On behalf of the faculty and staff of the GW Department of Biomedical Engineering (BME), I would like to present to you our 2018 newsletter. These are exciting times for biomedical engineering at GW. The formation of our new Department of Biomedical Engineering in Fall 2014 followed by the launch of our Science and Engineering Hall in 2015, which is across the street from the GW School of Medicine and Health Sciences and GW Hospital, make it a unique time to study biomedical engineering in the heart of the nation’s capital. We are also just few blocks away from the White House, Washington Monument, Lincoln Memorial, Smithsonian National Museums, and many other national capital landmarks and federal government institutions. Since inception of our department we have doubled our faculty, tripled the number of graduate students and increased undergraduate student population by 30%.

Undergraduates in the department can obtain a Bachelor of Science degree in biomedical engineering, which is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The wide range of expertise of our faculty allows us to prepare undergraduates for immediate entrance into the practice of biomedical engineering, or graduate, medical, policy, or law schools, and also to provide the breadth of fundamental knowledge that will prepare them for the lifelong learning that is necessary to remain productive as professionals in the future. We encourage and provide opportunities for study abroad, internships, and undergraduate research experiences.

At the graduate level, students can enroll for the Master of Science, Master of Engineering, and Doctor of Philosophy (Ph.D.) degrees in Biomedical Engineering. The BME department maintains a diverse program of research directed at areas such as medical imaging and devices, medical image and signal analysis, optogenetics, microfluidics and lab-on-a-chip instrumentation, and neural and cardiovascular engineering. Opportunities for graduate student support are available in many of these areas, and we invite prospective graduate students to contact the department office or individual faculty members for detailed information about teaching and research assistantships. Every year we attend annual sessions of Biomedical Engineering Society, where we present research conducted in our department and our programs to prospective graduate students. We are also proud to present these training opportunities to qualified prospective graduate students during our annual BME Day, which is now traditionally held the second week of November, one month after annual BMES conference.

Whether you are a prospective undergraduate or graduate student, we welcome the chance to talk with you and discuss all the options that are available to you in the BME Department. Please contact me at biomed@gwu.edu or at 202-994-3740 with any questions you have, including your interest in visiting GW BME Department in Washington, DC.

Sincerely,

Igor Efimov, Ph.D., F.A.I.M.B.E., F.A.H.A., F.H.R.S.
The Alisann & Terry Collins Professor and Chairman
Department of Biomedical Engineering

“Biomedical Engineering is everywhere!”

Igor R. Efimov
The Department of Biomedical Engineering, newly formed in 2014, offers unique opportunities for our students, who can take advantage of our location in the heart of the nation’s capital and near numerous federal agencies and research labs involved in biomedical and health-related enterprises.

What is Biomedical Engineering?

Biomedical engineering is the application of engineering practices to human health issues. Biomedical engineers have developed and improved the technologies used to diagnose and treat a wide range of diseases. Examples of new and exciting technologies under development by biomedical engineers are:

• Improved imaging methodologies for cancer detection
• Novel methods to analyze medical images and present additional information to physicians
• New technologies to understand electrical conduction abnormalities in the heart to better respond to heart attacks and arrhythmias
• New technologies to provide selective delivery of drugs, such as chemotherapy agents, to areas of interest in the body without damaging healthy tissues

Biomedical Engineering at GW

GW’s BME program takes advantage of the unique combination of resources and opportunities that the engineering school can provide to our BME students through its connection with GW’s School of Medicine and Health Sciences and GW Hospital, as well as the biotech industries and world-class laboratories in the Washington, DC metropolitan area. Potential focus areas include bioinformatics, telemedicine, instrumentation, pre-clinical, biomechanics, imaging, and other areas as directed by the student’s academic advisor.

Our undergraduates and graduate students conduct internships and research experiences at places like the NIH, NASA, and the FDA as well as private industry including Medtronic, Boston Scientific, and St. Jude Medical. This provides cutting-edge real world experience that often leads to job offers at the places where students intern.

