

SLU SCHOOL OF SCIENCE AND ENGINEERING NOV 2024

SLU BIOMEDICAL ENGINEERING

NEWSLETTER



SAINT LOUIS UNIVERSITY

DEPARTMENT OF BIOMEDICAL
ENGINEERING

IN THIS ISSUE

- BMES Conference
- SWE Conference
- Neuroscience Conference
- UG Summer Internship
- Student Ambassadors
- Biosense Webster Visit
- Cor Jesu Visit
- Alumni Spotlight
- BME Service Awards
- Zustiak Guest Issue
- Zustiak Presentation
- Ruesing Defense
- UG Exp. Learning App
- SSE Mentor Collective
- Alumni Questionnaire
- BME Newsletter Access

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SLU BME AT BMES 2024



SLU BME was well represented at the Biomedical Engineering Society's annual meeting in Baltimore, Maryland last month. 12 students and 2 faculty members attended and presented their research through oral and poster presentations. SLU BME also had a booth and engaged with many prospective students looking to further their studies in a BME graduate program. We are looking forward to BMES 2025 in San Diego. See you there!

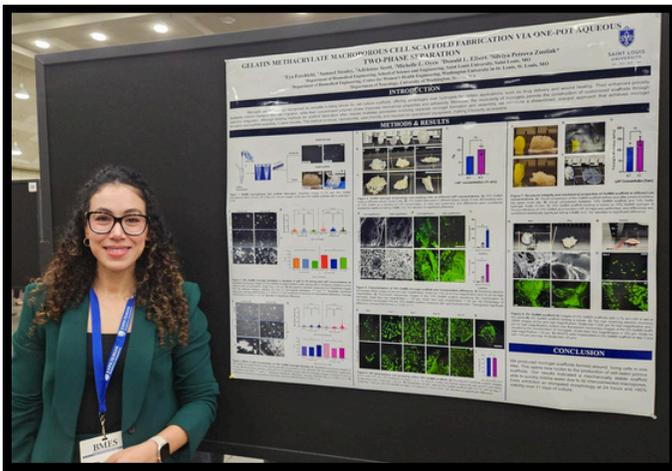
BMES
BIOMEDICAL ENGINEERING SOCIETY
2024 ANNUAL MEETING



BMES ORAL AND POSTER PRESENTATIONS

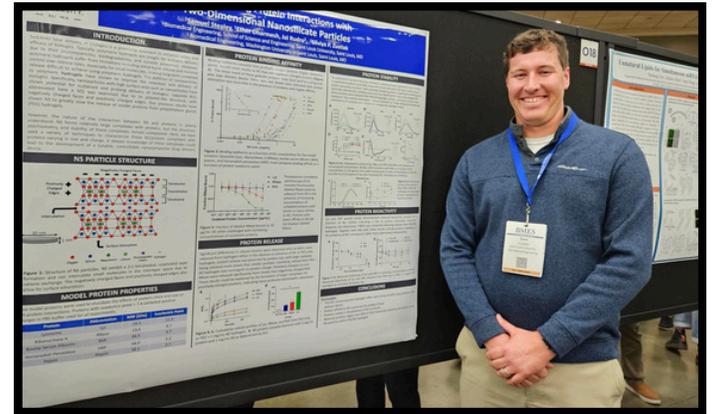
E. Ferchichi, S. Stealey, D. L. Elbert, S. P. Zustiak, "Gelatin Mathacrylate Microporous Cell Scaffold Fabrication via One-Pot Aqueous Two-Phase Separation," (Poster)

E. Ferchichi, J. Baker, A. Faber, S. P. Zustiak, "Glioblastoma Spheroid Growth, Infiltration, Motility in Single and Dual-Stiffness Hydrogels," (Poster)



