fee.

### The Phoenix Center of Auraria

The Phoenix Center at Auraria (PCA) serves the Auraria Campus. The Center provides **free and confidential** resources and assistance to survivors of interpersonal violence and their friends and families. Visit [www.thepca.org/](http://www.thepca.org/) for more information.

### Campus Health Center at CU Anschutz

The CU Anschutz Campus Health Center is a fully-functioning clinic that provides a range of physical and behavioral health care services, including vaccination administration, physical health services, and confidential mental health counseling and support. More information can be found here: <https://anschutzwellness.com/wellness-clinic-2/>

### Student Health Insurance

All degree and specific approved, certificate-seeking students on the Anschutz Medical Campus must enroll in the university's Student Health Insurance (SHI) Plan unless they can provide evidence of enrollment in other comparable insurance. Students enrolled in less than five credit hours in a degree program are eligible to purchase the SHI Plan by submitting a selection/waiver form by the deadline.

The Student Insurance Office is available to assist with selecting or waiving the SHI Plan. They can help evaluate student's insurance needs so they choose the best plan available.

Please note that for SHI, bioengineering students are considered Anschutz Medical Campus students and should contact the Medical Campus office. Funded PhD students who are required to enroll in the SHI Plan will have insurance premiums paid as part of their tuition and fees. Please direct all plan specific and coverage specific questions to the Student Health Insurance Office:

[CUAnschutzStudentInsurance@ucdenver.edu](mailto:CUAnschutzStudentInsurance@ucdenver.edu)  
Education II, North Room 3213  
13120 E 19th Ave, Aurora, CO 80045  
303-724-7674

## **Medical Services and Health Education**

The university provides medical and mental health services and health education to students, faculty and staff at an affordable cost. Students are encouraged to explore <https://www.ucdenver.edu/life/living-on-around-campus/health-well-being> for more information about the services available (noting that Bioengineering students are considered “Denver Campus Students.”). For more information regarding the CU Denver Downtown Counseling Center, please go to [www.ucdenver.edu/life/services/counseling-center](http://www.ucdenver.edu/life/services/counseling-center).

## **Housing**

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### **Downtown Campus Housing**

Contact CU Denver Housing and Dining at 303-573-5272 or email [housing@ucdenver.edu](mailto:housing@ucdenver.edu) to learn about your downtown housing options.

### **Campus Village**

318 Walnut St  
Denver, CO 80204

### **Anschutz Medical Campus Student Services**

The Anschutz Medical Campus Office of Campus Student Services maintains listings of students who are looking for roommates. These listings can be found at the Student Housing section of the Campus Student Services website:

<https://www.ucdenver.edu/anschutz/studentresources/student-assistance/housing/Pages/home.aspx>

Many area apartment complexes have preferred employer/student programs that give application discounts to AMC students.

## **Parking and Transportation**

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The Anschutz Parking and Transportation Services office is located in Fitzsimons Building on the 2nd floor (west side of the food court eating area). This office assists students with any request and question regarding parking on campus. Their office can be contacted at 303-724-2555.

Students who take classes at the Downtown Campus or Boulder campus may ask the parking office for a “Reciprocal Parking Pass” which will allow access to specific parking lots (check their parking maps) on those campuses at no additional charge if the pass is hung from the vehicle mirror.

Students will have a charge for the RTD College Pass on their account every term. This mandatory fee supports the RTD pass for all students, which includes all regular fixed route services, including bus (local, express, regional), light rail, call-n-Ride, and skyRide service (free to Medical Campus students with RTD College Pass). Services not included in College Pass are Access-a-Ride, BroncosRide, RockiesRide and other special event services. Students may get their College Pass from Badging and Security with their badge. Campus is

well-served by the 20, 121, 15 and 89 buses with easy connections to the 105 as well as the R-line light rail.

The University runs a shuttle between the Anschutz Medical and Downtown Denver Campuses with stops at the VA and National Jewish Health (NJH). The shuttle runs from right in front of Fitzsimons Building to the Lawrence Street Center (LSC). The shuttles leave from either end at 10 after the hour and arrive at about 10 to the hour. The first eastbound shuttle leaves LSC at 8:10 am and the last leaves at 6:10 pm. The first westbound shuttle leaves the Medical Campus at 7:10 am and the last leaves at 5:10 pm. Download a printable shuttle schedule to see the departure and arrival times at the VA and NJH.. <https://www.ucdenver.edu/about/departments/facilitiesmanagement/parkingmaps/pages/parkingmaps.aspx>.

### **Registrar's Office**

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The Registrar is responsible for all grade & course scheduling activities, including transcripts, schedule adjustments, course catalog & curriculum management, changes of record, residency, and personal student information including name change.

#### **Denver Campus**

Student Commons  
Building 303.315.2600

#### **Anschutz Medical Campus**

13120 E. 19<sup>th</sup> Ave.  
303.724.8059

### **Bioscience 2 Resources**

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#### **Lounge and Study Spaces**

Bioscience 2 has a Bioengineering-only student lounge with refrigerators, microwaves, and more. There is ample room for sitting, studying, and socializing in the lounge and study rooms.

#### **Lockers**

Students may claim a locker in Bioscience 2. The lockers are for semester-long use. To claim a locker, students must provide their own lock. Students must empty out the locker at the end of the academic year (spring semester). Lockers that have not been cleaned out at the end of the year will be emptied and all contents thrown away.

#### **Printing**

A student printer is available for all students to use in the Bioscience 2 Student Lounge. In addition, Anschutz Printing Services offers copying, printing and binding services and there are computer lab locations across campus, including the Education Buildings, Research 1 and the Health Science Library.

## Undergraduate Program in Bioengineering

### About the Program

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The undergraduate program at the University of Colorado Denver | Anschutz Medical Campus (CU Denver) emphasizes the professional competencies of leadership, communication, presentation and critical problem solving. Students will have the opportunity to learn:

- how to design new medical devices and technologies.
- how the body responds to implanted medical devices.
- how to generate solutions for current clinical and research problems using engineering principles.
- how to discuss and present their research and design to a variety of audiences.
- how to convey these results in a precise clinical, academic, or entrepreneurial context.

The B.S. in Bioengineering will prepare students for careers in the biomedical industry, hospital systems, the government, academic research labs, regulatory agencies, and further education in graduate school or advanced health science programs. The B.S. curriculum is also designed so that students who wish to enter medical school can fulfill pre-med requirements with few additional courses.

### Learning Goals

The program's student learning goals are derived from the "Criteria for Accrediting Engineering Programs, 2020 – 2021" set by the Accreditation Board for Engineering and Technology (ABET) . The program will document the seven student outcomes that define what students should know and be able to do by the time of graduation:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Students achieve all learning goals cumulatively and repeatedly as they progress toward the B.S. in Bioengineering degree. By experiencing a genuine progression with reiterations from

basic proficiency in the pre-major coursework to advanced proficiency in the upper-division major courses, graduates should demonstrate a broad range of understanding in mathematics, life science, and engineering as well as the specific mastery of bioengineering competencies.

### **ABET Accreditation**

The Department of Bioengineering is fully ABET accredited. To read more about ABET and the accreditation process, visit:

<https://engineering.ucdenver.edu/academics/departments/bioengineering/accreditation>

### **Fundamentals of Engineering Exam**

Licensure is not required to work in the field of bioengineering, but some may feel that it offers potential employers a standard way to assess one's preparedness. The process for licensure begins with taking the [Fundamentals of Engineering exam](#) (FE) and graduating from an ABET accredited engineering program. The FE exam consists of two parts, the morning exam which is the same for everyone and the afternoon specialized exam where you select to take the Chemical, Civil, Electrical, Environmental, Industrial, Mechanical, or the Other Disciplines (formerly the General) exam.

Biomedical Engineering students will be most qualified to take the Other Disciplines exam, but you can take the one of your choosing.

Those interested in taking the Fundamentals of Engineering Exam may want to consider registering for relevant review coursework through the College of Engineering Extension Program (CEEP).

### **Time Commitment**

Bioengineering is a rigorous academic program. Previous students report that a full course load results in 40+ hours of class, homework and study time per week. In addition, many students regularly seek the support of the Learning Resources Center, tutors, and academic mentors throughout the semester. More information regarding the Learning Resources Center can be found at: [www.ucdenver.edu/life/services/LRC](http://www.ucdenver.edu/life/services/LRC) . Students are also strongly encouraged to develop course specific study groups. Space is available on both the Downtown Denver and Anschutz Medical Campuses to accommodate regular review and study sessions.

Students are encouraged to consider the academic rigor of the program when scheduling off-campus activities such as work, family and personal obligations and keep in mind the majority of the major specific courses will only be taught during the day and during the traditional academic year (fall and spring terms).

### **Tuition and Funding**

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#### **Bioengineering Tuition and Student Fees**

Bioengineering (DDC subplan) majors will pay downtown Denver tuition and appropriate Auraria (Downtown Denver) Campus fees. Downtown students may also need to meet additional insurance and immunization requirements to participate in undergraduate research and clinical experiences. Once transitioned to the Anschutz Medical Campus, students will continue to pay downtown tuition but with a department specific tuition

differential. Students taking upper-division BIOE classes on the Anschutz Medical Campus will also be assessed Anschutz Medical Campus fees.

Once on the medical campus, Bioengineering majors (BIOE-BS) must meet the medical campus' health insurance requirement. Additional information regarding Student Health Insurance can be found at <https://www.ucdenver.edu/life/services/student-health/insurance/Pages/default.aspx>.

### **Scholarships**

The Scholarship Resources Office provides information about scholarships and offers guidance in the scholarship application process. Students may visit the Scholarship Resources Office located in the Student Commons Building on the Downtown Campus, Education 2 North on the Anschutz Campus, or at [www.ucdenver.edu/student-services/resources/Scholarships](http://www.ucdenver.edu/student-services/resources/Scholarships).

