# The Biomedical Engineering Society
Student Chapter of
## University of California, San Diego

# 2019-2020 Chapter Development Report

**Corresponding Author**
Daibo Zhang
Vice President Internal, UCSD BMES Chapter
daz045@ucsd.edu

## Executive Summary

The UC San Diego chapter of the Biomedical Engineering Society continues to represent the vibrant and diverse bioengineering community of the university and San Diego at large. We aim to provide resources for all undergraduate students who are interested in bioengineering, regardless of their background. With that, we have since established ourselves as one of the most prominent pre-professional organizations at UC San Diego. Under the leadership of our twenty-member officer board, the chapter engages in various activities spanning event planning, professional and technical development, community outreach, social, and mentorship. Our programs bring undergraduate students having different academic backgrounds and professional aspirations together with professors, researchers, local bioengineering industry representatives, science advocators, department administrators, and so on.

Privileged to a well-establish organization and a talented, passionate member base, we were fortunately able to shift our primary focus from merely growing the scale of our events to perfecting how we serve our community. We adopt a renewed leadership mindset and strived to make our activities meaningful experiences for both audiences and planning committee members in terms of professional and personal development. This markedly improved and sustained engagement and enthusiasm. Furthermore, we take pride our resolution and resilience during the COVID-19 crisis. Many of our activities--including Spring Retreat and Bioengineering Day-- could no longer take place as planned. Responsible committees of affected programs worked tirelessly and creatively to reorient their activities while still delivering their promises.

We proudly upheld our conviction in building and serving the bioengineering community amidst both stability and uncertainty. In the future, taking encouragement from this refreshed passion for service and the success of digital content broadcasting, UC San Diego's BMES will strive to better provide resources to an even broader community.

Website: http://bmes.ucsd.edu | Photo Repository: shorturl.at/lmsz3

June 1$^{st}$, 2020
Biomedical Engineering Society (BMES)
8201 Corporate Drive, Suite 1125
Landover, MD 20785-2224


To the Student Chapter Award Committee Members,

In the 2019–2020 year, the UC San Diego chapter of the Biomedical Engineering Society has worked hard to push its core mission: to be a resource for anyone interested in the field of Bioengineering and STEM, no matter the major or background. This letter seeks to present how the chapter has pursued this mission using 3 fundamental values: community, service, and perseverance.

Building a community within our organization is vital because the success of our members means success for the organization. Our Social Co-chairs were integral to this mission through the Mentorship Program, where underclassmen are paired with upperclassmen advisors for the year. Our Project Team co-chairs were also huge contributors, as they worked together with our Vice President External to host a dozen or so technical workshops and info sessions to ensure that our members would succeed professionally.

Even though our members are important to us, the UCSD chapter understands that it is important that we use our resources not only for our own gain, but to provide a positive service in our local community. This year, our Lab Expo event took huge leaps to become an integral part of the UCSD culture through collaborations with existing university resources, all to promote its mission of scientific literacy. It was also during this time that our Outreach committee made an impact at San Diego Festival of Science and Engineering, creating technically challenging projects that allowed our members to gain skills in engineering, while still inspiring younger students to think like scientists.

Finally, in the face of COVID-19, our chapter has found perseverance an essential value in pursuing our mission. At the onset of the COVID-19 crisis, the Translational Medicine Day team was left with two days to redesign their three-hundred-person event. However, with quick thinking and hard work, the chapter was able to shift TMD online, where speakers Zoomed in and every part of the day was livestreamed for the public. Our Outreach committee also worked hard during the lockdown, contacting over 50 schools for their College Counseling Sessions. Finally, one of the greatest successes of the year was our Bioengineering Day, an event that had to be rebuilt from the ground up to accommodate social distancing policies. A collaboration between the bioengineering department and local industries, the chapter put on this event to allow our Bioengineering seniors to present their capstone projects. And with an attendance that surpassed previous years, I am happy to report that the event was a huge success

But one may ask, why go through all this trouble? The answer is because we can. It is because the UCSD chapter was lucky enough to be filled with smart, kind, hard-working people who care about the community. It is because, more than ever, our communities need engineers who solve problems in the lab and in the world. The following CDR will serve as a record for the how the UCSD chapter pursued its mission. However, I hope that this CDR will serve as more than just a record, but also as both a source of inspiration for student chapters and a reassurance for those chapters who are already making an impact. I hope that you are all doing safe and well, and thank you for helping make UCSD Chapter what it is.


Sincerely,


**Reo Yoo**                                                          **Dr. John T. Watson**
President, UCSD BMES Chapter                     Director/Professor,
rsyoo@ucsd.edu                                             Bioengineering
http://bmes.ucsd.edu                                     Founder, von Liebig Center
                                                                      Faculty Advisor, UCSD BMES
                                                                      jtwatson@ucsd.edu

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# Section I – Administrative Report

For the 2019-2020 academic year, UCSD BMES maintained the leadership and administrative structure that has been implemented over the past few years. The chapter was led by a four-member Executive Board and a sixteen-member Officer Board. The Executive Board, consisting of the President and Vice Presidents of the chapter, was elected by the general members towards the end of the 2018-2019 year. Then, the newly-elected Executive Board was tasked to select the remaining officer positions through open applications and interviews. The selected officers took charge of various programs of UCSD BMES under the mentorship and supervision of the Executive Board. These programs included event planning (Lab Expo, Translational Medicine Day, and Bioengineering Day), technical and professional development (Project Team and Freshman Engagement), community engagement (Outreach), social and mentorship, and organization enhancement (Publicity Chair and Webmaster).

Membership to the organization was open to all undergraduate students at UC San Diego regardless of major and seniority. Some aforementioned programs--namely Lab Expo, Translational Medicine Day, Bioengineering Day, Project Team, Freshman, and Outreach--each had a committee dedicated to it. These committees were led by their respective officers and met weekly. They were open for all general members to participate and contribute, allowing them to be more impactfully involved with the organization. Additionally, interested members may also purchase a paid membership to access the mentorship program, faculty-sponsored technical project, and other incentives.

## I.1. Leadership Team and Management Structure

Below is an organizational chart detailing the Executive-Officer-Committee management structure and division of labor of UCSD BMES.
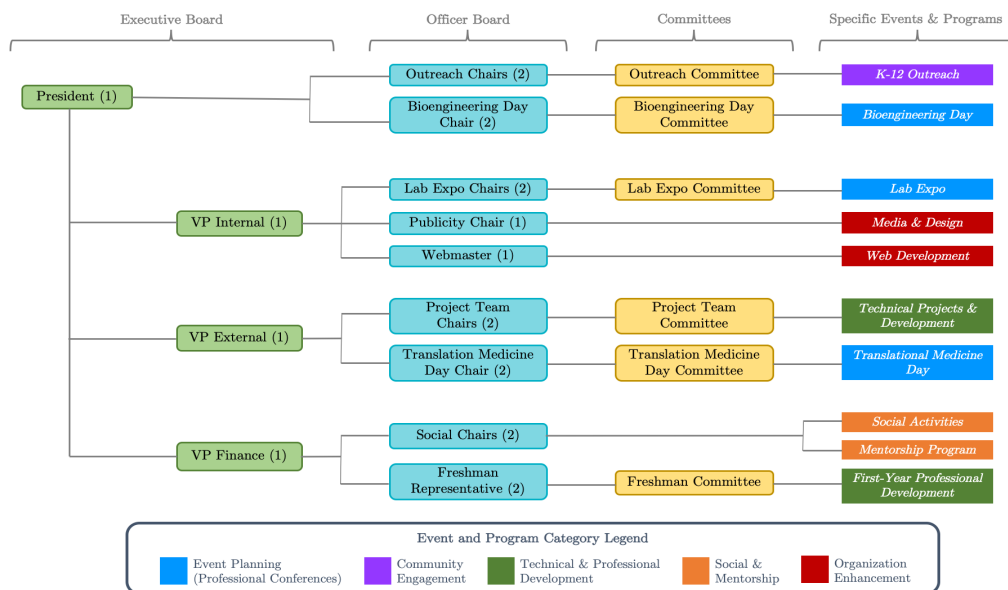
Figure 1: The organizational chart of UCSD BMES. The numbers in the parentheses indicate the number of officers allocated to a position. The leadership team consists of a four-member Executive Board and a sixteen-member Officer Board. Each executive is responsible for overseeing four officers. Each officer or each pair of officers, who may be leading a committee, is responsible for a program of the organization.

### I.1.1 Executive Board

Executive Board application was open to all BMES members who were not graduating seniors. New Executive Board members were chosen through an election in early May of 2019. A simple majority vote was required for a candidate to be elected. Immediately following their election, the new Executive Board was tasked to draft a vision for BMES for the upcoming year.

President: Reo Yoo (rsyoo@ucsd.edu)

> The chief executive officer of the organization. In charge of overseeing all operations, maintaining relations with the UCSD Bioengineering Department, corresponding with other chapters of BMES, presiding over all meetings, and managing the overall direction of the organization.

Vice President Internal: Daibo Zhang (daz045@ucsd.edu)

> Responsible for membership and officer logistics, engagement, and cohesion. Facilitate communication within BMES and with other student organizations. Oversees other secretarial duties such as brand image, documentation, and publication.

Vice President External: Michael Bennington (mbenning@ucsd.edu)

> Focuses on establishing and strengthening relationships with local industry and graduate research. Creates professional development opportunities for members. Acts as an advisor to the Bioengineering Department for industry engagement activities and strategies.

Vice President Finance: Tawny Bagnol (ttbagnol@ucsd.edu)

> In charge of managing all BMES funds. Negotiate funding allocations with the university. Distribute funding to officers. Oversees fundraising activities. Assists the committee chairs with logistical items such as location reservations and equipment requests.

### I.1.2. Officer Board

Applications to the BMES Officer Board were open to all BMES members who were not graduating seniors. In accordance with the newly developed vision, the new Executive Board was tasked to assemble the next Officer Board through application review and interviews in May of the preceding year.

Two notable exceptions to this timeline were the Lab Expo Chairs and the Freshman Representatives. Lab Expo occurs annually in mid to late January, and its organization can benefit from an early start. Therefore, the previous Lab Expo Chairs are tasked to choose two Lab Expo Interns in March prior to the Executive Board Election. The Interns are promoted to Lab Expo Chairs by the discretion of the new Executive Board based on their performance and fitness to the new BMES mission. Freshman Representatives are designed for BMES members who are first-year UCSD students to exercise their leadership abilities and enrich the experience of other first-year BMES members. Therefore, applications for the Freshman Representatives are open to first-year UCSD students in October in their first quarter at the university. They are chosen by the Executive Board in early November with application reviews and interviews.

The Officer and Executive Board met weekly in school weeks for hour-long structured meetings to provide updates on different committees and programs, announce upcoming events, and exchange advice and strategies. Below is the agenda of a typical officer meeting.

1. Updates from the Officers in charge of each program
2. Updates from each Executive Board members
3. Occasional special items (e.g. Annual BMES Meeting attendance logistics, large event debriefing, team bonding activities)
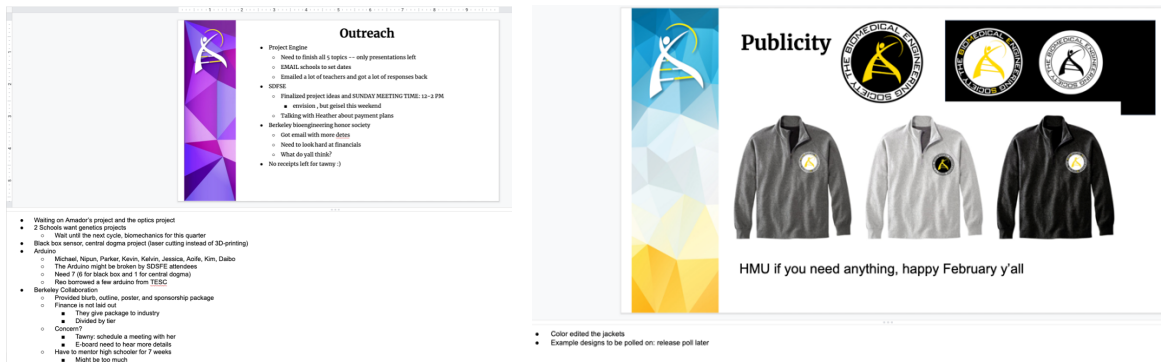


Two examples of presentation slides and notes from Officer Meetings.