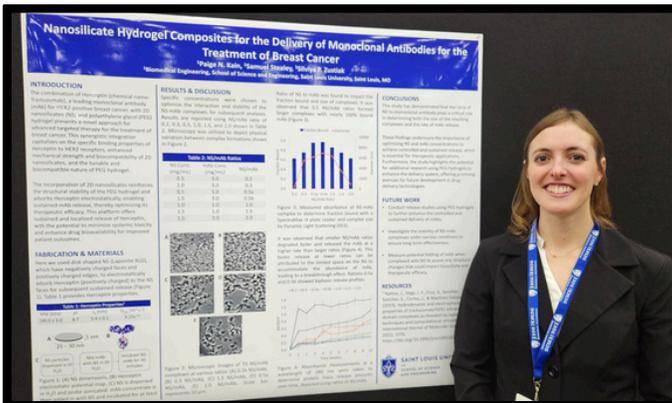
S. Stealey, E. Dharmesh, M. Baghat, A. M. Tyagi, P. Jelliss, Y. Abu-Amer, S. P. Zustiak, "Development of Super-Lubricious Platelet-Rich Plasma Loaded Microgels for the Treatment of Knee Osteoarthritis," (Oral)

S. Stealey, E. Dharmesh, J. Rudra, S. P. Zustiak, "Understanding Protein Interactions with Two-Dimensional Nanosilicate Particles," (Poster)



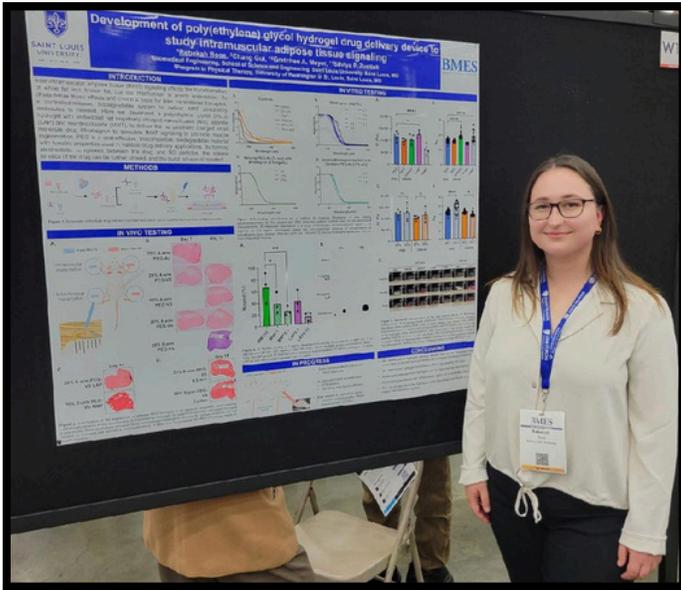
P. Bogert, S. Stealey, S. P. Zustiak, "Nanosilicate Hydrogel Composites for the Delivery of Monoclonal Antibodies for the Treatment of Breast Cancer," (Poster)

J. Baker, K. Garg, S. P. Zustiak, "Measuring Electric Currents from Piezoelectric Hydrogel Substrates for Excitable Cells," (Oral)