## **Admissions to the Bachelor's in Bioengineering**

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### **Admission to the University of Colorado Denver**

The University of Colorado Denver's Office of Admissions will receive and review new applications to the College of Engineering, Design and Computing, including those who indicate an interest in the bioengineering major. More information about admissions to CU Denver, including the admission requirements for both high school and transfer applicants can be found [atwww.ucdenver.edu/admissions](http://www.ucdenver.edu/admissions).

#### **First-Time Freshmen:**

Students with fewer than 24 completed college credits at the time of application are evaluated as first-time freshmen.

#### **Criteria:**

Minimum 3.0 cumulative high school GPA  
Minimum 24 ACT composite **or** 1180 SAT composite  
Minimum 25 ACT Math **or** 590 SAT Math

#### **Transfer Students and Intra-University Transfers (IUT):**

Students who, at the time of application, have completed 24 or more credits at regionally accredited postsecondary institutions will be evaluated using transfer admission criteria.

#### **Criteria:**

Minimum 3.0 overall GPA with a grade of B- or better in Calculus I **OR**  
Minimum 2.75 overall GPA **AND** a minimum 2.5 GPA (based on most recent course attempts) in Calculus I, Calculus II, and Calculus-based Physics I with corresponding lab, with a grade of C- or better in each course.

### **Admission to Pre-Engineering:**

Students who do not meet the criteria for direct admission to a major will be considered for admission to Pre-Engineering **with a major interest. Bioengineering students will be Pre-Engineering Bioengineering-Interest (KPEN) students at the time of admissions.**

#### **Criteria:**

Minimum 2.5 overall GPA

Completion of at least one of the following courses with a grade of C or better: College Algebra, College Trigonometry, Pre-Calculus, Calculus I, or Calculus II

### **Admission to CLAS-Undeclared**

Transfer students who do not meet the criteria for direct admission to a major or Pre-Engineering, but otherwise meet the University's admission criteria, will be admitted to CLAS as an undeclared major, or in the case of an IUT, remain in their current CU Denver school or college.

### **International Admissions**

Prospective international students should also visit the Office of International Affairs at [www.ucdenver.edu/academics/InternationalPrograms/OIA/admissions](http://www.ucdenver.edu/academics/InternationalPrograms/OIA/admissions) for more information.

### **Change of Major within the College of Engineering, Design and Computing**

Students currently enrolled in another major within the College of Engineering, Design and Computing, may submit a change of major form to the Undergraduate Program Manager.

### **Transfer Credit Evaluation**

The Department of Bioengineering will adhere to the University of Colorado Denver's policies and articulation agreements when reviewing transfer credit.

At this time, there are no courses taught in the Colorado Community College system that are equivalent to the lower-division bioengineering courses (*ENGR 1200*, *BIOE 1020*, *2010*, *2020*). These, and all other upper-division bioengineering courses, must be completed at CU Denver.

Upon a student's admission to CU Denver, the Registrar will review transcripts from other institutions for credit and initial course equivalencies. Once credit is awarded and at the student's request, the CU Denver home department may also review transfer credit for course equivalencies (for example the Biology department may review a Biology course). Students should speak with the Bioengineering's Undergraduate Program Manager for more information. The Bioengineering Undergraduate Affairs Committee will make final decisions regarding transfer credit applicability toward all degree requirements.

## **Requirements for a B.S. in Bioengineering**

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The B.S. in Bioengineering will provide students a rigorous multi-disciplinary education through a curriculum that integrates the three foundational disciplines of bioengineering:

1. Engineering, Science, and Math
2. Biological, Chemical, and Physical Sciences
3. Clinical Medicine

Graduates of this program are expected to become leaders and innovators in the bioengineering profession.

The B.S. in Bioengineering is granted upon successful completion of a minimum of 128 semester hours to include the following requirements:

1. CU Denver Core Curriculum Requirements
2. MATH, BIOL, CHEM, PHYS, ENGR/BIOE lower-division Requirements (Downtown Campus)
3. Upper-division Major Requirements (Anschutz Medical Campus)
4. Technical Electives

Students are highly encouraged to track their progress using the Degree Audit (found via UCD Access). Questions, concerns or discrepancies on the audit should be brought to the immediate attention of the Undergraduate Program Manager. Note that the Degree Audit is meant to serve as an advising guide; requirement completion will be confirmed prior to degree conferral.

### **CU Denver Core Curriculum Requirements**

The University of Colorado Denver faculty has established a core curriculum for undergraduate students. Bioengineering students must satisfy the College of Engineering, Design and Computing's Core Curriculum Requirements by taking 8 courses (24 credits) distinct from Math and Science.

These courses will be selected from the Intellectual Competencies, Knowledge, International Perspectives, and Cultural Diversity Areas found in the CU Denver Catalog at [catalog.ucdenver.edu](http://catalog.ucdenver.edu).

*Though students are not required to have completed their CU Denver Core Curriculum, it is highly recommended that students satisfy the majority of these requirements prior to beginning upper-division coursework. At this time, CU Denver Core Curriculum courses are not taught at Anschutz Medical Campus.*

### **Downtown Denver Campus (DDC) Requirements**

Students will complete all MATH, BIOL, CHEM, PHYS and ENGR/BIOE lower-division courses prior taking upper-division coursework in the department. Credit for some coursework may be achieved through Advanced Placement (AP) and International Baccalaureate (IB) coursework and exams or transferred from other institutions. However, it is important that students intending to use AP, IB or transfer credit toward these requirements



Speak with the Undergraduate Program Manager before moving forward. In some cases, it may be beneficial for students (i.e. those intending to apply to medical school) to re-take certain courses in the college setting. Additional information about how CU Denver awards credit for Advanced Placement (AP) and International Baccalaureate (IB) coursework can be found at:

<http://catalog.ucdenver.edu/content.php?catoid=28&navoid=8221&hl=advanced+placement&returnto=search>

### **Required Courses on the Downtown Denver Campus (DDC)**

All courses must be completed with a C- or higher prior to taking Upper-Division BIOE courses at the Anschutz Medical Campus.

#### **Mathematics (16 credit hours)**

MATH 1401: Calculus I

MATH 2411: Calculus II

MATH 2421: Calculus III

MATH 3195: Linear Algebra and Differential Equations

*\*MATH 3191 (Applied Linear Algebra) AND MATH 3200 (Elementary Differential Equations) may substitute for MATH 3195.*

#### **Biology (8 credit hours)\***

BIOL 2051: General Biology I

BIOL 2071: General Biology Lab I

BIOL 2061: General Biology II

BIOL 2081: General Biology Laboratory II

*\*CU Denver's Biology Honors Sequence may also be used toward these requirements. Please see the Biology department for placement information.*

#### **Chemistry (14 credit hours)\***

CHEM 2031: General Chemistry I

CHEM 2038: General Chemistry Lab I

CHEM 2061: General Chemistry II

CHEM 2068: General Chemistry Lab II

CHEM 3411: Organic Chemistry I

CHEM 3418: Organic Chemistry Laboratory I

*\*CU Denver's Chemistry Honors Sequence may also be used toward these requirements. Please see the Chemistry department for placement information.*

#### **Physics (10 credit hours)**

PHYS 2311: General Physics I (calculus-based)

PHYS 2321: General Physics I Laboratory

PHYS 2331: General Physics II (calculus-based)

PHYS 2341: General Physics Laboratory II

**Bioengineering (10 credit hours)**

ENGR 1200: Fundamentals of Engineering Design and Innovation

BIOE 1020: Bioengineering Prototyping and Design II

BIOE 2010: Introduction to Programming for Bioengineers

BIOE 2020: Introduction to Computational Methods for Bioengineers

**Downtown Campus Sample Plan**

<b>FALL I</b>	<b>SPRING I</b>	<b>FALL II</b>	<b>SPRING II</b>
MATH 1401	MATH 2411	MATH 2421	MATH 3195
BIOL 2051	BIOL 2061	CHEM 3411	PHYS 2331
BIOL 2071	BIOL 2081	CHEM 3418	PHYS 2341
CHEM 2031	CHEM 2061	PHYS 2311	BIOE 2020
CHEM 2038	CHEM 2068	PHYS 2321	
ENGR 1200	BIOE 1020	BIOE 2010	

The above plan is an example of how bioengineering majors may complete coursework on the downtown campus. Please review the following notes for additional considerations.

**Notes regarding the Sample Plan**

1. This plan does not include the CU Denver Core Curriculum, upper-division major or track elective requirements.
2. Though it is not required that they have completed their CU Denver Core Curriculum requirements when applying to the major, it is highly recommended that the majority of the CU Denver Core Curriculum is complete before students take upper-division bioengineering courses at the Anschutz Medical Campus. CU Denver Core Curriculum courses are not offered at Anschutz.
3. ENGR 1200 and BIOE 2010 are only taught in the Fall term. BIOE 1020 and 2020 are only taught in the Spring term.
4. Students may not register for MATH 1401 (Calculus I) without having first met the prerequisite and/or taking a placement exam. Newly admitted students should reach out to the Undergraduate Program Manager to discuss math placement.
5. Students that do not place into Calculus I in the first semester will need to take math during the summer terms in order to apply for full-major status in a timely fashion.
6. Those wishing to maintain a lighter course-load are encouraged to take courses during the summer. Many of the math, science and CU Denver Core Curriculum courses are taught during the summer term.
7. Once students have been admitted to full-major status, they will work with their faculty advisor and the Undergraduate Program Manager to design a plan to complete the degree.

