

Renewal Document – CSU BMES

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Jacqueline Oswald	Treasurer	jacqueline.oswald@colostate.edu
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Raylee Senn	Outreach Director	Raylee.senn@colostate.edu
Mya Lewis	Communications Director	Mya.lewis@colostate.edu
Anisha Kalla	Engineering College Council (ECC) Representative	Anisha.kalla@colostate.edu
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Chapter Website: <https://www.engr.colostate.edu/organizations/bmes/>

Free Membership Renewal Information

Membership Type	Email	Name	University	Graduation Year	Gender	Ethnicity
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Renewal	Mya.lewis@colostate.edu	Mya Lewis	Colorado State University	2027	W	White-Asian



Colorado State University

BMES

BIOMEDICAL
ENGINEERING
SOCIETY

Colorado State University Biomedical Engineering Society 2023-2024 Chapter Development Report

Corresponding Authors

The 2022-2023 Executive Team (bmes@colostate.edu):

Ian Lohrisch, Carter Giles, Jacqueline Oswald, Eric Gutierrez Camacho, Raylee Senn, Anisha Kalla, Mya Lewis

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Executive Summary

The student chapter of BMES at Colorado State University (CSU BMES) is dedicated to promoting social engagement, professional development, and community outreach among biomedical engineering students. The chapter intends to provide students with enriching experiences that allow them to grow in areas outside of their academics. Additionally, the chapter strives to promote biomedical engineering within the CSU and the local community. Throughout the 2023-2024 academic year, the executive team has worked hard to organize and host multiple events a week. These events served the purpose of bringing members together, but also created a thriving environment that facilitated social interaction, professional development, and volunteer work. Members were able to connect with many industry professionals from across the country to receive networking and career advice during a number of professional panels and industry spotlights. The CSU BMES chapter also continued a successful in-person outreach program, this time with low-income middle and high schools in northern Colorado. In the past two years, CSU BMES has additionally taken on a new project named CASE (Controls and Steering Engineering). This project consists of a strong leadership team as well as a great group of members who volunteer to design, prototype, and test a steering and controls system for a student here at CSU born without arms. Throughout the course of the academic year, the CASE team implemented their designs into a donated car proving their engineering excellence and dedication to this community-based project.

To Whom It May Concern,

I am thrilled to extend my enthusiastic support for the Biomedical Engineering Society (BMES) student chapter at Colorado State University. Over the past year, this chapter has not only maintained but **significantly expanded** its scope of influence and engagement within and beyond our community.

Remarkably, the chapter has organized more events this year than any other CSU BMES chapter historically. These activities have fostered strong relationships with industry leaders, culminating in valuable sponsorships, company tours, and professional spotlights. One of the year's highlights was our first ever BioInnovate Career Expo, which attracted 12 major companies and over 150 students, showcasing our chapter's commitment to bridging the gap between academic training and industry needs.

In addition to industry engagement, our outreach program has profoundly impacted the local community by introducing 65 underprivileged children to the principles of engineering, thereby inspiring the next generation of innovators.

The student's participation in the CASE project—Controls and Steering Engineering—has been particularly noteworthy. Briefly, the students have been working on developing an assistive driving system for a student at CSU with no arms. This includes designing, prototyping, and building a mechanical foot-steering system as well as an electronic control panel which enables accessible turn signals, blinker use, and other vital electronics that one needs to drive safely. Last year marked the start of this project and V1, which consisted of testing, developing, and integrating the initial design into a race simulator. This year with V2, the team has continued to advance their design and have begun the process of incorporating their work into an actual vehicle!

Furthermore, the chapter's presence at the National Conference in Seattle this fall has significantly enhanced their visibility and connections within the biomedical engineering community nationwide.

I cannot overstate the positive influence and the dynamic energy that the BMES student chapter brings to our university and the broader engineering community. I strongly advocate for continued support and recognition of their efforts, which clearly demonstrate their exceptional dedication and impact.

Please feel free to contact me if you require any further information or discussion regarding the outstanding contributions of our BMES student chapter.

Samuel Bechara, PhD

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I. Administrative Report

A. Abstract

Following the 2023-2024 administrative term, CSU BMES will continue with the same positions and structure of the executive team with some added flexibility to ensure team members are adequately supported in their work. These roles have proven to be successful in managing the organization, each with notable responsibilities that ensure that the organization is run smoothly. As we move into the next administrative term, all positions will remain, but with a transfer of officers. Elections were held in April to determine the administrative team for 2023-2024. Members and attendees voted democratically resulting in a competitive and diverse new set of leaders. Due to more work centered around CSU BMES's Project CASE, we've recruited some members interested in an administrative/managerial role to ensure the project is on track and members are consistently involved. Additionally, with aspirations of beginning a mentorship program, additional effort will be directed as needed. Support roles will be utilized to alleviate workloads from officer positions and to increase the reach and scope of BMES at CSU. CSU BMES's administrative team works hard to plan, organize, and execute industry, outreach, and CASE events, to name a few. Intra-organizational communication is primarily done through Microsoft Teams and weekly officer meetings to ensure that each member of the leadership team has enough direction and support to fulfill their duties and obligations. All file sharing and collective note taking is done through Microsoft OneDrive. Communication to advertise events to prospective students and members is done through LinkedIn, Facebook, and Instagram.

B. Chapter Officer Information

The executive positions for the 2022-2023 semester, the associated officer, and their responsibilities are outlined below.

Position Held	Name	Email
President	Ian Lohrisch	ian.lohrisch@colostate.edu
Vice President	Carter Giles	Carter.giles@colostate.edu
Treasurer	Jacqueline Oswald	Jacqueline.oswald@colostate.edu
Outreach Director	Raylee Senn	Raylee.senn@colostate.edu
Industry Director	Eric Gutierrez-Camacho	ericgc@colostate.edu
Communications Director	Mya Lewis	Mya.lewis@colostate.edu
Engineering College Council (ECC) Representative	Anisha Kalla	anisha.kalla@colostate.edu

President: The President is responsible for organizing and driving both officer and general meetings. The President is responsible for overseeing all events, unless otherwise delegated, to ensure the events run smoothly and to represent the face of the organization. The President is to prepare and manage a semester plan/calendar. The President is responsible for coordinating meetings with the faculty/staff advisors and ensuring that they are kept up to date with what is going on within the student organization.