Table 1: Full Officer Roster and National Member IDs for the 2019-2020 Year

| Position | Name | National Member ID |
|---|---|---|
| Bioengineering Day Co-Chair | Aoife O'Farrell | 4018434 |
| Bioengineering Day Co-Chair | Kendra Worthington | 4018267 |
| Freshman Representative | Jadyn Antonio-Valdez | N/A |
| Freshman Representative | Wei Ji Chen | N/A |
| Lab Expo Co-Chair | Khoi Le | 4018383 |
| Lab Expo Co-Chair | Nipun Talwar | 4018390 |
| Outreach Co-Chair | Amador Cabrera Lagunas | 4018378 |
| Outreach Co-Chair | Megan Tjuanta | 4018463 |
| Project Team Co-Chair | Parker Hill | 4018387 |
| Project Team Co-Chair | Eli Magaña Tapia | 4018406 |
| Publicity Chair | Jessica Ma | 4013977 |
| Social Co-Chair | Beverly Peng | 4011487 |
| Social Co-Chair | Kimberly Surja | 4018347 |
| Translational Medicine Day Co-Chair | Kelvin Zarate | 4018287 |
| Translational Medicine Day Co-Chair | Kevin Yu | 4018373 |
| Webmaster | Yuren Dong | 4011493 |
| President | Reo Yoo | 4018362 |
| Vice President Internal | Daibo Zhang | 4013978 |
| Vice President External | Michael Bennington | 4011497 |
| Vice President Finance | Tawny Bagnol | 4011986 |

### I.1.3. Committees and Subcommittee Leadership

The committee structure of UCSD BMES has seen substantial and sustained success.
Committees unite like-minded members under the common goal of delivering its associated
program. They also facilitate the meaningful engagement of general members, subsequently
improving the quality of our programs.

Committees were expected to meet weekly, and their memberships were open to all interested BMES members, paid or otherwise. To further engage the members and provide them with leadership and professional experience, all of our committees except for Outreach and Freshman offered Subcommittee Lead positions relating to subprojects of the program. Depending on the size and needs of the committee, the numbers of Lead positions could range from 10 to 20. We encouraged members of a committee, typically non-officers, to fill these roles. The scopes of these positions were defined by the responsible officers. For example, in the 2019-2020 year, the Lab Expo Committee assigned Lead positions according to the subevents of the namesake research symposium it was tasked to plan and other logistical needs of the event. Therefore, subcommittee leads for Lab Expo included Poster Sessions Leads, Networking Luncheon Leads, Lightning Talk Leads, Keynote Speaker Leads, Researcher Contact Leads, Sponsor Contact Leads, Advertisement Leads, and Social Leads.

## I.2. Membership and Diversity

Membership to UCSD BMES was readily open to all UCSD undergraduate students who were interested in the field of bioengineering. General membership is not defined or regulated. It is granted *de facto* to anyone who participated in BMES programs and their planning. We also offered a paid membership with additional incentives. Most active members had chosen to become paid members. No responsibilities or commitments are assigned to members. In the 2019-2020 year, UCSD BMES had 93 paid members.

### I.2.1. National Membership

All Officers besides the two Freshman Representatives were registered National BMES members for the 2019-2020 year. A list of national members and their national member IDs can be found in Table 1 in Section I.1.2.

### I.2.2. Paid Membership

UCSD BMES offerws a paid membership. Membership fee was $25 for all three quarters of the 2019-2020 year. The fee was reduced to $20 for just the Winter and Spring Quarter and $15 for the Spring Quarter along. Proceeds from membership fees were used primarily to fund technical projects, outreach programs, and social activities. In return, paid members were eligible to join the mentorship program, participate in faculty-sponsored technical projects, and apply to be an officer. They were also given a BMES T-shirt which we redesigned annually.

### I.2.3. General Body Meetings (GBMs)

Activities of UCSD BMES members were dispersed among committee meetings, social activities, workshops, projects, and so on. In addition, we hosted two GBMs every quarter (Spring 2020 GBMs were suspended due to the COVID-19 outbreak). GBMs gave us an opportunity to introduce BMES to new members. Officers also used GBMs to promote their programs and provide updates. GBMs typically ended with social activities.

Below is the typical agenda of a GBM

1. Pre-meeting social
    a. Sign in
    b. Membership and T-shirt sale
    c. Refreshment and networking
2. Introduction to UCSD BMES
    a. Mission statement
    b. Executive Board self-introduction
3. Officer updates
    a. Officer self-introduction
    b. Program and committee introduction and updates
    c. Event announcements
4. Executive Board updates
    a. Membership logistics
    b. Additional event announcement
5. Post-GBM social

Table 2: Details of the GBMs hosted by UCSD BMES in the 2019-2020 Year

| Date | Event Name | Attendance | Post GBM Social | Cost |
|---|---|---|---|---|
| 10/02/2019 | Fall 2019 GBM 1 | 94 | Various ice-breakers | $321 |
| 11/20/2019 | Fall 2019 GBM 2 | 47 | Blaze Pizza social | $0 |
| 01/15/2020 | Winter 2020 GBM 1 | 63 | Mentorship family quizbowl | $394 |
| 02/26/2020 | Winter 2020 GBM 2 | 36 | Pitch workshop & competition | $450 |



Two examples of UCSD BMES GBM presentation slides.

## I.2.4. Diversity Among UCSD BMES Members

Staying true to the diversity of bioengineering, UCSD BMES proudly serves its members with a variety of backgrounds and identities. We surveyed 65 of our active members, paid or otherwise, to understand the diversity among our community.
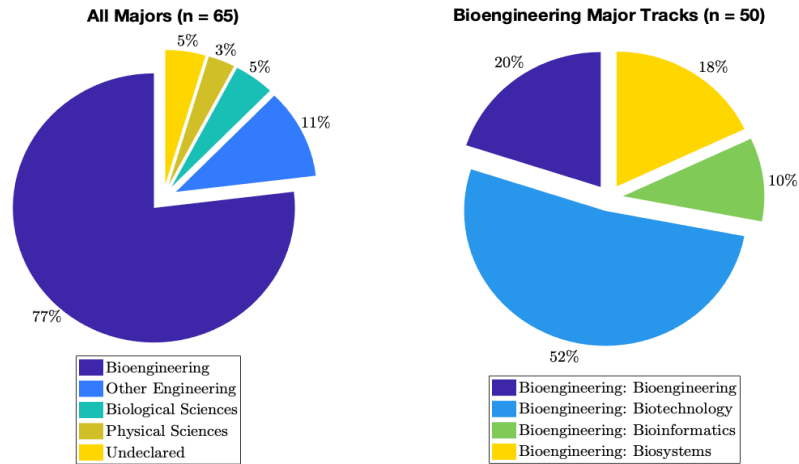


Figure 2: Major departments of surveyed UCSD BMES Members. The left panel indicates the general major departments of all 65 respondents, and the right panel indicates specifically the major tracks of the 50 Bioengineering majors among our respondents.
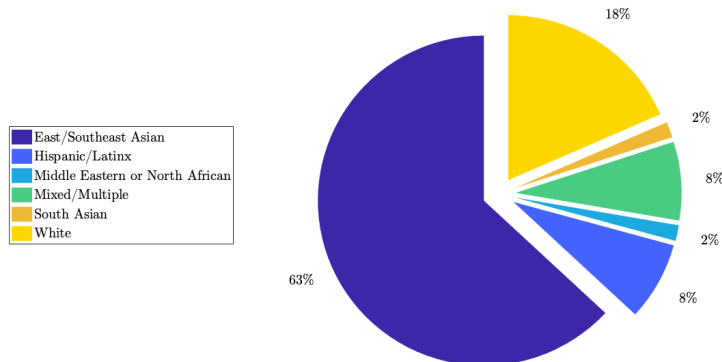


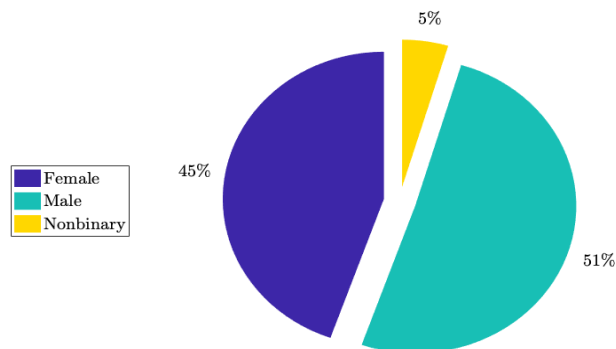Figure 3: Racial and ethnical identities of the 65 respondents.



Figure 4: Gender identities of the 65 respondents.

Additionally, 14% of respondents were on-track to be first-generation college graduates, 26% identified with the LGBTQ+ community, and 25% were born outside of the United States of America. The results helped us further understand our primary audience to better identify and address their needs. They also guided our future directions to make BMES more inclusive.

## I.3. Affiliations

While operating fully independently, the UCSD Chapter of BMES is affiliated with a myriad of other on-campus organizations and institutions.

1.  The Department of Bioengineering:
    UCSD BMES holds a lasting and fruitful partnership with the Department of Bioengineering. We are entrusted by the Department to host Bioengineering Day, which also includes the final poster presentations of the Senior Design Projects. Additionally, BMES representatives participate in weekly student affairs meetings, hold membership in the Industry Relations Board, and organize bi-annual Department Town Halls. These make UCSD BMES the ambassadors of undergraduate students to the Department of Bioengineering.

2.  Triton Engineering Student Council (TESC)
    TESC is an undergraduate-run student-government-like institution chartered by the Jacobs School of Engineering of UC San Diego. It is also a source of funding for BMES and other engineering student organizations. BMES is a full member of TESC, and the Executive Board attends bi-quarterly TESC Council Meetings. We have the right and responsibility to discuss and vote on policies pertaining to engineering student organization status, School of Engineering student affair, and resource allocation.

3.  The Associated Students (AS) of UC San Diego
    AS recognizes and protects the official student-organization status of UCSD BMES. This allows us to apply for student organization funding, reserve event spaces, and rent other facilities and equipment.

# Section II – Treasury Report

The Vice President of Finance is in charge of all UC San Diego, Biomedical Engineering (BMES) financial accounts and cash flow throughout the academic year. In addition to the UCSD BMES funds, financial income is split into four major contributors: (1) University of California, San Diego's Associated Students (AS) programming funding, (2) Bioengineering Departmental funding, (3) local biotechnology and pharmaceutical companies, and (4) other University of California, San Diego programming funding applications. Large events such as Lab Expo and Translational Medicine Day were mainly funded by the AS programming fund and other UCSD programming funds. Departmental funding was primarily geared towards our members, funding our Project Team and Outreach committees and our mentorship program.  Fundraisers, such as participating in our university's vendor fair and collaborating with Tau Beta Pi for a photoshoot, were also held in addition to the Departmental funding to assist any programming financial needs by the committees. In addition to keeping track of financial accounts and cash flow, the Vice President of Finance also acted as a financial advisor for all of the committees, in particular committees in charge of larger events. With many chairmen not being familiar with the financial processes, the VP Finance assisted the officers in applying for funding and optimizing their budgets. This written report should indicate what period of the fiscal year the report covers, the date it was prepared, and by whom. The report should also include all income and expenses for each quarter.

## II.1. Financial Summary

Here is a summary of the Balance Sheet of the BMES Bank Account from the 2019 - 2020 academic year broken down into expenses and revenues from the three quarters:

| *Balance Summary* | Fall Quarter 2019 | Winter Quarter 2020 | Spring Quarter 2020 |
|---|---|---|---|
| Starting Balance | $6,440.37 | $5,361.75 | $4,007.71 |
| Expense | $5,148.23 | $4,334.04 | $0.00 |
| Revenue | $4,069.61 | $2,980.00 | $3,115.00 |
| Ending Balance | **$5,361.75** | **$4,007.71** | **$7,122.71** |

NOTE: Financial contributors mentioned in the abstract are not included in expense and revenue calculations
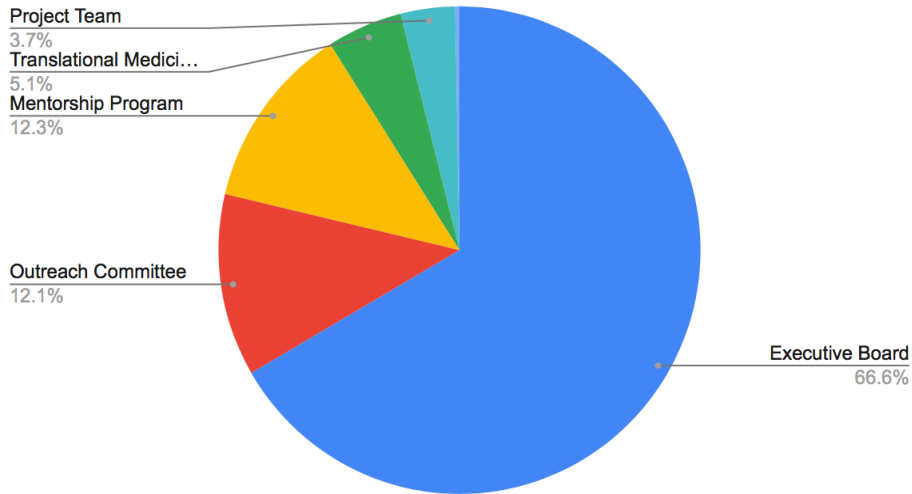
Figure 5: 2019-2020 Expense Summary Per Committee

