



Biomedical Engineering

Summer/Fall
2024
Newsletter

CHAIR'S MESSAGE



YI-XIAN QIN
Professor and Chair

Dear Students, Faculty, Alumni, Staff, and Colleagues,

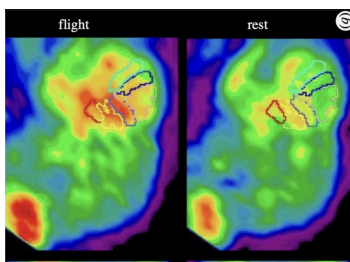
Greetings from [Stony Brook University \(SBU\) BME](#)! 2024 has been an incredibly exciting year filled with significant achievements in SBU BME. The historic \$500 million endowment from the Simons Foundation is a remarkable milestone for SBU, showcasing its prominence in higher education. Leading the \$700 million New York Climate Exchange on Governor's Island is another testament to the university's commitment to innovative research. Two new faculty members, Eric Josephs and Sufeng Zhang, recently joined our department in the areas of nanotechnology, nanomedicine, tissue engineering, and biomaterials. This year, we will celebrate 24 years since establishing the first Biomedical Engineering Department in the State University of New York, along with growing undergraduate and graduate programs. Although we are still a young department, SBU BME has achieved excellence in research and education. The research expenditure for faculty is approximately \$500K/ full time effort (FTE). Our students are exemplary, having published several papers as first authors, and our alumni are wildly successful, including Dr. Raza Hassan, who was named a Best Inventor by TIME Magazine. Our staff are collegial and incredibly skilled, and our faculty engage students closely in the classroom, labs, and design sites. It is also wonderful to see students being recognized for their hard work and achievements, like Dr. Marina Fandaros who received the President's Distinguished Doctoral Student Award, and faculty being awarded fellowships by renowned organizations like AIMBE and ASME. The department is set

for continued growth and innovation with recently expanded faculty. As we grow, we continue to diversify our department and ensure equity for all students, faculty, and staff. We have maintained a 50:50 ratio for undergraduate female and male students. We are immensely proud of the continued developments at SBU Biomedical Engineering and the translation of our impacts in the clinic and beyond.

SBU BME by the Numbers

\$ 76M New Engineering-Driven Medicine Building in construction	18.9:1 Student:Faculty Ratio	51% Students are Women	1/3 Faculty Members are Women
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RESEARCH & TEACHING



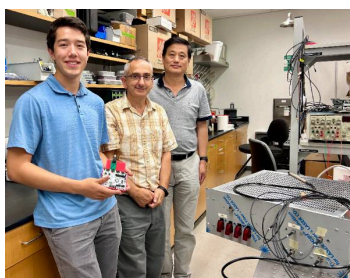
Group led by Vaska discovers brain evolution enabling flight

A team of international researchers led by **PAUL VASKA** (SBU BME/Radiology) and Amy Balanoff (Johns Hopkins Medical Institute) revealed that adaptive increase in the size of the cerebellum in fossil vertebrates enabled bird-like dinosaurs to achieve powered flight. The research combined positron emission tomography (PET) scans of pigeon brains with studies of dinosaur fossils and was published in the Proceedings of the Royal Society B. [More>](#)



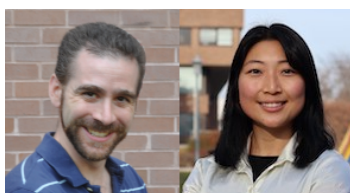
Rubenstein paper describes incorporation of DEI practices in BME undergraduate courses

DAVID RUBENSTEIN published a manuscript highlighting changes to a mandatory undergraduate BME course, Statics and Dynamics in Biological Systems. These changes, in response to newly proposed ABET diversity, equity, and inclusion (DEI) criteria, involved discussion and projects highlighting scholars and engineers from minoritized groups. The goal of this publication is to spur other instructors to incorporate diverse representation in their courses. [More>](#)



Undergraduate Moore publishes 2nd first author paper on Field-Programmable Gate Array technology

CHRISTOPHER MOORE published his second first author paper, "[A Device-on-Chip Solution for Real-Time Diffuse Correlation Spectroscopy Using FPGA](#)" in Biosensors, as part of work done for his undergraduate thesis. This is the first reported study integrating electronic components of a diffuse correlation spectroscopy in one chip. Moore was mentored by **WEI LIN** and **ULAS SUNAR**. [More>](#)