Vice President: The Vice President (VP) is responsible for running meetings when the President is absent. The VP is responsible for completing and submitting paperwork required for events unless otherwise delegated. The VP takes the important duty of overseeing interactions with the School of Biomedical Engineering, the College of Engineering, and Colorado State University including completing room reservations and maintaining connections with professors and faculty.

The VP is to coordinate yearly or biyearly t-shirt ordering and distribution of chapter t-shirts with the Treasurer. The VP is responsible for communication with the national level Biomedical Engineering Society and ensuring that members have a national membership. The VP is to maintain the online calendar and OneDrive for file storage as well as take notes during officer meetings.

Treasurer: The Treasurer is responsible for collecting dues and managing the financial accounts for the organization. At the beginning of the Treasurer's term, they will transfer the off-campus bank account information into their name. The Treasurer will oversee purchases made for events, and documentation of all financial information. The Treasurer is also in charge of any budgets that need be made, including but not limited to the full semester/year budget, gain/loss budgets, and budget proposals. The Treasurer will also oversee the budget made for traveling to the BMES National Conference, if it so applies. The Treasurer is responsible for seeking further sponsorship from the school and private sponsors and organizing fund-raising activities such as Landmark Event Staffing and RamRide. The Treasurer is to work with the ECC rep on biannual funding presentation made to ECC.

Outreach Director: The Outreach Director is ideally a graduate student and acts as a graduate student liaison. The Outreach Director oversees long-term design projects and proposals and coordinates with the Treasurer on any project needs related to expenditures, grants, etc. This position is responsible for overseeing volunteering activities such as Fall Clean-up and RamRide. The Outreach Director is to oversee outreach activities such as BioMed Bootcamp.

Industry Director: The Industry Director is responsible for coordinating events related to industry and works with the President and Vice-President in coordination of larger-scale events such as Biotech Connect. The Industry Director will work in conjunction with the Treasurer to organize any financial donations the organization receives. The Industry Director is in charge of contacting presenters/speakers from industry or outside businesses, scheduling the events that involve outside individuals, and maintaining contact with these individuals so significant bonds may be formed and kept between the organization and these individuals with the purpose of being able to contact them again in the future for any prospective events.

Communications Director: The Communications Director takes a key role in acting as the voice of the student member. This includes conducting quarterly surveys of general members' satisfaction with the organization and gauging student interest on current events, prospective events, and new event ideas. The Communications Director is responsible for maintaining communications for the organization. This includes updating the social media accounts and sending weekly emails to all active members including general meeting information. The Communications Director is to communicate events to the CSU student body (non-members) as appropriate and provide general meeting slides and any other relevant information to members.

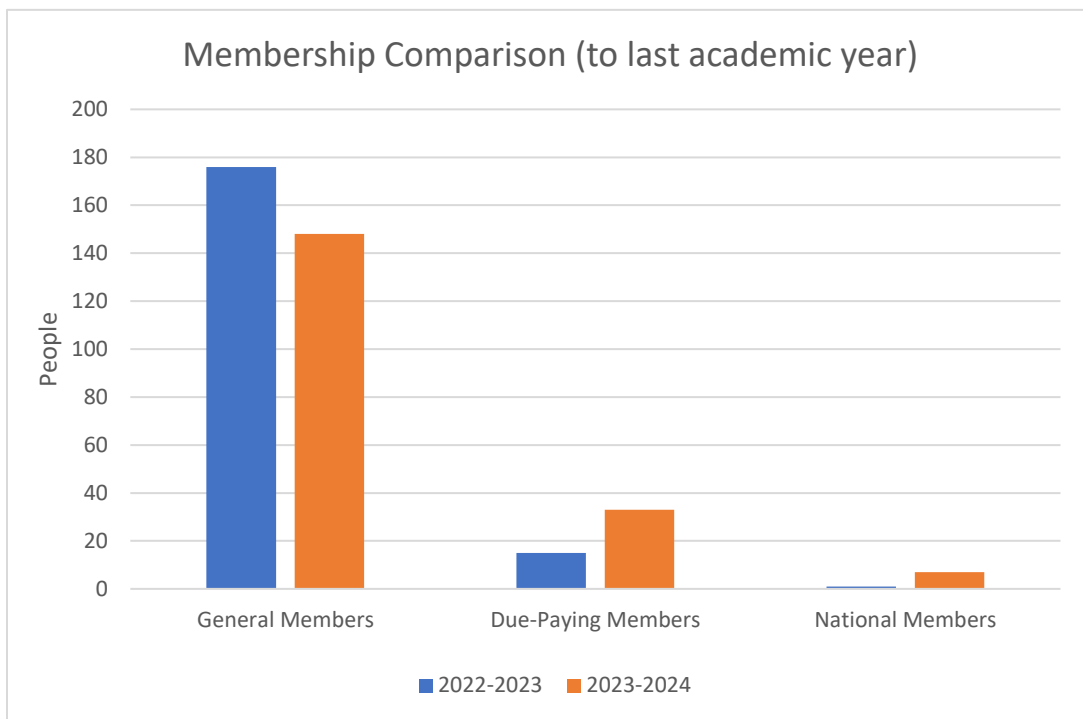
Engineering Student Council (ECC) Representative: The Engineering College Council Representative is the connecting voice between the ECC and the organization. The ECC representative will speak during

ECC meetings on behalf of the organization and will relay information after ECC meetings. The ECC representative will oversee the biannual funding presentation made to the ECC on behalf of the organization, with the purpose of obtaining funding from ECC for the organization’s events each semester.

C. Membership

CSU BMES has drastically increased membership over the past year. Our recruitment and marketing efforts as well as meaningful events have resulted in over 50% more due paying members and 7x increase in National Memberships. As seen below, even though there was a slight drop in participation the level of investment into BMES was greater for the participating members.