In Figure 1, the breakdown of expenses per committee can be seen. The Executive Board had the most expenses throughout the year due to funding of our General Body Meetings (GBMs) and other events of similar size, as well as purchasing UCSD-BMES t-shirts and graduation stoles. Following the Executive Board, the Mentorship Program and Outreach Committees have the most expenses from their respective projects throughout the year.
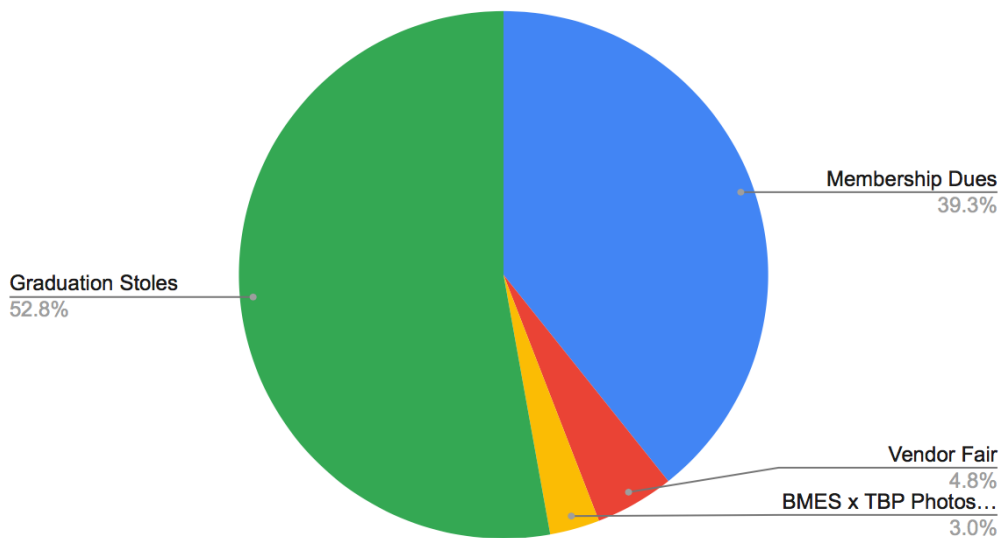


Figure 6. 2019-2020 Main Revenue Breakdown

Figure 6 shows the four main fundraisers that were held during the 2019-2020 academic year. Total Revenue for 2019-2020 is $5,718

Breakdown of Main Revenue:
- Membership dues were $25 in the Fall, $20 in the Winter and $15 in the Spring.
  - Total Revenue:  $2,295
- Graduation Stoles were sold $30 pre-order and $35 non-pre-order
  - Total Revenue: $3,085

## II.2. Details on Cash Flows

Below is a screenshot of winter's financial tracking sheet:

| | | The Biomedical Engineering Society (BMES) Finances | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Balance Forwarded from FALL 2019 | | 5361.75 | | | | | | |
| | | WINTER 2020 | | | | | | | |
| Committee | Event | | Vendor | Amount | Deposit | Withdrawal | Budget Grand Total | Date of Transaction | Payment |
| Outreach | SDSFE | | MICHAELS | 12.88 | - | 12.88 | | 01.01.20 | MEGAN |
| Executive Board | Winter GBM#1 | | RED SAMBUSAS | 453.53 | - | 453.53 | | 01.16.2020 | BMES Debit |
| Executive Board | Memership Fees | | VENMO | 120 | 120 | - | | 01.16.2020 | |
| Outreach | SDSFE | | HOME DEPOT | 12.9 | - | 12.9 | | 01.18.20 | AMADO |
| Outreach | SDSFE | | MICHAELS | 12.31 | - | 12.31 | | 01.18.20 | AMADOR |

Figure 3. Screenshot of Finance Tracking Sheet

Every transaction was recorded as illustrated above in order to keep a detailed account of all transactions that occurred.
- *Committee*: Name of the committee here. Gives the ability to break down spending per committee and analyze who is spending the most amount of money.
- *Event*: Where information was provided on the transaction being recorded and allowed for anyone who needed to check back on a purchase or payment to see the specifics.
- *Vendor*: Keeping track of where money is spent and how much is important. This allows us to see where exactly money is being spent whether it is for project supplies or snacks, and allows us to optimize spending in the future.
- *Deposit/Withdrawal*: Separating the columns makes it easy to keep track of the total expenses and revenue.
- *Payment*: This column combines the balance sheet and reimbursement sheet into one. If a payment was not made by the BMES Debit, the name of the payer as well as when they are reimbursed is noted down.

## II.3. Details on Reimbursement

Reimbursements were kept track of using the financial tracking sheet. The person that was reimbursed as well as the amount can be found on the financial tracking sheet. If a payment for any UCSD BMES related event was made using a payment type other than the BMES Debit, they would be reimbursed only if they submitted a receipt. Receipts were given to the VP Finance and stored in a drive organized by quarter. Receipts were used to accurately reimburse members as well as for reference for any organization that wished to audit our financial spending.

## II.4. Primary Means of Fundraising

### II.4.1. UCSD BMES Paid Membership

As mentioned above and in Section I.2.2, membership dues were $25, $20, and $15 for Fall, Winter, and Spring respectively. When purchasing membership, students were given a t-shirt designed by the Publicity Chair and VP Internal. The following programs were also made available to them: mentorship program, project team applications, applying to become an officer, BMES Olympics, and our End of the Year Banquet.

### II.4.2. Annual Officer Auction (cancelled due to COVID-9)

Uncertainty of the situation with COVID-19, we unfortunately had to cancel our annual officer auction. In past years, the officer auction has been our annual fundraiser where officers offered up a variety of services, such as music lessons, photo shoots, Bob Ross nights, and more, for auction. Instead of attempting to host an online version of officer auction, we decided that as a student organization, we wanted to focus our efforts on supporting our members and those in the community. Thus many of our Spring Events, as you shall read about further on, were focused on how we as an organization could best support our members during these COVID-19 times.

### II.4.3. UCSD Bioengineering Graduation Stoles

The sale of Bioengineering Graduation Stoles is another of our annual fundraisers. Due to the timing of ordering the stoles, there was a chance of not receiving the stoles due to no one being allowed on campus except authorized personnel. After discussing with our Bioengineering Department, they became willing to ship the graduation stoles to all the seniors who wanted to purchase them. The VP Finance handled all of the sales and organization of shipping information. The physical shipment was done by a staff member. For all the seniors, the current situation had been difficult and although this may be an anti-climactic way for them to end their college career, I hoped that their stole could serve as a reminder of all the hard work they had put in until now. They accomplished so much and created so many memories while here at UCSD. Congratulations Class of 2020 <3

### II.4.4. Vendor Fair

This fundraiser-social hybrid event brought in a profit of $140. This year we sold mini-kimbap rolls and spent the previous afternoon together making the rolls in preparation for this event. We sold over 400 rolls. Please see Section IV.1. for more detail.

## II.5. Finances Moving Forward

Moving forward for next year's or any future VP Finance, planning out future budgets more effectively can be done using this financial report. The expense summaries of this year can be

used to optimize the spending done in future, or allotting larger allocations to those committees that are growing and need more financial support. In addition to the budget, improving the performance of the current financial processes can also be done. Combining the reimbursement and financial tracking is something that was done this year in order to streamline financial processes, but more improvement can be done with clarity and transparency.

## Section III – Chapter Activities

This Section chronicles the large conferences hosted entirely or primarily by UCSD BMES, i.e. programs that fall under the "event planning" category. These events last for at least half a day. Most of them require months of dedicated efforts from committees to organize. Information regarding other prominent UCSD BMES programs (Outreach, Mentorship, etc.) and associated events are detailed in later sections.

### III.1. Lab Expo



*Audience: All UC San Diego undergraduates, graduate students, faculties, staff, and the general public who are passionate about research in all disciplines and science advocacy*

Lab Expo 2020 marks the 9th iteration of our chapter's campus-wide research symposium, organized by undergraduates, for undergraduates. Our event features a poster presentation session along with a lightning talk competition, a keynote speech, and a networking luncheon. We aim to inspire undergraduate attendees to pursue research during their college career as well as bridge the gap between students and presenting PIs or grad students. As with every year, we strive to uphold our mission of promoting scientific literacy, scientific advocacy, and interdisciplinary collaboration. This year, we have also emphasized the importance of effective communication through various elements in our event.

As with every year, our event grants undergraduate attendees a great opportunity to learn more about the fantastic on-campus research done at UCSD and potentially get involved in a lab or research group, all in a relaxed environment. For our presenters, not only do they have the opportunity to present their research, but they also have a platform to engage with the undergraduate community outside of their teaching roles. In addition, this year we pushed for undergraduate researchers to also sign up to present their research, providing the opportunity to hone their presentation skills in a low-stress setting. Our event would not have been possible without our Lab Expo committee, who also gained much experience from helping organize the event. Members were able to pick up valuable skills such as professional email, elevator pitches, and, most importantly, teamwork and camaraderie. We are proud to have inspired a new generation of Lab Expo leadership and we are excited to see where they take the event next year.

As aforementioned, a theme we decided to integrate into our event this year was effective communication, as this plays a key role in making research easy to understand and presentable to audiences. We featured Kate Yoshida, lead writer of the popular educational YouTube channel MinuteEarth, as the keynote speaker. She gave an inspiring talk on her process behind the writing of her short, yet informative and engaging videos. We also continued our Lab Expo Graduate Showdown lightning talk competition, which prompted our 8 graduate student contestants to present their research in a clear and understandable manner under 3 minutes. Lastly, we collaborated with some on-campus student resources to offer presentation feedback to poster presenters. Evaluations were based on communication and clarity rather than content, so as to help the presenters develop more effective ways of explaining their work. In the end, while attendance was slightly lower than in previous years, our attendees and presenters have noted that they were much more satisfied with their overall experience at this year's Lab Expo.

| Lab Expo 2020 | 01/31/2020 *10 AM - 4:30 PM* | Total Attendance: 579 (517 Attendees, 62 Presenters) | Cost: $7278 |
|---|---|---|---|



Photos from Lab Expo 2020

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## III.2. Translational Medicine Day



*Audience: Students, presenters, and community members, interested in learning about the field of translational medicine*

Translational Medicine Day (TMD) is a conference-style event dedicated to bringing together leading researchers, medical companies, and UCSD students to integrate, inform, and inspire attendees about the growing field of translational medicine. Featuring multiple segments to the event as a whole, TMD aims to be an event that emphasizes the interdisciplinary nature and "research to recovery" pathway of translational medicine, through our varied panels and presenters.

TMD 2020 began with a Keynote Presentation from Dr. Ariel Feldstein, on his experience bringing a novel drug therapy to market. Next, our MD/PhD Panel provided insight on the various challenges and opportunities afforded through pursuing a graduate degree and medical school. Our Industry Demonstrations session brought in representatives from companies such as Medtronic, Phillips, and Nanome to inspire future biomedical engineers. And our newest initiative, the Ethics Panel, covered topics relating to the future of AI in healthcare. These were supplemented by tours through the Center of the Future of Surgery (CFS), located in the basement of the MET Building, as well as a closing networking reception.

One of the core aims of TMD is to inform attendees of what translational medicine is — specifically, the pathway of bringing cutting-edge technology and breakthrough research to the end patient in a hospital. In addition to the event sections outlined, we aimed to give a better idea of this pathway through the arrangement our event schedule — beginning with the MD/PhD Panel, then Industry Demonstrations and Ethics Panel, with multiple Speaker Sessions provided in between.

Attendees are also benefited through the opportunity of interacting and networking with researchers and industry representatives, learning about what career paths and technologies interest them, and helping provide attendees with more solid career goals doing so.

The members of our committee, in addition to benefiting as attendees and co-hosts of the event, gained valuable experience in communicating with professionals, helping lead a sub-committee of

dedicated individuals, working in a team to critique and build upon each other's ideas, and meeting deadlines in our collective journey of putting on the event.

Presenters, on the other hand, are provided with a unique opportunity to present their research to an invested, educated audience and network with not only students, but other presenters, at the event. For many of them, the opportunity to inspire potential future researchers and experts in the field of medicine is compelling in itself.

However, this year, we encountered a major obstacle in the form of the COVID-19/SARS-CoV-2 coronavirus. Many of our presenters, as well as one of our sponsors (the UC San Diego Dept. of Bioengineering), expressed concerns over TMD's nature as an in-person public gathering.

