

Chapter Development Report

JUNE 2018-JUNE 2019

FLORIDA INTERNATIONAL UNIVERSITY

BMES FIU

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Executive Summary

During the 2018-2019 academic school year the Biomedical Engineering Society (BMES) student chapter at Florida International University (FIU) underwent two executive board election for Fall and Spring semester to encourage more student involvement. With the dedication and management of the new executive boards, the chapter not only established groundwork necessary to set the organization in a more positive direction, but also accomplished more than the society ever has within the last years. Initiatives has been made to promote industrial engagement and collaborations with other student organizations. For the first time annual BMES symposium was held to invite students in all majors to present their biomedical engineering related research. For the first time this year our chapter participated in several outreach activities and started to raise fund for volunteering as pre-health professionals on a medical mission trip to Peru. Innovative ideas for professional development, such as programming and soldiering workshops, were planned and executed. The chapter's signature events, Chocolate with the Chair and Softball between faculty and students, encouraged networking between faculty and students and provided our members with an opportunity to connect with their mentors in a friendly environment. Finally, for the first time in FIU Biomedical Engineering (BME) department, BMES chapter started hosting industrial engagement events including Networking Breakfast and Social Dinner, Career Fair, and Field Trip to Arthrex. With potential for improvement, but also an even greater potential for growth, BMES FIU is now the largest and most influential student organization in the BME Department at FIU.



Dear BMES National Chapter,

The Biomedical Engineering Society (BMES) Chapter at Florida International University has had a successful year. We believe the hard work and brilliance of our executive board made this success possible. We've hosted a broad range of social and networking events, career development and educational workshops, and outreach events.

As a student chapter, we recognized the need and desire from our members to have an industry-focused social event that provided a great opportunity for both students and faculty to broaden their network within the field. In Fall semester we successfully held for the first time an event that met those needs titled "Evening with Industry" because it was held for a few hours in the evening. In Spring we extended this activity to "Day with Industry" with collaboration of FIU Biomedical Engineering (BME) Department. The day started with a networking breakfast followed by research presentations by industry professionals and BME faculty where FIU BME introduced their newly formed Industry Advisory Board (IAB). The first time ever FIU BME Career Expo was the highlight of this day that was held in the afternoon per our members request for BME-focused job fair. Our students gained access to valuable insights as well as potential job opportunities from this event. We hope that "Day with Industry" will remain as an annual activity of our chapter.

Furthermore, student members of the chapter had the opportunity to tour Arthrex. This trip was planned in hopes of exposing students to opportunities available post-graduation. The education received within the BME degree provides a vast variety of concepts and subsections, however, with the abundance of information, students are often left confused or unsure of career opportunities available. To add to the uncertainty, there are hardly any job listings with the title of, "Biomedical Engineer". Students must learn the options available in the industry for post-graduation and how to look for them. The visit to Arthrex was just one way the BMES tried to assist students in viewing real-life applications of BME topics. This trip successfully revealed the different careers that exist within the BME field.

Giving back to the community, FIU BMES hosted and participated in many outreach events in places ranging from school, libraries, Frost Science Museum, and at STEM Day at Hard Rock Stadium. We promoted the field of Biomedical Engineering by showcasing an in-house project, built by active members of the society, composed of a 3-D printed humanoid Hand and Forearm and implementing EMG and actuators to control it. In February, we've started organizing and fundraising for a medical mission trip to Peru with a group of dedicated FIU BMES members to experience medicine first hand, while also volunteering in a low-income community.

Lastly, our hope is that more those events that represent enrichment for the students continue to be provided for the next period.

Sincerely,

Zahra Nafar and Josue Gil

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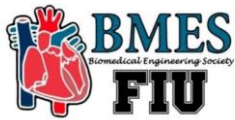


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I Administration Report

Our executive board consist of ten positions outlined in the following section. Each position has its designated responsibilities, however, the executive board functions as a team, and whenever one of its members needs help in accomplishing a task the other members are there to lend them then necessary assistance. The system was established during the 2017-2018 academic school year to improve the efficiency of the organization. The executive board meets once every week to discuss, plan, and coordinate any tasks that needs to be accomplished within the organization. Even though the executive board takes on the responsibilities of leading the organization, it is our general body members that influence the what the executive board decides to focus on. Our chapter encourages free and open discussion with our general body members at every meeting to have a better understanding of what our general body members want to get out of the organization. Our elections are held once a year during the spring, and are based on a popular vote. Any ambitious general body member can apply to run for any position. Qualified candidates give a speech at the last general body meeting of the semester and are then voted on electronically. This year to encourage student involvements we held the election twice and new executive board led the chapter in Spring semester.

IA. Executive Board Positions (Fall 2018)

President, Zahra Nafar (znafar@fiu.edu)

- Oversees entire organization

Vice President, Jay Yeung (jyeun003@fiu.edu)

- Assists President in overseeing the organization

Treasurer, Romina Doubnia (rdoub001@fiu.edu)

- Keeps track of budgeting and financing of the organization

Secretary, Refat Chowdhury (rchow012@fiu.edu)

- Send and responds to emails, etc.

Event Coordinator, Jorge Barter (jbart061@fiu.edu)

- Makes reservations to make events happen for our members

Webmaster, Baarbod Ashenagar (bashe001@fiu.edu)

- Updates the our BMES chapter's website with relevant information.

Council for Student Organizations (CSO) Representative, Manuel Garcia Russo (mgarc805@fiu.edu)

- Represents the BMES chapter to the Council

Alliance of STEM, Anderson Milfort (amilf003@fiu.edu)

- Responsible for collaborating with other STEM organizations on campus

Marketing Specialist, Monserrat Otarola (motar001@fiu.edu)

- Promotes BMES around campus

BMES National Ambassador, Josue Gil (jgil035@fiu.edu)

- Responsible for national communications and events

IA. Executive Board Positions (Spring 2019)

President, Josue Gil (jgil035@fiu.edu)

- Oversees entire organization

Vice President, Jay Yeung (jyeun003@fiu.edu)

- Assists President in overseeing the organization

Treasurer, Brigitte Manohar (bmano005@fiu.edu)

- Keeps track of budgeting and financing of the organization

Secretary, Gerson Romero (gmore044@fiu.edu)

- Send and responds to emails, etc.