Year	General Members	Due-Paying Members	National Members
2022-2023	176	15	1
2023-2024	148	33	7



In addition to increased membership, CSU BMES also saw a significant increase in the number of followers on social media platforms. According to Instagram analytics, over the course of the last 90 days, the official Instagram account for the student organization reached +425% more accounts compared to the 90 days prior, which was shortly after the beginning of the academic year. With 543 followers, this account is one of the main means of advertising for CSU BMES. Below are several posts made this year, averaging around 35-40 likes and over 200 accounts reached.

bmescsu ▾

158 posts 543 followers 168 following

CSU BMES
Biomedical Engineering Society - Student Chapter
Colorado State University in Fort Collins, CO
linktr.ee/bmescsu

Insights ⓘ

Last 90 Days ▾ Feb 1 - Apr 30

Overview

You reached **+425%** more accounts compared to Nov 3 - Jan 31

Accounts reached	2,360	+425%
Accounts engaged	138	+79.2%
Total followers	543	+5.8%



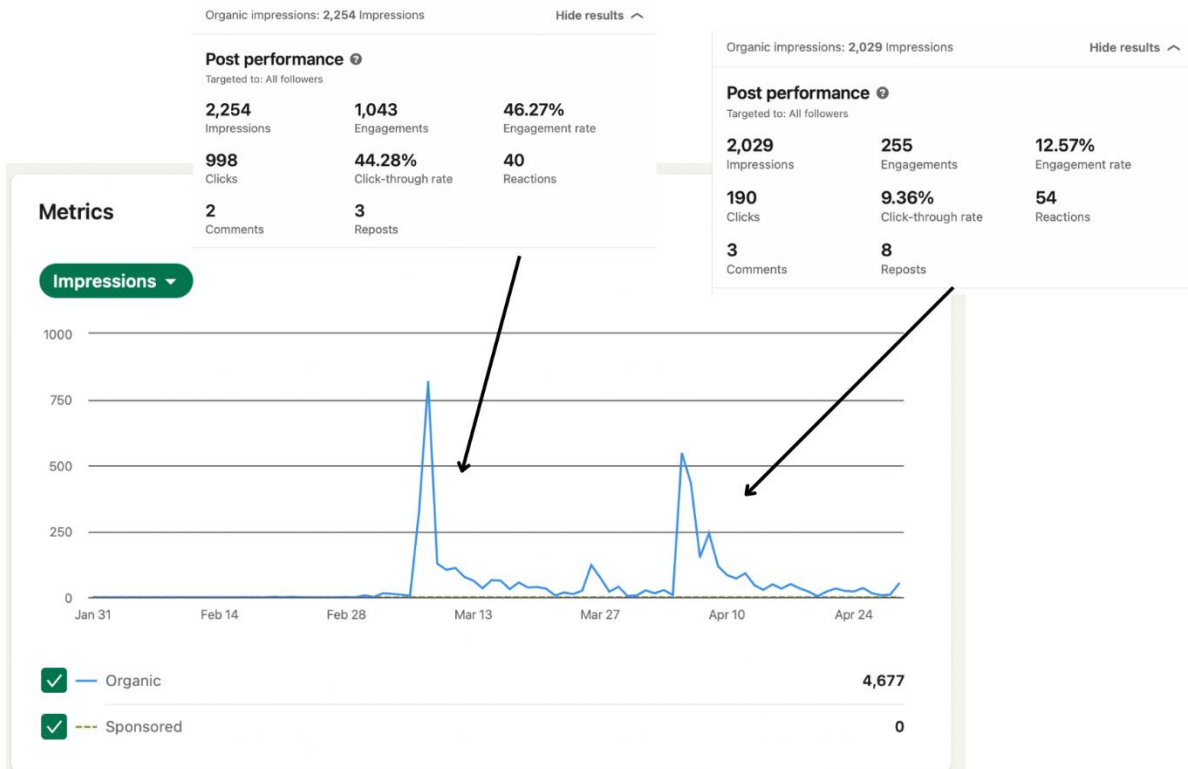
CSU BMES also established a strong presence on LinkedIn this second semester. Utilizing this platform has allowed the student organization to engage with not only students, but also university accounts and industry. Below is a graph of Impressions over the past couple months. The first spike can be attributed to a post related to CSU BMES CASE project. The second related to the announcement of the new officer team.



CSU Biomedical Engineering Society (BMES)

Fostering a biomedical engineering community via industry opportunities, outreach events, and project experience.

Professional Organizations · Fort Collins, Colorado · 204 followers · 11-50 employees



LinkedIn: <https://www.linkedin.com/company/csu-bmes/mycompany/?viewAsMember=true>

D. General Body Meetings

The 2023-2024 officer team worked hard to ensure existing and prospective members had opportunities to come to CSU BMES events regularly. The general body meetings held are outlined in the table below, excluding weekly executive meetings for the sake of brevity.

Semester	Date	Meeting Title	Meeting Type	
Fall 23	23-Aug	BMES Blastoff	General	
	24-Aug	CASE Kickoff	CASE	
	31-Aug	Outreach Kickoff	Outreach	
	5-Sep	CASE Meeting 2	CASE	
	7-Sep	Industry Spotlight- Medtronic	Industry	
	14-Sep	Photon Pharma	Industry	
	14-Sep	Outreach Meeting	Outreach	
	19-Sep	Case Meeting 3	CASE	
	21-Sep	Outreach Meeting	Outreach	
	28-Sep	BMES Bash	General	
	3-Oct	CASE Meeting 4	CASE	
	4-Oct	Outreach Meeting	Outreach	
	5-Oct	Deloitte Industry Spotlight	Industry	
	9-Oct	No Meetings (BMES National C	14-Oct	
	18-Oct	BioInnovate Resume Ready	Industry	
	19-Oct	Hyde Industry Spotlight	Industry	
	19-Oct	Outreach Meeting	Outreach	
	24-Oct	CASE Meeting	CASE	
	26-Oct	Outreach Meeting	Outreach	
	2-Nov	BioInnovate Career Expo	Industry	
	7-Nov	Medtronic Tours	Industry	
	10-Nov	Navigating the Transfer Process	General	
	12-Nov	Fall Outreach Event	Outreach	
4-Dec	BMES Bonanza	General		