Commentary by Rubenstein and Kim explores LLMs in BME graduate course

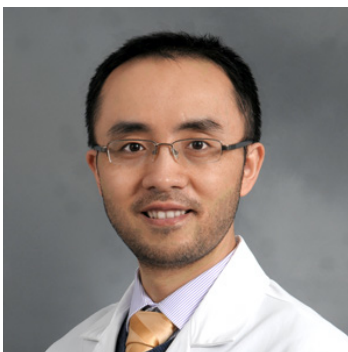
DAVID RUBENSTEIN and undergraduate **CARSI KIM** published a perspective on how large language models (LLMs) such as ChatGPT impact teaching and learning in a first-semester BME graduate course. The article, published in Cellular and Molecular Bioengineering, also explores the need for considerations and guidelines whenever new disruptive technologies become widely available. [More>](#)

FACULTY NEWS



Qin elected Fellow of the American Society of Mechanical Engineers

YI-XIAN QIN was named as Fellow of the American Society of Mechanical Engineers (ASME) for his outstanding achievements in the field of engineering. Qin is among pioneers who discovered bone's ability to rapidly adapt to its functional environment, bone fluid flow, and regeneration to dynamic signals. He has published more than 180 peer-reviewed articles, and related books and chapters, as well as several U.S. patents. [More>](#)



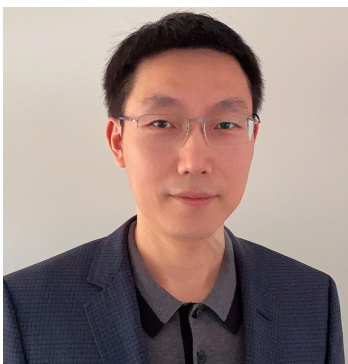
Wang awarded NIH R35 grant for single-cell analysis at the protein level

JUN WANG received an NIH R35 award entitled "Advanced Single-Cell Protein Analysis with Multiplex in Situ Tagging Array Technology". This five-year, \$1.97 million grant will be used to expand the single-cell spatial multiplex in situ tagging (scMIST) technology to quantify ~500 functional proteins to assess cellular features, physiological status and functions within a solid tissue microenvironment, harness the power of AI to prognose disease progression and occurrence, and visually detect single pathogens within a minute. [More>](#)



Yin-led Biodesign Curriculum R25 Award renewed by NIBIB

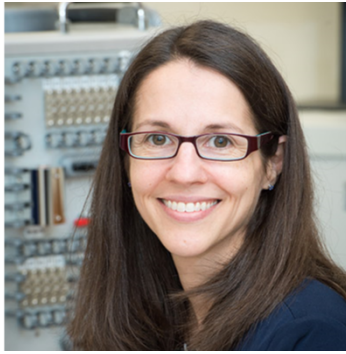
WEI YIN and Lauren Maloney (Emergency Medicine), along with collaborators **CLINT RUBIN** (BME) and Jonathon Schwartz (Anesthesiology) received a renewal on their R25 award titled "Development of an enhanced biodesign curriculum to promote biomedical innovation." The 5-year, \$208k award will be used to improve the current curriculum by developing new courses/programs and bringing new partners to interdisciplinary design teams, to enhance BME student skill development in biodesign, expand team perspective, and improve communication across disciplines. [More>](#)



Zhu receives NIH grant for bioresorbable drug-eluting stents for pediatric cardiovascular applications

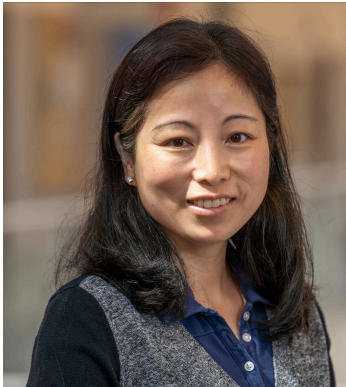
DONGHUI ZHU, an Empire Innovation Professor, and Ke Cheng (Columbia University) were awarded a \$2.9 million NIH R01 grant entitled "Bioresorbable zinc-based drug-eluting stents for pediatric cardiovascular applications." The renewed five-year project will support Zhu's efforts to develop a novel stent designed for children

with heart defects, such as aortic coarctation. These stents offer mechanical strength, ductility, and stable biodegradation. [More>](#)



DeLorenzo and Parsey receive R21 to explore role of acetylcholine transporter in major depressive disorder

CHRISTINE DELORENZO and Ramin Parsey (Psychiatry) received a National Institute of Mental Health (NIMH) R21 award entitled "Preliminary imaging studies evaluating the vesicular acetylcholine transporter as a treatment target in major depressive disorder". This two-year, \$438k grant will provide evidence for vesicular acetylcholine transporter's role in development of major depressive disorder and as the mechanism of action for novel cholinergic drugs. [More>](#)



Yin awarded American Heart Association grant for smart monitoring of ECMO oxygenators