## **Upper-division Major Requirements**

Bioengineering majors will take 34 credit hours of required upper-division coursework on the Anschutz Medical Campus. These courses include:

BIOE 3010: Bioinstrumentation

BIOE 3020: Introduction to Biomechanical Analysis

BIOE 3030: Introduction to Biomaterials

BIOE 3040: Physiology for Bioengineering BIOE 3050: Cell and Molecular Bioengineering

BIOE 3051: Cell and Molecular Bioengineering Lab

BIOE 3060: Biostatistics

BIOE 3070: Bioengineering Lab I BIOE 3071: Bioengineering Lab II BIOE 3090: Introduction to BioDesign

BIOE 4035: BioDesign II

BIOE 4045: BioDesign III

Upper-division courses will be taught at the Anschutz Medical Campus and will culminate in a Senior Design Project

## **Technical Electives**

In addition to the required upper-division courses, all Bioengineering students must meet the Technical Electives requirement. The goal of the Technical Electives are to provide students with more advanced understanding of specialized areas in bioengineering. Students must take a minimum of 12 credit hours to meet the bioengineering technical elective requirements. All 12 credits of Technical Electives must be upper-division (3000 or 4000-level). Students are eligible to take one approved non-Bioengineering technical elective or petition to have a second non-Bioengineering technical elective. Consult with the Undergraduate Program Manager on the approved technical electives.

## **BS/MS Program**

Students interested in continuing their bioengineering studies may apply for the BS/MS program the spring semester before their senior year. The BS/MS program allows students to take six credit hours of graduate coursework during their senior year, and apply it towards their bioengineering technical electives and their CU Denver BIOE master's degree. Students must have a minimum cumulative GPA of 3.2 in order to apply. For more information regarding requirements and the application process, students need to meet with both the Undergraduate Program Manager and the Graduate Program Manager.

## **Academic Policies**

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### **Prerequisites**

A prerequisite is any course that must be completed prior to taking a subsequent course. The College of Engineering, Design and Computing requires that all students receive a C- or higher in engineering courses to move on to the next level. Students must repeat a prerequisite course in which a grade of D+ or lower was earned before moving on to the subsequent course. If students do not receive a C- or higher in an engineering class on the

second attempt, they must obtain written approval from their major department to enroll in the course for a third time.

### **Academic Performance**

The Department of Bioengineering will adhere to University probation and suspension policies. For more information regarding these policies, visit <http://catalog.ucdenver.edu/content.php?catoid=28&navoid=8191&hl=academic+policies&returnto=search>

### **Academic Expectations of the Bioengineering Major**

Bioengineering students must maintain a CU Denver cumulative GPA of a 2.0 and a 2.0 average GPA in all required coursework and all courses taken within the Department of Bioengineering.

In addition to remaining in good academic standing at the University of Colorado Denver, bioengineering majors should receive no less than C- or above in all downtown coursework.

### **Attendance Regulations**

Successful work in the College of Engineering, Design and Computing is dependent upon regular attendance in all classes. Students should always refer to their course syllabi for individual instructors' policies regarding attendance and missed work.

### **Repeat and Withdrawal Policies**

Undergraduate students may not register for credit in a course in which they have already received a grade of C- or higher. Students who receive an F grade in a required course must retake and satisfactorily complete the course. Students must repeat a prerequisite course to another required course in which a grade of D+ or lower was earned before moving on to the subsequent course. If

students do not receive a C- or higher in an engineering class on the second attempt, they must obtain written approval from their major department to enroll for the course for the third time. Re- enrollment approval will be subject to the discretion of the CEDC.

### **Preparation for Graduation – B.S. Bioengineering**

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To become eligible for a Bachelor of Science (B.S.) in Bioengineering in the College of Engineering, Design and Computing, a student, in addition to being in good standing in the university, must meet the following minimum requirements:

- **Courses:** The prescribed and elective work in the curriculum as determined by the bioengineering department must be completed satisfactorily.
- **Hours:** A minimum of 128 semester hours.

- **Hours in Residence:** At least 30 semester hours of coursework applicable to a Bachelor of Science degree in engineering must be taken at CU Denver while a declared student in good standing at the College of Engineering, Design and Computing. Students must be enrolled in the college for at least the final two semesters of the degree prior to graduation.
- **Transfer Credit:** All requests for consideration of transfer credit and its application toward a degree in Engineering and Applied Science must be submitted prior to the student's last two semesters at the Denver campus.
- **Grade Point Average (GPA):**
  1. Students must maintain a minimum 2.0 cumulative GPA in all hours attempted at the University of Colorado (all campuses), AND
  2. Students must maintain a minimum 2.0 cumulative GPA in all hours attempted at the University of Colorado (all campuses) in engineering, math, physics, chemistry, and biology.
- **Faculty Recommendation:** The recommendation of the faculty of the department offering the degree and the approval of the faculty of the College of Engineering, Design and Computing is required.
- **Incompletes and Correspondence Courses:** It is the student's responsibility to ensure that all incompletes and correspondence courses are officially completed before the 10th week of the student's final semester in school.
- **Simultaneous Conferring of Degrees:** For any double degree program, both bachelor's degrees must be conferred at the same commencement.
- **Commencement Exercises:** Commencement exercises are held in December and May. A student finishing in August is encouraged to attend commencement the following December.
- **Applying for Graduation:** Students must apply online for graduation. Information regarding this process will be distributed by the College of Engineering, Design and Computing. Students must adhere to application deadlines. If students have questions about this process, please contact the Undergraduate Program Manager.
- **Commencement Ceremony:** All bioengineering undergraduate students will take part in the commencement ceremony on the downtown campus alongside the rest of the College of Engineering, Design and Computing students.

### **Undergraduate Student Support**

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The Department of Bioengineering's faculty and staff are committed to student success both in and out of the classroom and as such welcome student feedback.

### **Bioengineering Undergraduate Affairs Committee**

The Bioengineering Undergraduate Affairs Committee (BUAC) is responsible for developing undergraduate procedures within the Department of Bioengineering. Students may speak with the undergraduate advisor regarding the BUAC's agenda.

## **Student Services**

The Department of Bioengineering is committed to providing excellent and personalized undergraduate advising and student support. The role of the Student Services is to:

- Assist students in identifying their short and long-term academic and career goals and create an educational plan that supports those goals.
- Facilitate appropriate course selection and registration.
- Help students navigate the dual-campus environment and refer to appropriate resources as needed.
- Facilitate faculty, student, industry and community networking opportunities.
- Help students engage in department and university-wide undergraduate experiences that will enhance their in-classroom work.
- Create “high-impact” out-of-classroom activities to support student engagement and success.

In addition to working with Bioengineering Student Services, students are encouraged to consult with faculty and academic mentors to develop academic and career plans that meet their personal goals.

## **Academic Mentoring**

The Department of Bioengineering makes a concerted effort to ensure that the undergraduate student body has the support and guidance they need to reach their academic potential. To this end, the majority of undergraduate courses have accomplished Teaching Assistants who help faculty with grading and instruction and provide guidance and mentorship to enrolled students. In addition, mentoring opportunities exist in various labs and other settings. Students interested in identifying a student or faculty mentor are advised to speak with the Undergraduate Program Manager.

## **Internships and Career Planning**

The Department of Bioengineering strongly encourages students to participate in internships during their course of study. CU Denver’s Experiential Learning Center is available to support such efforts, offering students workshops and activities to prepare them for both the job search and ‘on the job’ experiences. In addition, the Department of Bioengineering is actively developing partnerships with local and national industry professionals, in an effort to create a network of internship and mentoring opportunities for undergraduates. Students interested in pursuing internships should begin a conversation with the Undergraduate Program Manager early in their college career.

## **Research Opportunities**

Students interested in research experience should consider applying to the University of Colorado Denver’s Office of Undergraduate Research and Creative Activities (URCA). The Department of Bioengineering faculty is highly supportive of students applying for URCA and welcome student requests for mentorship and advising. Interested students should speak with the Undergraduate Program Manager for more information. Find more information on URCA here: <https://www.ucdenver.edu/lynxconnect/undergraduate-research>

## The Graduate Program in Bioengineering

As a department within the College of Engineering, Design and Computing, Bioengineering is considered a Denver Campus department. As such, the graduate program in Bioengineering works most closely with the downtown side of the consolidated Graduate School. Students will interact with the Graduate School at all stages of their studies, from admission to graduation. Many of these interactions are managed collaboratively between the Graduate School, the College of Engineering, Design and Computing, and the department. However, graduate students spend the majority, if not all of their time at the Anschutz Medical Campus.

### **Graduate Program Governance**

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**Graduate Affairs Committee:** The Graduate Affairs Committee (GAC) consists of one committee chair, four core faculty members from Bioengineering, the Graduate Program Manager, and a graduate student representative. The GAC is responsible for all aspects of the Bioengineering graduate program, including routine transactional issues to developing and implementing strategies to increase national rankings and research excellence. The GAC will also evaluate and make recommendations to the chair for any changes on policies and procedures pertaining to graduate curriculum, affairs, and admissions. Among some of its provisions, the GAC serves as the approving authority for core course substitution and extension to milestone deadlines.

The Graduate Committee in the 2020-2021 academic year:

Dr. Jeffrey Jacot,  
Chair  
Dr. Dae Won Park  
Dr. Emily Gibson

Dr. Cathy Bodine  
Dr. Richard Benninger  
Graduate Program Manager (Natalie Kersten)  
Graduate Student Representative (Amy Zhang)

**Department Chair** (also referred to as the “Program Director” by the Graduate School) is Dr. Robin Shandas. You may need to meet with the Department Chair to request exceptions to policy or to address concerns. Dr. Shandas is available by appointment to discuss your academic and career goals.

## **Program Requirements & Academics**

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### **University Training Requirements**

The University delivers most of its safety and other training online through SkillSoft via UCD Access (accessible upon matriculation). All students must take (and remain current on):

- CU: Chemical Waste Management
- CU: Lab Safety
- CU: Regulated Medical Waste Management
- CU: Bloodborne Pathogens
- CU: HIPAA Regulations
- CU: Information Security and Privacy Awareness
- CU: Discrimination and Harassment
- CU: COVID-19 Return to Campus - CU Denver | Anschutz

Students may be required to take additional training modules depending on their research project or teaching duties. Graders and Teaching Assistants must attend the TA and Grader Training organized by CU Online at the beginning of the term and take the following Skillsoft training: CU: FERPA.University of Colorado Hospital Access Requirements

In order to participate in some of the exciting clinical training opportunities at the University of Colorado Hospital (UC Health) and/or Children’s Hospital Colorado, students will be required to provide documentation of current vaccinations or titers as well as pass a background check, 10-panel drug test and safety training. Students must also be able to provide proof of current health insurance. The cost of the background check and drug test will be covered by student fees through the department. Note that the 10-panel drug test includes marijuana and cannabis-derived products and can detect usage in the previous 2 weeks dependent on the frequency of use.