Semester	Date	Meeting Title	Meeting Type	
Spring 24	24-Jan	Outreach Kickoff	Outreach	
	25-Jan	Professional Development WS	General	
	29-Jan	CASE Kickoff	CASE	
	7-Feb	3D Systems Tour	Industry	
	7-Feb	Outreach Meeting	Outreach	
	8-Feb	Steering team Dissection	CASE	
	13-Feb	Click Medical IS	Industry	
	15-Feb	Controls team Dissection	CASE	
	21-Feb	Outreach Meeting	Outreach	
	29-Feb	BioMed Boost	Industry	
	29-Feb	CASE Meeting	CASE	
	6-Mar	Investments 101- Canvas	General	
	6-Mar	Outreach Meeting	Outreach	
	7-Mar	Quorum Prosthetics IS	Industry	
	Spring Break			
	20-Mar	Stryker Tour	Industry	
	20-Mar	Outreach Meeting	Outreach	
	21-Mar	CASE Meeting	CASE	
	26-Mar	CCH Gait Lab IS	Industry	
	27-Mar	Pre-Elections Social	General	
	2-Apr	Beckmann Coulter IS	Industry	
	3-Apr	Outreach Meeting	Outreach	
	4-Apr	Officer Elections	General	
	10-Apr	Stryker Tour 2	Industry	
	11-Apr	CASE Whole team Meeting	CASE	
	17-Apr	Outreach Meeting	Outreach	
	24-Apr	Greely Outreach Event	Outreach	
25-Apr	CASE Meeting	CASE		
30-Apr	End of Semester Social	General		

E. Executive Meetings

Officer meetings were held weekly and allowed the officer team to come together to schedule and plan future meetings for the members and discuss other significant items. In previous leadership teams, a highly structured document was used. To make the officer meetings more collaborative and engaging, each officer was assigned a slide where they could give updates, ask questions, and take notes. This shift towards a more interactive format encouraged participation and allowed for a more dynamic exchange of ideas and insights among team members. An example of a meeting slideshow is below.

The figure shows a 2x5 grid of 10 numbered slides from a meeting slideshow. Each slide contains text, images, and lists of items. The slides are numbered 1 through 10 in the bottom left corner of each slide frame.

Figure 1: Example officer meeting slideshow.

II. Treasury Report

For the 2023-2024 academic year, the CSU BMES treasurer along with the officer team reviewed and allocated funds at each of the weekly officer meetings. The generated funds are typically put towards T-shirts for dues-paying members and the officer team, food if the meetings are held in-person, any costs associated with running the CSU BMES Outreach Program, costs with the CASE project, and any miscellaneous costs covering a multitude of small charges. This year, however, T-Shirts were not purchased to allow funding for more pertinent and impactful activities and events.

A. Expenses

The 2023-2024 school year required funding for:

1. Outreach Program Costs (\$900.00)
2. CASE Project Costs (\$1,233.00)
3. Food (\$542.00)
4. National BMES Conference (\$4,849.50)
5. Miscellaneous (\$75.00)

Total: \$7599.50

B. Funding

Fundraising is generally attained through proposals to the CSU Engineering College Council (ECC), corporate sponsorships, various volunteering events on campus, and voluntary membership dues. In the 2023-2024 school year, the sources of funding included:

1. Membership Dues (\$290.00)
2. SBME Travel Allocation Grant (\$1500.00)
3. SBME Good Faith Funding (\$2900)
4. BMES National Conference Award (\$1000.00)
5. CSU Engineering Business Office Grant (\$1200.00)
6. ASCSU Event Grant (\$2505)
7. Industry Sponsorships (\$0.00)
8. CSU ECC (\$600.00)

Total: \$9995.00

C. Balance Sheet

CSU BMES 2023-2024 Accounts Balances					
Account Name	FNBO & Venmo	EBO	SBME	SOFA	Totals
Starting Balance	\$62.76	\$1713.43	\$3000.00	\$196.49	\$4972.68
Current Balance	\$1703.96	\$997.24	\$1224.92	\$92.00	\$4018.12

III. Chapter Activities

The activities that CSU BMES hosted provided members the opportunity to work on their professional development, meet others, and contribute to meaningful community outreach projects, among other things.

A. Social or Other Activities

The social events were held throughout the semester to create a safe, stress-free environment for our Biomedical Engineering students and to connect them to the CSU BMES chapter. Students attended welcome events, celebrations, and officer elections. This allowed for stronger growth of the community of members and officers within CSU BMES.

- Welcome Events:** Every year, the chapter holds an introductory welcome event in which the BMES officers introduce themselves to new interested students, explain how the organization is run, and allow new members to connect with officers and current members. In the Fall of 2023, our leadership hosted the introductory event 'BMES Blastoff' which served as a social connecting with students and members. Treats were served, games were played, and everyone had the opportunity to get to know each other.

Event Title	Event Date/Time	Attendance
BMES Blastoff	5:00 – 6:00PM, 8/23/23	25



Figure 4: BMES Blastoff (1 of 2)



Figure 3: BMES Blastoff (2 of 2)



Figure 2: BMES Blastoff Flyer

- II. **BMES Elections:** Every Spring, officer elections are held for the following academic year. Candidates present speeches, and students vote anonymously for a President, Vice President, Treasurer, Industry Director, Outreach Director, Communications Director, and Engineering College Council representative.

Event Title	Event Date/Time	Attendance
BMES Officer Elections	5:00-6:00 PM, 4/4/24	20 BME attendees



Figure 5: Elected 2024-2025 Officer Team



Figure 6: 2023-2024 with 2024-2025 Officer Team

- III. **End of the Year Events:** At the end of each semester, the chapter holds a final social event to celebrate the hard work of the members and to relax before the year ends. This is a time of joy and festivity for all. In the Fall 2022 semester, students reflected on the semester and celebrated with food. In the Spring 2024 semester, students had their final CASE meeting to reflect and socialize.