Event Coordinator, Kelsie Bryant (kbrya030@fiu.edu)

- Makes reservations to make events happen for our members

Council for Student Organizations (CSO) Representative, Jorge Barter (jbart061@fiu.edu)

- Represents the BMES chapter to the Council

Alliance of STEM, Jessica Molina (jmoli112@fiu.edu)

- Responsible for collaborating with other STEM organizations on campus

Marketing Specialist, Daniela Guevara (dguev017@fiu.edu)

- Promotes BMES around campus

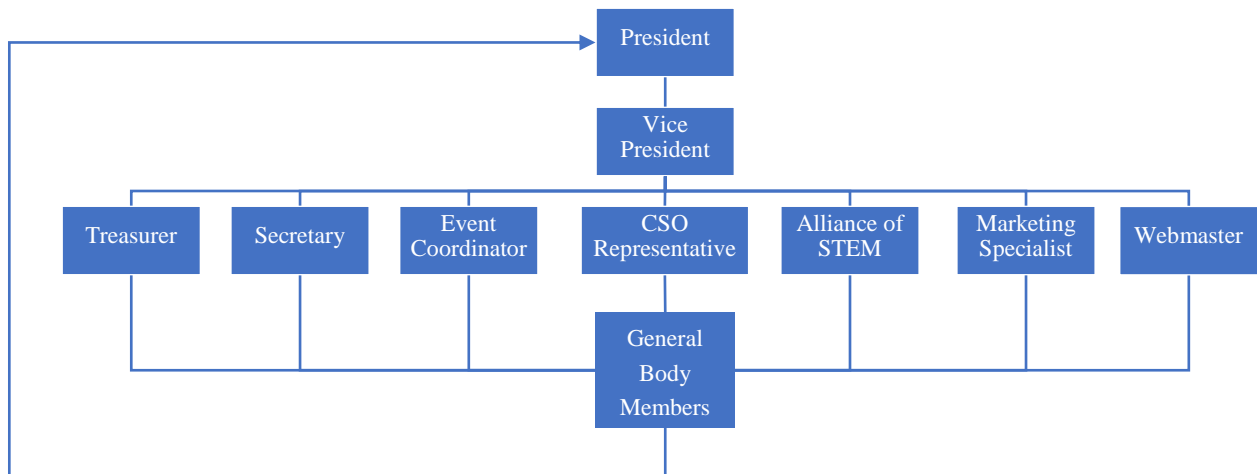
Webmaster, Romina Doubnia (rdoub001@fiu.edu)

- Updates the our BMES chapter’s website with relevant information.

BMES National Ambassador, Zahra Nafar (znafar@fiu.edu)

- Responsible for national communications and events

Management Tree of Officer Responsibilities



Membership

Academic Year	Local Members	National Members	Total BME Department Students	Fraction of Students in BMES
2017-2018	42	18	413	15%
2018-2019	67	25	413	22%

Executive and General Body Meetings:

Meeting Category	Meeting Dates	Attendance	Fraction of Membership
Excutive Board Meeting	August 2018-May 2019 (<i>Weekly</i>)	10	15%
General Body Meeting	September 1st, 2018	22	33%
General Body Meeting	October 4th, 2018	18	27%
General Body Meeting	January 16th, 2019	25	37%
General Body Meeting	March 1st, 2019	16	24%
General Body Meeting	April 16th, 2019	19	28%

Example Meeting Agenda:

Notetaker: Gerson & Daniela

1. Ideas
 - a. Mentorship program,
 - i. Couple of upperclassmen to mentor underclassmen, pass on information
 - ii. To qualify for funding for BMES Conference - (Long term goal)
 - iii. Get list of upperclassmen who are interested
 1. Announce at general body meeting
 - iv. Recruit lowerclassmen in the intro to BME class
2. General Body Meeting
 - a. Room TBD, time TBD
 - b. Doodle poll will be sent out for scheduling the meetings
3. Women's 2019 Basketball STEM DAY Outreach
 - a. Have general body meeting before this event
 - b. January 17th
 - c. Time : **
 - d. FIU Arena
 - e. Expo and then womens basketball game
4. Spirit point
 - a. Manual will be sent out to determine the qualifications for the point system
 - b. picture , poster, and description of how it is a spirit point.
5. Chocolate with the Chair
 - a. **File for funds**
 - i. **Josue and bridgette**
 - ii. Publix quote for drinks
 - iii. New forms for CSO application
6. Getting shirts & Graduation stoles
 - a. National BMES

II Treasury Report

This academic year our BMES chapter relied on university funding from the Council for Student Organizations (CSO). Each semester CSO allows for a maximum of \$500 in funding for each student organization on campus, unless certain requirements are met to receive special allocation funding. These requirements are tracked via the use of a point system. Student organizations earn points by hosting events on campus, attending other organization's events, and attending monthly meetings. The total amount of special allocation funding available to all campus organizations is determined by the university at the beginning of each semester. All student organizations at FIU that qualify for special allocation funding can file for funds. Funds are then approved on a first come first serve basis between all the organizations within FIU, until all the special allocation funding runs out. With the exceptional leadership of our new executive board we qualified for special allocation funding for BMES FIU for the Spring semester and again for Fall 2019 semester. Any funding provided by the university that is not used by the student organization does not carry over to the next semester, and every semester the special allocation requirement must be met for the organization to receive additional funding the following semester.

This year we also received a travel funding from FIU engineering center that supported our Arthrex trip. Besides we received National BMES support for graduation stoles.

I BMES FIU Chapter Funding

Expenditure for BMES Spring 2019		
EVENT	Amount Spent/Received	Date
Chocolate with the Chair	\$118.17	2/11/2019
Chocolate with the Chair	\$94.98	2/13/2019
Chocolate with the Chair	\$138.24	2/13/2019
Volleyball Social Event	\$21.40	2/25/2019
2nd General Body Meeting for BMES	\$78.00	2/25/2019
Day with the Industry / Breakfast with the Industry 2019	\$1,000.00	4/3/2019
BMES field day	\$80.80	4/3/2019
BMES t-shirts	\$284.70	4/3/2019
BMES Field Trip to Anthrex. (1370 Creekside Blvd, Naples, FL 34108)	\$1,105.00	3/4/2019
Graduation Stoles Spring 2019)	\$120.00	
Graduation Stoles fund (Received from National BMES)	\$750.00	4/3/2019
Car wash & Bake Sales	\$1,595.34	Throughout the Spring Semester of 2019
Resturant Fundraiser : Panda Express	\$37.85	02/16/19
Resturant Fundraiser : Chipotle	\$110.83	01/28/19
Resturant Fundraiser : Anthony's Coal Fired Pizza	\$56.77	01/16/19
Valentine's Day Grams	\$130.00	Throughout February 2019
Airpods Raffle	\$160.00	Throughout March & April 2019
Resturant Fundraiser :Dominoes Pizza Cards	\$250.00	03/18/19
TOTAL EXPENDITURE	\$3,041.29	
AVAILABLE Balance	\$3,090.79	

III Chapter Activities

Professional Development Activities

X. Professional Development Workshops (Application for Outstanding Chapter Industry Program Award)

FIU BMES holds educational workshops every semester to prepare our members as much as possible not only for their classes but also for their future careers. This semester we focused on developing skills that are not typically thought as part of the undergraduate curriculum but that are useful to have nonetheless. The workshops are held upon members request s and suggestions during general body meeting. This year's workshops included MATLAB programming, 3D modeling, and Soldering. A short description of each workshop is included below:

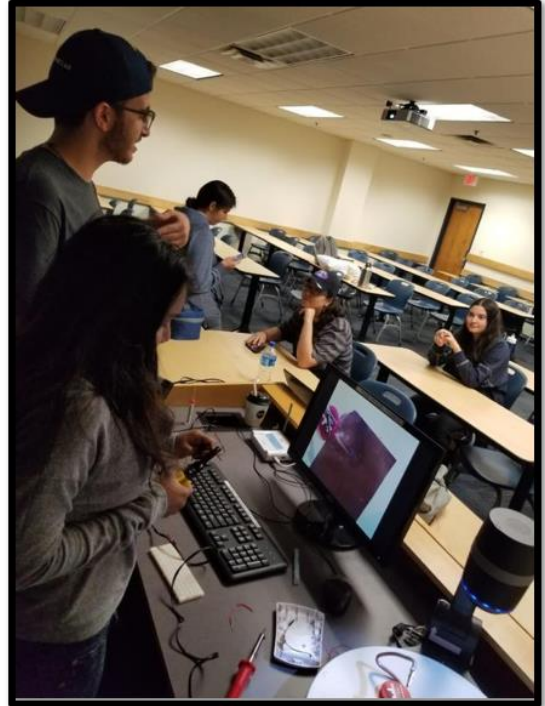
Café Con Lecture (November 27th, 2018)

This semester due to students request we held a MATLAB programming workshop before the finals week to review some programming skills for the students before their exams. The lecture session was held with coffee and pastries, therefore called *Café Con Lecture!*



Soldering Workshop (February 21st, 2019)

BMES members were able to learn how to solder for those that had never experienced it before. Lead by a fellow BMES member in collaboration with the honors Edge lab, attending members were able to get hands on practice by soldering two wires. Soldering is a useful skill to have for senior design projects as it can be used for rapid prototyping techniques.