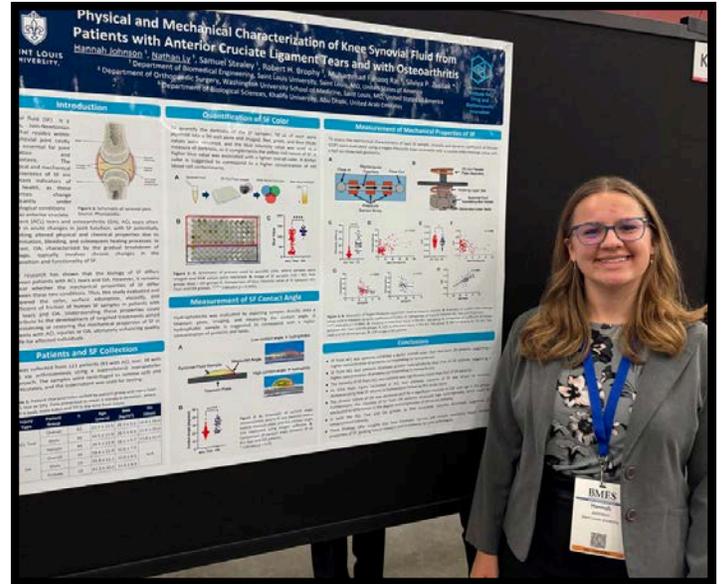


BMES ORAL AND POSTER PRESENTATIONS

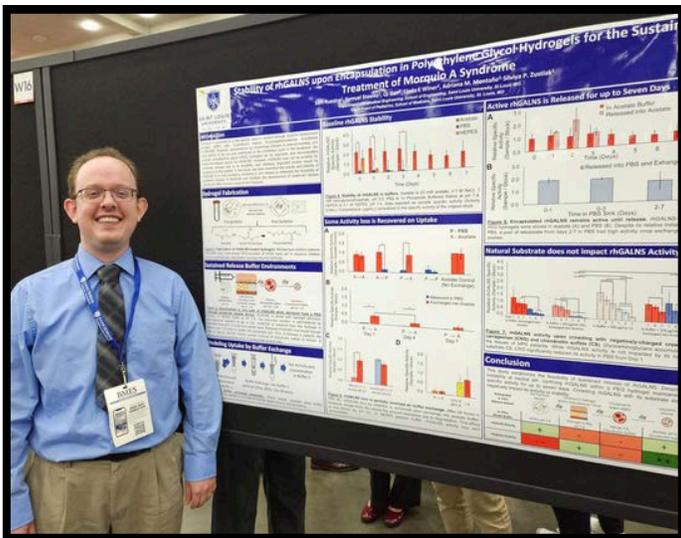
R. Boos, C. Gui, G. Meyer, S. P. Zustiak, “Development of Poly(ethylene) Glycol Hydrogel Drug Delivery Device to Study Intramuscular Adipose Tissue Signaling,” (Poster)



H. Johnson, S. Stealey, N. Ly, R. H. Brophy, M. F. Rai, S. P. Zustiak, “Physical and Mechanical Characterization of Knee Synovial Fluid from Patients with Anterior Cruciate Ligament Tears and with Osteoarthritis,” (Poster)



S. Ruesing, S. Stealey, Q. Gan, L. Winter, A. Montano, S. P. Zustiak, “Stability of rhGALNS Enzyme in Buffers for Sustained Release Applications,” (Poster)



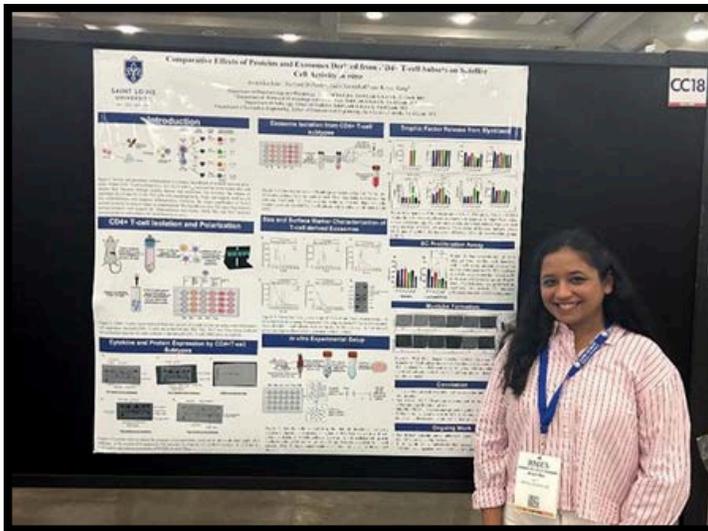
J. Tadiwala, C. Tobo, A. Ridolfo, M. Wood, K. Garg, “GDNF-infused Biosponges for Improved Muscle Reinnervation Following Volumetric Muscle Loss,” (Oral)