Event Title	Event Date/Time	Attendance
End of Semester Social	6:00-7:00 PM, 4/30/24 In person	15 BME attendees
End of Semester Social and CASE Review	5:00-6:00 PM, 4/25/24 In person	20 BME attendees



Figure 8: End of Year Social Flyer



Figure 7: End of Year Social

B. Outreach Activities



Colorado State University
BMES
BIOMEDICAL
ENGINEERING
SOCIETY
OUTREACH PROGRAM

Fall Semester – 2023

For multiple years, since the creation of BioMed Bootcamp, the CSU student chapter of BMES has advertised a major event throughout semesters and hosted said event on campus at the end of each semester. For the Fall 2023 event, this format was used. The Outreach Director created a flyer advertised to K-12 students, and this flyer was posted on Facebook Message Boards, dispersed among Fort Collins school districts and public libraries, and to other outreach organizations in Colorado State. On the day of the event, Saturday, November 11, 2023, there were 20 students. The Fall 2023 outreach event was composed of three activities. Each activity was associated with one of the primary pairing engineering majors here at CSU (mechanical engineering, electrical engineering, and chemical engineering). While each activity had different engineering focuses we made sure all activities were centered around biomedical engineering. The overall goal of the event was to provide students with a general overview of various applications of biomedical engineering and give them tools to allow them to independently continue exploring engineering. More information about each activity can be found below.

Mechanical Engineering Activity

This year for the Mechanical Engineering activity each student received a set of customized 3D printed bones (humerus, radius, and ulna), two rubber bands, and three bungee ropes. After giving the students a general overview of human arm anatomy and force dynamics of the human body the students began following the guided instructions to assemble the 3D model. The aim of this activity was to give students a greater understanding of the mechanical principles in relation to human body.

Electrical Engineering Activity

For the electrical engineering activity each student received a 3D printed neuron and small breadboard kit to follow along with each activity. To start, the electrical team gave a lesson on the basics of electricity, where very basic level equations and diagrams were shared. Then the lesson transitioned into the biomedical side of electrical engineering with a focus on neurons in the human body (why each student received a 3D printed neuron model). Then at the back half of the lesson students were tasked with replicating basic breadboard circuits. Through this activity the students learned about the basic principles of electricity and its role in the human nervous system.

Chemical Engineering Activity

The chemical engineering activity had a focus on DNA this year. The lesson focused on engineering in relation to DNA and CRISPR technologies. Once the students had the opportunity to ask questions we then transitioned to the activity. The chemical engineering activity was a strawberry DNA extraction. The resulting DNA was capped and put on a necklace for all of the students to keep. This activity aimed to give students a understanding of DNA in human beings and the mechanisms of which we can extract DNA.



Figure 9: Fall 2023 Outreach Program (1 of 3)



Figure 10: Fall 2023 Outreach Program (2 of 3)



Figure 11: Fall 2023 Outreach Program (3 of 3)

Spring Semester – 2024

For the following Spring semester, a different outreach program continued and iterated upon from last year. The Outreach Director contacted K-12 educators as an invitation for a collaboration at their schools. Research was done in order to identify low-income schools in the Front Range area that would benefit from a BMES Outreach Program. According to Kids Count Data Center, the Greeley and Evans School District had 63% of students enrolled in Free and Reduced Lunch Programs in 2021.

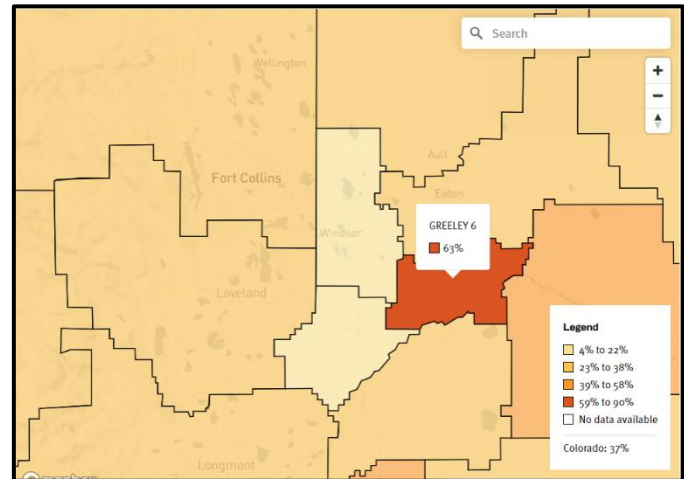


Figure 12: Free and Reduced Lunch NoCo Map

After contacting every high/middle school math and science educator in that school district, Greeley Central High School, Franklin Middle School, and Kinard Middle School helped us to establish events with their students. Over **130 students** were directly impacted. Two activities were established for the Spring.



Figure 13: Spring Outreach Program (1 of 2)

This year the spring semester outreach event focused on electrical engineering. This outreach event covered the same topics as the electrical engineering activity from the fall semester, except our

team went more in depth to the concepts of electrical engineering to match the knowledge level of high school students.



Figure 14: Spring Outreach Program (2 of 2)

C. Industry and Professional Development Activities

Throughout the academic year, numerous events and activities were organized by the Industry Director that focused specifically on improving the connection between BMES members at CSU and surrounding biomedical companies in the area. A diverse set of event types ranging from in-person facility tours to on-campus company spotlights were chosen to give members the opportunity to learn about the industry workforce first-hand. One of the most common event types was our **Industry Spotlight Events**, where a reputable speaker from a company in biotechnology gave a presentation on their unique career and the work that their company does.



Figure 1515: Medtronic Industry Spotlight with guest Engineering Director, Christian Lee and Engineering Manager, Michelle Fylak.

Some speakers focused heavily on advice for young professionals, such as leveraging LinkedIn for networking and communication while others went in depth on the technical engineering work that they've accomplished.



Figure 1616: Quorum Prosthetics Industry Spotlight with guest Engineers Sean McClure, Alex Koenigsberg, and Jack Fleischmann.

Various hosted companies were prospecting for new interns and full-time hires, and every event provided students the chance to meet directly with hiring managers, executive engineers, and CSU alumni. This gave BMES members from CSU a significantly greater chance of obtaining an internship or job opportunity.