The department will not provide students with copies of their University of Colorado Hospital documentation. In addition, such documents will not be shared with a third party, even at the student’s request. Therefore, it is strongly recommended that students make copies of all documents (including vaccination records) prior to submission.

### **Student Methods & Research Seminars and Examination Talks**

The Department of Bioengineering facilitates Research in Progress Lectures, where graduate students have the opportunity to practice their presentation skills while sharing their research with the rest of the program. The decision to sign up for a Research in Progress Lecture is typically made by a student’s research advisor. All students are encouraged to attend these events.

Student examinations (PhD comprehensive exam and dissertation defense and MS thesis defense) will be advertised by the Bioengineering Department with an email containing the date, time, location and abstract at both the Anschutz Campus and the Downtown Campus.



The Bioengineering Seminar Series occurs approximately every other week, usually on Fridays at 12:30pm. This seminar series invites prominent bioengineering faculty from across the country and the world to present their research. Additionally, most speakers will meet with students at some point in the day. Each year, we invite one student chosen speaker based on recommendations from the graduate and undergraduate students.

Please make every effort to attend these talks, as they are good learning experiences.

### **Coursework Requirements**

**MS students** will take an additional fifteen credit hours for a total of 30 credit hours. These fifteen credits hours must include three to six credit hours of project or thesis (BIOE 6960 or BIOE 6950) plus nine to twelve credit hours of elective courses. Students may not exceed 6 credit hours for project/thesis.

**PhD students** will take an additional 9 credit hours of didactic (instruction-based) coursework and 30 credit hours of dissertation (BIOE 8990). Students are expected to outline the entire program of study at their preliminary examination before the start of the second year. The exam committee may make recommendations for changes to this plan. Students must also plan their dissertation credits carefully.

### **Elective Course Selection**

There is not a “list” from which students may select elective coursework; for an MS degree, students may include no more than 6 hours of 4000 (senior) level courses, and for a PhD degree, all elective coursework must be graduate-level (5000 or above). In addition, electives must be relevant to the student’s degree plan, and approved by the student’s thesis/project or dissertation committee in advance. Undergraduate-level coursework cannot be applied toward a PhD degree in Bioengineering though it may be allowed for an MS degree.

### **Enrollment Policies**

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#### **Taking Classes at another CU campus**

Students who wish to take classes at CU Boulder or Colorado Springs must submit an “Intercampus Enrollment Form” to the Graduate Program Manager. This form can be found on the [Registrar’s Office website](#). Once this form is processed, CU Denver Registrar’s Office will manually enroll the students on the first day of the term. Please note that this means that popular classes may fill up before that day. Talking to the professor ahead of time may help, as professors can often grant enrollment even if the class is officially full (if classroom capacity allows). Please be sure to have a backup option in case the class is full before the first day of the term.

#### **Enrollment Status**

According to the [Office of the Registrar](#), full and part- time graduate statuses are defined as:  
Full-time:

- 5 or more semester hours
- 0 semester hours if enrolled in CAND 5940: Once all required semester hours of thesis work have been taken and all other course work is completed, students may register for Candidate for Degree (CAND 5940) for the semester in which they will defend their thesis. CAND 5940 carries no credit or grade, but students pay for one credit of resident tuition and minimal fees. Students may only enroll in this

course once during their final semester. Students registered for the Candidate for Degree course will be considered full-time for financial aid and enrollment verification purposes.

- 1 or more semester hours of thesis

Half-time:

- 3 - 4.5 semester hours

### **Enrollment Status and Funding**

Individual students receiving financial aid may be required to complete hours in addition to those listed above. The exact requirements for financial aid will be listed in the student's financial aid award letter and students are encouraged to contact the Financial Aid Office directly with questions regarding enrollment expectations.

Other types of funding (i.e. grants) may also require certain enrollment status. Therefore, it is critical that students work closely with their direct funding source (i.e. a specific grant source) regarding enrollment expectations.

Finally, enrollment status may impact student employee withholdings. Visit [Student Employee Payroll](#) for more information.

### **Registering for research credits**

All students registering for research credits (BIOE 8990, BIOE 6960, BIOE 6950) must email the Program Manager the following information in order to be permissioned into the course:

- Student ID
- Term/Year
- Course Number
- Section Number
- Credit Hours

### **PhD Full-time Enrollment Requirements**

The Department recommends that PhD students remain full-time every semester (including summer in which one semester hour of dissertation is considered full-time) prior to passing the comprehensive exam.

### **Courses, Grades & Academic Probation**

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Students must maintain a **cumulative GPA of 3.0**. This will include all coursework that students take during their graduate program, regardless of where the courses are taught (Anschutz Medical Campus, Denver Campus or the Boulder Campus) or what level they are (graduate or undergraduate). Please note that CU Denver does not allow grade replacement: all grades count towards cumulative GPA.

Pass = B-  
and GPA

A passing grade as defined by the Graduate School is a **B- or better**; only courses with a grade of “B-“ or better will count towards the final degree requirements. Any course with a grade of “C+” or lower must be retaken. Students may choose a different course if it is an elective course. Both grades will count towards the cumulative GPA.

A few other grades that students may see on their transcripts: “**W**”: this grade appears when students withdraw after Census Date.

“**IP**”: All master project/thesis or PhD dissertation hours are reported as “IP” (in progress) until the final defense exam. At this time, the “IP” grade will be changed to a letter grade. Per Graduate School rules, if cumulative GPA falls below a 3.0, students will be placed on academic probation and will have two semesters to raise their cumulative GPA to above a 3.0. (These two semesters do not include summer if, during the summer, students only take thesis/project/dissertation credit. This is because the credit will be graded as IP until the defense exam. However, if students are not enrolled in any course for graded credit during the summer, the summer term will count toward the two-semester academic probation). Failing to raise the cumulative GPA to at least a 3.0 after two semesters of academic probation results in high risk of being suspended from the program.

Before the next semester starts, students are required to meet with their faculty advisor, the Graduate Program Manager and/or the Department Chair to develop a plan to raise their GPA. Students on probation cannot register for classes on UCD Access until they complete this step. The Graduate Program Manager can assist with this process.

“**I**”: An incomplete grade (I) should only be assigned if a) the majority of course work has already been completed and b) of the cause for a student’s inability to complete the required work is outside the student’s control (disease, passing of a family member, etc.) the failure to complete the work in time is due to causes outside a student’s control. (In all other cases, students should be encouraged to withdraw from the course so as not to impact their GPA Courses from which a student withdraws after the add/drop date are graded with W). Incomplete work has to be completed in one academic year. The Registrar automatically changes an I to a failing letter grade (F) after one (1) year, unless a grade change is initiated by the Course Director. If a student enters military service before completing a course and an I is reported, this grade may be carried on for the duration of the student’s service, provided this service requirement has been communicated to the Graduate Program and the Graduate School.

### Withdrawing from a Class

Students may withdraw from a class up until Census Date each semester without being recorded on their transcripts. Withdrawals after Census Date will be recorded on final transcript with a grade of “W.” To withdraw from a class after Census Date, please fill out the [Schedule Adjustment Form](#) and ask the instructor to sign. After the second drop deadline, the Dean also has to sign. Please refer to the [Academic Calendar](#) for more details.

### Repeating a Class

Per the Graduate School Handbook, a student who received a failing grade (less than a “B-“) in a required class may repeat that class one time only. Both grades will appear on the transcript and be included in the GPA. A recorded grade of W counts as an attempt. Students may withdraw from or

fail a class the first time taking it, but must pass it the second attempt. Failure to meet course requirements could result in dismissal from the graduate program at the end of the term in which the failing grade or withdrawal from a required course occur the second time.

### **Program of Study Sheet**

It is critical for students to establish their Program of Study during the first semester. The Program of Study is a list of all the courses students need to take to meet the degree requirements. It is acceptable and even expected that the program of study may change as students learn more about bioengineering and the available research opportunities. However, by documenting these courses and subsequent changes each semester, students and their Academic/Research Advisor can ensure that they are on track to meet all the Bioengineering and Graduate School requirements. Having regular conversations with the advisor about academic progress can avoid miscommunication and misconceptions that may delay graduation.

To help with this planning, there is a Program of Study form for each degree program ([MS](#) & [PhD](#)).

### **Independent Study**

Students may choose to do an independent study and count it as an elective for the degree. Students must check in with their faculty advisor first. If the instructor is not a core BIOE faculty member, students need to ask their faculty advisor to serve as the instructor of record. They must fill out a Special Processing Form, attach a syllabus with specific assignment for each week, course objectives and grading rubrics, and then submit them to the Graduate Program Manager. It is important to understand that the independent study must be **different** from the final project or thesis. The GAC will review and make the final decision.

### **Transferring Credit**

The Graduate School Rules define the guidelines for transferring credit toward a graduate degree at CU Denver. The Department of Bioengineering defines the process by which these transfers must be approved. Please refer to the [Graduate School Rules](#) and consider the following:

1. The maximum amount of transfer work that may be applied toward the MS degree is twelve (12) hours of coursework and thirty (30) hours of coursework for the PhD degree.
2. Master's courses applied to one previously conferred Master's degree program may not be applied to our MS program. However, graduate level coursework (5000 level or higher) taken for a Master's degree may be applied toward the PhD program with the instructor and the GAC approval. Likewise, coursework taken for a completed doctoral degree may be applied toward a concurrent or subsequent Master's degree with the program approval.
3. PhD students can request transfer course evaluation after completing one full-time semester with a passing GPA of 3.0. Students should complete the [transfer credit form](#) and submit to the Graduate Program Manager.