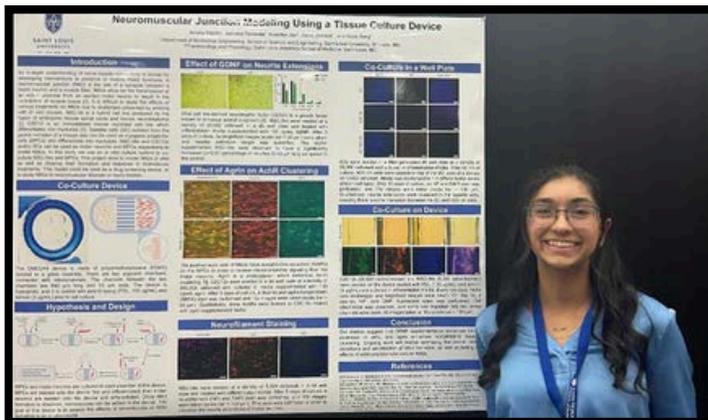
BMES ORAL AND POSTER PRESENTATIONS CONTINUED

A. Jain, A. Ridolfo, M.M. Subramanian, D. Johnson, E. Pattan, S. Babu, J. Kornbluth, K. Garg, "Differential Effects of Hypoxic and Normoxic Extracellular Vesicles in Muscle Trauma Recovery," (Oral)

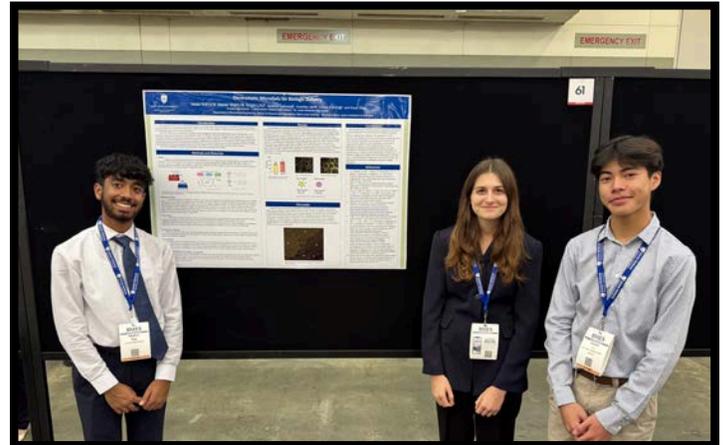
A. Jain, R. DiPaolo, J. Kornbluth, K. Garg, "Comparative Effects of Protiens and Exosomes Derived from CD4+ T-cell Subsets on Satellite Cell Activity *in vitro*," (Poster)



A. Ridolfo, J. Tadiwala, A. Jain, D. Johnson, K. Garg, "Neuromuscular Junction Modeling Using a Tissue Culture Device," (Poster)



*S. Shaji, *N. Wolk, *V. Ly, **J. Tadiwala, A. Jain, A. Ridolfo, K. Garg,** "Electrostatic MicroGels for Biologic Delivery," (*Summer High School Interns in Garg's Lab), (Poster)



A. Sedano, C. Uwakew, A. Mahmud, Z. Bao, "Enzyme-like Graphene Networks for Continuous In Vivo Hormone Monitoring," (Oral)