Multiple panelists and company representatives were unable to make it, or requested to present through the video conference app Zoom, which we gladly accommodated for. In addition, our committee raced to find a way to ensure the safety of attendees, choosing to minimize risk by restricting attendance to a core group of 50 BMES volunteers (compared to a public attendance of about 200 in 2019). We also announced a health advisory for volunteers, and provided gloves and hand sanitizer to all in-person attendees.

We also devised a way of streaming presentations to our event's Facebook page through Facebook Live, allowing all who were interested, in-person or not, to participate. A number of minor technical issues relating to stream quality and consistency occurred; this was to be expected given our reorganization of the event on such short notice. Future recommendations would be to have adequate power supply for streaming laptops, and a more solidified online presence, rather than the hybrid of in-person and online presentations we chose to go with.

Still, with an opening audience of over 600 members (petering out through the day), we were still able to host a strong remote event — despite having only a few days to adapt to the situation! TMD 2020 marks the first broadcasted event of UCSD BMES, blazing new trails for the student chapter.
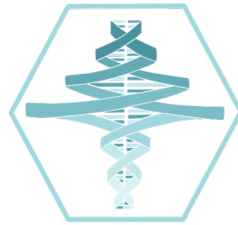
| Translational Medicine Day 2020 | 03/11/2020 *2:00-7:00 PM* | In-Person Attendance: 50 Online Views: over 600 | Cost: $5418 |
|---|---|---|---|

Photos from Translational Medicine Day 2020

### III.3. Bioengineering Day



*Audience:*
- *Primary: UC San Diego undergraduate students interested in bioengineering*
- *Secondary: UCSD faculty and staff, industry members, UCSD graduate and medical school students, students from community colleges, high school, and other universities, friends and family of presenting seniors.*
- *Presenters: UCSD bioengineering seniors, bioengineering industry members, bioengineering-related student organization members, visiting professors*

Bioengineering Day (BE Day) is a celebration of the top-tier bioengineering department here at UC San Diego, as well as the research-centered education essential to our program. Bioengineering Day helps students at all stages in their research journey as they develop scientific literacy, leadership abilities, and professional communication skills. Younger students have the opportunity to explore research options for their future projects, and hone their networking skills with industry and faculty. Junior and senior students take part in senior design projects - leading their own research project under faculty mentorship. Not only do they present the research they completed during the year, but they also are able to learn about opportunities available to them after university, including higher education and industry.

The theme this year for Bioengineering Day 2020 was "BE Diverse" - we intended to showcase the importance of understanding the healthcare needs of populations that are served by bioengineering research, both through representation by diverse researchers and through acknowledgments of the diversity amongst patients. We initially planned a keynote speech by Dr. Cato Laurencin, the founder and director of the Institute for Regenerative Engineering at

the University of Connecticut. As an advocate for racial, ethnic, and gender diversity in the field of bioengineering, he serves as inspirations for our bioengineering students and staff.

Although our plans for BE Day 2020 were forced to change due to COVID-19, we successfully adapted several aspects of our event into an online format. Initially, we planned an in-person event attended by guests from across the country with an expected 400+ attendees. However, due to social distancing guidelines put into place due to coronavirus, we successfully altered our event set up to adapt to a completely virtual format. The main focus of our online event was our senior design poster sessions. When it comes down to its core, BE Day is about serving the students and their educational experience, so now more than ever it was important for us to recognize and highlight the achievements of our 41 senior design groups. All 41 of these teams presented at Virtual BE Day 2020, and 4 of them were recognized for their work with awards.

While our primary audience may have been the students, our event also hosted faculty, industry members, alumni, relatives, and friends of students, and staff members, allowing all of them to partake in BE Day and support our bioengineering seniors. We also successfully adapted our annual, trivia-style Quizbowl competition to have games played via Zoom, and to display the championship bracket on our BE Day website. Fortunately, the incredible work of our committee paid off, and we successfully hosted the first-ever online Bioengineering Day at UCSD, with a 14% increase in attendance from last year's in-person event.
If you'd like to see the website utilized for Bioengineering Day this year, please visit
https://sites.google.com/ucsd.edu/bioengineering-day-2020/home

Original Plans:
- Keynote Lecture - speech by Dr. Cato Laurencin: founder and director of the Institute for Regenerative Engineering at UConn
- Poster Sessions - research presentations by undergraduate seniors to share their student-led design projects with industry, faculty, students, and guests
- Industry Demonstrations - presentations from local bioengineering companies to expose students to the opportunities available to them after graduation.
- Student Org Demonstrations - presentations from bioengineering-related student organizations at UCSD to showcase opportunities for students in bioengineering for humanitarian work and engineering design.
- Networking Lunch - provides a space for students, faculty, industry members, and guests to meet, share ideas, and network
- Quizbowl - culminating match in a year-long trivia tournament. The winning undergraduate team faces off against a team of graduate students for a monetary prize

Online Event Achievements:
- Poster Sessions - senior design projects were presented virtually via Zoom facilitated by a website. 41 groups of seniors presented their projects virtually to 457 total guests
- Quizbowl Tournament - the Quizbowl trivia tournament continued in an online format after the start of social distancing in March. The top three teams received a monetary prize of $200, $100, and $50 for first, second, and third place teams respectively.

- BE Day Website - featured informational sections about our industry partners, other BMES events, and the quizbowl tournament

| **Bioengineering Day 2020** | 05/22/2020 10:00-3:00 PM | Total Attendance: 457 (376 Students, 16 Faculties, 10 Alumni/ae, 20 Industry Reps, 35 General Public) | Cost: $850 |
|---|---|---|---|



Photo of the Bioengineering Day Committee

### III.4. Bioengineering Experience (Postponed due to COVID-19)



*Audience: Targeted towards current bioengineering majors, but any students interested in bioengineering are welcome to attend.*

The Bioengineering Experience (BeX) is the one of two events hosted by the Freshman Committee, the other being SWiB (See Section VIII.7), but in contrast to SWiB, BeX is more focused for students who are already bioengineering majors and also are relatively certain they will continue to be students of this department for the rest of their foreseeable undergraduate career. Therefore, the Bioengineering Experience strives to demonstrate to these students what being a bioengineer entails, what is it that makes them unique, and most importantly, to give

them further insight on whether the experience of bioengineers in undergraduate, graduate, and postgraduate levels is something they desire. The event was originally schedule for 04/02/2020. Due to the COVID-19 circumstances, BeX 2020 was unable to be held and with the sudden closing of the school along with the panic and stress among the students. Tthe Freshman Representatives decided that BeX 2020 will be postponed until Fall Quarter.

The distinction that would've made the 2020 BeX special was that the events were tailored so bioengineers can learn not just what being a bioengineer means, but how they can put themselves in the best position to maximize their potential so they may enjoy their journey with clarity and focus. Most people don't know exactly what you want to do at 18 and even if someone is set on a field, how do they know which part of that field they'll like to explore? How would they know how to reach their desired destination efficiently without instruction? BeX 2020 plans to help students craft a clearer image of the steps necessary to achieve their ambitions and everything planned within the event is done to fulfill this objective.

We planned to have a keynote speaker in Dr. Fraley, who will touch upon a variety of topics, her personal experiences, future of bioengineering innovations, the current landscape of bioengineering research, and at the conclusion of her speech, begin a short social event in which students will rotate through the groups of upperclassmen, graduate students, and industry professionals present so they may ask questions and interact with them on a personal level. This will also serve as a chance for students to make industry connections, build relationships with graduate students in various high-profile labs, and attain a mentor in this process. A formal dinner will be served and there will be two alumni panels introduced, one with industry professionals and the other with graduate students so students can have a broad view of the day to day life, overarching goals, and differences between industry and academia.



The Freshman Representatives

## Section IV - Social Activities

Organization-wide social activities are essential for BMES members to bond and de-stress throughout the academic year. Our goal is for our members to engage with each other in friendly competitions and casual meet-ups because these interactions lay the foundations of personal connections and relationships between individuals. A majority of BMES is planning events and developing professionally, so social activities are important because they allow our members to interact with others in a less professional environment. These events establish BMES as a close-knit community, and we continuously strive to provide a strong support network for our members. We focus on bringing everyone together through a variety of activities, such as bonfires and food socials. Social events are perfect ways for new members to become acquainted with the rest of the organization. It can be difficult for new members, especially freshmen who are still very much new to college life, to find their niche in any organization and/or university, so we strive to ease this transition. This year, we emphasized small, fun events to contrast to the work-intensive academic year. We want to allow our members to get to know each other in small group settings where it is much more laid-back than the more professional groups inside of the organization itself. Through our socials, we hope to foster friendships and build stronger relationships between our members to build a tight-knit inclusive community.



Photos from UCSD BMES social activities. Top left: Capture the Flag Social with Graduate Students (IV.5). Top right: Bonfire Social (IV.2). Bottom left: Dumpling Social (IV.4). Bottom right: Virtual Board Game Social (IV.6)

### IV.1. Vendor Fair
*Audience: BMES members*

A new initiative for this year was to take part in UCSD's quarterly vendor fair. We wanted to have a casual event where members could stop by during the school day and hang out. This year

we sold mini-kimbap rolls and spent the previous afternoon together making the rolls in preparation for this event. We sold over 400 rolls and made over $200.

| Vendor Fair | 10/21/2019<br>*11:00 AM - 2:00 PM* | 15 Volunteers | Cost: $114<br>Revenue: $254 |
|---|---|---|---|

## IV.2. Bonfire Social
*Audience: BMES members and BMES graduates*

This was the first BMES-wide social event that took place on the beautiful La Jolla Shores. Our members got to know each other through casual conversation, icebreakers, and s'mores. We hoped to have a strong start to the year and have a beautiful night on the beach.

| BMES Bonfire Social | 11/08/2019<br>*6:00-10:00 PM* | 24 Attendees | Cost: $32 |
|---|---|---|---|

## IV.3. Study Socials
*Audience: BMES members*

We hosted organization-wide study socials for finals week and provided a room and snacks. We wanted to create a quiet space for studying and emotional support for our members. We hope to continue this tradition and continue to encourage each other academically.

| Study Socials | 12/07/2019, 12/08/2019, 03/14/2020, 03/15/2020<br>*10:00 AM - 6:00 PM* | Approx. 30 Attendees Total | Cost: $0 |
|---|---|---|---|

## IV.4. Dumpling Social
*Audience: BMES members*

We wanted to have an event celebrating Chinese New Year, so we hosted a dumpling making event. We taught our members how to make dumplings and had plenty to eat and take home.

| Dumpling Social | 01/20/2020<br>*11:00 AM - 3:00 PM* | 6 Attendees | Cost: $0 |
|---|---|---|---|

## IV.5. Joint Socials with Graduate Students
*Audience: BMES members and UCSD Bioengineering graduate students*

In an effort to expose our members to graduate school and research, we held an event where undergraduates could interact with graduate students in a non-academic setting by playing a friendly game of Capture the Flag. The undergraduate and graduate students were able to work as a team and foster cooperation. For next year, we aim to interact with more organizations within the bioengineering community and connect with organizations of different disciplines in a variety of activities.

| BMES x BEGS Capture the Flag Social | 02/29/2020 *1:00 - 2:30 PM* | 9 Attendees | Cost: $0 |
|---|---|---|---|

## IV.6. Virtual Board Game Night
*Audience: BMES members*

Before the mandated stay-at-home order, we planned on hosting an in-person board game night; however, we adjusted to the current circumstances and hosted a virtual board game night instead. We still wanted to provide a social event for our members to reconnect and play online games while connected through Zoom. We had some additional laughs by creating shapes with our bodies through video chat.

| Virtual Board Game Night | 05/09/2020 *6:00 − 8:00 PM* | 11 Attendees | Cost: $0 |
|---|---|---|---|

## IV.7. Committee Socials
*Audience: Members of various BMES committees*

Subcommittees host social events with their own social leads throughout the year. These events are open for general members outside their committees. All committee socials incur no cost ($0) on the end of UCSD BMES.

| Event Name | Date and Time | Attendance |
|---|---|---|
| Lab Expo Pajama Party | 10/16/2019 *6:00PM-8PM* | 14 |
| Freshman Pinata Social | 10/31/2019 *6:00PM-7:00PM* | 15 |
| Outreach Extraordinary Dessert Social | 11/02/2019 *9:00PM-10:00PM* | 45 |
| Project Team Yogurt World Social | 11/06/2019 *5:000PM-6:00PM* | 8 |
| Freshman Boba Social | 11/07/2020 *6:00PM-7:00PM* | 15 |
| Translational Medicine Day Boba Social (TeaMD) | 11/09/ 2019 *12:00PM-3:00PM* | 18 |
| Project Team x Outreach Bowling, Ramen and Boba | 11/16/2019 *7:00PM-10:00PM* | 23 |

| Bioengineering Day x Lab Expo Friendsgiving (BE thanXPO) | 11/23/ 2019 *5:00PM-10:00PM* | 40 |
|---|---|---|
| Bioengineering Day Mock Quizbowl | 01/15/2020 *8:00PM-9:00PM* | 30 |
| Post-Lab-Expo Reception | 02/01/2020 *7:00PM-12:00AM* | 40 |
| Project Team Korean BBQ Social | 02/02/2020 *7:00PM-9:00PM* | 12 |
| Lab Expo Palin's Cafe Social | 02/11/2020 *8:00PM-10:00PM* | 20 |
| Outreach Taco Social | 03/07/2020 *5:30PM-7:00PM* | 17 |
| Lab Expo Weekly Game Nights | Saturdays Apr.-Jun. 6:00-7:00 PM | Varies |

### IV.8. Spring Quarter Retreat (Canceled due to COVID-19)
*Audience: BMES members*

We were in the midst of planning our annual Spring retreat, but unfortunately had to cancel due to COVID-19 despite the enthusiasm of our members. The decision was made before the nationwide lockdown for the safety of our members. We planned on hosting the weekend long retreat for ~35 of our members in Temecula, CA where our members bond over downtown scavenger hunts and outdoor activities (i.e hiking). Spring retreat is an opportunity for BMES members to escape academics for a weekend and create unforgettable memories.

