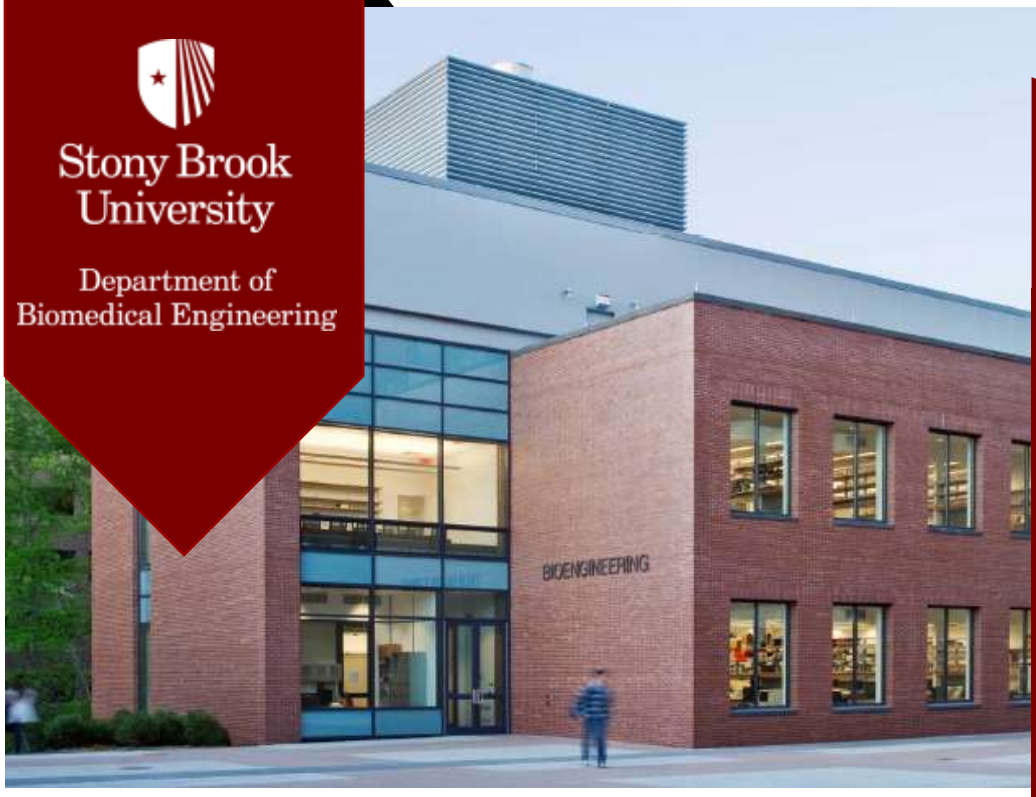
Stony Brook University

Department of Biomedical Engineering



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Biomedical Entrepreneurship

Chair's Message

It is our pleasure to present the latest updates of our department and programs. We are proud of our successes in 2018 and started strong into 2019 with two faculty recruitments. I would also like to draw your attention to our revamped Master's Program that will accept applications until April 15.

Stefan Judex

Apply Now Online

Application Deadline:
April 15, 2019
Program Starts in Late August

Contact Us

Graduate Program Coordinator
107 Bioengineering Building
Stony Brook, NY 11794-5281
www.stonybrook.edu/bme/

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Synthetic *Gene Thermometers* Show How Cells Endure Heat or Cold

In the natural world, organisms, cells, and therefore genes respond and adjust to temperature changes on a regular basis. But when scientists study genes in the laboratory, the cells containing them are most often kept at a constant temperature, which does not match the real world and minimizes the understanding of cell/gene adjustments to temperatures during the natural living process. To better understand how genes respond to temperature fluctuations, a team of scientists at the Louis and Beatrice Laufer Center for Physical & Quantitative Biology and the Department of Biomedical Engineering at Stony Brook University designed a study of yeast cells. They used computational methods and matching experiments to predict and explain how heating and cooling affect synthetic genes and gene networks, which act like genetic thermometers in the cells. Their findings, published in PNAS, could potentially help scientists to better determine how temperature changes affect genes in various cell types, and thus reveal how infectious microbes or human cells respond to fever or heating-cooling. The findings may also help scientists to control genes when seeking answers to diseases caused by or associated with certain genes.