K. Gurski, S. Mensah, D. Albrecht, "UVC Disinfection of a Low-Cost Bubble CPAP," (Oral)

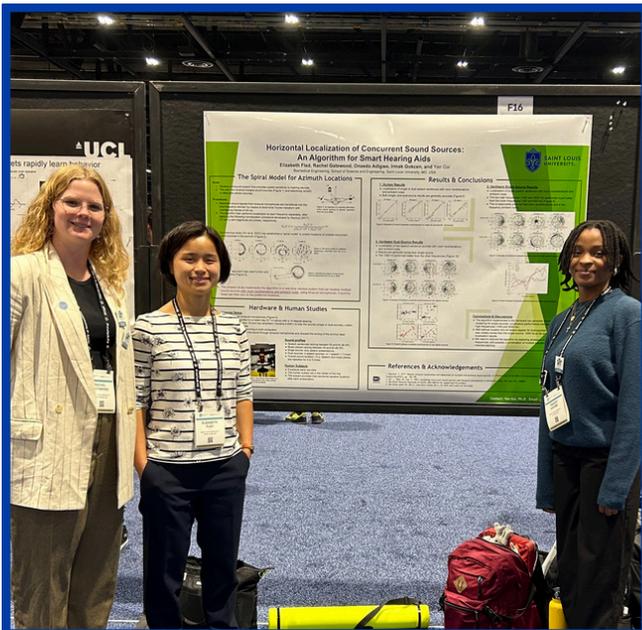


SWE CONFERENCE

The Society of Women Engineers (SWE) had their annual conference in Chicago, Illinois from October 24th - 26th. This conference aims to promote professional development for women in engineering and technology through networking, a career fair, workshops, and so much more. SWE's main goal is to be the premier resource for females in engineering and technology seeking growth and advancement at all stages of their career. The theme of the 2024 conference was, "Together We Rise" where 450 organizations attended to support this community. Some of our very own biomedical engineering students attended this event including, **Katherine Marino** (Senior, pictured left), **Andrea Grisalez** (Senior, pictured right), and **Esha Pattan** (Junior, not pictured).



NEUROSCIENCE CONFERENCE



Elizabeth Flad (BME BS/MS Senior, pictured center), **Sage Gatewood** (BME Senior, pictured left), and **Onaedo Adigwe** (EE Senior, pictured right) work in BME Associate Professor, **Dr. Yan Gai's** Neuroengineering Lab. They had the opportunity to attend the Society for Neuroscience's annual conference in Chicago, Illinois last month thanks to funding from Dr. Gai's NIH Grant. The students presented their poster titled, "Horizontal Localization of Concurrent Sound Sources: An Algorithm for Smart Hearing Aids."



UNDERGRADUATE BME INTERNSHIP HIGHLIGHT

Srishti Mitra – BME Senior

National University of Singapore
Summer Intern with Dr. Andrew Holle
Mechanobiology Institute



Research Focus: Developing granular scaffold systems that mimic the physiologically confined spaces in our body. The goal was to study how breast cancer cells behave, in terms of migration and metastasis, under these confining conditions. Overall, this model would help us better understand cancer cell migration for the development of future treatments.

What skills did you learn and how did your BME background support your work?



This was my first time working with cell cultures and cancer cell lines. I was also able to obtain skills in microfabrication. Additionally, working in a different country was a very new experience, especially having collaborative lab spaces. The work I was doing was a direct application of the content we learn in our Materials Science and Biomaterials classes. Additionally, my BME background gave me an upper hand conceptually compared to other interns, as mechanobiology is a direct derivation of biomedical engineering in the field of research.



STUDENT AMBASSADORS – BME

BME seniors **Aryana Yazdi** and **Andrea Sedano** are official student ambassadors for Saint Louis University's School of Science and Engineering (SSE). As ambassadors, they share their experiences with prospective and current students. Both students represent SSE and the BME department at admissions-related events, school-level events and other outreach events. For those interested in learning more about the vibrant life at Saint Louis University's School of Science and Engineering, Aryana and Andrea are invaluable resources, embodying the spirit of curiosity and innovation that SSE fosters.



SLU BMES HOSTS BIOSENSE WEBSTER



The Biomedical Engineering Society (BMES) at SLU recently hosted Biosense Webster on campus. Students from all disciplines came together to learn about cutting-edge innovations in biomedical engineering and how Johnson & Johnson's systems are shaping the future of healthcare. Biosense Webster specializes in developing advanced diagnostic and therapeutic solutions for cardiac arrhythmias, particularly through innovative mapping and catheter technologies used in electrophysiology procedures. A big thank you to our speakers for sharing their expertise! While the Biomedical Engineering Society at SLU is primarily for undergraduates, we are always thrilled to welcome everyone to explore the fascinating world of biomedical technology!