### **Substituting a Core Class**

Though the course offerings in Bioengineering continue to expand each year, and new courses are added that satisfy core class requirements, students' area of research interest may dictate that other courses would be more valuable. In this case, students may petition to substitute a core class with another graduate level class offered in the CU system. Please obtain approval from the

faculty advisor first, then complete a [\*Petition a Core Class Substitution\*](#) and submit it to the Graduate Program Manager at least one month before the semester starts. The GAC will review this petition and notify the result to the student via email.

### **Withdrawing from the Program**

Students may choose to leave the Bioengineering program for academic or non-academic reasons. CU Denver system will automatically deactivate student accounts if no classes are enrolled during three consecutive semesters, including summer. However, if students wish to be formally withdrawn from the program, please work with the Graduate Program Manager to complete the necessary paperwork. Remember to return any keys, badges or parking permits.

### **Bioengineering Degree Options**

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#### **Entrepreneurship Certificates**

The Jake Jabs Center of Entrepreneurship in the CU Denver Business School offers two certificates that may be of interest to Bioengineering students:

- Entrepreneurship Certificate
- Certificate in Bioinnovation and Entrepreneurship

Both certificates require that students select from collections of courses with business and entrepreneurship foci. Graduate-level courses from these programs will meet the BIOE MS elective requirement. PhD students should consult with their mentors about the relevance of these courses to their programs of study.

It may be possible that the BIOE MS project, MS thesis or PhD dissertation satisfies the capstone requirement for the certificates, provided that the work has an entrepreneurial component and involves a Business School faculty member. Students should speak with the Business School for more information and guidance.

#### **Graduate Certificate in Medical Device Design and Entrepreneurship**

The graduate certificate in medical device design and entrepreneurship includes nine credits of coursework and three credits of project work. It is open to anyone interested in a graduate certificate. More information can be found [here](#).

- BIOE 5054 Regulatory Affairs (3 credits)
- BIOE 5420 Biomedical Device Design and Entrepreneurship (3 credits)
- One bioengineering elective class (3 credits)
- Entrepreneurship project (3 credits)

#### **Dual MS/MBA**

To participate in the dual MS/MBA program, students must apply and be accepted to both degrees. Though coursework does not necessarily need to be taken for both degrees in a given semester, a student will remain enrolled in both programs until all requirements for both degrees are met. Degrees are conferred at the same time.

## Dual MD-MS

Bioengineering offers the MS component of a dual MD/MS-Bioengineering. The School of Medicine manages all admissions to the MD program without input from Bioengineering. Further, matriculation in the BIOE-MS program first does not confer any admissions advantage to the MD program. Most dual degree candidates will take a leave of absence between their third and fourth years of medical school to complete their BIOE-MS requirements. The dual degree option is available to University of Colorado School of Medicine MD students who are in good standing and have the permission of the School of Medicine to pursue the dual degree. The MS requirements can be completed by a motivated student in three semesters (Summer, Fall, Spring) but may require additional time, depending on the student's course choices and research project.

To meet the MS requirements of the dual MD/MS- BIOE, students must:

- Complete a modified BIOE core (14 credit hours) + 1-2 electives (3-6 credit hours. Please note that exact course numbers are subject to change):
- Complete BIOE 5020 and/or BIOE 5021 (Quantitative Core; 3-6 credit hours)
- Complete the Technology Core (6 credit hours)
- Complete BIOE 5040 – may satisfy the research ethics course requirement; (2 credit hours)
- Complete the elective requirement: any graduate-level class agreed to by the academic and/or research mentors
- Conduct research and produce a project or thesis under the mentorship of an approved faculty member and earn six credit hours of BIOE 6960 or 6950 (project or thesis hours).
- Establish a committee of at least two Graduate Faculty members to oversee the research and administer the final defense examination.
- Pass a final defense examination:  
MD/MS students will count the following classes towards their life sciences and clinical experiences core requirements, in lieu of BIOE 5041, BIOE 5010 & 5011 or equivalent:  
Molecules to Medicine
- Cardiovascular, Pulmonary and Renal Systems
- Nervous System
- Digestion, Endocrine and Metabolic

## One-Year MS, Medical Device Design and Entrepreneurship

For those students with a bachelor of science in bioengineering from CU Denver, six credits from upper division undergraduate elective courses can count for the undergraduate and MS degree in Medical Device Design and Entrepreneurship. More information can be found [here](#).

## Time Commitment

Bioengineering is a very rigorous program. Previous students report that a full course load often results in 40+ hours of class, homework and study time per week. Combined with research, graduate students can expect to spend upwards of 50-60 hours per week at their studies and research. In some cases, students may need to visit the lab on evenings and weekends, and even in the middle of the night or during holiday time.

Graduate school is rigorous and may demand 50-60+ hours per week!

## **Grad School Policy for Vacation & Leave (PhD)**

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Graduate school is a privilege; working in the biomedical research/academic field, whether as a graduate student, a postdoctoral fellow, or an independent investigator, is a time-honored and challenging profession that requires a high level of commitment and responsibility. Students who receive full-support stipends from CU Denver | Anschutz Medical Campus PhD programs are required to pursue their training on a full-time basis, devoting each day of the normal work week, plus any additional time required by their research projects and academic courses. Additionally, for a student to maintain full-time status, the following guidelines for vacation and leave time have been established by the Graduate School. These represent the leave to which a graduate student is entitled; however, research demands and commitment to graduate studies often result in students using less than the allotted leave. Individual graduate programs may not have a formalized system for accounting for vacation and sick leave; if so, vacation and leave monitoring falls under the honor system and is the responsibility of the student.

### **Vacation and Holidays**

Graduate students receive all University holidays and no more than 14 calendar days (counting all days Monday through Sunday) of vacation per annum, with no year-to-year accrual. Students continue to receive stipends during vacations and holidays. In the Graduate School at CU Denver, the times between academic terms and the summers are considered active parts of the training period and are not necessarily free times. Students taking courses are expected to attend all classes and take all exams as scheduled. They should not take vacations when classes or exams are scheduled.

### **Sick Leave and Other Leave**

Graduate students may continue to receive stipends for up to 15 calendar days (counting all days Monday through Sunday) of sick leave per annum, with no year-to-year accrual. Under exceptional circumstances, additional sick days may be granted following a written request and approval by the student's Program Director. Sick leave may be used for the medical conditions related to pregnancy and childbirth.

*Parental Leave.* Graduate students may also receive stipends for up to 60 calendar days (counting all days Monday through Sunday) of parental leave per annum for the adoption or the birth of a child.

Either parent is eligible for parental leave. Parental leave must be approved by the student's program director. Sick leave may not be used to supplement parental leave, except as noted above.

*Unpaid Leave.* Individuals requiring more than 15 calendar days of sick leave or more than 60 calendar days of parental leave, must seek approval from their program for an unpaid leave of absence. Approval for a leave of absence must be requested in advance by the student and approved by the program. The leave period and conditions must be documented, both at the time of leave and at the time of re-entry in the program. A copy of this agreement must be submitted to the Graduate School.



*Termination.* Upon graduation or termination a graduate student forfeits all unused annual and sick leave; payment may not be made from grant funds (training grants or research grants) for leave not taken.

## **Funding, Tuition and Residency**

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### **Master's Students**

The Department of Bioengineering does not have formal research assistantships for MS students. However, some students have been able to find mentors with research funding. Students may also be hired as teaching assistants or graders for undergraduate or graduate level courses. Job postings for such positions are usually distributed by the department 4-6 weeks prior to the start of the term.

Scholarship information is available at CU Denver's [Financial Aid](#) and [Scholarships Office](#). The Downtown Campus Financial Aid Office is located in the North Classroom Building on Auraria Campus. Their phone number is 303-315-5969.

### **Tuition & Fees**

It is difficult to predict exactly how much a student will spend in tuition and fees in a given semester because not all students take the same number of classes. Students also find that some classes have additional instructional fees. During the academic year of 2020-2021, in-state graduate students in the Bioengineering program pay \$626 per credit hour; out-of-state graduate students pay \$1,378 per credit hours (subject to change each year).

Currently, Bioengineering graduate students pay Denver Campus tuition and Anschutz Medical Campus (AMC) fees. Please visit the [AMC Bursar's Office website](#) for more details about student fees. As students on Anschutz Medical Campus, Bioengineering graduate students must enroll in student health insurance or, if eligible, request a waiver. More information can be found on the [Anschutz Medical Campus' Student Health Insurance website](#).

### **PhD Students**

All new PhD students are offered a stipend plus tuition, fees, and health insurance at the time of admission. Continued funding, however, is dependent on a number of factors including but not limited to mentor funding availability, successful grant applications, residency status, and satisfactory academic and research progress.

The PhD is a pathway to a career as an independent researcher and most of the available funding for research comes from public (NIH, NSF) and private research and philanthropic organizations. As part of the degree path, PhD students are strongly encouraged to write and apply for grants in their first year. This process prepares the student for success in early career funding and allows mentors to fund more students as their students start to fund themselves. Your mentor and the department's Grants Manager will provide grant-writing guidance.

The following list is not exhaustive, but should give you ideas of where to look for grant and fellowship opportunities. Each program is going to have its own application requirements, deadlines and review processes. However, many applications are due in fall for funding the following school year and review can often take 6-12 months.



#### Internal CU Denver Programs:

- Colorado Clinical and Translational Sciences Institute TL1 (T32) Predoctoral Fellowship
- Bioscience Discovery and Evaluation Grant Federal Government:
  - National Defense Science and Engineering Graduate Fellowships
  - NSF Graduate Research Fellowship
  - NIH NRSA Predoctoral Fellowship (F31)
  - NIH PA-12-149 Research Supplements to Promote Diversity in Health-Related
  - NIH R36 Dissertation

#### Award

#### Other Organizations:

- Graduate Women in Science Fellowship
- American Heart Association
- Juvenile Diabetes Research Foundation
- American Association of University Women
- American Association of Cancer Research travel grants
- L'Oreal USA for Women in Science

Many professional organizations will have travel awards to support students who will be attending annual meetings to present research. In addition to award application deadlines, pay attention to abstract submission deadlines as well.