3-D Modeling Workshop (February 28th, 2019)

Continuing of build of the momentum of the previous workshop a follow up workshop was held. Attending members were able to learn the basics of Autodesk Fusion 360, a Computer Aided Design (CAD) program used to model objects to later 3-D print them, or machine them through Computer Aided Machining (CAM).



Project: 3-D Printed Humanoid Hand and Forearm (Mondays or Thursdays weekly)

Throughout the semester the FIU BMES worked on implementing the Myoware EMG to control the fingers, and wrist of the 3D printed hand and forearm. Additionally, the FIU BMES members worked on the actuation of the second 3D printed hand, forearm, and shoulder component with the ultimate goal of

being able to have a moving hand and forearm, and shoulder. FIU BMES members also worked in obtaining the signals form the EMG, and displaying them via MATLAB, and using MATLAB to control the servo motors.



Workshop	Date	Attendance
BMES Project	Mondays and Thursdays	10 Attendees
Café Con Lecture (MATLAB)	November 27th, 2018	21 Attendees
Soldering Workshop	February 21st, 2019	6 Attendees
3D Modeling Workshop	February 28th, 2019	8 Attendees

X. Industrial Engagement Events (Application for Outstanding Chapter Industry Program Award)

Evening with Industry (November 6th, 2018)

Contact Person: Zahra Nafar (znafar@fiu.edu, 4079705124)

Location: Florida International University, Modesto A. Maidique Campus, GC (10955 SW 15th Street, GC, Miami, FL 33199)

Date: 11/6/2018

Purpose of Activity:

The lack of Biomedical Engineering companies participating in FIU career fair made us at FIU BMES feel the need for more industrial engagement. So, we got together the other student organizations in BME (AEMB and IEEE-EMBS) to hold a social networking event for our members to get in touch with people of industry in a less formal environment and to promote our departments and its student chapters between industry professionals. BME undergraduate and graduate students, and faculty participated in this event and broadened their professional network. The session started with a keynote speaker (Nicholas Leonardi)

presentation about formation of Bioelectrical industry, its progress, and prospective. The dinner was served during the networking session. In the second half of the event nominees from graduate students, presented a summary of ongoing research at FIU BME with three different field of focus: Therapeutic and reparative Neurotechnology, Tissue Engineering Model Systems, Bio-imaging and Sensor systems. The social session was continued after the presentations.

This event promoted the ongoing research in Biomedical Engineering and provided our members the opportunity to build their network and get professional insights from Industry.

Statistics: 86 people attended the event from which 15 guests were from industry, 6 faculty, and 65 undergraduate and graduate students combined. The companied included: Vivex, Stryker, Cordis, Zimmer Biomet, TissueTech, and InnFocus.

Cost of Activity: The event cost is as follow:

Expense	Amount	Supported by
Room and Tabling	300\$	AEMB
Coffee	200\$	AEMB
Catering	1000\$	BMES student chapter

Self-Evaluation: The event was a great success and FIU BME newsletter also wrote about this event: <https://bme.fiu.edu/2018/11/evening-with-the-industry-event/>.

We received positive feedback from our members and we were encouraged by the department to repeat this event next semester. This event was the first step in formation of industrial engagement and built the foundation for future activities.



Day with industry (April 10th, 2019)

Contact Person: Zahra Nafar (znafar@fiu.edu, 4079705124)

Location: Florida International University, Modesto A. Maidique Campus, GC (10955 SW 15th Street, GC, Miami, FL 33199)

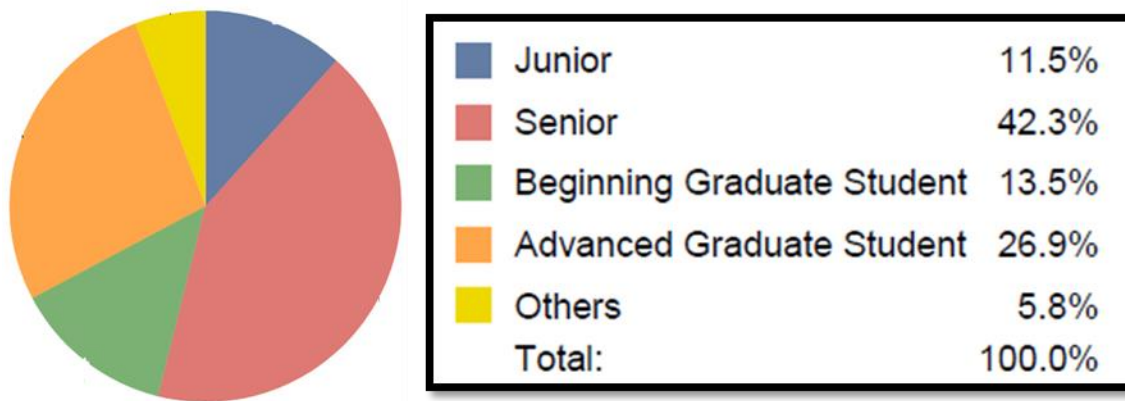
Date: 4/10/2019

Purpose of the Activity:

After the successful event held last semester titled “Evening with Industry”. FIU BMES and other student organizations in BME decided to not only continue hosting an industrial engagement event at FIU, but also extend the event to a full day event titled “Day with Industry”. The event was extended to allow for additional time for the industry professionals to not only network with more students, but also to have an opportunity to get to know the research in the BME department, and their respective faculty. The day started with a networking breakfast where our members met with the professionals of the field in a less

formal environment where one of our guests from BioRASI company shared his personal experience with our members. The event was followed by research presentation sessions and introduction of the newly formed Industry Advisory Board (IAB) at FIU BME. A luncheon was held during a discussion about engagement of academia and industry communities. In the afternoon, industry professionals joined us in the **first time** ever FIU BME Job Expo where they met with our amazing members who were seeking opportunities within the industry.

Statistics: We had 72 people attendance including 12 guests from 10 Biomedical Companies. The following chart shows the attendance from FIU students and faculty (others indicates faculty). The companies that attended the event included Biorep, BioRASI, InnFocus, Texas Instrument, Medtronic, Zimmer Biomet, Tissue Tech, SHL Group, ImmunoSite, and Coulter Foundation.