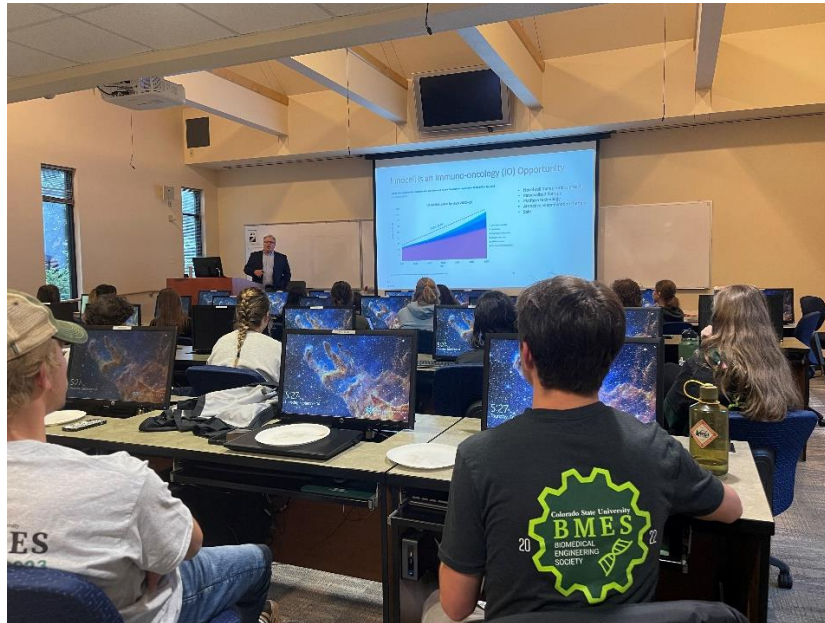


Figure 1717: Photon Pharma Industry Spotlight, with guest Ph.D. and Co-Founder, Raymond Goodrich.

Industry Tours contributed to the portfolio of professional development events in both semesters. Transportation was provided for students, completely free-of-charge, to allow maximum accessibility for all BMES members.



Figure 1818: BMES members of CSU touring Medtronic's cleanroom within their facility in Boulder, CO.

This academic year had an emphasis to promote more Industry Tours to allow students to witness the resources and technology that industry engineers interact with daily. We believe that these events allowed undergraduate students to gain a better understanding of what they are working towards and gave graduate students the opportunity to directly connect with engineers on-site for potential employment opportunities.



Figure 1919: BMES members of CSU attending Stryker's Industry Days Event. Students operating surgical instruments on a cadaver.

Additionally, our Industry Director organized **Professional Development Workshops** that allowed students to polish their soft skills and supplemental material when venturing for internships and job opportunities. These events were held in collaboration with CSU's Career Center and some industry companies. One major professional development event consisted of BiomedBoost, a mock interview and resume rush event that gave members practice with our guest engineers from the CSU School of Biomedical Engineering Industry Advisory Board.

This was especially useful as students joined us for our flagship industry event of the year, **the BioInnovate Career Expo**, formally known as BioTech Connect. The Industry Director reached out to various biomedical engineering companies and laboratories in Colorado to secure a total of 10 corporations and laboratories. This event served as a platform for biomedical engineering students and companies to network and connect. Students spoke independently with hiring managers, talent acquisition, and engineers of all backgrounds within the biomedical engineering industry to discover unique opportunities that companies had to offer.



Figure 2020: Birdseye view of the 2023 BMES BioInnovate Career Expo.

This event was hosted in close collaboration with CSU's School of Biomedical Engineering and the CSU Career Center. The BMES Student Chapter of CSU anticipates making this a yearly recurring event, with the 2024 BioInnovate Career Expo already in development.



Figure 2121: BMES executive member, Raylee Senn, networking with UHealth Medical Group.

D. Hosted Events

In the Fall of 2023, the CSU BMES hosted events were as follows:

Date	Event Type/Name	Company	Speaker(s)	Attendance
Thu, Sep 7	Industry Spotlight	Medtronic	Christian Lee, Michelle Fylak	42
Thu, Sep 14	Industry Spotlight	Photon Pharma	Raymond Goodrich	22
Thu, Oct 19	Industry Spotlight	Hyde Engineering + Consulting	Teagan Walsh	8
Thu, Nov 2	2023 BioInnovate Career Expo	<ul style="list-style-type: none"> - 3D Systems - Tensentric - UHealth Medical Group - CONMED - Medtronic - Orthopaedic Bioengineerin g Research Laboratory - Hyde E+C - Terumo BCE 	Dr. Stuart Tobet, Dr. Samuel Bechara, Ian Lohrisch, Eric Gutierrez- Camacho	164

		<ul style="list-style-type: none"> - Tolmar - Children's Hospital Colorado 		
Tue, Nov 7	Industry Tour	Medtronic	Michelle Fylak	10

The events for the Spring of 2024 were as follows:

Date	Event Type/Name	Company	Speaker(s)	Attendance
Thu, Jan 25	Professional Development Workshop	CSU School of Biomedical Engineering, CSU Career Center	Brett Beal, Fabiola Pascual Luna	18
Wed, Feb 7	Industry Tour	3D Systems	Marty Palinic	12
Tue, Feb 13	Industry Spotlight	Click Medical	Jimmy Capra	14
Thu, Feb 29	BiomedBoost – Mock Interview and Resume Rush	Samson Design, CSU Career Center	Jeff Samson, Fabiola Pascual Luna	11
Thu, Mar 7	Industry Spotlight	Quorum Prosthetics	Sean McClure, Alex Koenigsburg, Jack Fleischmann	10
Wed, Mar 20	Industry Days External Event	Stryker	Meaghan Wheeler, C. Denisho Coleman	8
Tue, Mar 26	Industry Spotlight	Children's Hospital Colorado	Lucas Moore	13
Tue, Apr 7	Industry Spotlight	Beckman Coulter	Seth Flickinger, Emily Maverick	7
Wed, Apr 10	Industry Days External Event	Stryker	Meaghan Wheeler, C. Denisho Coleman	9

E. Industry Sponsorships

To raise funding that supports professional development meetings, community outreach events, and projects like CASE, the Industry Director of CSU BMES works with the President, Vice President, and Treasurer. The 2023-2024 Sponsorship Packet, below, outlines who BMES at CSU is and what we do. It also provides companies with the opportunity to contribute some amount of money to become a donor or sponsor of our student chapter. In this academic year, this packet allowed us to secure a sponsor, Hyde E+C, and the amount will be determined in the near future. In the upcoming academic year, changes to this informational packet will better reflect our work and quicker implementation and communication with companies will ensure increased funding.