#### Travel Funding

The department does not have specific travel funds for graduate students. However, research mentors might have available funding for students to attend conferences. The Graduate School has small travel awards available, and often the professional associations that sponsor conferences have travel awards. Students are encouraged to explore all of the options.

#### Colorado Residency

Out-of-state students should consider establishing Colorado residency to be qualified for in-state tuition. ***Funded PhD students may only be eligible for continued funding if Colorado residency is established prior to their second year in the program.***

By law, an “in-state” student, or student’s parents, must be domiciled in Colorado for 12 or more continuous months immediately preceding the first day of classes. Students can establish domicile in Colorado only if they are residing in Colorado with the present intention to reside permanently in the state. Please reach out to the [Residency Office](#) on the Downtown Campus for more information and direct any questions to [residency@ucdenver.edu](mailto:residency@ucdenver.edu).

#### PhD Timeline Table

Students should use the below table to plan their Program of Study. The individual plans may differ from the one below, but all students must meet the preliminary and comprehensive examination deadlines in order to progress in the program.

	Pre-app			Year 1			Year 2			Year 3			Year 4		
	Fall	SPR	SU	Fall	SPR	SU	Fall	SPR	SU	Fall	SPR	SU	Fall	SPR	SU
<b>Bioengineering Program Requirements</b>	Note that only 10 dissertation credits should be taken before the semester of the Comprehensive exam. All post-comp PhDs must take 5 credits of dissertation in Fall and Spring and 1 credit in Summer until defense.														
Identify Funding & Advisor	X														
Application	X														
Admission Decision		X													
Core Classes (21 CR)				X	X										
Preliminary Exam						X									
Elective Classes (9 CR)							X	X							
Comprehensive Exam									X						
Dissertation (30 CR)							X	X		X	X	X	X		
Dissertation Defense														X	

## Lab Rotation

At the discretion of the department and the admissions committee, some students may be admitted with the expectation that they rotate through laboratories for one or two semesters in order to choose a lab. Rotations would generally occur over the first semester with three required six-week rotations, but could last for two semesters with three required 12-week rotations at the discretion of the admissions committee. The students must complete all three rotations during the time specified in the offer letter. However, if students receive their own funding, from a grant or fellowship, they are no longer held to the rotations and the completion of rotations is at the discretion of the student and their advisor.

Additionally, the student will be assigned an advisor who is not a PI of one of the rotation laboratories. Any other changes to the offer letter stipulations must be approved by a vote of the Graduate Affairs Committee.

## Year 1: Preliminary Examination

Each Bioengineering PhD Candidate will complete a PhD preliminary examination, typically during the Spring Semester of their first year of study. The exam format will consist of three components: (1) oral and written presentation of the research topic; (2) oral and written presentation of the training pathway (coursework & timeline) to prepare the student for the research; (3) oral exam on undergraduate-level competencies in relevant topic areas. These sections are described in more detail below. Students are highly encouraged to discuss these items with their research advisor(s) and form the Preliminary Examination committee as early as possible, certainly no later than the middle of February. Students should schedule their examination several months ahead of time to ensure that all committee members are available on that date. All written exam materials (Research Plan and Training Plan) must be turned in to committee members at least two weeks prior to the exam date.

## The Committee

The preliminary examination committee must consist of three faculty mentors including a primary mentor (additional committee members may be included but three is recommended). Note that this committee is not necessarily the same as the candidate's thesis committee. At least two committee members must be bioengineering department core faculty. If a candidate has a primary mentor who is only an affiliated

bioengineering faculty, they additionally require a "primary" co-mentor who is core faculty and who must be identified prior to their preliminary exam. This core member insures that bioengineering-specific expectations are met for the duration of the thesis.

***The Preliminary Exam consists of three parts:***

***Part 1: Research Plan***

Candidates are expected to identify a relevant bioengineering research topic for their proposed thesis working closely with their research mentor(s). With the preliminary examination members identified, and with the help of the Research Methods class, the candidate should prepare a 30 minute presentation and associated written proposal (2-3 pages) covering the following topics:

1. Research goals and hypothesis: a brief (½ page) introductory summary narrative of the major goals of their proposed research, and the overall research hypothesis that drives these goals.
2. Background and Significance: a summary of relevant background material, gathered primarily from peer-reviewed journal articles, which support the research goals and hypothesis.

Given that the candidate's first year consists of mostly didactic training, this plan is expected to be fairly general in its detail, and does not need to include preliminary research results or detailed research methods and approach.

***Part 2: Training Plan***

Given the research topic proposed in the first part of the exam, the candidate will further create a 15 minute presentation and an associated 1 page written training plan that describes his/her career goals/objectives and the training activities to be undertaken for the rest of their PhD program. The second part of this plan could be broken down as descriptions of the following topics:

1. Formal didactic training: i.e. coursework and its contribution to the candidate's research area. This section should include a summary of previous coursework that is relevant and proposed coursework with a description of how these contribute to the candidate's graduate preparation. A table format is recommended for clarity.
2. Informal training: plans to attend local seminars / national meetings; a list of mentors, proposed meeting arrangements with them, and how these mentor interactions will contribute to the candidate's research; additional collaborations with (non-mentor) faculty, if any; lists of any informal classes such as animal handling or ethics; and any mentoring the candidate may provide to others.
3. Peer Review: plans for journal submissions, conference abstracts, and/or intramural/extramural grant applications.

***Part 3: Background Knowledge***

Finally, by mid-February of the Spring Semester the candidate must identify three fundamental knowledge areas appropriate for their proposed research and inform their mentors/committee of these areas. It is recommended that one of these areas comprise the anatomy and physiology of the biological system being studied. For example, a candidate studying a new ultrasound imaging modality for blood flow might select acoustics, fluid dynamics, and cardiovascular anatomy & physiology, while a candidate studying orthopedic biomechanics might select mechanics and dynamics, materials, and musculoskeletal anatomy and physiology.

The candidate will work with their faculty mentor and with their preliminary exam committee members to select material that they will use for preparation in these three broad knowledge areas such as textbooks, papers, book chapters, etc. The candidate will be expected to know this material in detail and answer questions on this material in the oral presentation. It is important to note that the expectation is for the student to demonstrate undergraduate-level competency in these knowledge areas as the student is not likely to have completed all the graduate course work in these topics before the preliminary exam. The goal is to ascertain fundamental knowledge and general ability to think through problems, not necessarily just memorization of equations.

The Preliminary Examination Committee will then make one of the following decisions:

1. Student has unconditionally passed the Preliminary Examination.
2. Student has conditionally passed the Preliminary Examination. Conditions that the student must fulfill must be provided to the student along with a date by which the student must do this.
3. Student has failed the Preliminary Examination. The committee may recommend that the student stand for the Preliminary Examination a second time (no student may take the Preliminary Examination more than twice) or may recommend that the student discontinue further PhD study.

Students must submit a [Preliminary Exam Committee Proposal](#) to the Graduate Program Manager prior to moving forward with a [Request for Exam](#); please allow one week for proposal to be reviewed by GAC.

### **Dissertation Advisory Committee**

By the end of the second Fall semester, students will need to establish their Dissertation Advisory Committee (DAC). The Dissertation Advisor will work with the student to select at least four other faculty members to serve on this committee. The purpose of the DAC is to advise the student and the Dissertation Advisor to ensure that the research and dissertation progress in a timely manner. Students will also likely choose their Comprehensive Examination and Dissertation Defense Committee members from the Dissertation Advisory Committee. The Committees can be the same.

The Chair of the DAC must be a bioengineering core faculty member and may not be the Dissertation Advisor. This will allow the DAC to provide more objective guidance to the student and their Dissertation Advisor. Note that two members must be BIOE core faculty.

Student must meet with their DAC twice per year following the preliminary examination. Failing to do so may negatively impact the overall progress. Every other meeting will correspond to a public Methods & Research Seminar and may also correspond to planning the major examinations.

### **Graduate Faculty Appointments**

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In order to serve as a mentor or primary advisor, on a thesis or examination committee or as a program or course director, a faculty member must be appointed to the faculty of the Graduate School ("Graduate Faculty"). The Graduate Faculty is comprised of individuals who have been nominated by a graduate program on the basis of their research and scholarship, mentoring or teaching, and who demonstrate a commitment to graduate education and students. The Graduate School maintains a directory of Graduate Faculty on their [website](#). Please consult the list and work with the Graduate Program Manager to ensure that all of your committee members have current

Graduate Faculty appointments. Please note that Bioengineering may nominate industry partners or researchers from other institutions for special appointments, if necessary.

### **Years 2-3: Comprehensive Examination**

Sometime during the end of the second or third years in the Bioengineering PhD program, students will take their second major examination: the comprehensive examination. Details about this exam can be found in the [Comprehensive Examination Document](#).

The comprehensive (comp) exam is a major stepping-stone for PhD students. This exam must be taken by the end of the third year. The first part of the exam is an open seminar (45 minutes), followed by a closed-door portion (two hours) with the exam committee. Once students pass the exam they will be admitted to candidacy and officially become a PhD Candidate. Before taking the comp exam, students must complete all of the didactic coursework (30 credit hours) and have made progress on their research (as determined by the DAC). Students may earn no more than ten credits of dissertation prior to the semester they take their comp exam. Some advisor and committee will have specific requirements, but generally, students should have produced at least preliminary data by this point, have a clear plan for the remainder of their research, and some sense of where to publish and present.

The Comprehensive Examination Committee must consist of at least four members of the Graduate Faculty. These members may be the same or different from the DAC members. The Comprehensive Exam Committee Chair must be a bioengineering core faculty member and may not be the Dissertation Advisor.