WEI YIN, along with collaborators Jon Longtin (Mechanical Engineering) and Jonathon Schwartz (Anesthesiology) received an American Heart Association grant entitled "Smart monitoring for ECMO." The 2-year, \$197k award will be used to develop and test a smart novel optical microfluidic device providing real-time coagulation measurements in extracorporeal membrane oxygenator (ECMO) circuits. The device will be based on a computational fluid dynamics - machine learning workflow that correlates oxygenator blood flow parameters to clot burden and predicts the risk of clotting. [More>](#)



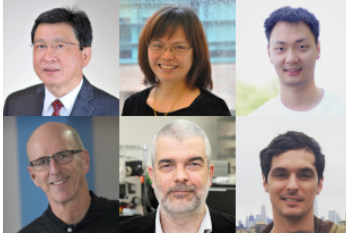
Arbab awarded R21 grant for early detection of eye diseases using terahertz time-domain spectroscopy

HASSAN ARBAB received a National Eye Institute (NEI) R21 grant entitled "Terahertz time-domain spectroscopic imaging of cornea for three dimensional mapping of hydration gradients". This two-year, \$422K grant will be used to develop instruments based on terahertz time-domain spectroscopy (Thz-TDS) to measure and map corneal hydration gradients. This approach may be utilized for early detection and monitoring of diseases affecting the eye's cornea. [More>](#)



BME faculty awarded multiple Stony Brook University seed grants

BME faculty were among six teams of SBU researchers who received SBU Office of the Vice President of Research seed funds to explore new research avenues. [Fall 2023](#) awardees included: **JAWAAD SHERIFF**, **DANNY BLUESTEIN**, Wadie Bahou (Medicine), and Yuefan Deng (AMS) for "Platelet Mechanical Stiffness and Shear-Mediated Response Across the Lifespan"; **WEI YIN**, Sharon Martino (Physical Therapy), and Adam Gonzalez (Psychiatry and Behavioral Health) for "Effects of Activity Tracking and Virtual Reality Mindfulness on Stress and Cardiometabolic Health of College Students"; and **ULAS SUNAR**, Isadora Botwinick (Surgery), Lucian Manu (Psychiatry), and Charles Mikell (Neurosurgery) for "Neuromodulation for Delirium in Critically-Ill Patients." [Spring 2024](#) awardees included: **ERIC BROUZES** and Kenneth Shroyer (Pathology) for "Point of Care Digital Platform for Cervical Cancer Prognosis"; **CHRISTINE DELORENZO** for "Development of a Blood Glucose Based Correction Factor for Brain Glutamate Estimates"; and **DONGHUI ZHU**, research scientist **JUNCEN ZHOU**, and Wayne Waltzer (Urology) for "Biodegradable Metallic Stents for Ureteral Obstruction Treatment." [More>](#)



Patents awarded to several BME faculty

Three patents were recently awarded to BME faculty. **YINGTIAN PAN**, **CONGWU DU**, and **WEI CHEN** (PhD '17) were awarded a patent for "[System, Method, and Computer-Accessible Medium for Subsurface Capillary Flow Imaging by Wavelength-Division-Multiplexing Swept-Source Optical Doppler Tomography.](#)" **CLINT RUBIN** and Janet Rubin (UNC Chapel Hill) received a patent for "[Compositions and Methods for Enhancing the Biological Response to Chemical Agents and Physical Stimuli.](#)" **ERIC BROUZES** and **MARTIN SAUZADE** (PhD '14) were awarded for "[Microfluidic Device and Methods.](#)"

STUDENT/ALUMNI NEWS



Hassan's AI-Driven shoe recognized as a TIME Best Invention

RAZA HASSAN (PhD '20) and IAMBIC co-founder Maeve Wang were recognized by TIME magazine for their artificial intelligence (AI)-driven, precision-fit shoe. The IAMBIC MODEL T, which made the Best Invention of 2023 list for its originality, ambition, and transformative potential, uses an smartphone scanner coupled with AI-based machine learning models to generate custom-fit shoes at a fraction of the cost and time compared to traditional manufacturing approaches.

[More>](#)



Kovarovic wins 2024 NAI-SBU Young Academic Inventor's Award

BRANDON KOVAROVIC (PhD '20) received the Young Academic Inventor's Award from the Stony Brook chapter of the National Academy of Inventors (NAI). Kovarovic was honored for his inventions directed to artificial polymeric heart valves under the mentorship of

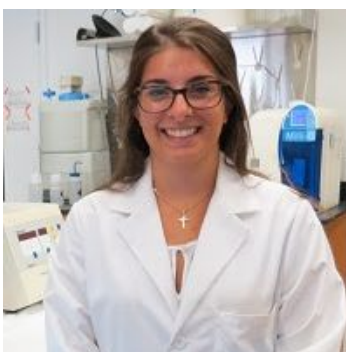
DANNY BLUESTEIN. [More>](#)



Moore receives Chancellor's Award for Student Excellence

CHRISTOPHER MOORE (BE '24) received a Chancellor's Award for Student Excellence from the State University of New York (SUNY) Chancellor John B. King, Jr. The award is the highest honor awarded to SUNY students who have best demonstrated academic excellence and leadership. Moore is an aspiring physician-scientist and Honors student mentored by **WEI LIN** and **ULAS SUNAR**, and is continuing his research in SBU's Medical Scientist Training Program (MSTP).