According to Gábor Balázsi, PhD, the Henry Laufer Associate Professor of Biomedical Engineering at Stony Brook University and corresponding author, the researchers found that heating and cooling alter gene function by affecting single molecules, chemical reactions and cell physiology.

They documented four key effects of non-optimal temperatures at different biological scales: 1) cells decide to keep growing or give up, 2) growing cells divide more slowly, 3) reaction rates increase with increased temperatures, and 4) protein structures change.

Professor Balázsi said the results and the methodology will also help to predict how future synthetic, human-built genetic systems respond when deployed at non-standard temperatures.

The research is funded by a National Institutes of Health MIRA grant and the Laufer Center.

Advancing Transcatheter Aortic Valve Replacement Outcomes

We are pleased to announce that Danny Bluestein, Professor of Biomedical Engineering (BME), has been awarded $3.84 million Bioengineering Research Partnership (BRP) U01 grant from the National Institute of Biomedical Imaging and Bioengineering (NIBIB) for his proposal *Biomechanical Approaches and Technologies for Enhancing TAVR Outcomes*.

Calcific aortic valve disease (CAVD) is a major health issue that can lead to severe aortic stenosis (significant narrowing of the heart valve) and heart failure if untreated. Minimally invasive transcatheter aortic valve replacement (TAVR) in which a valve that is collapsed into a stent is delivered and deployed over the diseased valve using a catheter, obviating the need for an open heart surgery, has emerged as an effective therapy for inoperable CAVD patients, often as their only life-saving alternative. However complications such as calcification, valve migration, cardiac conduction abnormalities in heart rhythm, and paravalvular leaks leading to increased stroke risk have limited TAVR utility and its anticipated expansion into younger patients.

“Our translational project aims to develop the next generation of TAVR technology, by combining imaging, computational, and experimental techniques into an optimization approach that will guide pre-planning and tailor TAVR procedures for achieving significantly better patient outcomes and reduce their ensuing complications,” said Bluestein. “We also aim to offer a disruptive technology – next generation polymeric valves specifically optimized for TAVR.”

Partners in the project include Tel Aviv University and Rabin Medical Center in Israel, as well as the Sarver Heart Center of University of Arizona in Tucson, AZ.

OUR STUDENTS

BME Students and Future Entrepreneurs Win Honors at NYS Finals Competition

Approximately 100 teams from 75 universities in New York participated in the competition. The students developed Roflex as a wearable device technology that stroke patients can use at home to monitor and gauge their rehabilitation practices. The device is worn like a watch. The broader aim of the Roflex project is to develop a wearable device for stroke rehabilitation and athletic training.

At the competition the Roflex team — made up of Biomedical Engineering undergraduate students Joseph Muller, Amna Haider, Yusef Saad-Eldin, Belinda Tang and Jimmy George — was placed in the "Fuzehub Products" category tract and won the People's Choice Award, receiving the most votes for best product among 16 teams in the category. This opportunity helps students to implement their ideas in medical device innovation.