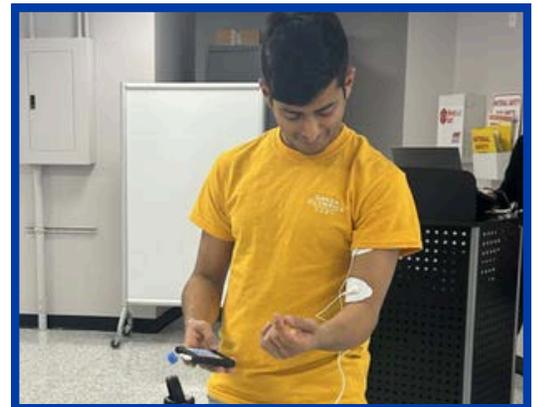


COR JESU STUDENTS VISIT SLU BME

Along with three dozen hosts from around the St. Louis area, SLU offered a free, one-day learning experience to help high school students from Cor Jesu Academy explore potential career opportunities. As part of this experience, BME professors **Dr. Koyal Garg** and **Dr. Alex Reiter** teamed up and guided 11 students through distinct, yet complementary modules designed to electrify their understanding of neuromuscular stimulation and its therapeutic applications.



In Dr. Reiter's lab, students explored electrophysiology through a hands-on experiment. While paired up with a classmate, one student had the electrical activity measured in their muscle while they flexed their forearm. The signal was processed and sent to the other student's arm to cause an involuntary muscle contraction. Everyone had the opportunity to "control" someone else's arm.



With Dr. Garg and her team, the high schoolers explored the fascinating science behind neuromuscular electrical stimulation, uncovering how Dr. Garg's lab is using animal models of muscle injury to develop more effective treatments. A memorable highlight was when BME Ph.D. student, **Jamshid Tadiwala**, wowed the group by demonstrating a TENS device in action, flexing and contracting his muscles on cue! The demonstration sparked an engaging conversation about the real-world applications of this technology—from pain management to helping quadriplegic patients, and even preventing muscle atrophy after ACL surgery.

BME ALUMNI SPOTLIGHT

Jasenka Verbarg, a 2006 SLU BME (B.S.) alum, works at **MilliporeSigma** within their Life Science business in the Chemistry franchise. After graduating from SLU, she went on to earn a Ph.D. in Biomedical Engineering from the University of Missouri. Dr. Verbarg works on External Partnerships, which is a business development role focused on establishing collaborations with academia, research organizations, and other companies in order to promote the development of new chemistry and life science products.



JASENKA VERBARG, PH.D.
EXTERNAL PARTNERSHIPS
MilliporeSigma

What is your favorite part of your job?

I enjoy the innovation aspect of my job. The projects that I get to work on all involve very exciting science and I get to be a part of impacting life and health through science.

How did SLU and SLU BME prepare you for your current job?

Doing undergraduate research has taught me to work independently on a large scale project, and ultimately pushed me to pursue graduate school. BME at SLU was certainly not easy, but having to learn engineering, biology, and chemistry has been a huge benefit in my career, both in the types of roles I have been able to hold and in the ability to work with people who work on various scientific modalities.

10 YEAR SERVICE AWARDS

Congratulations to Assistant Professor, **Dr. Natasha Case** (pictured left) and Associate Professor, **Dr. Yan Gai** (pictured right) on reaching their ten-year milestone with SLU BME. Department Chair, Dr. Gary Bledsoe presented them with their awards.



10
YEARS



"My colleagues are my treasures. My advice to students is that we are all here to help if they need us." - Dr. Gai

ZUSTIAK GUEST ISSUE MOST CITED AND VIEWED

BME Professor and Associate Chair, **Dr. Silviya Zustiak**, and Assistant Professor of Biomedical and Chemical Engineering at Syracuse University, Dr. Era Jain, co-edited a special issue and e-book titled, "Feature Reviews in Pharmaceutical Technology." Since it became available in 2023, it is the most cited and viewed special issue on the Pharmaceuticals MDPI website. This special issue features 12 papers highlighting exciting developments in pharmaceutical technologies. To download this publication for free and to learn more about the cutting-edge advancements in the pharmaceutical field, click [here](#). Please join us in congratulating Dr. Zustiak and Dr. Jain on this impressive achievement!



SAINT LOUIS  UNIVERSITY.