Cost of Activity:

Expense	Amount	Supported by
Room and Tabling	300\$	AEMB
Coffee for afternoon	200\$	AEMB
Catering for breakfast	1000\$	BMES student chapter
Catering for Lunch	1200\$	FIU BME sponsored

Self-Evaluation: The event was even a greater success compared to last semester. This time we had more attendance from the industry. The networking breakfast prepared the students for the afternoon Job Expo, they had the chance to socialize with employers and get advice and perform better in the afternoon interviews. FIU BME newsletter also wrote about this event: <https://bme.fiu.edu/2019/04/day-with-industry-spring-2019>



Arthrex Trip (April 9th, 2019)

FIU BMES strides to build industry relationships for the prosperity of the FIU Biomedical Engineering Department. As part of this effort, FIU BMES held its first ever industry trip. With support from the Dean's office FIU BMES was able to take 19 students to Arthrex, an orthopedic medical device company located in Naples, Florida. This field trip exposed our students to engineers in the industry and provided them with networking opportunities.



Industry Engagement	Date	Attendance
Evening with Industry	November 6th, 2018	85 Attendees
Day with Industry	April 10th, 2019	68 Attendees
Arthrex Trip	April 9th, 2019	21 Attendees

IV Social Activates

BMES Volleyball Social (March 2nd, 2019)

FIU BMES members were able to enjoy a day of beach volleyball to break away from the stress of the semester. Members were able to social network with each other's while having some fun in the sun.



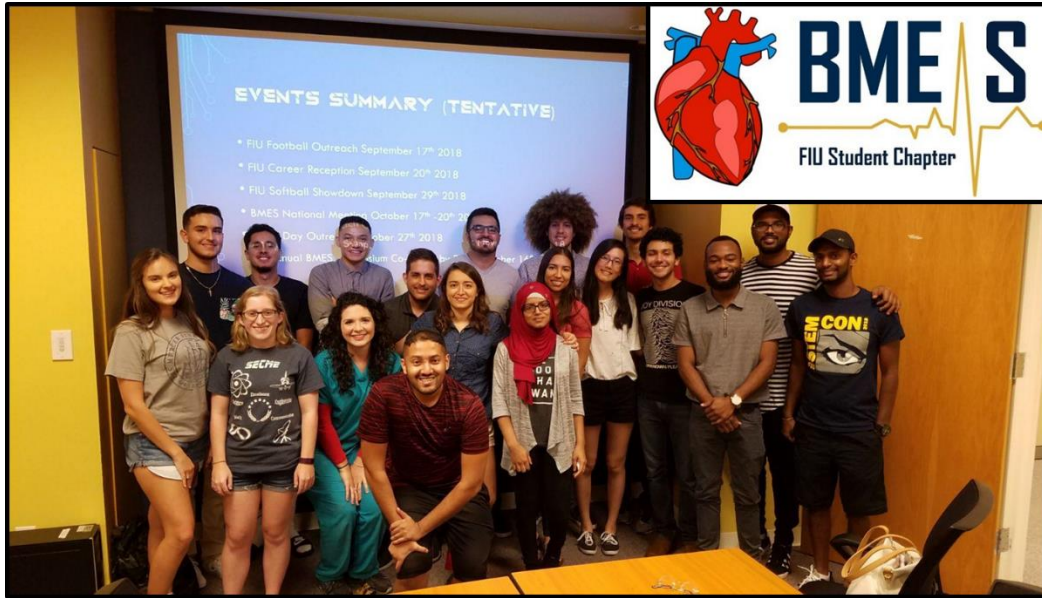
Field Day Social

We planned this event to promote mentor and mentorship activities, however, we did not have the attendance that we expected. Instead it turned out to be a great social activity for our members to get to know each other and compete in several fun games.



FIU BMES T-Shirt Contest

We also held a T-shirt contest in for the new FIU BMES t-shirt and logo design. Active members received free FIU BMES T-shirts. The Winner logo is displayed below:



Mentorship Activity	Date	Attendance
Softball	September 29th, 2018	38 Attendees
Chocolate with the Chair	February 15th, 2019	64 Attendees
T-shirt Contest	October 1st, 2018	27 Attendees

IX. Mentoring Activities

Annual BMES Softball: Students vs Faculty (September 29th, 2018)

As a tradition FIU BMES holds a softball game between BME faculty and the students. This year's game was a huge success and ended with the historical tie between faculty and students. Several faculties, Dr. Jorge Riera, Dr. Zachary Danziger, Dr. James Schummers, Dr. Anthony McGoron, and Dr. Joshua Hutcheson, led the faculty team with Dr. Ranu Jung's (Department Chair) continues support from the dugout!!

In this event our members were provided a chance to meet and play with their mentors in a friendly environment.



Chocolate with the Chair (February 15th, 2019)

Continuing Annual tradition that started last year, BMES held its signature event Chocolate with the Chair on February 15th, 2019 to conclude the yearly Heart Day Symposium which is organized by Dr. Hutcheson. BMES members were able to network with faculty, the industry guests, and most importantly the chair of the BME department, Dr. Jung, while enjoying chocolate and food.



Social Events	Date	Attendance
Volleyball	March 2nd, 2019	8 Attendees
Field Day	April 6 th , 2019	6 Attendees

V Inter-Chapter Activities

This year we started communication with other BMES Chapters in Florida that our board had the chance to meet in National BMES annual meeting. However, we have not yet been successful in co-hosting an event with other chapters mainly because of the physical distance between the universities.

Nevertheless, we have expanded our collaborative activities and invited other student organizations at FIU BME to help us in holding the First BMES Career Fair which was mentioned above. These organizations are Alpha Eta Mu Beta (AEMB) honor society and Institute of Electrical and Electronics Engineers in Medicine and Biology Society (IEEE-EMBS).

Inner Chapter Collaboration	Date	Collaborator	Attendance
Evening with Industry	November 6th, 2018	AEMB, IEEE-EMBS	85 Attendees
Day with Industry	April 10th, 2019	AEMB	68 Attendees

VIII Outreach Activities

BMES FIU encourages our members to go out and make a difference in their community in both a STEM and non-STEM related ways. One crucial, yet often overlooked aspect of biomedical engineering is the certain level of empathy an individual must have to be motivated to be a biomedical engineering student and encourage younger students to join the biomedical engineering field. BMES conducted several outreach events for students from elementary school to graduate school. Some of our outreach activities in this year are as follow:

FIU Football STEM Day (September 15th, 2018)

FIU BMES introduced its organization and Biomedical Engineering to the elementary school students. Our members judged the handmade car-plane competition between different groups from various elementary schools.



National BMES annual meeting project in a box (October 17th and 18th, 2018)

FIU BMES participated in the 'project-in-a-box' showcase at the 2018 BMES Annual Meeting along with other student chapters. The project was done by our active members and the E-board officers. This outreach activity brought us up in the national BMES newsletter for December 2018 (see the following image).

FIU BMES Robotic Humanoid Hand & Forearm

The Florida International University Biomedical Engineering Society Student Chapter completed the making of an open-sourced 3D printed hand and forearm.



The project was displayed as part of the 'project-in-a-box' showcase at the 2018 BMES Annual Meeting along with other student chapter projects.

The entire hand and forearm is 3D printed. The fingers are actuated through the use of servo motors and are controlled via an Arduino Uno Microcontroller. The servo motors are tied to a braided fishing line which when pulled by the servo motor causes the fingers to flex or relax. A servo motor placed in the wrist also allows the wrist to rotate up to 90 degrees with the use of gears.