# Section V – Inter-chapter Activities

For the UCSD BMES Chapter, the 2019 – 2020 year saw the greatest number of inter-chapter activities of any year in recent history. With collaborations with chapters from the University of North Carolina at Chapel Hill (UNC), the University of California, Los Angeles (UCLA), and the University of California, Irvine (UCI), the UCSD Chapter has forged personal and mutually beneficial relationships each of these chapters.

The first collaboration of the year was with UNC, during our Cornell Info Session. Having had contact with the UNC Chapter, UNC was invited to join in on the virtual info session. The event was a success, with attendees from both universities attending the informative event. The next collaborations occurred later in the year, during the COVID-19 crisis. After UCLA and UCI reached out to UCSD, the 3 chapters created a strong network of sharing virtual events during the time of social distancing. This includes the Pen Pal Program, where members are paired with someone from a different chapter. Both UCLA and UCI also received invitation the virtual Bioengineering Day hosted by UCSD. This event was also a great success, and members from both UCLA and UCI reached out to let us know how they enjoyed the event.

## V.1. Cornell Info Session with the University of North Carolina
*Audience: All UCSD and UNC undergraduates*

Early into the Fall Quarter, an alumnus of the UCSD BMES Chapter reached out to the current officers with an opportunity from Cornell. Cornell University wished to spread the word on their Biomedical Engineering MEng and PhD programs, and they wanted to host a virtual info session with UCSD. The chapter gladly accepted, but were also interested in sharing this unique opportunity. Through a contact with the University of North Carolina BMES Chapter, the President invited the UNC chapter to join in on the virtual event. UNC accepted, and were able to join the conference call between UCSD and Cornell.

At the event, there were 24 members in attendance at the info session, 18 from UCSD and 6 from UNC. The info session was presented by 2 Cornell Faculty, one who was in charge of the Meng program and the other in charge of the PhD program. The session went well overall, with students from both schools actively engaged in the conversation about the programs. To finish off the info session, every attendee was given a fee waiver for the Cornell Graduate School application, a small thank you from the university for attending the info session.

| Cornell Info Session with UNC BMES | 11/06/2019 *5:00-6:00 PM* | 24 Attendees (UCSD: 18, UNC: 6) | Cost: $0 |
|---|---|---|---|

### V.2. The Perfect Pairing Pen Pal Partner Program (PPPPPP)

*Audience: Bioengineering students at UC San Diego, UC Los Angeles, and UC Irvine who are interested in forging friendships with bioengineering majors outside of their school in a time of unusual stress and differences.*

The Perfect Pairing Pen Pal Partner Program is a program meant to connect students between BMES chapters at UCSD, UCLA, and UCI through weekly challenges and virtual socials. It is the brainchild of the Freshman Representatives. The PPPPPP was conceived as a desire to keep the BMES committee at UCSD cohesively together despite the differences in time zones and distances during COVID-19. However, we decided to expand upon this idea by aiming to bring together bioengineering students from UCSD, UCLA, and UCI. Each person is paired with another person from a different school in hopes of providing an outlet for students to make connections through a diverse set of weekly challenges that are designed to bond pairs together. By completing these challenges, points are earned and at the end of the program, the pairs who have the most points will earn prizes. Pairs are also reshuffled every three weeks so everyone can meet someone new.

| Perfect Pairing Pen Pal Partnership Program | Throughout Spring 2020 | 33 Participants (UCSD: 15, UCLA: 9, UCI: 9) | Cost: $0 |
|---|---|---|---|

## Section VI – Outreach Activities

Our UCSD BMES Outreach Committee of 2019-2020 is one that strives for the collective growth of both its committee members and the greater San Diego community. Utilizing the diverse resources available among our own committee members, UCSD, and the San Diego community, we increase awareness and interest in STEM/Bioengineering opportunities for our younger generations. Our committee as a whole has continued throughout the year to make significant impacts through both live and virtual events: Light the Night, Lab Tours, San Diego Festival of Science and Engineering, Project Engine, College Conversation sessions, and science videos. These events are only possible through a mutual drive found within our committee: the passion to teach and to learn for cultivation of oneself and the community.

Through Outreach, our members continue to grow as leaders and individuals -- always consciously exercising creativity, compassion, and constructive criticism in a safe, judgement-free environment. Not only do we gain hard skills from designing all our own demonstration projects, but we also gain soft skills such as creativity, leadership, communication, and teamwork. In addition to enriching our younger generations with our knowledge in STEM, our members in Outreach seek to inspire our younger generations and community in ways beyond the educational subjects we teach in the classroom. We seek growth and development. We seek aspiration and opportunity. We seek inspiration and cognizance.

Our unique incentive for this year's Outreach committee was the stress for personal growth of our individual members, all the while inspiring kids who do not necessarily have the opportunities or exposure to higher education. Oftentimes in Outreach, members are not sure of their specific role within the committee or how they are contributing in an impactful way. This year, we made an effort to remind our committee members of their individual -- as well as group -- roles, and procure self-assessments to understand how they have grown or made an impact. Furthermore, our incentive for Project Engine this year was to reach out to schools that were more disadvantaged in areas like STEM development or opportunities in general; many schools we met with and reached out to vocalized that the majority of their students come from households without higher education.

We also had issues starting Project Engine meetups early in the year because we did not have any existing demo projects from previous years. So, this year, we made it an incentive to create projects that were sturdy and could be reused for many years to come. Although we spent most of our time constructing these projects, we will be giving them to next year's Outreach to use so they can start the year off running with the several existing projects we have made. We wish for our successors to follow in suit so we can create a neat pool of projects for Outreach to use at any time and at any occasion!

Unfortunately many plans we had for spring quarter this year were cancelled due to COVID-19. This includes many additional Project Engine sessions that were planned and  several collaborations with Poway High School, including a college day and science fair. We will provide the information for these plans and our contacts at the schools to our successors so that they

can continue on where we left off. To account for these setbacks, we have continued to hold weekly meetings via Zoom, and we moved forward with our virtual projects: College Conversations and science videos. We strongly believe that students have and will be impacted by these because they still serve as valuable resources for them. We have received many comments and feedback from our College Conversation sessions, with students of all ages saying that our advice was tremendously helpful and insightful. Our Outreach committee has also helped a few students this quarter commit to UCSD. Despite the current situation, we at BMES Outreach 2019-2020 strongly believe that we have made an impact this academic year and will leave a lasting one in the upcoming years.



Photos from UCSD BMES outreach activities. Top left: Light the Night (VI.1). Top right and bottom left: project presentation at SDFSE (VI.4). Bottom center: project building for SDFSE. Bottom right: a screenshot from a virtual committee meeting.

### VI.1. Light the Night
*Audience: Attendees of Light The Night San Diego 2020*
*Volunteers: All BMES members*

At this event BMES organizes volunteers to help the Leukemia and Lymphoma Society set up and run their annual Light The Night Fundraiser and awareness walk. It's a BMES tradition to volunteer at the event and at this point our participation is almost a necessity for the program to run smoothly. This event benefits the operators by promoting their organization's mission and fundraising. Cancer is a terrible disease for the people affected by it and their friends and family. This event shows these people that their struggle is known and there are people in the world trying to find a cure. For our committee members it is a great introduction to the goals of our outreach committee, helping others. It shows them the effort and organization required to run a large event. Allows them to volunteer for an afternoon or all day. Most importantly, it is the first opportunity to get a face to face interaction with the people they are trying to help.

Every one of our volunteers that we talked to had some sort of experience interacting with someone who had cancer affect their life. The event also created a bonding opportunity with the volunteers. It should be noted that our BMES Outreach committee is the only volunteer group that stays after the event ends to assist the event coordinators with cleanup and pack away the extremely sizable tents, which is a huge task that requires much teamwork and effort. Working together on a project is a good way to build camaraderie and after the event our volunteers get desert together at a local dessert shop. A well-deserved opportunity to enjoy oneself and relax. Our committee was especially recognized this year by the Leukemia and Lymphoma Society themselves, crediting our superb help at the event and offering us a gesture of appreciation for our volunteers in the form of lunch.

| Light the Night Volunteering | 11/02/2019 *10:00 AM - 9:00 PM* | 51 Volunteers | Cost: $252 |
|---|---|---|---|

## VI.2. Lab Tours for Clairemont High School
*Audience: Clairemont High School Students*
*Volunteers: All BMES members*

On this day we had a class of students from Clairemont high school come to the UCSD campus for a series of lab tours within the Bioengineering Department. The goal of the event was to give the students a brief firsthand experience about what a research lab looks like and the different areas of research that exist at UCSD. As the participating labs provided their own people to present their research to the students, our volunteer's main job was to guide the students from lab to lab and answer any questions the students had along the way. We hope that this is a non-intimidating way for students to learn more about STEM and bioengineering so they can consider it as an option for them in the future. This is a great opportunity for our members of all grade levels to participate in because they each bring their own unique perspective. First and second years more clearly remember the high school experience and can give guidance and advice on the transition from high school to college. Older volunteers are more familiar with the different types of research on campus and post-graduation possibilities so they can give key insights into future endeavors.

| Lab Tours for Clairemont High School | 12/05/2019 *9:00 AM - 12:30 PM* | 16 Volunteers | Cost: $0 |
|---|---|---|---|

## VI.3. Project EngINE
*Audience: Elementary and Middle School Students*
*Volunteers: BMES Outreach Committee members*

This is our initiative to promote STEM and bioengineering topics at elementary and middle schools. We connect with teachers in San Diego and bring volunteers to the classroom to talk

about hands-on demonstrations. Oftentimes, UCSD feels isolated from the rest of San Diego. Events like this allow our students to get away from campus and experience what life is like in the rest of the city and county. This allows our members to experience life outside of the more privileged scene found in La Jolla. This year, we created four hands-on demos centered around various biomechanics and biophysics concepts. For our members it is one of the best ways to get hands on experience volunteering with younger students and to help science education.

| Project EngINE | 02/28/2020 *1:30 - 3:30 PM* | 8 Volunteers | Cost: $63 |
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## VI.4. San Diego Festival of Science and Engineering (SDFSE)
*Audience: Attendees of SDFSE, primarily local K-12 students*
*Volunteers: All BMES members*

This event is a 10-day educational experience for kids and their families to get involved in STEM demos and interactive activities. Our Outreach committee holds a booth on EXPO Day, where our volunteers (UCSD students within our committee and in BMES) help oversee two interactive projects for kids and their families. This year, our two projects were completely conceptualized and constructed by our committee members. Each project included an informative poster and an interactive demo where the kids and their families were encouraged to participate. Our volunteers engaged with families, guiding them through the posters and demos just enough so that they grasped the concept, while still allowing them to draw their own conclusions.

