Senior Design & Engineering Days (E-Days)

Why are CSU Biomedical Engineering students unique?
Colorado State University biomedical engineering majors earn two degrees in a five year period: Bachelor of Science in Biomedical Engineering and one of the following:
- Bachelor of Science in Chemical & Biological Engineering
- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Mechanical Engineering

What is Senior Design?
Senior design challenges students to think creatively and empowers them to take responsibility for all phases of their project, from design and manufacturing to documentation and marketing. In their fifth year, students are required to complete BIOM 486A—Biomedical Design Practicum: Capstone Design I and BIOM 486B—Biomedical Design Practicum: Capstone Design II. During the Fall and Spring semesters of their fifth year, students work diligently in small, multidisciplinary teams to complete a project.

What is Engineering Days (E-Days)?
E-Days is a long-standing tradition of CSU excellence which allows senior undergraduate students an opportunity to showcase the completion of their senior design projects to faculty, family, industry representatives, and peers. It helps students develop practical, hands-on skills and teaches them how to succeed in an integrated, interdisciplinary engineering design environment.

When can I see CSU BME students in action?
We invite you to join us for E-Days on Thursday, April 12, 2018. This event will take place in the Lory Student Center on the CSU campus in Fort Collins. We promise you will be captivated by the College of Engineering award-winning student design projects. For more information, contact Ellen Brennan-Pierce, 970.491.5046 or Ellen.Brennan-Pierce@colostate.edu.
Small Teams
Students work in interdisciplinary teams of 3-6 individuals on an open-ended BME design project, from problem definition to design to prototype(s) to validation.

Multidisciplinary Design Teams
Biomedical engineering senior design teams consist of students from at least two of BME’s three partner programs: chemical and biological, electrical, or mechanical.

Industry Experience
Over 45% of fifth-year BME students at Colorado State have had engineering industry internship experience. This experience reinforces important skills learned in labs and classrooms: valuable critical thinking skills, strong communication skills, and essential interpersonal skills needed to work effectively with others.

Long Hours
Each student is expected to work 12-15 hours per week for their capstone design class. This time includes preparing reports and presentations about the project and a few smaller assignments.

Weekly Advisor Meeting
Students are strongly encouraged to meet with their project advisor weekly or at least have a phone meeting and meet in person monthly.

Are you looking to find support for the design, modification, or development of a new product, process, testing apparatus, or system? If so, we can help!

By participating as a corporate senior design sponsor, companies are expected to make a financial contribution toward project materials and overall operations of senior design. Corporate sponsors can protect their company’s intellectual property in the work done by students. All students engaged in company-sponsored projects will sign intellectual property (IP) and non-disclosure agreements (NDA).

Your participation will produce a valuable return on investment in the following ways:

Obtain Solutions
Utilize young, vibrant minds to help your organization explore concepts that may be difficult to achieve in-house due to personnel constraints or time.

Identify Potential Hires
By working closely with our senior design teams, you will have recruiting exposure to our graduating engineers.

Build Relationships with Innovators
The School of Biomedical Engineering is proud to boast a high percentage of faculty innovators. Twenty-two percent of inventions disclosed to CSU Ventures, the technology transfer office for the University, are created by SBME faculty. By participating as a corporate sponsor, you will have access to these brilliant minds, which may provide benefits in research and/or consulting in the future.

Increase Visibility
Gain campus exposure; increase your brand recognition and reach students.

Receive Tax Deduction
All corporate senior design investments are tax-deductible if your company chooses to provide funds through a donation. Please check your company’s policies on donations compared to purchase orders in consideration of intellectual property.

Senior Design Sponsorship Opportunities

Biomedical Engineering
Student Team Facts

<table>
<thead>
<tr>
<th>Percentage of Students with Research Lab and Industry Internship Experience</th>
<th>SM15</th>
</tr>
</thead>
<tbody>
<tr>
<td>engineering industry internships</td>
<td>15%</td>
</tr>
<tr>
<td>research lab internships</td>
<td>5%</td>
</tr>
</tbody>
</table>

3 Colorado State University School of Biomedical Engineering
The capstone senior design program promotes student development of highly marketable skills:

**Problem Solving**  
Students get exposure to real engineering problems as they work on meeting a practical industrial need and creating a final design, prototype, testing and validation in an environment similar to that of industry professionals.

**Professionalism and Perspective**  
Interacting with industry representatives on a regular basis gives students an opportunity to gain the competencies which the business community requires.

**Communication**  
As students conduct their team-oriented capstone project, they hone important communication skills through interaction with industry clients, team members, Colorado State faculty and staff, and vendors.

**New Technology**  
Students are exposed to new technology used in the workplace and are encouraged to explore new design tools and lab resources.

**Teamwork**  
Working with a multidisciplinary team, students learn critical interpersonal skills necessary to achieve a shared goal through respectful interaction, coordination, and collaborative problem solving. Precise understanding is essential when working in groups. Students are quick to familiarize themselves with the technical terminology used among various engineering disciplines.

**Problem Analysis**  
Students gain critical thinking skills while working in multidisciplinary teams to facilitate project completion.

---

**How it Works**

Senior design begins in the fall semester (August) and concludes in the spring semester (April) at Engineering Days (E-Days).

Proposed projects will be evaluated for acceptance based on a number of criteria including, but not limited to anticipated learning objectives, resources (internal expertise & supplies), and cost barriers.

Corporate project advisors must review the Project Plan Report (due in mid-October) and give each student on the team a score at the end of each semester.

Projects should have clear goals for design, prototyping, and testing that are achievable within one academic year. These goals can be part of a larger project that would continue with a new team the following year(s).

**Current and Past Senior Design Projects**

- Hemocompatibility Flow Chamber
- Bone Matrix Airbrushing
- Fourier Ptychographic Imaging
- Sperm Capacitation
- Paper-Based Microfluidic Device for Global Health
- Robotic Force Controlled Testing System for Spine Constructs
- Canine Exoskeleton
- Dermal Regeneration Template
- Training Laparoscope
- Improved Serum Product for Cell Culture
- Blood Flow and Cell Sedimentation Simulations
- Correlating Gait Analysis to Healing Progression
- Wheelchair Gait Analysis to Healing Progression
- Temporary Transcatheter Aortic Valve
- ChemSense (sensory substitution technology for people with hearing loss)
- Comparison of Conventional and Helical Shaped Arterial Stent Designs Using Computational Fluid Dynamics
- Amperometric Microfluidic Device with Incorporated Tissue Slice for Personalized Cancer Treatment
YES! Let’s start a conversation.
We are interested in pursuing a senior design project.

Please print.

<table>
<thead>
<tr>
<th>Company Name (as it should appear in materials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailing Address</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>Contact (First name, Last Name)</td>
</tr>
<tr>
<td>Telephone Number</td>
</tr>
<tr>
<td>Email Address</td>
</tr>
</tbody>
</table>

Complete and return this form to Ellen Brennan-Pierce, College of Engineering, Colorado State University, 1376 Campus Delivery, Fort Collins, CO 80523-1376. Or, place the information above in an email and send it to Ellen.Brennan-Pierce@colostate.edu.

Questions? Contact Ellen at 970.491.5046.

Thank you for considering sponsorship.