The project is displayed at STEM outreach events to promote Biomedical Engineering and inspire the future generations of Biomedical Engineers.

More information about the open-sourced project can be found on the official website inMoov.fr.

For more information about FIU BMES visit bmesociety.fiu.edu. Additional information about the Biomedical Engineering Program at Florida International University can be found by visiting bme.fiu.edu. To support FIU BMES and other student organizations at FIU please visit Give.fiu.edu.

Miami Dolphins STEM Day (October 27th, 2018)

BMES along with several other engineering school student organizations at FIU, participated in this event. We introduced Biomedical Engineering to elementary and middle school students by presenting BMES project in the box that was prepared by our members. The goal of the project was to explain the concept of prosthetic hand and its mechanism.



GPSC Gradskellar (December 5th, 2018)

Graduate and Professional Student Committee (GPSC) Gradskellars are social events for grad students to network and have fun. This year Gradskellar was taken place in FIU engineering center to give graduate students a chance to learn about ongoing research and opportunities for collaboration in different schools and showcase fields that they can pursue postdoc positions. Around 150 students attended the last GPSC Gradskellar in 2018 and learned about ongoing research at FIU EC. Dean Volakis, Associate Dean, Dr. McGoron, and Ms. Kayyali also participated in this event.



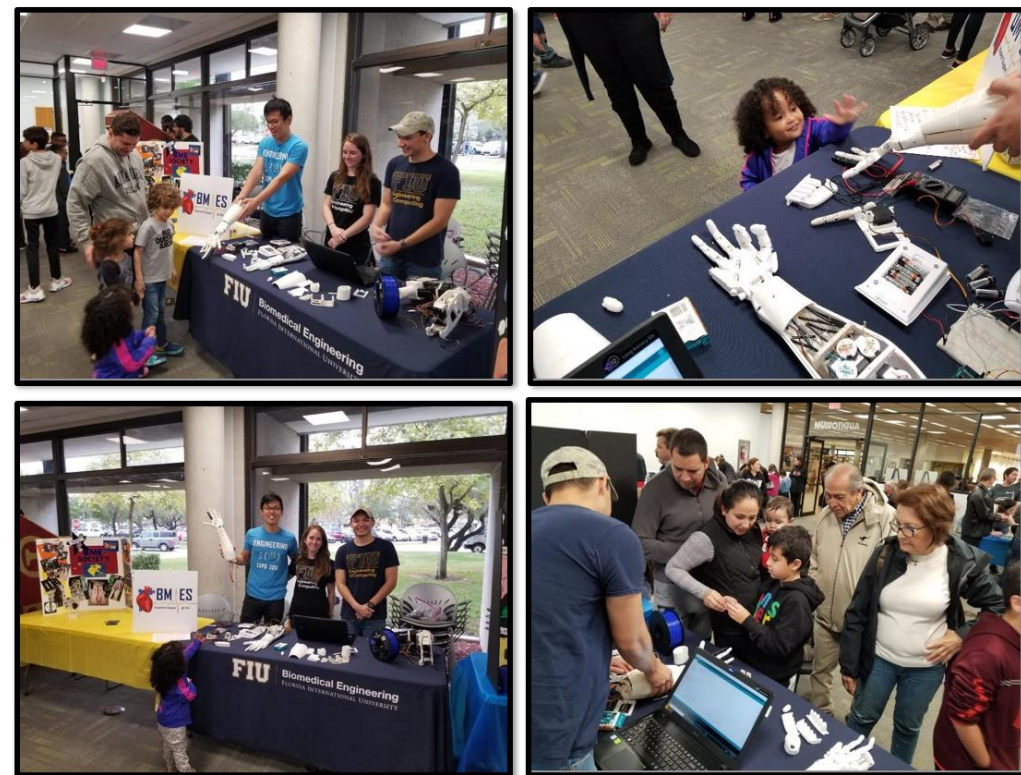
Women's Basketball STEM Day (January 17th, 2019)

FIU BMES introduced the organization and Biomedical Engineering to the elementary, and middle school students. Our members displayed a 3-D printed robotic humanoid hand, forearm and shoulder. The project explained the basic concept of a prosthetic hand, while our members explained the broad field of biomedical engineering.



West Dade Library STEAM Fest 2019 (January 26th, 2019)

Our members continued to impact the local community while supporting our college Engineer on Wheels outreach program. At this event our members displayed two 3-D printed robotic hands and forearms and discussed 3-D printing and biomedical engineering to k-8 students and adults at a local public library.



Miami Beach Senior High school STEM Educational Career Fair (January 29th, 2019)

FIU BMES member participated in the Miami Beach Senior High School STEM Educational Career Fair during which the field of Biomedical Engineering was discussed with potential future students. Attending the event was also assistant Professor Shahrestani who spoke about his company and displayed some medical devices which he worked on.



Frost Science Museum Engineering Day (February 17th, 2019)

FIU BMES participated in the Frost Science Museum Engineering Day. Our members promoted Biomedical Engineering while engaging with K-8 students and adults about what it means to be a biomedical engineer. The robotic hand was also on display.



FIU Engineering Expo (February 22nd, 2019)

FIU BMES members participated in the annual engineering expo. Thousands of k-8 students attended the expo. Throughout the day BMES members spoke to various schools about the different aspects of biomedical engineering. Modeling, simulation, research, coding, and prototyping were all topics of discussion as students were encouraged to ask questions to our BMES members.



Outreach Activity	Date	Attendance
FIU Football STEM Day	September 15th, 2018	200 Attendees
National BMES annual meeting project in a box	October 17th and 18th, 2018	45 Attendees
Miami Dolphins STEM Day	October 27th, 2018	180 Attendees

GPSC Gradskellar	December 5th, 2018	40 Attendees
Women's Basketball STEM Day	January 17th, 2019	100 Attendees
Miami Beach Senior High school STEM Educational Career Fair	January 29th, 2019	60 Attendees
West Dade Library STEAM Fest 2019	January 26th, 2019	50 Attendees
Frost Science Museum Engineering Day	February 17th, 2019	100 Attendees
FIU Engineering Expo	February 22nd, 2019	150 Attendees

VI Other Initiatives and Activities

Research presentation symposium (November 16th, 2018)

FIU BMES this year held the very **1st Annual BMES Symposium**. This scholarly forum was greatly supported by Dr. Lin, Dr. Danziger, and Dr. Hutcheson by their presence and judging the presentation contest. Contestants were invited from all the engineering school (Electrical Engineering, Mechanical and Material Engineering, and of course Biomedical Engineering) and Psychology department. The first 3 winner were awarded with certificates and monetary prizes.