  This year's projects focused on two areas of STEM: genetics and the engineering design process (Scientific Method). For our genetics themed project (Avengers), we created a Central Dogma setup that consisted of two parts: 1) matching tRNA base pairs with the mRNA template strands that were created via laser cutting and CAD, and 2) creating a protein via the scanning of different RFID chip combinations and Arduino interface.  For our engineering design project (Black box), we engineered six "black box" circuits -- each equipped with a different property -- and had the kids and their families interact with the boxes in efforts of determining the sensor in the circuitry. The six boxes each contained a different sensor -- temperature, humidity, proximity, sound, light, and no sensor -- where stimuli were represented through the frequency at which the LED light blinked. One of the boxes has no sensor, but rather a randomly blinking LED, which was intended to teach students an important lesson: approaching science with previous biases due to scientific expectations can hinder insightful interpolations. Not only did preparing for this event push our members to develop many hard skills such as Arduino, circuits, CAD, laser cutting, tool work, etc., but it also pushed us to develop soft skills such as thinking outside the box and explaining high-level concepts in a simplified manner.

| San Diego Festival of Science and Engineering | 03/07/2020 *7:00 AM - 5:30 PM* | 37 Volunteers | Cost: $105 |
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## VI.5. College Conversation
*Audience: High school students nationwide who are interested in college*
*Volunteers: BMES Outreach Committee members*

In order to continue our mission during these times, we began a series of live online presentations and Q and A sessions. Member pairs from our chapter would co-host a zoom meeting where they would present on a topic of their choice ranging from what life is like as a premed to getting along with roommates. After these brief (10-15) minute presentations, the presenters would answer questions that had been asked or posted in the chat. While anyone was free to join we focused our efforts on the high schools of current members. This time of the year is critical for students trying to choose a college so we thought it would be especially useful for high school seniors. Our members were able to use their insights to help students make tough choices under difficult circumstances.

| College Conversations | All Throughout Spring 2020 | 15 BMES panelists<br>105 high schoolers | Cost: $0 |
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## VI.6. Science Videos
*Audience: Elementary, middle, and high school students*
*Volunteers: BMES Outreach Committee members*

This is currently an ongoing project for Spring quarter 2020 in lieu of making virtual resources for kids during the pandemic. Since we were not able to go to schools in person this quarter for Project Engine, we have been working on a series of scientific DIY videos for kids to follow along with at home. The idea for this project is for kids to still experience science in an interesting manner, while using supplies they can find easily at home. Most of these videos touch on food science topics and mechanics. Each of our members put together a simple protocol, video, and scientific explanation for their demo they chose to conduct. The videos will be uploaded onto YouTube in the coming weeks. We will be reaching out to our Project Engine teachers with these videos once they are finalized. This project was great for our committee members to learn how to design simple protocols, experiments, and explanations. Our members also had a lot of fun with this, and also gained video editing skills along the way!

| Science Videos | All Throughout Spring 2020 | 10 videos planned from<br>10 volunteers | Cost: $0 |
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# Section VII - Mentorship Activities

The mentorship program focuses on fostering an intimate relationship between upperclassmen and underclassmen. Our goal of this program is to provide our new members with individualized attention from our successful juniors and seniors along with an entire support system that will allow both groups develop lifelong skills and will help them be successful. Each pairing are handpicked with careful considerations to their personal interests and their professional interest as well as the track they are in. With nearly 100 participating members, we were able to match one mentor to 1-2 mentees and place all pairings in our family system. This year, we had close to a one to one mentor to mentee ratio, allowing mentors focusing on fewer mentees than previous years. The family system consists of 3 families, named after the founding fathers of UC San Diego's Bioengineering Department: Dr. Yuan-Cheng Fung, Dr. Marcos Intaglietta, and Dr. Benjamin W. Zweifach. This family system allows members to familiarize themselves in smaller, casual settings outside of the larger BMES events. Throughout the year, our families engage in a variety of friendly competitions such as scavenger hunts, spending time with their mentorship group and family, and challenge events. Through the mentorship program, we hope to help our members familiarize themselves with the new school environment, help them build their network with future colleagues and cultivate early professional development.



Photos from UCSD BMES mentorship-related activities. Left: Mentor-Mentee Speed Dating (VII.1). Right: Mentor-Mentee Reveal (VII.2).

## VII.1. Mentor-Mentee Speed Dating
*Audience: Paid members of UCSD BMES*

Before the mentorship group selection process, the program began with a speed dating event so the upcoming mentors and mentees could familiarize themselves with one another. The event involved rotating groups of mentees to meet different mentors, with whom they would answer prompted questions designed to acquaint the fellow students. Through this event, students could request specific mentors or mentees in the hopes that obtaining their choice would encourage students to devote themselves more to the mentorship program.

| Mentor-Mentee Speed Dating | 10/03/2019, 10/23/2019 *7:00 - 8:00 PM* | 49 attendees total | Cost: $63 |
|---|---|---|---|

## VII.2. Mentor-Mentee Reveal
*Audience: Members of the UCSD BMES Family System*

The Mentor-Mentee Reveal was a large-scale event meant to introduce underclassmen mentees to their upperclassmen mentors. This created an enthusiastic atmosphere for the initial encounter of mentor to mentee, generating an impact to kick start a smooth transition into a strong relationship. Our theme for this year was Pokémon, and our members engaged in multiple Pokémon themed activities to allow. students to get to know their respective mentors, mentees, and members of the overarching family their group was a part of, as well as given personalized pokeball buttons representing their family to emphasize a sense of community.

| Mentor-Mentee Reveal | 10/27/2019 *11:00 AM – 2:00 PM* | 49 attendees total | Cost: $144 |
|---|---|---|---|

## VII.3. Mentor-Mentee Scavenger Hunt
*Audience: Members of the UCSD BMES Family System*

The Scavenger Hunt occurs shortly after mentor-mentee and family assignments. It is a friendly competition between mentor-mentee groups from the three families, and it is designed to help participant of the mentorship program to bond with each other. Mentor-mentee groups were challenged to solve riddles in order to locate UCSD landmarks and resources, such as libraries, gyms, and tutoring centers. Therefore, the Scavenger Hunt also helped participants explore the campus and learn what it offered.

| Scavenger Hunt | 11/16/2019 *11:00 AM – 12:30 PM* | 29 attendees | Cost: $0 |
|---|---|---|---|

## VII.4. Family Socials
*Audience: Members of the UCSD BMES Family System*

We encourage our family heads to host socials throughout the year to destress and have some fun. These socials are designed to provide members with an easily accessible community that they may become closely attached to so as to provide them a desirable support system throughout the academic year. All family socials incur no cost ($0) on the end of BMES.

| Intaglietta Taco Social | 11/11/2019 *5:00PM-7:00PM* | 8 attendees |
|---|---|---|

| Zweifach Hot Pot and Boba Social | 11/11/2019 *6:00PM-8:00PM* | 9 attendees |
|---|---|---|
| Fung Dim Sum Social | 11/15/2019 *8:00PM-10:00PM* | 10 attendees |
| Intaglietta Ramen Social | 11/17/2019 *2:00PM-4:00PM* | 10 attendees |
| Fung Dessert Social | 11/24/2019 *12:00PM-2:00PM* | 7 attendees |
| Fung Boba Social | 01/12/2020 *2:00PM-4:00PM* | 7 attendees |
| Fung Ice Skating Social | 01/17/2020 *7:00PM-9:00PM* | 10 attendees |
| Zweifach Movie Social | 02/08/2020 *3:00PM-5:00PM* | 5 attendees |
| Intaglietta Souplantation Social | 02/17/2020 *12:00PM-2:00PM* | 8 attendees |

## VII.5. Mentorship Group Meetups and Challenges
*Audience: Members of the UCSD BMES Family System*

Once our members were placed in their mentorship groups, they were encouraged to regularly meet and post photos on social media for family points. We hoped to incentivize pairings to meet and encourage others to as well to increase member interactions. This year we decided to have quarterly BINGO cards for groups to fill out with various activities such as attending BMES events together to de-stressing with a spa night. These meetups and challenges occur from November to March. Many mentorship groups continued to meet remotely during the COVID-19 lockdown.

## VII.6. Mentorship Program Assassins Game
*Audience: Members of the UCSD BMES Family System*

Assassins was a quarter long game where members of each family in the mentorship program competed to see who could be the last one standing. The basic premise is that each member receives a "target" that they must assassinate by sticking a sticky note on them. However, there are safeties that prevent assassination (e.g. wearing a cape) as well as safe zones (e.g. class or work). This game fosters family growth and bonding through teamwork and cooperation.

| Mentorship Assassins Game | January - March 2020 | 58 Participants | Cost: $0 |
|---|---|---|---|

## VII.7. BMES Olympics (Canceled due to COVID-19)
*Audience: Members of the UCSD BMES Family System*

Unfortunately, we had to cancel our annual BMES Olympics due to COVID-19. This event would have been the last all family social event where the families compete in a series of physical challenges to bring honor to their family. The planned challenges included an inflatable bounce course, relays, and water balloon tosses.

## Section VIII – Industry and Professional Development Activities

A major goal of UCSD BMES is to promote technical and professional development via research, academic and networking opportunities in undergraduate students interested in biomedical engineering. This mission was accomplished through project cycles, workshops, a design project, and undergraduate/graduate talks held by our Project Team committee. On top of this, the project team committee met approximately weekly for an hour, with 15-25 undergraduate students working together to plan all the separate aspects of the Project Team. Furthermore, at the beginning of Winter Quarter, the design project team (called DEBUT), met every weekend for one to three hours. This mission was also fulfilled through a variety of professional development events planned by the BMES executive board and through collaborations with the UCSD Bioengineering department and other undergraduate organizations. These events provide undergraduate students with access to jobs and internships in bioengineering as well as opportunities for professional development and industry networking. These events include individual company informational sessions, workshops, and the Bioengineering Career Fair. Furthermore, our Webmaster also worked with the Department of Bioengineering to develop an online hub to publicize research and internship opportunities to undergraduate students.



Photos from UCSD BMES Professional and Technical Activities. Top left: Resume Workshop and Professional Headshot (VIII.6). Top right: Bioengineering Career Fair (VIII.9). Bottom left: BEinformed Talk (VIII.4). Bottom right: Finite Element Analysis Workshop (VIII.2).

## VIII.1. Project Cycles
*Audience: Paid BMES members*

Project Team worked with graduate students, postdocs, and professors to find students to fill in open lab positions. Our role was to provide our members a description of the open lab position(s), create an application, collect resumes, interview the applicants, and forward our thoughts on each applicant to the graduate student or professor. Due to COVID-19, we were unable to continue project cycles or work with professors who were interested in working with us in the spring quarter. Project Cycles were faculty-sponsored, and they did not incur any cost on UCSD BMES.

### McCulloch Lab
The first project cycle we worked on was with Sachin Govil, a graduate student of Dr. Andrew McCulloch. The name of the project was Cardiac Atlas and was focused on the study of ventricular remodeling in adult heart congenital disease patients with the aid of machine learning to form statistical shape atlases based on CMR images. We had six applicants, and Sachin accepted one of them.

### Valdez-Jasso Lab
Sachin later referred us to Ethan Kwan, a graduate student who is a friend of his in Dr. Daniela Valdez-Jasso's lab. Ethan was looking for an undergraduate to student work with him on various projects centered around studying how the right ventricle of the heart remodels in response to pulmonary arterial hypertension. We had nine members apply to the lab, of which we chose four top applicants and Ethan accepted them all into the lab.

### Dr. Saddawi
Lastly, Dr. Saddawi who works with the Moore's Cancer Center as a postdoc/physician reached out to us for assistance in finding a student to work with him in his lab. The projects in the lab broadly concerned translational work to discover novel precision therapies for cancer - principally, head and neck cancers and uveal melanoma. We had five applicants for the position and Dr. Saddawi chose one out of the group.

## VIII.2. Project Team Technical Workshops
*Audience: All BMES member*

The workshops put on by the Project Team committee focused heavily on developing the technical skills of anyone who was interested in attending them. These skills were specifically tailored to those useful for the Bioengineering: Bioengineering major at UCSD, due to the interests of the co-chairs, thus there were not many workshops based around biotechnology. Most workshops lasted one to three hours and were designed to take a person with no working experience with a specific skill, and build them up to the point where they'd feel comfortable learning more on their own. All workshops incurred no cost.