LABORATORIES, CENTERS, & INSTITUTES

• Cardiac Ischemia Research Laboratory
• Cardiovascular Engineering Laboratory
• Medical Imaging and Image Analysis Laboratory
• Optical and Acoustic Imaging Laboratory
• Therapeutic Ultrasound Laboratory
• Cardio: Optogenetics and Optical Imaging Laboratory
• Assistive Robotics and Tele-Medicine (ART-Med) Laboratory
• Nanomedicine, Cellular Therapeutics, and Diagnostic Platforms Laboratory
• Advanced Bio-Integrated Electronics Laboratory
• Nanophotonics and Microfluidics Laboratory

RESEARCH AREAS

• Biomedical signal processing and signal analysis
• Cardio: optogenetics
• Cardiovascular engineering
• Robotics and human robot interactions
• Biosensors
• Cancer detection and therapy
• Disease and pathogen detection
• Drug delivery
• Electrophysiology (cardiac and neural)
• Heart disease and heart failure
• Medical Imaging and image analysis
• Microfluidics and nanotechnology
• Physiological flows
• Simulation and modeling
• Therapeutic ultrasound
• Nanomedicine, cellular therapeutics, and diagnostic platforms
• Bio-integrated electronics

DEGREES AND PROGRAMS

• Undergraduate: Biomedical Engineering (B.S., 5-year B.S./M.S.)
• Graduate: Biomedical Engineering (M.S., Ph.D.)
• M.Eng in Regulatory Biomedical Engineering (pBME)
Igor Efimov

AUSANN AND TERRY COLLINS PROFESSOR AND CHAIR
DIRECTOR, CARDIOVASCULAR ENGINEERING LABORATORY

B.S./M.Sc., Physics, Moscow Institute of Physics and Technology, 1986
Ph.D., Biophysics/BME, Moscow Institute of Physics and Technology, 1992

TEACHING
BME 2810: Biomedical Engineering Seminar I
BME 6045: Cardiovascular Engineering
BME 6994: Biomedical Engineering Regulatory Practicum

SELECTED PUBLICATIONS

RESEARCH
Our NIH- and Leducq Foundation-funded research laboratory studies the biophysical mechanisms of cardiac conduction and arrhythmia, and has developed novel anti-arrhythmia therapies, including low-energy defibrillation therapy. The lab works on future treatments for the heart rhythm disorders and on engineering the pacemaker and conduction system of the heart, using electrical engineering, molecular biology, and multimodal imaging techniques. Our work led to startup company Cardialen, which has recently raised Series B funding ($17M) to develop implantable pain-free atrial defibrillator.

Office: Science and Engineering Hall, Room 5000C
Phone: (202) 994-2152
Email: efimov@gwu.edu
Website: http://efimovlab.org

Emilia Entcheva

PROFESSOR
DIRECTOR, CARDIAC OPTOGENETICS AND OPTICAL IMAGING LABORATORY

B.S., Electrical Engineering, Technical University - Sofia, Bulgaria
Ph.D., Biomedical Engineering, The University of Memphis, 1998
Postdoctoral, Biomedical Engineering, Johns Hopkins University, 2000

TEACHING
BME 3897: Biopotentials
BME 6046: Cell and Molecular Imaging

SELECTED PUBLICATIONS

RESEARCH
Our group leads efforts in the concept and development of new fully automated high-throughput all-optical electrophysiology platforms to improve drug testing, human stem cell research, and gene therapies for the treatment of cardiac arrhythmias. We collaborate with companies or other researchers to characterize the electromechanical function of disease-specific patient-derived iPS-CMs in a massively parallel fashion.