FIU BMES Medical Mission Trip

Our STEM Outreach Coordinator for the 2018-2019 school year sought outreach the furthest she could along with fellow members in making a mark as biomedical engineers from Florida International University. In doing so, she came up with a plan to do a medical mission trip. Being that we are a national university she wanted to not just

impact the local community, but also give back and do outreach nationally. Therefore, in December of 2019, a group of twenty FIU BMES members will embark on a life-changing experience, volunteering as pre-health professionals on a medical mission trip to Peru. This volunteer experience is unique in that not only will they be volunteering in low-income communities offering a helping hand to those who need it most, but also gain first-hand experience in the medical field becoming (if even for a short while) the physicians they will one day be working with. In efforts to participate on this mission trip, our Peru team has had numerous fundraisers promoting their determination towards this project. Some of the fundraisers we have hosted this past semester have included car washes, tie-dye events, bake sales, as well as fundraising events at participating restaurants. On top of their continuous fundraising efforts the FIU BMES' Peru Team will also be hosting several charity collection drives to gather different supplies and necessities that they will be able to take with them to these less fortunate clinics to create the most lasting impression we can.



XI. National BMES Meeting (Application for Chapter Travel Award)

During the 2018-2019 academic school year, BMES chapter encouraged students to participate in the annual national BMES Meeting as presenters and volunteers. The BMES annual meeting is a prestigious event in the biomedical engineering field. The opportunity to go to attend this convention and participate is a privilege. This convention is known to be attended by students, researchers, professionals, and sponsors from all over the world. This convention gives the opportunity for expansion in knowledge as many young researchers present to provide information as well as individuals learn from the new faces around them. In total FIU BME send 50 members for 50th BMES meeting. The following are the members that presented their cutting-edge research at this meeting:

Name	Member ID	Title
Arash Moshkforoush	4014007	Wave CSD: A method for estimating transmembrane currents originated from propagating neuronal activity in the neocortex: Application to study cortical spreading depression
Amirala Bakhshiannik	5099439	Glucose-mediated smooth muscle cell contraction is required for calcification in vitro
Mohammad Shaver	5796418	Cyclic Stretch Induces Caveolin-1 Release in Extracellular Vesicles From Vascular Smooth Muscle Cells
Lakshmini Balachandar	4709083	Serotype Evaluation of An Optogenetic Construct Targeting Rat Cortical Astrocytes
Brittany Gonzalez	3616602	Leaflet Extensions in Porcine Small Intestinal Submucosa Bio-Scaffolds for Heart Valve Regenerative Applications
Sana Nasim	5873171	Paracrine effects of oscillatory shear stress on valvular endothelial to interstitial cells in the context of aortic valve calcification
Maedeh Mozneb	5456893	Novel Surface Plasmon Resonance Model for Monitoring Heart Cells Contractility in Real Time "
Maria Carla Gonzalez	3256866	First portable, low cost Mueller matrix microscope
Carolina Moncion	2887220	Fully - Passive Wireless Recording of Neural Activation in Wistar Rats
Ricardo Siu	2647346	Computational Assessment of a Neuromorphic Closed-Loop Controller for Ventilatory Pacing
Valentina Dargam	3118578	Language proficiency and executive function: an fNIRS study

Ashfaq Ahmed	5571259	Computational modeling for slow wave entrainment in stomach
Mehenur Sarwar	5569188	1. Aptamer-Based ATP Biosensor for Characterizing Engineered Heart Tissue 2. Smart-Phone Paper-Based Fluorescent Sensor for Ultra-Low Inorganic Phosphate Detection
Chia-Pei Denise Hsu	6069417	Assembly of a Pulsatile Flow Bioreactor System to Facilitate Oscillatory-flow Conditions to Optimize <i>In Vitro</i> Engineered Valve Tissue Growth
Mohamed Almadi	5567811	Intraoperative Quantitative Ultrasound for Tissue Differentiation; Pilot Study
Jessica Molina	5917711	Using Tunable Resistive Pulse Sensing to Identify and Quantify Extracellular Vesicles
Andres Rodriguez	3998462	Tiny Ox - A Wearable Muscle Oximeter for the Obese
Baarbod Ashenagar	5706423	Multiscale Modeling of Neurovascular Coupling
Tananant Boonya-Ananta		Voxelization Based Monte Carlo Simulation of the Ischial Tuberosity.
Ahmed Ali	5741397	Aortic Valve Leaflet Curvature Alterations after elastin degradation
Jorge Barter	5815602	Assessment of wound healing in diabetic foot ulcers through the use of tissue oxygenation measurements obtained with near infrared spectroscopy
Brigitte Mahonar	5152640	Evaluating the Effects of Sensory Feedback on Motor Control Using Functional Near-Infrared Spectroscopy
Priscilla Lozano	4099652	'Validation of Near-Infrared Optical Scanner to Assess Saturated Oxygen Changes in Response to Breath-Hold'
Jessica Zatarain	5118493	Ion Channel expression Regulation by Sodium and Potassium in Vascular Endothelial Cells
Monica Karas	5904911	Ion Channel expression Regulation by Sodium and Potassium in Vascular Endothelial Cells
Hailey Hendon	3046685	Towards 3D Printing of a Bio-mimetic Hydrogel Scaffold for Tissue Engineering Heart Valve Applications
Maria Saavedra Guevara	3633616	Tissue Oxygenation Changes in a Large Diabetic Foot Ulcer: Longitudinal Case Study
Luis Herran	5163680	Evoked Referred Sensations Through Quadripolar Transcutaneous Electrical Neurostimulation
Jared Leichner	1708842	Network Architecture Assessment of Cortical Brain Tissue through Simultaneous

		Immunofluorescent Staining of Neurons, Astrocytes, Vasculature, and Nuclei
Caitlyn Myland	3849914	The Neural Recruitment of Executive Function in Monolingual versus Bilingual Preterm-born Children: an fNIR Study
Edwin Robledo	4213886	'Assessment of Wound Healing in Diabetic Foot Ulcers Through the Use of Subclinical Tissue Oxygenation Measurements Obtained with Near Infrared Spectroscopy'
Kevin Leiva	3967158	Tissue oxygenation to assess healing diabetic for ulcers and effectiveness of scalpel debridement
Teshaun Francis	5380198	Volunteer
Kacie Kalie	5676433	Tissue oxygenation to assess healing diabetic for ulcers and effectiveness of scalpel debridement
Ramon Castellanos	5152094	Agent Base Model of Intramuscular Fat Infiltration".
Nathalia Bernal	5733437	Volunteer
Manuel Garcia Russo	5760790	Volunteer
Josue Gil	4012147	Volunteer