The first workshop of fall quarter was designed around the application 'Prototyping on Paper', which allows a person to design an application on paper, and test the functionality by taking a picture of the app and assigning buttons to the photos. This workshop was less about the application however, and more about learning how to work in a team to develop a functional prototype.

| **Prototyping on Paper Workshop** | 10/23/2019 *6:00-7:00 PM* | 15 Attendees |
|---|---|---|

The second workshop of fall quarter was designed around learning how to utilize Solidworks to make a keychain. This workshop was by far the most attended workshop as it was advertised to a much greater degree than any other. Students learned the basics of CAD in general, as well as how to go through the process of turning a drawing into a 3D model in Solidworks. Students were then encouraged to use what they learned to make a custom symbol on the keychain. Students then submitted a stereolithography which was 3D printed and given to them at the next committee meeting.

| **Solidworks Workshop** | 11/06/2019 *4:00-7:00 PM* | 20 Attendees |
|---|---|---|

The third workshop of fall quarter was designed around learning how to use Python in general. A recent graduate student, John Vincent Laxa, was brought in to teach students the basic functionality of Python and how it could be used to make certain tasks easier, with a specific focus on applying Python to difficult homework problems and monotonous tasks.

| **Python Workshop** | 12/04/2019 *5:00-7:00 PM* | 12 Attendees |
|---|---|---|

The first workshop of winter quarter was designed around learning how to work with Arduino to interface with buttons, LEDs, DC motors, and motor drivers. Students were split into multiple teams of three and assigned with filling in Arduino code which had been partially written (key information erased which was then walked through), and building a circuit to interface with the Arduino. Students learned how to write Arduino code, how breadboards function, how to utilize push buttons and LEDs in a circuit, and the basics of motor control.

| **Arduino Workshop** | 01/30/2020 *5:00-7:00 PM* | 15 Attendees |
|---|---|---|

The second workshop of winter quarter was split into three parts and was focused towards developing the skills of the students who were part of the DEBUT project. Over the first two sessions, students were taught how to use many of the tools in the Envision (UCSD Makerspace) space. These tools included: Laser cutter, 3D printers, band saw, drill press, sticker creator, and soldering iron. In the third session, students were expected to laser cut boxes from scraps of wood, and make a box with an LED in it, which lights up a piece of acrylic cut into a custom pattern. Developing these skills in the DEBUT members was paramount for the coming process of assembling a prototype surgical robot, which sadly was canceled due to COVID-19.

| **EnVision Workshop** | 02/08/2020, 02/15/2020, 02/22/2020 | 20 Attendees Total |
|---|---|---|

The third workshop of winter quarter was focused on introducing students to the basics of finite element methods and how they could be utilized to verify that designs would work. Utilizing Solidworks Simulation, students were shown how to create a complicated CAD model (Geisel Library), apply boundary conditions, fixtures, and connections within the model, and then see how the model reacts to certain stimuli. At the end of the workshop, students were briefly introduced to computational fluid dynamics, and how it can be used to analyze external and internal fluid flows. This workshop was unfortunately held near the end of winter quarter, thus leading to student drop-off because of Covid-19, a problem which persisted into spring quarter as all workshops were moved onto Zoom.

| Finite Element Analysis Workshop | 03/12/2020  *5:00-7:00 PM* | 10 Attendees |
| --- | --- | --- |

The first workshop of spring quarter was focused on introducing students to some of the more advanced functions that could be made in MATLAB. As many of the students who attended the workshop already had taken a class in which they had to use MATLAB, a focus on complicated example programs written for upper-division classes and research was taken. Students were shown a piece of code which converted videos into images, a piece of code which computed an integral using the trapezoidal method, a piece of code which estimates the solution to differential equations using Euler's Method, and a piece of code which generates solutions to the Hodgkin-Huxley model based on different input stimuli. Each piece of code was thoroughly explained.

| MATLAB Workshop | 04/09/2020 *6:00-7:30 PM* | 10 Attendees |
| --- | --- | --- |

The second workshop of spring quarter was focused on teaching some of the ideas key to nanoparticle drug delivery. Different types of nanoparticles were introduced to students, and how they have been used to efficiently deliver cancer treatments. Then, students were assigned to work with a group to propose a nanoparticle design to deliver a drug of interest. While there were not many people who attended the Zoom session for this workshop, it was recorded and posted on Facebook for our members who could not make the workshop to view.

| Drug Delivery Workshop | 05/08/2020 *4:00-6:00 PM* | 6 Attendees |
| --- | --- | --- |

## VIII.3. Design Project (DEBUT)
*Audience: All interested BMES members*

The design project had always been a small portion of Project Team in the past, with the two previous years focusing on developing a herringbone origami based burn massager to help massage burn victims' scars to aid with inhibiting collagen development in the tissue. While these projects had plenty of success in the past, they always remained a smaller priority than workshops and project cycles for Project Team. This year, the Project Team chairs wanted the design project to be a much more significant part of the committee, with a separate meeting time from the Project Team committee as a whole. The original goal was to work on a design

project throughout the year, and at the end of spring quarter, submit a proposal to an undergraduate design competition (like the VentureWell DEBUT competition for which the sub-committee was eventually named). Unfortunately, due to student inexperience, a difficult time finding an idea for a project, and Covid-19, actual prototyping for the project never got started. While this was unfortunate, it provided something much more helpful to newer students, which was access to a group of students who intended to help them develop the skills necessary to properly prototype a design. Over time, this group grew more and more closely knit, and while we continued to help develop the technical skills of our student in Envision and by teaching them how to properly conduct research and organize a research paper, it also served as a social community.

### VIII.3.1. Initial Research

The original plan for the DEBUT committee was to decide on an idea by week 5 of fall quarter and finish preliminary research on the topic by week 10, so that by the start of winter quarter, prototyping could begin. However, due to difficulty in finding a good project idea and preoccupation with some of the other aspects of Project Team, we were unable to settle on a good idea until the very end of fall quarter. Our original idea was to develop a novel method to control a surgical robotic that would improve surgeon's control of a robot such as the da Vinci robotic system. Coming into the beginning of winter quarter, we began research with a group of approximately 20 students at the beginning, and quickly found this idea to be uninspired. We instead turned our attention towards telesurgical robots, with the ability for a surgeon to interface with the robot from hundreds of miles away and accurately perform surgeries. While this had been done before, we wanted to focus on making a telesurgical robot for underserved populations, made of materials that were both low cost and easy to sanitize. Everyone was very excited about this idea, however, given the difficulties in designing such a system and the general inexperience of many of our members, it was instead decided to focus on proposing a framework for our idea as opposed to making a fully-fledged prototype. After weeks of research and going back and forth with ideas, the project proposal was fully decided upon:

> *"We are proposing the framework for a low cost telesurgical robot for laparoscopic procedures in developing nations. Our proposal is theoretical rather than a hard design; however, we will provide a prototype to show feasibility, given materials found on a typical college campus. We will utilize wireless tracking technology and motion scaling to allow surgeons to accurately control the system from a distance of approximately 500 miles away. Future goals for this project include developing robots for use in other surgeries and improvement to the current sterilization techniques used in surgical robotics."*

With the project proposal completed, it was time to move the committee to a design space where we could work towards prototyping smaller aspects of this project as a proof-of-concept for the design competition.

### VIII.3.2. Training

Upon moving the committee to the Envision space, it was realized that all members had to be properly trained on all Envision equipment that would be necessary for the development of a proper surgical robot. See the workshop section for the 'Envision workshop', on how this turned out. With the members trained on all necessary Envision equipment, and prepared to get started on the prototype, the committee was split into three groups. The mechanics group was created to focus on the actual design of the robotic arm, the interface group was created to focus on the interface for which a surgeon could interact with to work the robot, and the telesurgical group was focused on finding ways to effectively transmit the data from the interface system to the robot. One day was taken to test the teamwork of all the separate subteams in creating paper replicas of Geisel Library, and the committee was finally prepared to begin prototyping on the robot by the end of week 8.

### VIII.3.3. COVID-19 Rescheduling

As the reader may have guessed, this project does not have a successful ending, as Covid-19 quickly threw all the plans for DEBUT into disarray. Due to the chaos of Covid-19's first breakout in the US, all DEBUT meetings were suspended until spring quarter, at which point meetings would have to be shifted online. Due to the inability to physically prototype anything anymore, the focus was instead shifted to learning more about surgical robotics and robotics through fun exercises and planning out a potential research review paper on telesurgery in general. While this was not the original vision for DEBUT, it had to suffice while everyone was unable to physically meet. Currently, the DEBUT committee still meets weekly, barring the Project Team leads being unable to attend due to new executive board responsibilities and the DEBUT subleads being unavailable. The plan for DEBUT is to continue on into the summer, with a slimmer, and more dedicated team to begin prototypes on Fusion 360 and write a review paper. Coming into next year, the new Project Team chairs would have the option of continuing this original project, or thinking up something entirely different. While the DEBUT committee had plenty of setbacks, it was a resounding success in terms of adding another avenue for BMES members to develop their technical and professional skills. Special thanks go to the DEBUT subleads, Bryan Nguyen and Hannah Tauchi, for their hard work in helping the Project Team chairs manage what amounted to two committees simultaneously.

## VIII.4. Undergraduate/Graduate Talks (BEinspired/BEinformed)

The purpose of our BEinformed talks was to give our members a platform to practice developing soft skill development in a "low stakes" environment. The members who signed up for these talks would deliver a power-point presentation on an article related to biomedical engineering research that they had found interesting to share at our meetings. These talks took up an average of 10 - 20 minutes depending on the subject and were followed up with questions from other curious members and a discussion within the group as a whole. Our BEinspired talks had a very similar format but were given by our undergraduate members as well as invited alumni to speak about their research or industry experiences and how these were obtained. The goal of these talks was to show members that their peers and our alumni can serve as guides and

resources to each other. We still incorporate these talks into some of our meetings over zoom. These incurred no cost.

| John-Paul Pham BEinspired | October 2nd, 2019 | 17 attendees |

John-Paul Pham is an undergraduate student who was invited to speak about his lab experience he gained from one of Project Team's project cycles last year. He gave a thorough and clear description of the process of his research in Dr. Shengqiang Cai on the characteristic properties of PLA-hydroxyapatite.

| Elisabette Tapia BEinformed | October 23rd, 2019 | 13 attendees |

This BEinformed talk was an update on an FDA approved injectable hydrogel by the Christman Lab to repair cardiac damage.

| Parker Hill BEinformed | October 30th, 2019 | 17 attendees |

Spoke about Project lim(b)itless that has the goal of making prostheses more accessible to amputees everywhere.

| Shoun Matsuka BEinspired | November 6th, 2019 | 18 attendees |

Shoun Matsuka is an alumnus of UCSD and former Project Team Co-chair. He was invited to speak about his college experience, internships, and how they led to his job in industry.

| Elisabette Tapia BEinformed | January 9th, 2020 | 13 attendees |

This BEinformed talk was on Magnesium Microneedle patches for drug delivery purposes as researched by the Dr. Joseph Wang and Dr. Nicole Steinmetz labs.

| Reo Yoo BEinspired | January 23rd, 2020 | 16 attendees |

Reo Yoo gave a talk on his student project research experience

| Nipun Talwar BEinspired | February 6th, 2020 | 18 attendees |

Nipun Talwar gave a talk on his summer research experience at USC on Crispr/Cas9 in the eye for gene therapy of ocular diseases.

| Michael Bennington BEinformed | February 13th, 2020 | 18 attendees |

Michael Bennington gave a talk on the difference between engineering for biology and engineering from biology with the example of "sensorized" skin from MIT.

| Elizabeth Howard BEinformed | February 27th, 2020 | 12 attendees |

This talk was on hydrogel research

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|---|---|---|
| Yifan Lin BEinformed | April 9th, 202 | 15 attendees |

This talk was on protein maps research

| | | |
|---|---|---|
| Aoife O'Farrell BEinspired | April 23rd, 2020 | 14 attendees |

This talk was on immunology research

## VIII.5. Informational Sessions
*Audience: All UCSD students*

During these informational sessions, company and graduate school representatives were invited to UC San Diego to present the work done by their companies and researchers, as well as the opportunities that they offer for students. Students had the ability to talk to these representatives and learn what steps they would need to take to gain access to these opportunities. These informational sessions were planned and executed in coordination with other undergraduate bioengineering organizations at UCSD. These info sessions incurred no cost on the end of BMES.

| Company | Date and Time | Attendance |
|---|---|---|
| Medtronic | 09/30/2019 *6:00 - 8:00 PM* | 70 |
| Keck Graduate Institute | 10/15/2019 *6:30 - 8:00 PM* | 10 |
| Genentech | 10/24/2019 *6:00 - 7:00 PM* | 40 |

## VIII.6. Professional Headshot and Resume Review
*Audience: All UCSD students*

In collaboration with the California Psi chapter of Tau Beta Pi, UCSD BMES held a professional headshot and resume review workshop. Here, students had the opportunity to have their resume reviewed by a group of experienced upperclassmen from both organizations. They were also given a formal headshot that could be used for LinkedIn profiles. At this event we had six resume reviewers and eleven student attendees.

| Professional Headshot and Resume Review | 11/16/2019 *3:30 - 6:30 PM* | 11 Attendees 6 Reviewers | Cost: $0 |
|---|---|---|---|

### VIII.7. Switching into Bioengineering
*Audience: All students interested in changing their major to a bioengineering track or becoming more involved with bioengineering student organizations*

Switching into Bioengineering (SWiB) is a professional development event aimed to provide information detailing the logistics and requirements for any students that are interested in changing their major to the competitive Bioengineering Majors. It was organized by the Freshman Representatives and their committee. In order to provide students not just the hows for switching into bioengineering, we aim to explain the why. The event includes a keynote speaker in Dr. Bruce Wheeler for the 2019-2020 Switching Into Bioengineering Event, who gives a presentation in the various tracks in the Bioengineering Department, bioengineering, biotechnology, bioinformatics, biosystems, in order to better paint a picture for what each track specializes in. Furthermore, the discussion includes the general history of the bioengineering department along with introducing what the future of an bioengineer can potentially be after UCSD through various career pathways i.e. medicine, corporate, entrepreneurship, etc. Vanessa Hollingsworth who is responsible as the M.S./M.Eng. advisor thoroughly took students through the prerequisites, logistics, and statistics of prospective bioengineering students. A panel composed of upperclassmen who've switched into the bioengineering department ended the event by answering various questions from the audience along with adding in personal insights to advise the students in their upcoming years at UCSD.