The Graduate School is responsible for documenting the comprehensive exam. Students must submit the completed [Application for Admission to Candidacy](#) and [Request for Exam](#) to the Graduate School following their instructions and deadlines. The Graduate School will generate an exam report form. Please copy the Graduate Program Manager on any communications regarding the comp exam paperwork.

### **Years 4-5: The Defense Exam & Graduation**

The defense exam is the last major milestone and there are several important deadlines to consider that precede the defense. The defense exam will begin much like the comprehensive exam, with an open seminar about 45-55 minutes in length. This seminar should focus entirely on the research, followed by a closed-door exam by the defense committee.

The final defense committee may be the same as or include different members from the DAC. At least five members of the committee must hold Graduate Faculty appointments and the Committee Chair must be a member of the bioengineering core faculty but not the Dissertation Advisor. One member must not be a core BIOE faculty member. Please see the earlier section on Graduate Faculty appointments for more information.

Besides the defense exam, students must complete the following items to graduate. Please see the Graduate School website for more details about the deadlines.

1. Apply for graduation on UCDAccess
2. Submit the dissertation for format review to the Graduate School
3. Submit [Request for Examination](#) **two weeks before the exam** to the Graduate School (the Graduate School schedules the final defense exam)
4. Defend (make sure to bring the Thesis Approval form to the defense exam)

5. Include the [Declaration of Original Work statement](#) at the beginning of thesis.  
For any questions on this form, contact the Graduate Program Manager.
6. Submit [Thesis Approval](#) form to the Graduate School
7. Submit final thesis/dissertation to ProQuest

Missing any of these deadlines could result in delay of graduation. There are no exceptions made to the graduation deadline so please plan accordingly.

### **Publication Guidelines**

As publications are the currency of research, students are strongly encouraged to publish their work. Each Dissertation Advisor will set their own requirements, but a typical dissertation will result in at least one first-author, peer-reviewed journal article. For many students, the first publication may come in the form of a literature review that will also serve as the introduction to the dissertation. By the comprehensive exam, students should have a good idea what their publications will be; ideally they should have already submitted one.

### **Time Limit for PhD Completion**

Doctoral students, whether enrolled full-time or part-time, must complete all degree requirements within eight years of matriculation. Students who fail to complete the degree in this eight-year period are subject to termination from the Graduate School upon the recommendation of the Program Director and concurrence of the Dean. For a student to continue beyond the prescribed time limit, the Program Director must petition to the Dean for an extension and include (1) reasons why the program faculty believes the student should be allowed to continue in the program and (2) an anticipated timeline for completion of the degree.

Normally, extensions for time to degree are for one year or less, but under rare circumstances, a second extension may be requested. Complete the Graduate School's [Extension of Time Limit form](#). Approved leaves of absence do not automatically extend the time limits for earning a degree, but they may be used as a reason to request an extension, if needed.

### **Policy on Change of Academic Advisor**

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#### **Applicability**

This policy applies when graduate students in the Department of Bioengineering PhD program change advisors during their degree program. This policy does not apply when a student completes a degree with one advisor and then starts a new degree with another advisor. This policy does not apply if the change is forced by extreme circumstances, such as the advisor leaving the Bioengineering graduate faculty.

#### **Rationale**

Graduate students in the bioengineering PhD program may have personal or professional reasons for needing to change advisors during their degree program. This policy ensures a fair process to both the student and their advisor.

#### **Rules for changing advisors:**

1. In general, the student will initiate advisor changes by submitting a petition to the Graduate Affairs Committee (GAC) requesting the change and detailing the new research advisor.
2. If a faculty member wishes to cease serving as advisor to a particular student, he or she must petition the GAC, who will decide to approve or deny the change. The advisor must include an explanation of the reasons for the change along with supporting documentation.
  - a. For changes initiated due to poor student performance in the research environment, the advisor must provide documentation of meetings with the student and evidence of poor performance covering at least three months of observation.
  - b. For changes due to lack of advisor funds for the student stipend and tuition, the advisor should provide documentation of laboratory funding. Because funding difficulties are often predictable months ahead of time, the advisor should contact the committee at least 4 months before the end of funding to attempt to find other possible solutions. The GAC expects advisors to prioritize graduate student funding over teaching buy-downs, summer salary, technician salary and postdoc salary. In these cases, the GAC can choose to limit or prevent the PI from advising future students in the Bioengineering department.
  - c. Changes initiated due to research misconduct, plagiarism, or a blatant breach of ethics, safety, or university policies do not need to have 3 months of documentation and can be initiated immediately. The GAC can then decide whether to allow a lab change or to remove the student from the program.
3. Students may approach a prospective advisor to inquire whether they would be accepted as a student if they do switch laboratories. A prospective advisor is not obliged to inform the student's current advisor. The prospective advisor should consult the Graduate Affairs Committee about funding and stipend levels prior to accepting the student into their lab.
4. The student must inform his/her current advisor of intention to change advisors. The students may do this either before approaching prospective advisors or within one working day after accepting a position with a new advisor.
5. It is the responsibility of the student to inform the Graduate Program Manager when they have changed advisors. The Graduate Program Manager will process the documents necessary to comply with university records. Within three weeks of changing advisors, the student must schedule a meeting with the Graduate Affairs Committee and the new advisor to work out a revised timetable for procedural requirements (e.g., course of study, proposal, comprehensive exam, etc., as appropriate). The timetable for the Ph.D. qualifying or comprehensive exam may be adjusted to accommodate the change in project focus.

- Note that many offers of student support are conditional upon the student working in a particular research area or for a particular advisor; when a student changes advisors, the original offer becomes void. The new advisor and the Graduate Affairs Committee will provide a new offer of student support according to Graduate School Rules.

## Master's Program Milestones

### MS Timeline Table

Students should use the below table to plan their Program of Study. The individual plans may differ from the one below, but this shows students how to graduate in two years.

	Pre-app			Year 1			Year 2		
	Fall	SPR	SU	Fall	SPR	SU	Fall	SPR	SU
<b>Bioengineering Program Requirements</b>	MS students may choose to spread their core classes out over both years to ease the load, particularly if they are going to start research right away. However, doing core in Year 1 leaves more time for research in Year 2.								
Application	X								
Admission Decision		X							
Core Classes (21 CR)				X	X		X	X	
Identify a project/thesis mentor & project					X				
Elective Classes (3-6 CR)							X	X	
Project/Thesis (3-6 CR)							X	X	
Defense								X	

### Master's Curriculum Update, Fall 2020

Beginning Fall 2020, MS students will no longer be required to take BIOE 5021 *Numerical Methods for Engineering Analysis*. Additionally, MS students can choose between BIOE 5010 *Cell and Molecular Biology* and BIOE 5011 *Systems Physiology*.

### Choosing Academic Advisor

Each incoming Bioengineering student is assigned an Academic Advisor from the Bioengineering core faculty. This faculty member may also be your project/thesis advisor; alternatively, he/she will help you identify a project/thesis advisor.

### Choosing Your Project/Thesis

MS students have the choice between a Master's project and a Master's thesis. The Master's thesis is a traditional academic document. If the work results in a peer-reviewed publication, students are likely doing a thesis. Master's theses are subject to the same formatting guidelines as doctoral dissertations and must be filed with the Graduate School. Master's theses are acknowledged on the final transcript with the inclusion of thesis title, whereas Master's projects are not. Students who do a thesis must register for at least three credits (and no more than six credits) of BIOE 6950 during their studies.

Students will receive a grade of "IP" (in progress) until their final defense. Contact Graduate Program Manager for more details.

A Master's project is more flexible than the Master's thesis and is likely more appropriate if the project involves an industry partner. Examples of Master's projects include product designs, product testing, regulatory and policy review, market analysis, business plans, and patent applications (though these may still be involved in theses). Because the project does not have to be



filed with the Graduate School, it does not have to follow the same formatting guidelines. This does not mean the project should be viewed any more lightly than a thesis. Students will still be expected to produce a well- written, professional document. If doing a Master's project, students must register for at least three (and no more than six) credits of BIOE 6960 during their studies. Students will receive a grade of "IP" (in progress) until their final defense.

All students must have a project and Research Mentor chosen by the end of their first semester in the program. Please work with your Academic Advisor and/or Program Manager if you're having trouble.

### **Choosing Exam Committee**

Students should choose their committee by the end of their first year and have at least one or two meetings prior to their defense. The final defense committee must consist of at least three Graduate Faculty members, two of whom must be part of the Bioengineering Core Faculty. The Committee's Chair must be a Bioengineering core faculty member. The research advisor may also serve as the committee's chair. Use the [Committee Planning Form](#) to help you with this important task.

If students choose to work on a project with an industry partner, their Industry Advisor may not already have a Graduate Faculty appointment; please work with Graduate Program Manager to seek such an appointment. Alternatively, students may have three Graduate Faculty members plus the Industry Advisor.

### **Years 2-3: Final Defense Exam**

All MS students must take the final defense exam. However, there are several important deadlines to consider that precede the defense. Please find the specific dates of these deadlines on the Graduate School's website.

1. Apply for graduation on UCDAccess by Census Date
2. Submit [Request for Examination](#) to the Graduate Program Manager **at least two weeks** before the exam
3. Defend (make sure to bring the [Thesis Approval](#) form to the defense exam if doing a thesis)
4. Submit Thesis Approval form to the Graduate Program Manager (if doing a thesis)
5. Include the [Declaration of Work statement](#) at the beginning of thesis. For any questions on this form, contact the Graduate Program Manager.
8. Your committee is in charge of the format review. Once approved, submit final thesis to [ProQuest](#) or final project to Graduate Program Manager

Missing any of these deadlines results in delay of graduation. There are no exceptions made to the graduation deadline so please plan accordingly.

Your defense exam will begin much like a PhD comprehensive or defense examination, with an open seminar about 45 minutes in length. This seminar should focus entirely on your research. Plan on one hour of closed-door examination by your Master's committee.