Office: Science and Engineering Hall, Room 5660
Phone: (202) 994-7807
Email: entcheva@gwu.edu
Website: http://entcheva.seas.gwu.edu
Matthew Kay
PROFESSOR
ASSOCIATE CHAIR FOR RESEARCH & GRADUATE AFFAIRS
DIRECTOR, CARDIAC ISCHEMIA RESEARCH LABORATORY
B.Sc., Mechanical Engineering, North Carolina State University, May 1993
M.Sc., Biological Engineering, North Carolina State University, August 1996
D.Sc., Biomedical Engineering, Washington University in St. Louis, May 2000
Postdoctoral, Biomedical Engineering, University of Alabama in Birmingham, June 2001

TEACHING
BME 820: Principles and Practice of Biomedical Engineering
BME 6484: Biomedical Signal Analysis
BME 1010: Introduction to Biomedical Engineering

SELECTED PUBLICATIONS

RESEARCH
Research in Dr. Kay’s laboratory is focused within the areas of heart failure and neurocardiology. Dr. Kay and his research team have specific expertise in high-speed optical assessments of cardiac physiology, including optical mapping and absorbance spectroscopy, and have developed powerful algorithms to analyze time varying optical signals. Projects include aspects of cardiac metabolism, hypoxia, electromechanical function, and targeted activation of cardiac autonomic nerves using optogenetics and DREADDs.

Office: Science and Engineering Hall, Room 5670
Phone: (202) 994-2898
Email: phymwk@gwu.edu
Website: kaylab.seas.gwu.edu

David Lee
ASSOCIATE PROFESSOR OF PRACTICE
B.A., Maryville College, 1982
M.S, San Jose State University, 1995
Ph.D., Ohio State University, 2002

TEACHING
BME 1010: Introduction to Biomedical Engineering
BME 1020: Introduction to Biomedical Engineering
BME 3915W: Biomedical Engineering Project Lab I
BME 4925W: Biomedical Engineering Capstone Project Lab II
BME 6045: Biomedical Engineering Methods

SELECTED PUBLICATIONS

RESEARCH
Dr. Lee’s interests are in developing project and laboratory-based curriculum for educating undergraduate biomedical engineers, and in developing assistive and adaptive devices for underserved markets. He currently directs the Biomedical Engineering Capstone Courses and is developing lab and project-based activities throughout the four-year undergraduate program.

Office: Tompkins Hall, Room 104B
Phone: (202) 994-2183
Email: dtlee@gwu.edu

Mouse ECG Vest Team
The mouse vest is a device used to collect ECG data from a mouse and wirelessly transmit that data to a computer.
Zhenyu Li
ASSOCIATE PROFESSOR
DIRECTOR, NANOPHOTONICS AND MICROFLUIDICS LABORATORY
B.S., Tsinghua University, 1999
M.S., University of California, 2000
Ph.D., California Institute of Technology, 2007
_postdoctoral scholar, Howard Hughes Medical Institute (HHMI) Janelia Farm, 2008-2010

TEACHING
BME 4482: Medical Measurement
BME 4483: Medical Instrumentation Design

SELECTED PUBLICATIONS
Allan Guan, Parisa Hamilton, Yi Wang, Maud Gorbet, Zhenyu Li & K. Scott Phillips, "Medical Devices on Chips", Nature Biomedical Engineering Vol 1, Article number: 0045, 2017.
Yun Qiao, Quan Dong, Baichen Li, Sofian Obaid, Christian Miccile, Rose T Yin, Trisha Talapatra, Zhenyu Li, Igor R. Efimov, "Multimersive Clice Culture Platform for the Investigation of Human Cardiac Tissue Physiology", Progress in Biophysics and Molecular Biology, 2018.
Q. Dong, BC Li and ZY Li, Wearable Formaldehyde Sensor for Pediatric Asthma Study, BMES 2018.
Q. Dong, BC Li and ZY Li, Using a Wearable Multiple-Lead ECG Sensor to Detect Sudden Cardiac Events, BMES 2018.
BC Li, Q Dong, N Tran, RS Downen, M Zaghloul and ZY Li, Clouded-based Wearable and Stationary Sensors for Monitoring Air Pollution Exposure in Pediatric Asthma Research, International Society of Exposure Science and the International Society for Environmental Epidemiology (ISES-ISEE 2018), Ottawa, Canada, 26-30 August 2018.