| Switching into Bioengineering | 1/22/2020 *6 - 8 PM* | 70 Attendees | Cost: $0 |
|---|---|---|---|

### VIII.8. Resume and Elevator Pitch Workshop
*Audience: All UCSD students*

This workshop was held in the lead up to the Bioengineering Career Fair as a collaboration between UCSD BMES, the UCSD chapter of the International Society for Pharmaceutical Engineering (ISPE), and the UCSD Career Services Center (CSC). A representative from the CSC came and gave an interactive presentation about how to craft an effective and standout resume and how to pitch yourself to company representatives. This event was meant to directly prepare students for networking with companies at the Bioengineering Career Fair. The event was attended by 30 students.

| Resume and Elevator Pitch Workshop | 01/28/2020 *5:00 - 7:00 PM* | 30 Attendees | Cost: $0 |
|---|---|---|---|

### VIII.9. Bioengineering Career Fair

*Audience: All UCSD undergraduate and graduate students*

The Bioengineering Career Fair was a collaboration event between UCSD BMES, the UCSD Bioengineering Department Industrial Outreach Committee, ISPE, the Undergraduate Bioinformatics Club (UBIC), Tau Beta Pi (CA Psi), the Bioengineering Graduate Society (BEGS), and Engineering World Health (EWH). This was the only bioengineering-specific career fair held at UCSD. It was attended by 20 different companies, ranging in size and including both companies from San Diego and from around the country. These companies cover fields of bioengineering like medical devices, with companies like Medtronic and SeaSpine, biopharmaceuticals and biotechnology, with companies like Illumina and Takeda, genetics and genomics, with groups like the Genomics Institute of the Novartis Research Foundation, and computational biology, with companies like Reveal Bioscience and Nanome, among other. On the day of the event, every company had a booth where they were able to interact with students, provide information about internship and career opportunities, and conduct one-on-one interviews. The event was attended by 240 students, including both graduate and undergraduate students.

| Bioengineering Career Fair | 02/05/2020 *8:00 AM - 2:30 PM* | 240 Attendees | Cost: $4516 |
|---|---|---|---|

### VIII.10. KGI Biotech Industry Bootcamp

*Audience: All UCSD undergraduate students*

UCSD BMES coordinated with ISPE and the Keck Graduate Institute to host a Virtual Biotech Industry Bootcamp. This event was originally planned as an in-person workshop, but these plans had to be changed because of the escalating COVID-19 pandemic. During the virtual event, students had the chance to work in teams to learn about applying entrepreneurial and engineering skills and knowledge to the next generation of biotechnology companies. They also learned about the wide range of career possibilities in the biotechnology field. This event was virtually attended by fifteen students.

| KGI Biotech Industry Bootcamp | 04/27/2020 *5:30 AM - 7:00 PM* | 15 Attendees | Cost: $0 |
|---|---|---|---|

### VIII.11. Other Virtual Professional Development Activities

*Audience: All BMES member*

During the COVID-19 stay-at-home period, the UCSD BMES event planning committees took the initiative to prepare additional virtual professional development activities. These can be live Zoom panel discussions or recorded lectures addressing certain academic and professional topics

pertaining to bioengineering undergraduates. Recordings of these sessions are release to our members.

| Topic | Responsible Committee | Live Stream or Release Date | Cost |
|---|---|---|---|
| Undergraduate Research (Part 1) | Lab Expo | 04/15/2020 | $0 |
| Technical Writing | Translational Medicine Day | 04/20/2020 | $0 |
| Undergraduate Research (Part 2) | Lab Expo | 05/15/2020 | $0 |
| Interviews | Translational Medicine Day | 05/21/2020 | $0 |
| Bioengineering Technical Elective Courses | Bioengineering Day | 05/30/2020 | $0 |

## Section IX – National BMES Meeting Attendance



UCSD BMES representatives at the 2019 Annual Meeting Dessert Bash (Courtesy of the Biomedical Engineering Society)

For the past few years, UCSD BMES was honored to have the opportunity to send representatives to attend the National Annual BMES Meetings. We dispatched 18 of our 20 officers (all but the Freshman Representative as they are not selected by the time of the Meetings) to attend the 2019 Meetings. Their National Member IDs are listed in Table 1 in Section I.1.2. We are grateful for BMES for hosting the events, giving us an opportunity to network, learn from each other, and to showcase our own accomplishments. We also appreciate the generous support from the Department of Bioengineering of UCSD that funds our travel and accommodation.

UCSD BMES representatives volunteer for the event with alacrity. We help publicize the UCSD Department of Bioengineering at its booth, and we also demonstrate our outreach projects at the student chapter booth. Furthermore, many UCSD Bioengineering faculties, with whom we collaborate closely, and UCSD BMES member Summer Joyce Batasin hold administrative roles in the national organization. A few of our members are also invited to present their research at the Meeting (See Table 3 for more information).

In 2019, our President Reo Yoo was invited to participate in the BMES Student Think Tank, and our Bioengineering Day Chairs Aoife O'Farrell and Kendra Worthington attended the Women in BME Luncheon. Furthermore, UCSD BMES was awarded the "Outstanding Chapter Award" in 2017 for its achievements in the 2016-2017 year. Four of our members (Jessica Ma, Michael Bennington, Aditi Vaidya, and Breno Madi De Biasi) were also crowned champions in the 50th Anniversary BMES Jeopardy in 2018.

The 2020 National BMES Meeting will take place in our home city, San Diego. We are incredibly honored to have such a celebration of biomedical engineering coming our way. If public health guidelines permit, we most cordially welcome bioengineering researchers, industry representatives, advocates, students and BMES officials to experience San Diego's vibrant culture and prosperous bioengineering ecosystem. We are excited to represent our adoptive hometown and introduce this wonderful conference to our broader audience.

Table 3: Technical presentations in the 2019 Annual Meeting by UCSD BMES Members

| Presenter | Abstract Title | Type |
|---|---|---|
| Summer Joyce Batasin | "Using *In Vivo* Two-Photon Calcium Imaging to Investigate the Validity of the Dentate Gate Hypothesis" | Poster |
| Amanda Breton | "Hyperspectral Imaging to Monitor Effects of Itaconate during Hemorrhagic Shock" | Poster |
| Troy Houssain | "Quantitative MRI Volumetry to Characterize the Time Course of Hippocampal Atrophy after Chemoradiation Therapy for Brain Tumors" | Poster |

# Section X – Future Directions

In the upcoming 2020-2021 academic year, UCSD BMES looks to continue on its path as a valuable resource for any undergraduate interested in the potential of the field of bioengineering, regardless of the challenges that the organization will face due to unprecedented circumstances. Even as the COVID-19 pandemic uproots established practices of in-person organization and committee meetings, our chapter has still been consistently moving forward with its mission to assist the bioengineering community and beyond as best as possible through virtual means. Much of this is due to the dedication and flexibility of our previous board, who have worked tirelessly to transition the organization into an online format that is as capable of reaching out to members and other contacts as it has been before to continue bringing access to our chapter's resources. The new board looks forward to expanding upon this foundation so that the ease of access to the chapter's resources and connections will further benefit the diverse bioengineering community and bring it closer together. Our aims to accomplish this goal include providing students passionate about bioengineering and life sciences with any opportunities available in the San Diego community, with an emphasis on serving those from underrepresented backgrounds, and nurturing a philosophy of growth with a supportive space in the organization, virtual or otherwise, in which members are able to develop together, both personally and professionally. With these plans and the current prognosis of the pandemic, we will be ready to help old and new members of the bioengineering community adapt to and make the most of the situation we all have been placed in, supplementing their personal and professional development with important connections and resources no matter where they may be.

## X.1. Retaining the Focus and Adaptability of the Previous Board

The focus of the previous board was to make BMES a resource for the bioengineering community, regardless of background. They did this by creating many initiatives aimed at expanding the range of experiences for everyone in the organization as well as standardizing different aspects of committee meetings to increase awareness and thus accessibility to these newfound opportunities. We will work closely with the new officer board to ensure that the benefits of these ideas are not lost, while improving on their effectiveness in the virtual setting in much of our work will be presented.

To increase the diversity of experiences available to people in the bioengineering community, last year's board provided a plethora of new workshops and opportunities for those interested in the field to learn about all of its possibilities and improve their chances to become involved themselves. These included a professional development workshop hosted by our Publicity/Historian Chair and Webmaster, a Bioengineering Internship Symposium for different industry representatives to present their research, and lab tours to expose and connect high school and undergraduate students to different research research laboratories on campus. One of the milestones of this year's board was to cement the need for an annual Bioengineering Career Fair, which mirrors the university's quarterly career fair but is specifically for bioengineering opportunities from companies large and small across San Diego County. The previous board also improved communication amongst the committees of the organization to ensure that events

hosted by one committee were advertised and known by all active members in the five committees of BMES. This wide range of focused initiatives launched by the previous board to enhance the overall bioengineering experience are staples that the new board is eager to build upon to continue making a myriad of opportunities available through our organization. We believe that continuing the focus the previous board had in enriching the variety of professional development events hosted by BMES will improve our ability to guide both new and old members with more ways to further their own careers.

Beyond their work in making BMES a valuable and accessible resource for all students interested in bioengineering, the previous board has also performed a phenomenal feat in moving the events hosted by the organization into an online format for the final quarter of this school year. The impact of COVID-19 on public events at UCSD was immediate, as no in-person lectures, meetings, and events were allowed to be held on campus. Obviously, this impacted our organization's ability to continue providing different bioengineering events to experience, including Translational Medicine Day, one of our annual events scheduled to take place just two days after the campus-wide announcement. Incredibly, the previous board was able to restructure the event to host it almost exclusively through streaming platforms in the short time period of two days, allowing it to still happen as best as it could have, given the situation. This and the following transition to completely virtual meetings and events were enabled by the adaptability and quick thinking from our previous board, which is something our current board will uphold as we head into a hybrid virtual/in-person situation at the beginning of the next school year. We plan on working closely with the previous board and the new board to ensure that right from the start of the year, our committees are well-prepared to provide an equivalent experience of community, productivity, and connectivity while planning everything virtually, and potentially hosting some of our annual events in virtual formats until we transition back to in-person events.

## X.2. New Initiatives for the 2020-2021 Academic Year

The new board's vision is twofold: to connect students from diverse backgrounds to the resources and opportunities available to our organization and to foster a sense of community by nurturing the personal and professional growth of all of our members. Both of these aims will also be achieved while keeping in mind the prevalence of online events and meetings for much of the upcoming school year.

For the first goal of connection with an emphasis on those from underrepresented backgrounds, one of the new board's initiatives is to begin a tradition of selecting a transfer representative as an officer, replacing one of the two freshman representatives. There are many transfer students in a well-known university such as UCSD, and yet they have fewer resources specifically targeted towards their needs for the difficulties they face, so we seek to create this position to provide a welcoming haven for them where they can connect with people and ask for advice. In addition, changing the language that we use to advertise and promote certain events will be edited to be more inviting to everyone interested in the opportunity beyond just new freshmen, as transfer students are likely to need many of the information sessions we host as well. As a

general rule, inclusive language will also be a target for improvement as we seek to broaden our organizational diversity and encourage participation from anyone interested in the field of biomedical sciences outside of the major. The new board collectively wishes to improve this aspect of BMES for all of our events, so we want to make an effort to ensure that no one feels excluded from participating in our events and furthering our organization's vision.

While the first goal is aimed towards connecting with people outside of the organization to have them obtain opportunities for their own professional development without feeling left behind, the second goal is aimed towards our members. BMES as a whole is a professional development organization, but we also round out the college experience with a vibrant social community to work together, make lifelong connections, and experience college with friends by one's side. With this aspect of the organization in mind, the new board wishes to build a supportive space for members to feel comfortable in to develop both personally and professionally. One initiative we want to spearhead in the upcoming year is to publicize the accomplishments of different members of the organization on a weekly basis to validate each individual's successes and build connections between the organization and its members. Another plan we are considering to put in motion is to build a more personal connection between Executive Board members and the general body of the organization to bridge the gap between active members who do not hold positions and those at the top of the hierarchy of BMES. Both of these initiatives meshes well with the virtual setting forced onto us for the foreseeable future, making it easily implementable. We as the new board hope that these goals we have set for UCSD BMES will build interest in the bioengineering field and actively engage both new and old members in our events even with the necessity of online interactions in the upcoming year.