 **Syracuse University**
College of Engineering
& Computer Science

ZUSTIAK - INVITED SPEAKER AT IOCBE CONFERENCE



Dr. Silviya Zustiak was an invited speaker at the 1st International Online Conference on Bioengineering. This conference was held virtually October 16-18, and featured over 1000 attendees from over 30 different countries. It was organized and hosted by MDPI Bioengineering and aimed to bring together scientists, engineers, and practitioners from different areas to collaborate and learn from one another. Dr. Zustiak's talk was titled, "Development of Super-Lubricious Hydrogel Microspheres for the Treatment of Knee Osteoarthritis." Congratulations to Dr. Zustiak for an excellent talk! Contributing authors: **S. P. Zustiak, S. Stealey**, M. Baghat, A. Malik, Y. Abu-Amer, P. Jelliss

RUESING DISSERTATION DEFENSE



Congratulations to Ph.D. student, Samuel Ruesing, for successfully passing his dissertation with distinction on October 30th! Members of Dr. Zustiak's lab helped him celebrate.



Title: Stability of Recombinant Human N-Acetylgalactosamine-6-Sulfatase (rhGALNS) for the Treatment of Morquio A Syndrome via a Sustained Release Polyethylene Glycol Hydrogel Delivery Device



NOVEMBER BME SEMINARS



The BME department hosts a weekly seminar that features invited speakers from academia and industry as well as SLU biomedical engineering graduate students. The seminar is a great opportunity to learn about the latest research taking place broadly in the biomedical engineering field and the amazing work our graduate students are performing at SLU. Sign up [here](#) to receive BME Seminar announcements for upcoming speakers. This is separate from our newsletter distribution list. Every seminar is held in the Biomedical Engineering Department Building, room 1004, 3:30 - 4:45 pm.

Coming Up:

- 11/6** Elizabeth Wurtzler, Ph.D., Director of R&D at Geneoscopy, Inc.
- 11/13** Aaryani Tipirneni-Sajja, Ph.D., Associate Professor of BME at the University of Houston
- 11/20** Hanieh Shokrani and Paige Bogert, BME Ph.D. Students in Dr. Zustiak's Lab
- 11/27** No seminar - Thanksgiving break

SLU Department of Biomedical Engineering
BME Research and Experiential Learning
Opportunities for Undergraduates

Are you interested in experiential learning opportunities in BME?

- Work closely with professors and graduate students on impactful research
- Acquire exposure to hands-on applications in improving healthcare
- Apply class knowledge to real-life situations
- Develop lab skills
- Gain resume experience

Research Areas

- +Biomaterials
- +Biomechanics
- +Mechanobiology
- +Neuroengineering and Brain Computer Interface
- +Regenerative Engineering
- +Scaffold Production
- +Tissue Engineering



Scan me for faculty profiles!

CALLING ALL UNDERGRADUATES!

Are you eager to collaborate with professors and graduate students on impactful research? Want to gain hands-on experience that's advancing healthcare? Looking to develop lab skills and boost your resume? Apply for the BME Research and Experiential Learning Opportunities for Undergraduates! This program offers a unique chance to immerse yourself in meaningful research and practical applications. Don't miss out! Click [here](#) to fill out the application and then submit your resume to biomed@slu.edu.

THE MENTOR COLLECTIVE FOR UNDERGRADUATES AND ALUMNI!

We're calling on valued members of our community to serve in Saint Louis University's School of Science and Engineering Mentor Collective Alumni Network! This program matches undergraduate sophomores, juniors, and seniors with mentors like you who have been in their shoes and know first-hand what it's like to learn at SLU. Click [here](#) to sign up to be a mentor.



ATTENTION 2024 GRADUATES AND BME ALUMNI

Did you graduate this year? Are you a SLU BME Alumni? If so, we'd like to invite you to fill out the form below to give us your updated contact information (email) and tell us where you have landed after graduation. With your permission, we would love to highlight your career achievements and stay connected with you in the future! [BME ALUMNI FORM](#)



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