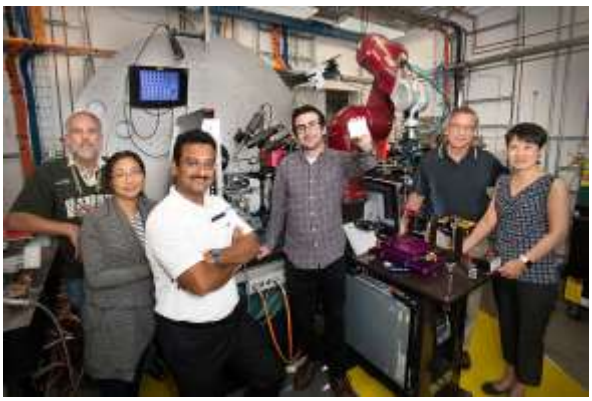
The NYBPC competition is the third award that the Roflex has received. In April the team won a first place award of $10,000 in the 2018 Stony Brook Entrepreneur Challenge, a program in the Small Business Development Center (SBDC) at Stony Brook University. This funding is being applied toward filing for the provisional patent and developing start-up to bring the product to market. Roflex then won first place again in the Regional Business Plan Competition among Long Island universities before going into the NYBPC.

"We are extremely proud of our entrepreneurial students and their mentors for winning this award," said Stefan Judex, Chair of the Department of Biomedical Engineering. "They demonstrated that they can take the skills learned in our rigorous BME curriculum and translate them into designing a promising product."

"The Roflex team worked hard and wisely throughout the development of this stroke rehabilitation and athletic training device prototype," said project advisor M. Ete Chan, Assistant Professor in the Department of Biomedical Engineering. "The team's success in these three competitions is certainly encouraging, and I am looking forward to their continued success to move this project forward. They will serve as an excellent example for our BME students."

Stony Brook Scientists Solve Fundamental Puzzle in Medical Imaging

BME scientists from Stony Brook University have used a novel technique at the National Synchrotron Light Source II (NSLS-II), a U.S. Department of Energy (DOE) Office of Science User Facility located at Brookhaven National Laboratory, to answer longstanding questions in medical imaging. Adrian Howansky, a BME Graduate Student in Professor Wei Zhao's lab (center, holding one type of scintillator the group studied), investigated how light moves within scintillators.



Full Article

University Groups Participate in Maker Day at Long Island School for the Gifted

Last fall, a total of 16 Stony Brook volunteers, representing students, staff and faculty from the International Biomedical Engineering Honor Society Alpha Eta Mu Beta (AEMB), Biomedical Engineering Society and Center for Excellence in Learning and Teaching participated in the Long Island School for the Gifted Maker Day. There were more than 200 attendees at the event consisting of children from pre-K through 9th grade and their caretakers.

Full Article

BME NEWS

Professor Christine DeLorenzo to Join Biomedical Engineering Department

We are excited to welcome Associate Professor Christine DeLorenzo to the core faculty of Biomedical Engineering at Stony Brook. Dr. DeLorenzo holds a Ph.D. in Biomedical Engineering from Yale University (2007). Her current research on PET imaging of depression and antidepressants is funded by the National Institutes of Health, the Alzheimer's Foundation of America, the Dana Foundation, and the Brain & Behavior Research Foundation. Dr. DeLorenzo will retain her (joint) appointment in the Department of Psychiatry at the Renaissance School of Medicine at Stony Brook University and will continue as the Director of the Center for Understanding Biology using Imaging Technology (CUBIT) within the Department of Psychiatry. Starting in Spring of 2020, Dr. DeLorenzo will become the course director of BME 301 – Bioelectricity.

2018-2019 Biomedical Engineering Seminar Series

An Interdisciplinary Program of Translational Biomedical Research Wednesdays at 4:00pm, Laufer Center, Lecture Hall 101

March 27th, 2019

Immune Cell-Mediated Cell and Drug Delivery Platform

Cheng Dong, Ph.D.
Distinguished Professor and Chair Department of Biomedical Engineering
Penn State University
Faculty Host: Professor Yi-Xian Qin

April 24th, 2019

OCT and Nonlinear Optical Endomicroscopy for in vivo Histologic Imaging

Xingde Li, Ph.D.
Professor Department of Biomedical Engineering
Johns Hopkins
Faculty Host: Professor Hassan Arbab

Find more BME News here!