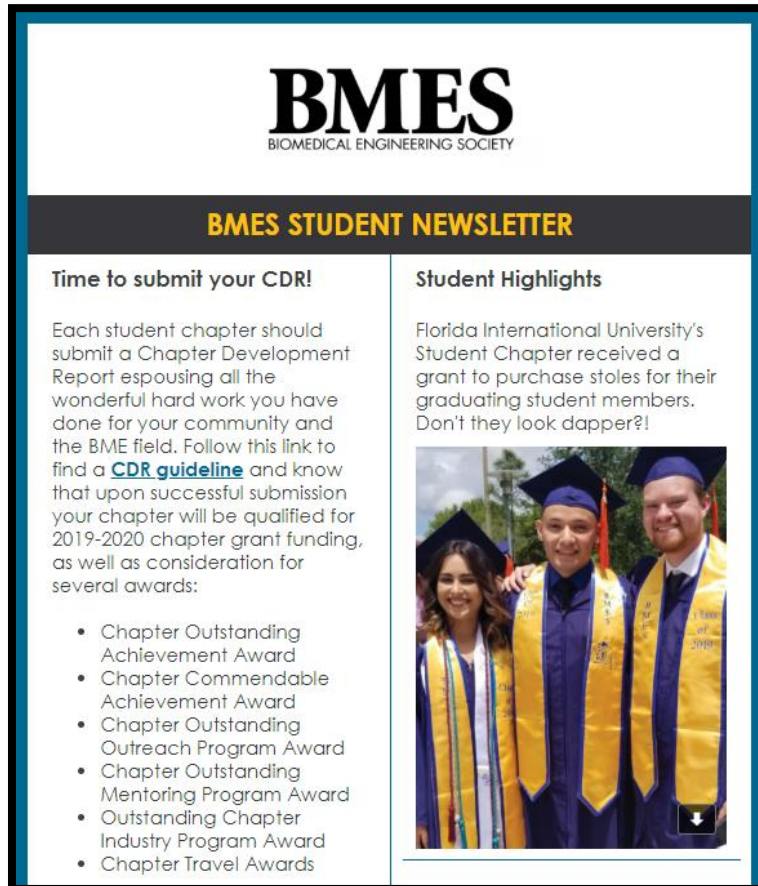
What were the takeaways? Our members were given the opportunity to present their work and get insightful comments from the experts in the field. Our volunteers helped in the FIU BME booth as well as student chapter booth for the project in a box competition. We were able to build our network with other student chapters, especially in Florida. We discussed possible collaborations for the future.

If your chapter wins a travel award, what do you hope to do with those funds? This annual meeting is always a highly desired event to attend for our members, but the cost is often a hindrance for students in our chapter to be present. Provided with an award that can financially aid our students to attend the 2019 BMES annual meeting will allow a group of students to attend. Attending this meeting give insight and knowledge to better understand bioengineering beyond the classroom. Being able to interact, meet, and listen to professionals in the industry, as well as, professors and lecturers in the field, and fellow students that are in research laboratories can be defining opportunities for a student trying to further their career or finding a focus within the studies. The Florida International University BMES chapter would be honored to received funding for an opportunity to open up the door for a group of our members to attend the 2019 BMES annual meeting.

Who would you send and what do you hope to learn this year? We would send our active members that not only participate in our activities but also take part in the leadership. We hope to improve our leadership activities beside our Biomedical Engineering knowledge and encourage our members to do so as well.

National BMES Support

The hard-work and dedication of our BMES members, as well as the increase in national BMES memberships from our chapter, and the involvement of our chapter within our community and university garnered the attention of the National Biomedical Engineering Society. This led to receiving funding for graduation stoles for our national members, and additionally our chapter got featured in the national BMES newsletter for May 2019.



BMES
BIOMEDICAL ENGINEERING SOCIETY

BMES STUDENT NEWSLETTER


Time to submit your CDR!

Each student chapter should submit a Chapter Development Report espousing all the wonderful hard work you have done for your community and the BME field. Follow this link to find a [CDR guideline](#) and know that upon successful submission your chapter will be qualified for 2019-2020 chapter grant funding, as well as consideration for several awards:

- Chapter Outstanding Achievement Award
- Chapter Commendable Achievement Award
- Chapter Outstanding Outreach Program Award
- Chapter Outstanding Mentoring Program Award
- Outstanding Chapter Industry Program Award
- Chapter Travel Awards

Student Highlights

Florida International University's Student Chapter received a grant to purchase stoles for their graduating student members. Don't they look dapper?!



VII Future Directions

This semester was packed of fun socials, meetings, and outreach events. We have been working on growing our community and pushing for our members to become nationally recognized. We hope to continue promoting BMES to gain more members and have a larger network of peers for people to rely on. Furthermore, we hope to continue the FIU BMES inter disciplinary fields by working with other organizations on campus and other BMES chapters.

Here are some of our plans for the following year:

1. We plan to continue our Mentor/Mentee program to cultivate a better relationship between incoming BMES members and upperclassmen. We hope they will guide them in making choices for classes, research, and career.
2. Considering our signature event, Day with Industry, we hope to continue the impact we've been having with students in aiding them make connections within different industry leaders within the field of BMES. Furthermore, we hope to continue adding to our list of companies for our career fair and socials for students to make crucial connections for their future.
3. In regard to our active members, we are implementing a new point system for our members to work towards earning a coveted BMES t-shirt and if they are graduating, a stole to represent the chapter at graduation.
4. In growing our chapter, we have plans to promote our society and hopefully gain more members by offering different skill workshops.

THANK YOU!



VIII Application for Outstanding Outreach Award

Over the last year we have done a lot of outreach at varying locations and events. Below is the best advice we can give after learning from the outreach that we have done. To do outreach you really just have to want to do it. If you really want to do outreach as a BMES student chapter, it can be done in one way or another. This how to guide will hopefully take you from not knowing where to start to having an idea on how to do outreach. Additionally, at the end we have also included the details of our project-in-a-box, which we use to do some of our outreaches, and information for you to be able to build your own. We breakdown doing outreach into three steps, and then we go into details of each step. We try to cover as much information as possible to reduce the uncertainty that you might have if you have never done outreach before. Outreach can be free, even if it means simply doing a simulation on MATLAB and talking about how simulations can help Biomedical Engineers predict diseases before they happen. Look up projects on the internet using Google and YouTube.

Step 1: Select a project-in-a-box

There are several project ideas available on the internet ranging from the creation of simple microspheres to the creation of more complex projects involving robotics. The project that you decide to complete is up to you however there are some factors that need to be considered.

The first one is time. Consider the complexity of the project you want to complete the more complex a project is the more time it will take to complete. In general, the more time necessary to complete the more awe-inspiring the project should be. Consider the aspect of how many people will be working on the project and how much time each individual has. For example, if you have one hour of work to get done it will take one person one hour to do it, it will take two people 30 minutes, or four people 15 minutes on it, and so on so forth. The more people the less time requirement for each person.

The second aspect that must be considered when choosing a project is money. Whatever project you decide to do it is going to cost money for you to do. If you really want to make a nice project, then you might have to fundraise to be able to purchase what you need. If a project is too expensive then you might not be able to complete it. It all depends on how much money you have available. The less expensive project is the more of the projects you will be able to complete. Also, consider how often you will be able to reuse materials to reduce cost. Money is one of the main challenges that we face a BMES student chapters regardless of what the money could be used towards. There are different routes to take when it comes to obtaining money, some more preferred than others. The first thing that you want to do is look for grants through your university, it is common for universities to offer their students grants to do outreach. The

most conventional way to raise money is to do fundraisers. Industry sponsorships, and Crowd-funding could also be options. The least preferred way for you to have money for a project is through self-funding, but it's an option on the less.

The last thing you must consider is the resources at your university available that you might be able to use to complete the project. Think about what resources you will need such as 3D printers, tools, etc. Any materials that you might need electrodes, wires, microcontrollers, etc. You might not always necessarily have to buy everything you need. You, and your peers could have some materials left over from previous projects or classes that you've taken that you could use for the project-in-a-box. Perhaps there are other student organizations or makerspaces that could let you use equipment or tools to build your project.

Step 2: Build or make the project

Once you have thought about the previously mention considerations and have gathered all the material, it's time to assemble a team, get together, get to work. Announce the project to you members at your meetings. Tell them how they can benefit from it (what new skills they will gain), and the impact that it will have on the community. Come up with a schedule to work on it. If your project is not something you have build over time, then it is always a good idea to get a team of individuals prior to doing outreach to get familiar with what it is you are doing.