RESEARCH
Professor Zhenyu Li’s research focuses on the development of wearable biosensors and miniaturized medical devices using micro and nanotechnology, namely microfluidics, MEMS, nanophotonics, and flexible electronics. Our current projects include a handheld automated blood analyzer using microfluidic blood samples, a wearable ECG sensor on a finger ring, and soft robotics with embedded medical sensors and actuators for automated health care delivery.

Office: Science and Engineering Hall, Room 5590
Phone: (202) 994-4272
Email: zhenyu@gwu.edu
Website: https://sites.google.com/site/gwulilab

Murray Loew
PROFESSOR
DIRECTOR, MEDICAL IMAGING AND IMAGE ANALYSIS LABORATORY
B.S.E.E., Drexel Institute of Technology, 1965
M.S.E.E., Purdue University, 1967
Ph.D., Electrical Engineering, Purdue University, 1972

TEACHING
BME 3915, BME 4920, & BME 4925: Biomedical Engineering Capstone
Project Lab I, II, and III
BME 6485: Medical Imaging I
BME 6840: Digital Image Processing
BME 6850: Pattern Recognition
BME 6885: Computer Vision
BME 8484: Medical Imaging II

SELECTED PUBLICATIONS
Huda Asfour, Shuyue Guan, Narine Muselimyan, Luther Swift, Murray Loew, Narine Sarvazyan, Optimization of Wavelength Selection for Multispectral Image Acquisition: A Case Study of Atrial Ablation Lesions, Biomedical Optics Express, 2018 May, Vol. 9, No. 5, pp. 2189-2204

RESEARCH
Medical imaging and image analysis: image registration, compression, and quality evaluation; computer-aided diagnosis; Image processing and computer vision: segmentation, multispectral analysis, statistical methods, image fusion, and human perception; Pattern Recognition: feature extraction, classifier design, validation.

Current work: quantitative thermal imaging for breast cancer detection, hyperspectral image analysis for assessment of success of cardiac ablation, salience measures for diagnosis of cancer and anomaly detection, development of simple imaging tools for characterization of glass.

Office: Science and Engineering Hall, Room 6660
Phone: (202) 994-5910
Email: loew@gwu.edu
Website: http://loewlab.seas.gwu.edu

Top: High-accuracy lesion detection for verification of cardiac ablation. This uses only four bands from a hyperspectral image, which makes it feasible for intraoperative applications.
Bottom: Automatic segmentation of infrared breast image in pilot study of early cancer detection
Luyao Lu
ASSISTANT PROFESSOR
DIRECTOR, ADVANCED BIO-INTEGRATED ELECTRONICS LABORATORY
Ph.D. Chemistry, University of Chicago, 2015
Postdoctoral Fellow, University of Illinois-Urbana-Champaign
Postdoctoral Fellow, Center for Bio-Integrated Electronics, Northwestern University

SELECTED PUBLICATIONS

RESEARCH
Professor Luyao Lu’s laboratory explores the next-generation soft, lightweight, and bio-compatible materials, devices, and unconventional micro/nanofabrication approaches with an emphasis on creating organic and inorganic classes of optoelectronic systems, such as photodetectors, solar cells, and light emitting diodes for cardiac and neuroscience research. The goal is to provide advanced healthcare platforms such as wearable and implantable sensors that can seamlessly integrate with biological systems to facilitate health monitoring, personalized medicine design and accurate disease diagnosis.

Office: Science and Engineering, Room 6665
Phone: (773) 791-3169
Email: luyaolu@gwu.edu
Website: www.lu.seas.gwu.edu

Anne-Laure Papa
ASSISTANT PROFESSOR
DIRECTOR, NANOMEDICINE, CELLULAR THERAPEUTICS AND DIAGNOSTIC PLATFORMS LABORATORY
M.Sc., Chemistry of Interfaces and Materials, University of Bourgogne, France
Ph.D., Physical Chemistry in partnership with NVH Medicinal Biotechnology, University of Bourgogne, France

TEACHING
BME 6045: Biology of Materials and Regulatory Medicine
BME 6046: Drug Delivery

SELECTED PUBLICATIONS

RESEARCH
Development of novel translationally directed therapeutic systems including programmable nanoparticles and ex vivo modified cells (e.g. platelets), utilizing surface modifications and biomimicry to ensure optimal circulation times and multifunctional therapeutic effects on various disease models. My current research interests are inspired by platelet physiology and their implications in cancer metastasis and vascular diseases.