A few pages, of many, included in our sponsorship packet are below:

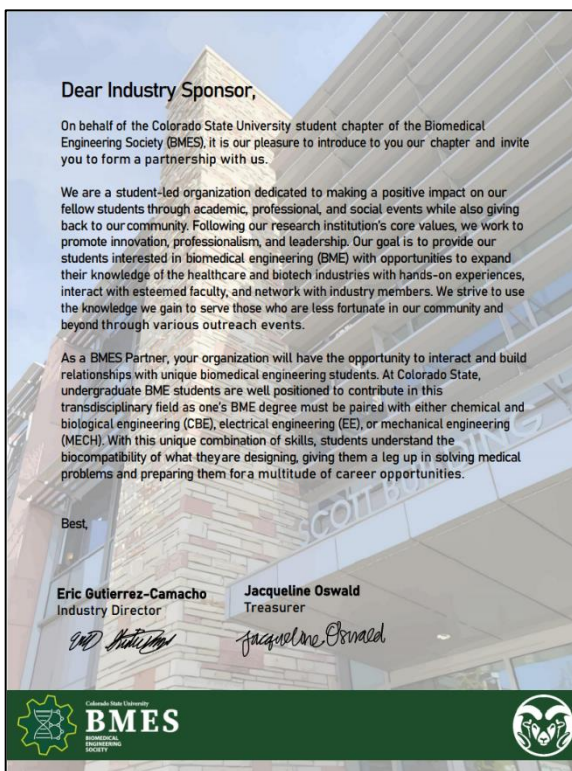


Figure 22: Sponsorship Packet (1 of 2)



Figure 23: Sponsorship Packet (2 of 2)



Figure 24: Hyde Engineering + Consulting

F. Societal Impact Activities



Project CASE (Controls and Steering Engineering)

Project CASE, initiated by CSU BMES in Fall 2022, continues to evolve and impact the community profoundly. This initiative began with the goal of creating a custom transportation system for John, a CSU student born without arms. The project's first major milestone was the development of a foot-operated racing simulator, completed in Spring 2023. This simulator enabled Jian to interact with a driving system tailored specifically to his needs, using only his feet. The success of the simulator, showcased at

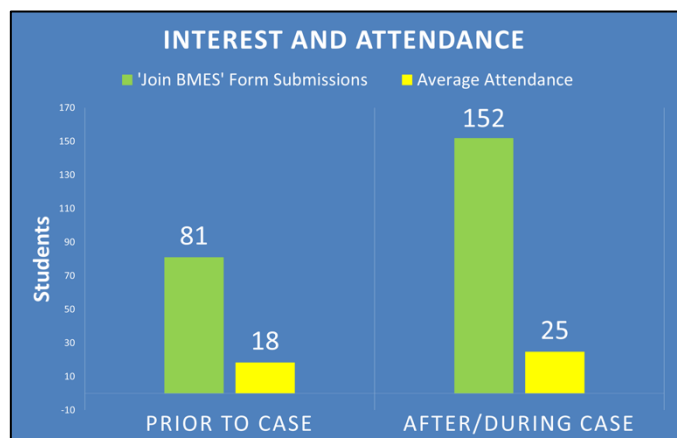
CSU's annual Engineering Days (E-Days), not only captured media attention but inspired local K-12 students and undergraduate students alike to impact the world in a positive way.

In Spring 2024, the project took a significant leap forward with the donation of a 2003 Subaru Baja. This vehicle was meticulously retrofitted with a mechanical steering linkage and an adaptive steering column control system designed to accommodate Jian's specific requirements. The controls were strategically placed to maximize accessibility for Jian, allowing him to operate the vehicle effectively using his residual limb. The success of the Baja, showcased at CSU's annual Engineering Days won CSU's "Best Program of the Year" at E-Days 2024.



Community Impact

The impact of Project CASE on our community has been substantial. It has provided Jian with greater independence and an opportunity to engage in driving, a pivotal aspect of personal mobility. Furthermore, Project CASE has served as a critical educational platform for our students. Under the guidance of project leaders and BMES leadership, approximately 20 students from



1st through 5th year have gained invaluable experience in project management, team building, and technical skills including CAD, sheet metal fabrication, and aluminum manufacturing.

These efforts have not only supported Jian’s journey towards independence but have also enriched the educational experience of all involved, fostering a nurturing environment focused on innovation and accessibility. Additionally, the project has opened doors for mentorship opportunities, allowing younger students to learn hands-on engineering and manufacturing from their more experienced peers.



Technical Advancements

In the 2003 Subaru Baja for Project CASE, several technical systems have been designed and installed to accommodate Jian, a student without arms, enabling him to drive safely and effectively. Here's a brief technical synopsis:

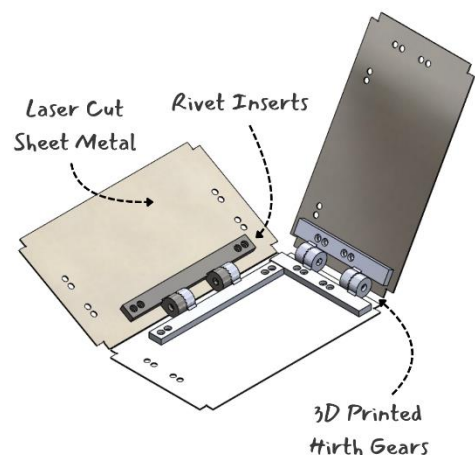
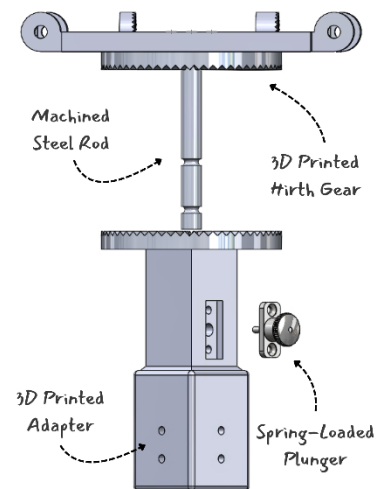
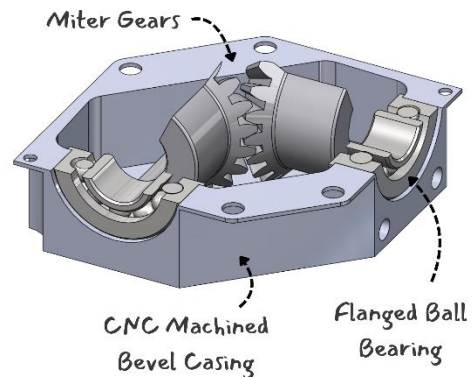
1. Foot-Operated Steering System: This system uses mechanical linkages to convert foot movements into steering commands. It is interfaced with the car's original rack and pinion steering system, located close to the power steering unit in the engine bay. The linkage includes 3/4" stainless steel shafts and universal joints (u-joints) leading from the foot steering wheel, situated to the left of the brake pedal, up to the steering column.