Step 3: Outreaching

After all your hard work coming up with a project and putting it together its finally time for the rewarding part which is doing the outreach. Before you do outreach think about who the target audience for your project is, and how you can present the project to them. For example, is your project something that students can put together in groups while learning about Biomedical Engineering, or is it something that is more of a show and tell which you can present to a classroom of students while talking about Biomedical Engineering? Additionally, think about the targeted age range for your project. Is your project something that you are comfortable presenting to any age group, or is it something that is leaning more towards a specific age group such as high school students? If so, think about how you can simplify high level concepts to more basic and general Biomedical Engineering concepts so that elementary school students will understand, or vice versa. Generally, the broader your audience the easier it will be to do outreach simply because broadens your opportunity present your project.

To do outreach you have to reach out. If your college has an outreach program, then the most simple and effective way would be to reach out to the program coordinator of such program and join them on outreaches. If not, then you will have to reach out to schools yourself. The most effective way to reach out to schools is to communicate with past teachers. Tap into your

network and get in contact with past teachers about presenting your project at your previous schools. If your outreach is target towards a younger audience then try reaching out to elementary school teachers about presenting your project for a few hours of a specified day. Elementary, and middle school teachers are always in need of a promoting STEM to their students, so more often than not they will be willing to let you step in and teach the class for a few hours for one day. Having a lesson plan is a plus, but it is not always necessary. It really just depends on your project, and the teacher who you will be collaborating with. Don't be intimidated to do outreach, teachers will often facilitate you going to their school as much as possible.

Another approach is to look up if there are any dual enrollment programs in your university and see if you can get in contact with them about doing outreach at the participating schools. It would be easier since your university has already established a relationship with the school. Once you start doing outreach and feeling more confident with it then you can get in contact with other student organizations at your university and see if they would like to join you in collaborating in outreach. You could also communicate with your local public libraries about showcasing your outreach project there and doing outreach activities there for a day. Ideally, they would promote it, you just have to worry about whatever it is that your project entails.

There are other forms of outreach as well not just doing projects. You and your fellow BMES members, could volunteer as judges at STEM competitions representing the BME field. You could also speak to schools about having a field trip to your campus and having them tour your Biomedical Engineer Department. You could have a "Be a Biomedical Engineer for a Day" where they come and spend time with your BMES members, tour labs, maybe have a Q & A session about what it means to be a Biomedical Engineer. Keep in mind however that doing something like that can take up more time and money than doing a project. It is usually more effective if you go to them since you can do it multiple times in a semester, throughout the year, usually at your convenience.

Always do an excellent job because word of mouth spreads. Not only do you want to always do your best because you are representing your university and BMES, but also because you want to leave a positive impression because when you do they will almost always invite you to come back and do outreach there again.

One last final word of advice is to keep in mind that it takes time to have a wonderful outreach program. It is not something that happens overnight. It is something that takes years and effort, but once you start getting to know people in your community, and where you can do outreach then it will build on itself. As time goes by you can try different things and getting more people involved. Doing outreach in public places sometimes teachers will come up to you and

ask for you to go to their school. Never get discouraged, because at the end of the day you are inspiring the next generation of Biomedical Engineers.

Our Project-in-a-Box

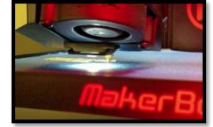
Now that you have a general idea of what it takes to do outreach, we will go into the details of our project-in-a-box that we use to do outreach ourselves. All of this has been done before it just a matter of putting it together. The project-in-a box that we chose to do is an opensource robotic humanoid hand and forearm. It is opensource, so we did not create it from scratch. In our case time was of the essence, so we chose to build a project that is already available online. Although we could technically have made a hand from scratch it would have been an inefficient way of doing the project since it would have taken more time, materials, and multiple iterations to get it right. Now that we have already made one and gained the experience we can probably design one ourselves. Our project in a box is an open source hand and forearm which are part of the whole humanoid robot that can be 3D printed titled inMoov (<http://inmoov.fr/>). Since it is an opensource project anyone can download the parts and make one themselves for free, which is what we chose to do. The robot was created by a French sculptor and designer, Gael Langevin. We chose this project because as Biomedical Engineers we get exposed to a variety of different characteristics in engineering such as electrical engineering, software engineer, and biosystems. With this project we try encompassing as many aspects of the broad field of Biomedical Engineering as we could. This project exposes students to the 3D printing which is used in rapid prototyping in the industry, it exposes them to electrical engineering since we can teach them how to connect a servo motor, and Biomedical Engineering since we can teach them how to control the fingers of the hand with the Myoware electromyogram, and biomechanics.



The instruction for building your own hand and forearm are already written and can be found here: <http://inmoov.fr/hand-and-forarm/>. Also take time to make sure you have the necessary tools, and materials to build one, read the official instructions so you know what you will need. Since the project is open source there is a whole community of people and information that you can take a look at if you need help. You can also email us at BMES@Fiu.edu for some guidance. It took us about 2 and a half months to go from printing to having a functioning hand. The overall time it takes to build depends on how much time you have available, and how many people are working on it. Overall there are 4 steps to building your own. The details of which can be found on the aforementioned website.

Step 1. Download and Print

The first step is to download all the part necessary to make your own. The parts can be found here: <http://inmoov.fr/inmoov-stl-parts-viewer/?bodyparts=Right-Hand> and here <http://inmoov.fr/inmoov-stl-parts-viewer/?bodyparts=Forearm-and-Servo-Bed>. They are in the .STL format so that they can be printed on almost any 3D printed. Depending on what 3D printer you are using all the parts can take 1-2 weeks to print. Directions for the infill and support can be found as part of the official instructions.



Step 2. Place the parts together

This is the fun part because you get hands on experience if you've never built anything. For the most part you just have to follow the official instructions to build the hand and forearm. Just be careful when gluing, make sure you glue the correct parts together, otherwise you will have to reprint. The parts are printed from plastic so keep in mind they can break if you handle them with too much force. Some part might need to be filed, but besides that everything is made to fit together.



Step 3. Wire up electrical components

Once you have finish building the mechanical aspect of the hand it is time to connect the electrical aspects of the project. For this you will need to get a microcontroller such as an Arduino or there are other PID controllers that can be used to control the servos. Instructions on how to wire a servo can be found on the official website and YouTube.



Step 4. Code it

One cool aspect of this project is that you can control it with multiple coding languages from the standard Arduino language to MATLAB, to Javascript. We primarily use Arduino because we wanted to learn more of using Arduino and also because there is a lot of help and videos on YouTube on how to use Arduino. We also use MATLAB since we have members that prefer using MATLAB. The instructions provide you with a standard code to open and close the finger by rotating the servo motors. Once you have the code working with the servo motors you have completed the project. However, there is still more you can do to keep making it more interesting.



Additional attachments

Once you have completed your first inMoov there are still things you can do. With Arduino there are Arduino shields that can be purchased that can give it additional functionality such as servo shields to reduce the use of a breadboard. To make it more interactive our student chapter have implemented using EMG to control the servos that control the fingers. You can also build another one or build another part of the robot or make any modifications you feel could make the hand and forearm better. The more interactive you make it the better. Have fun!