[More>](#)



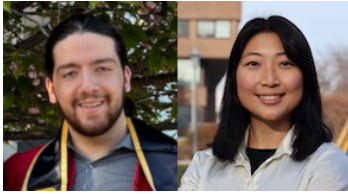
Fandaros Receives 2024 President's Award to Distinguished Doctoral Students

MARINA FANDAROS (PhD '24) received a President's Award to Distinguished Doctoral Students, the highest honor for a SBU graduate student. Under the mentorship of Wei Yin, Fandaros used non-invasive cardiac imaging coupled with computational modeling to evaluate the biomechanics of arterial plaques that are a hallmark of heart disease. [More>](#)



DiPietro and Kaimis honored with Provost's Award for Academic Excellence

PETER DIPIETRO and **ANDREAS KAIMIS** received the Provost's Award for Academic Excellence. The award is given to select graduating seniors who have excelled in their academics, research and creative activities, and building academic communities. DiPietro and Kaimis will continue at Stony Brook as part of the Accelerated Master's Program in BME. [More>](#)



Kaimis and Kim featured as May URECA Researchers

ANDREAS KAIMIS and **CARSI KIM** were featured as May 2024 Researchers of the Month by the Undergraduate Research & Creative Activities (URECA) program. Andreas was honored for his work on low intensity vibration's effect on cells and improving biomanufacturing for CAR-T cell immunotherapy. Carsi was honored for her diverse work, including a mouth-controlled input device for quadriplegics, kidney-on-a-chip models, measurement of infant non-nutritive sucking force, and molecular optical imaging techniques. [More>](#)



Graduate Students Inspire 4th Graders to Pursue Prosthetics Design

BME graduate students, led by **MEI LIN (ETE) CHAN**, collaborated with technology instructor John Schumacher and his students from Rocky Point High School to mentor and support 4th graders from Joseph A. Edgar Intermediate School to improve the design of their prosthetic legs, created from basic household supplies. The 4th graders were driven with a mission to provide 3D-printed assistive technology to local veterans in need. [More>](#)



BME Faculty and students encourage children to dream, design, and invent at Maker Faire

STEFAN JUDEX and **MEI LIN CHAN** and their students joined other SBU community members to inspire the next generation of makers at the Long Island Explorium's seventh annual Maker Faire. Chan's tables highlighted 3D printed assistive technology for the community, while Judex fielded questions as an "Ask the Scientist" volunteer. [More>](#)



3DPath Connects STEP Program with Canine Companions

MEI LIN CHAN and 3DPath, a newly formed club that she advises, work with community centers, nursing homes, and various high school and elementary students to enable access to 3D-printed assistive technologies. Together with STEP, which prepares underrepresented minority secondary school students for STEM- and health-related professions, the team visited Canine Companions to tour the training facility for service dogs and learn how their 3D printed accessible dog treat dispensers can assist wheelchair users. [More>](#)

Stony Brook University is now accepting student applications for Fall 2025!

Please click on the buttons below to learn more about our BME programs

Graduate Programs

Undergraduate Program

Application Deadlines

Ph.D. Program: December 1st

Masters Program: January 15th

Undergraduate Program: November 1st (Early Action) | January 15th (Regular)

About Stony Brook BME

The Department of Biomedical Engineering was founded in December 2000, jointly established by the College of Engineering and Applied Sciences (CEAS) and the Renaissance School of Medicine (RSOM) at Stony Brook University. The BME department currently has 26 core and approximately 50 program faculty members. The mission of the Department is to fully integrate the cutting edge of engineering and physical sciences with the state-of-the-art biology to advance human health. The ABET-accredited undergraduate program serves approximately 500 BME majors. The Graduate Program in BME has approximately 100 MS and doctoral students. The BME Department enjoys close collaboration with the facilities and faculty at the newly established Institute for Engineering-Driven Medicine (IEDM), Center for Biotechnology, Brookhaven National Laboratory (BNL), and Cold Spring Harbor Labs (CSHL).

More about Stony Brook BME:

[BME core faculty](#)

[Program faculty](#)

[Research areas](#)

[Undergraduate program](#)

[Ph.D. & M.S. program](#)

[Affiliated labs and Facilities](#)

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Stony Brook University

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