Office: Science and Engineering Hall, Room 5665
Phone: (202) 994.0527
Email: alpapa@gwu.edu
In our Assistive Robotics and Tele-Medicine (ART-Med) Lab, we study the collaborative innovation between human intelligence and robotic technology, integrating human-robot interaction, machine learning, and computer vision, haptics, and telepresence robotics. We investigate the impacts of multi-modal feedback on the aspects of human-robot interaction and its application in assistive scenarios, such as telepresence for individuals with visual impairments or emotionally and socially interactive robotic systems for children with autism spectrum disorder (ASD). We also study the computational methodologies of machine learning for robotic learning of human behaviors and intelligence for biomedical scenarios, from simple care-giving tasks towards intelligent surgical assistance and training systems.

**SELECTED PUBLICATIONS**


Diba T, George S, Elmor I, Zara JM, "Optical Coherence Tomography to Measure Cardiac Structure Changes Due to Induced Edema. BMES 2017 Annual Meeting.

**RESEARCH**

Optical Coherence Tomography, Ultrasound, Medical Image Analysis, Epithelial Cancer Detection, and Treatment Monitoring.

**OFFICE:** Science and Engineering Hall, Room 5610

**PHONE:** (202) 994-2402

**EMAIL:** pzaraj@gwu.edu

---

Chung Hyuk Park

ASSISTANT PROFESSOR

DIRECTOR, ASSISTIVE ROBOTICS AND TELE-MEDICINE (ART-MED) LABORATORY

- B.S., Electrical Engineering, Seoul National University, 2000
- M.S., Electrical Engineering & Computer Science, Seoul National University, 2002
- Ph.D., Electrical & Computer Engineering, Georgia Institute of Technology, 2006-2012
- Postdoctoral, Electrical & Computer Engineering, Georgia Institute of Technology, 2012-2013

**TEACHING**

- BME 4920 & 4928: Biomedical Engineering Capstone Project Lab
- BME 3915W: Biomedical Engineering Capstone Project Lab I
- BME 4830 & 4833: Introduction to Medical Imaging Methods
- BME 4920 & 4928: Biomedical Engineering Capstone Project Lab

**SELECTED PUBLICATIONS**


Diba T, George S, Elmor I, Zara JM, "Optical Coherence Tomography to Measure Cardiac Structure Changes Due to Induced Edema." BMES 2017 Annual Meeting.

**RESEARCH**

In our Assistive Robotics and Tele-Medicine (ART-Med) Lab, we study the collaborative innovation between human intelligence and robotic technology, integrating human-robot interaction, machine learning, and computer vision, haptics, and telepresence robotics. We investigate the impacts of multi-modal feedback on the aspects of human-robot interaction and its application in assistive scenarios, such as telepresence for individuals with visual impairments or emotionally and socially interactive robotic systems for children with autism spectrum disorder (ASD). We also study the computational methodologies of machine learning for robotic learning of human behaviors and intelligence for biomedical scenarios, from simple care-giving tasks towards intelligent surgical assistance and training systems.