2. Gearbox Systems: Two custom designed CNC gearbox systems have been implemented:

- Foot Wheel to Steering Shaft: Transfers motion from the foot-operated wheel to the steering shaft.
- Foot Wheel Steering Shaft to Stock Steering Column: Connects the custom steering shaft to the car's stock steering column. Both systems employ miter gears to create a 90-degree angle between the shafts, mounted on flanged bearings to maintain optimal alignment and smooth operation.

3. Control Panel System: The control system features a large, modular panel with threaded inserts allowing for adjustable placement of controls. Hirth joints are used for precise angular adjustment, enhancing the ergonomics of the control interface. A spring-loaded plunger secures the panel's position, facilitating easy adjustments without requiring manual support.

4. Electrical System Enhancements: The electrical system has been upgraded with the Banana Pie Button integrated into the primary control system for functions like the horn. Future enhancements include additional Banana Pie Buttons for controlling hazard lights, wiper settings, and headlight adjustments. These systems are managed by an Arduino Mega, which also handles the automated deactivation of turn signals via a potentiometer attached to the steering mechanism.



These systems collectively aim to provide Jian with a driving experience that is both functional and tailored to his physical capabilities, focusing on safety, independence, and ease of use.



Future Direction

As we look to the future, Project CASE remains a cornerstone of BMES, symbolizing our commitment to hands-on engineering education with a focus on accessibility and user experience. The ongoing development of adaptive and user-friendly engineering solutions will continue to offer students a platform to showcase their skills and contribute to meaningful community projects. Our plan is to keep refining the technologies we've developed, expanding the project's scope to include more adaptive technologies and possibly other vehicles.

This year, we will continue to present our findings and the latest developments to faculty and industry representatives, gathering and implementing feedback to enhance the functionality and user-friendliness of our systems. Project CASE is set to be a lasting feature of BMES, providing ongoing opportunities for student development and making a tangible difference in the lives of individuals like Jian.



IV. National BMES Meeting

This academic year, the whole officer team had the privilege of attending the National BMES conference. This was made possible by the School of Biomedical Engineering at CSU, the Outstanding Industry award received last year from the 2022-2023 CDR submission, travel funding grants provided by the CSU student government, and the accepting of our abstract for the CASE project. We cannot thank everyone who had a part in getting the team to the Seattle conference enough.

The National BMES conference was an enlightening experience for all officers and after getting the chance to experience the conference the officer team has made a point to inform members of the valuable experiences that can be gained from attending the conference and promote active attendance in the national chapter, with the hope some members will be interested in joining the officer team at the next conference.



V. Future Direction

Goals Achieved

In the 2023-2024 academic year, CSU BMES achieved remarkable advancements across the entire organization. The club successfully introduced the innovative BioInnovate program and notably increased the number of Industry Spotlights and tours. Our Outreach efforts continued to thrive, actively engaging with the local community and extending our reach to schools in traditionally low-income areas. Furthermore, the CASE project saw significant progress in its technical design and substantially enhanced its impact within the community. Looking ahead, we have set ambitious goals for the coming year to bolster networking opportunities, enhance inclusivity, and initiate a mentorship program for underclassmen interested in leadership roles.

Reflecting on the previous 2022-2023 year, BMES made substantial progress toward our four main objectives: elevating engagement, expanding inter-chapter activities, incorporating research and social impact initiatives, and refining our outreach program. These accomplishments underscore our continuous commitment to growth and excellence within BMES, as we strive to set new benchmarks in all our endeavors.

Future Expectations

Leveraging insights from the past year, the executive team at CSU BMES has crafted an ambitious set of objectives for the 2024-2025 academic year:

Expanding Networking Opportunities

In response to the historical challenge of attracting Biomedical Engineering companies to CSU career fairs, BMES pioneered the BioInnovate career fair. This event became CSU's largest biotech industry gathering, drawing over 10 companies last year. Building on this success, plans are underway to scale up the event, offering more space and inviting more companies. Additionally, the executive team aims to enrich development opportunities for students, preparing them for the job market and maximizing attendance at industry spotlights throughout the year.

Enhancing Societal Impact

The CASE project, now a hallmark of CSU BMES, continues into its second year with new leadership transitioning to sustain its momentum. This year, the focus will be on refining the integrated system in the donated 2003 Subaru Baja to ensure it is more adaptable and easier for patients to use. Additionally, upperclassmen will have the opportunity to earn academic credit for their contributions, with underclassmen shadowing them to ensure continuity and skill transfer.

Boosting Inter-Chapter Activities

Continuing collaborations with BMES chapters at CU Boulder and CU Anschutz, we have reciprocally participated in career fairs, enhancing our statewide network. This year, we plan to either host or participate in a major BMES event in Colorado, focusing on outreach to lower-income communities or improving connections between students and internship opportunities.

Advancing Outreach Initiatives

Our outreach efforts have already achieved notable success, receiving positive feedback from high school and middle school events. This year, the focus will shift to organizing major events each semester, potentially collaborating with tech companies in Fort Collins to develop and distribute educational kits that provide practical engineering experiences.

Deepening Connections with Underclassmen

To counter the observed decline in underclassmen engagement as the year progresses, a new mentorship program will be introduced. This program will pair upperclassmen with one or two underclassmen, fostering regular, personalized interactions and task-based learning experiences. The program aims to provide a structured yet flexible environment for all club members, promoting active participation and skill development across all levels.