## **Publication Guidelines**

As publications are the currency of research, you're strongly encouraged to publish your work. It is not unusual for a Master's Thesis to result in one or more first-author, peer-reviewed journal articles. Talk with your advisor about your career plans and your desire to publish.

## **Time Limit for Master's Completion**

Master's students, whether enrolled full-time or part-time, have seven years from their first semester to complete all degree requirements, including filing the thesis with the Graduate School, if required.

Students who fail to complete the degree in this seven-year period are subject to termination from the Graduate School upon recommendation from the Department Chair and concurrence of the Dean.

For a student to continue beyond the prescribed time limit, the Department Chair must petition to the Dean for an extension and include (1) reasons why the program faculty believes the student should be allowed to continue in the program and (2) an anticipated timeline for completion of the degree.

Normally, extensions for time to degree are for one year or less, but under rare circumstances, a second extension may be requested. Students need to complete the Graduate School's [Extension of Time Limit form](#). Approved leaves of absence do not automatically extend the time limits for earning a degree, but they may be used as a reason to request an extension, if needed.

## **Continuing from the MS to the PhD**

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The MS in BIOE is a great stepping stone to a PhD in Bioengineering at CU Denver or elsewhere. Here are some important things to know:

1. Students should have identified a mentor with whom they will be studying for their PhD. This person must have guaranteed funding for a PhD student and may or may not be their MS advisor.
2. Students will need to apply to the PhD program following the standard application process. Students will probably do this during their second year of the MS. Please note that the PhD application window closes on **December 1** for all applicants.
3. Students may apply for certain pre-doctoral fellowships while they are finishing the MS so that funding is available for the PhD.

## **Graduate Student Commencement Policy**

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Bioengineering students participate in the commencement ceremony on the Anschutz Medical Campus only. The medical campus has only one ceremony in May.

Note that PhD students can only participate in commencement and be hooded if they have successfully defended their dissertation.

In order to be listed in the medical campus' program, you must let the Graduate Program Manager know that you intend to graduate. Bioengineering graduate student diplomas will list both the University of Colorado Denver and University of Colorado Anschutz Medical Campus.

## Directory of Services

### **Anschutz Medical Campus Badging Office**

Phone: 303.724.0399 · Email: security.badgeoffice@cuanschutz.edu · Office: Fitzsimons Building First Floor

*Go to for:* badge replacements, badge holders

### **Anschutz Medical Campus Parking Office**

Phone: 303.724.0399 · Email: security.badgeoffice@cuanschutz.edu · Office: Fitzsimons Building First Floor

*Go to for:* parking permits, parking tickets, RTD pass questions

### **Anschutz Medical Campus University Police Department**

Phone: 303.724.4444 (police dispatch or non-emergencies) or 911 · Office: Bldg. U-09, 12454 E. 19<sup>th</sup> Place

*Go to for:* campus security, lock-out problems

### **CARE Team**

Phone: 303.315.7306 (Denver) 303.724.2866 (Anschutz)

*Go to for:* health and safety concerns

### **Graduate Student Progress Coordinator**

Phone: 303.315.0074 · Email: stephanie.puello@cuanschutz.edu · Office: 1380

Lawrence Street, Denver CO 80204

*Go to for:* graduate school logistics (e.g. application for admission to candidacy, request exam, transfer credits, transfer programs)

### **Student Health Insurance Office**

Phone: 303.724.7674 · Email: CUAnschutzStudentInsurance@ucdenver.edu · Office: Ed 2 North 3213

*Go to for:* all things student health insurance

### **Office of Campus Student Services, Anschutz Medical Campus**

Phone: 303.724.2866 · Office: Ed 2 North 3123

*Go to for:* student housing

### **Student Mental Health Service**

Phone: 303.724.4716 (M-F); 720.848.0000 (On-call psychiatrist for emergencies)

*Go to for:* Identify yourself as a student so that you get routed properly

## Department Directory

### Bioengineering Staff

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**Karen Gilbert, Grants Manager**

Phone: 303.724.7296 · Email: [karen.gilbert@cuanschutz.edu](mailto:karen.gilbert@cuanschutz.edu) · Office: Y18-1007

*Go to for:* Routing your grant, grants information

**Kate Hoch, Department Administrator for Finance and Administration**

Phone: 303.724.6280 · Email: [kate.hoch@cuanschutz.edu](mailto:kate.hoch@cuanschutz.edu) · Office: Y18-1307D

*Go to for:* budget, spending, human resources, faculty concerns, concerns with faculty

**Natalie Kersten, Graduate Program Manager**

Phone: 303.724.9972 · Email: [natalie.kersten@cuanschutz.edu](mailto:natalie.kersten@cuanschutz.edu) · Office: Y18-1307B

*Go to for:* all things graduate program, marketing ideas, social media, AMC badges

**Shaun Boulter, Undergraduate Program Manager**

DC Phone: 303.556.5838 · Email: [shaun.boulter@cuanschutz.edu](mailto:shaun.boulter@cuanschutz.edu) · DC Office: North Classroom 2516B

*Go to for:* undergraduate admissions and curriculum information, advising, student services, support for undergraduates, DDC badges, FCQs

### Bioengineering Faculty

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**Dr. Robin Shandas, Distinguished Professor, Department Chair & Program Director**

Phone: 303.724.4196 · Email: [robin.shandas@cuanschutz.edu](mailto:robin.shandas@cuanschutz.edu) · Office: Y18-1307K

*Go to for:* director approval, feedback on program, significant grievances

**Dr. Richard KP Benninger, Associate Professor**

Phone: 303.724.6388 · Email: [richard.benninger@cuanschutz.edu](mailto:richard.benninger@cuanschutz.edu) · Office: Barbara Davis Center 4306-D

*Go to for:* imaging questions, tech questions, diabetes questions, rotation questions, curriculum concerns

**Dr. Cathy Bodine, Associate Professor**

Phone: 303.315.1281 · Email: [cathy.bodine@cuanschutz.edu](mailto:cathy.bodine@cuanschutz.edu) · Office: Assistive Technology Partners 601 East 18<sup>th</sup> Avenue, Suite 130, Denver CO 80203

*Go to for:* assistive technology questions, rehabilitation questions

**Dr. Emily Gibson, Associate Professor**

Phone: 303.724.3678 · Email: [emily.gibson@cuanschutz.edu](mailto:emily.gibson@cuanschutz.edu) · Office: RC2 8112

*Go to for:* quantitative questions, imaging questions, cellular biophysics questions

**Cassandra (Casey) Howard, Instructor and Director of External Relations**

Phone: 303-724-9385 · Email: [Cassandra.howard@cuanschutz.edu](mailto:Cassandra.howard@cuanschutz.edu) · Office Y18-1307P

*Go to for:* International service questions, design questions, industry questions

**Dr. Kendall Hunter, Associate Professor**

Phone: 303.724.4197 · Email: [kendall.hunter@cuanschutz.edu](mailto:kendall.hunter@cuanschutz.edu) · Office: RC2 6018

*Go to for:* quantitative modeling questions, admissions questions

**Dr. Jeffrey Jacot, Associate Professor**

Phone: 303-724-8696 · Email: [jeffrey.jacot@cuanschutz.edu](mailto:jeffrey.jacot@cuanschutz.edu) · Office: Y18-1307M

*Go to for:* tissue engineering questions, department seminars, admissions questions

**Dr. Vitaly Kheyfets, Assistant Research Professor**

Phone: 303-724-6280 Email: [vitaly.kheyfets@cuanschutz.edu](mailto:vitaly.kheyfets@cuanschutz.edu) Office: RC2 6111

*Go to for:* biomechanics questions, MatLab questions

**Dr. Steve Lammers, Instructor**

Phone: 303-724-9549 Email: [steve.lammers@cuanschutz.edu](mailto:steve.lammers@cuanschutz.edu) Office: Y18 1307G

*Go to Steve for:* Bioprinting questions, design project questions

**Dr. Chelsea Magin, Assistant Professor**

Phone: 303.724.3344 · Email: [chelsea.magin@cuanschutz.edu](mailto:chelsea.magin@cuanschutz.edu) · Office: RC2 Room 9006

*Go to for:* regulatory affairs questions, pulmonary engineering questions

**Dr. Keith Neeves, Professor**

Phone: 303.724.3344 · Email: [keith.neeves@cuanschutz.edu](mailto:keith.neeves@cuanschutz.edu) · Office: RC2 Room 9006

*Go to for:* hematology questions, oncology questions

**Dr. Daewon Park, Associate Professor**

Phone: 303.724.6947 · Email: [daewon.park@cuanschutz.edu](mailto:daewon.park@cuanschutz.edu) · Office: RC1 North 4118

*Go to for:* polymer questions, drug delivery questions, Graduate Committee questions

**Dr. Brisa Pena, Research Assistant Professor**

Phone: 303-724-1113 · Email: [brisa.penacastellanos@cuanschutz.edu](mailto:brisa.penacastellanos@cuanschutz.edu) · Office: BS3, #121

*Go to for:* Material Science, Atomic Force Microscopy, Cardiac Tissue Engineering and miRNA delivery.

**Dr. Bradford Smith, Assistant Professor**

Phone: 303.724.0137 · Email: [Bradford.smith@cuanschutz.edu](mailto:Bradford.smith@cuanschutz.edu) · Office: RC2 6015

*Go to for:* pulmonary questions, independent study and research project questions

**Jennifer Wagner, Instructor & Director of Lab Safety and Compliance**

Phone: 303.724.9367 · email: [Jennifer.wagner@cuanschutz.edu](mailto:Jennifer.wagner@cuanschutz.edu) · Office: Y18-1307D

*Go to for:* Research questions, lab questions, design project questions

**Dr. Richard Weir, Associate Research Professor**

Cell: 847.912.1032 · Email: [richard.weir@cuanschutz.edu](mailto:richard.weir@cuanschutz.edu) · Office: Y18-1307H

*Go to for:* prosthetic questions, 3D printing questions