**OFFICE:** Science and Engineering Hall, Room 6655

**PHONE:** (202) 994-5147

**EMAIL:** cpark@gwu.edu

**WEBSITE:** www.chungiypark.com

---

Jason Zara

ASSOCIATE PROFESSOR

ASSOCIATE CHAIR FOR ACADEMIC AFFAIRS

DIRECTOR, OPTICAL AND ACOUSTIC IMAGING LABORATORY

- B.S., University of Illinois at Urbana-Champaign, 1996
- Ph.D., Duke University, 2001

**TEACHING**

- BME 1010: Introduction to Biomedical Engineering
- BME 3910: Capstone Design Preparation
- BME 3915W: Biomedical Engineering Capstone Project Lab I
- BME 4833: Introduction to Medical Imaging Methods
- BME 4920 & 4928: Biomedical Engineering Capstone Project Lab

**SELECTED PUBLICATIONS**


Diba T, George S, Elmor I, Zara JM, "Optical Coherence Tomography to Measure Cardiac Structure Changes Due to Induced Edema." BMES 2017 Annual Meeting.

**RESEARCH**

Optical Coherence Tomography, Ultrasound, Medical Image Analysis, Epithelial Cancer Detection, and Treatment Monitoring.

**OFFICE:** Science and Engineering Hall, Room 5610

**PHONE:** (202) 994-2402

**EMAIL:** jzara@gwu.edu

---

From top to bottom: In one OCT imaging application, routine hearts were perfused with Tyrode’s solution and arrested using a bolus of potassium chloride prior to imaging. OCT imaging was performed under two conditions: under control Tyrode’s perfusion (first image) and then after infusion with Tyrode’s and mannitol to induce edema (second image). The degree of the edema was measured by assessing void areas in the images before and after mannitol perfusion.
**Therapeutic Ultrasound Laboratory**  
Professor Vesna Zderic has been actively involved in novel biomedical work in the area of therapeutic ultrasound and drug delivery. The current focus of her laboratory is in the application of low-intensity ultrasound to promote delivery of medications into the eye, high-intensity focused ultrasound therapy for tumor treatment, modeling of ultrasound effects in various biological tissues, and studies of the effects of ultrasound on modifying cellular responses such as insulin release from pancreatic beta cells.

**Cardiovascular Engineering Laboratory**  
Professor Igor Efimov’s primary research in the Cardiovascular Engineering Laboratory investigates the arrhythmic and metabolic mechanisms of physiological remodeling during heart failure using donor human hearts, which are rejected for transplantation and human end-stage failing hearts procured at the time of transplantation. Our work has resulted in the development of new energy delivery platforms, which is currently being translated by startup company Cardialen, Inc. (cardialen.com). Our research is in the field of medical devices focusing on novel concept organ mounted conformal electronics based on flexible and stretchable electronics platform, developed by our collaborator John A. Rogers from UIUC, who recently moved to Northwestern University.

**Cardiac Ischemia Research Laboratory**  
Professor Zhanyu Li’s laboratory focuses on the integration of nanophotonics and microfluidics, for life sciences and medicine. His research also concentrates on the innovation of novel biosensors and medical devices using micro/nanotechnology, namely microfluidics, MEMS, nanophotonics, and flexible electronics. Multiple projects analyze single cells for stem cell and cancer research. The lab also develops portable integrated biosensors for point-of-care diagnostics, environmental monitoring, and food safety inspection.

**Advanced Bio-Integrated Electronics Laboratory**  
Professor Luyao Lu’s laboratory explores the next-generation soft, lightweight, and bio-compatible materials, devices, and unconventional micro/nanofabrication approaches with an emphasis on creating organic and inorganic classes of optoelectronic systems, such as photodetectors, solar cells, and light emitting diodes for cardiac and neuroscience research. The goal is to provide advanced healthcare platforms such as wearable and implantable sensors that can seamlessly integrate with biological systems to facilitate health monitoring, personalized medicine design, and accurate disease diagnosis.
### Recent Faculty Research Grants

**Title of Project:** Improving Termination Therapy for Ventricular Tachycardia
- PIs: Igor Efimov, Daniel Cooper, Brent Shelton
- Funding Agency: National Heart, Lung, and Blood Institute

**Title of Project:** Ambulatory Sensor Arrays for Real-Time Monitoring of Pediatric Patients with Asthma
- PI: Zhenyu Li
- Funding Agency: National Institute of Biomedical Imaging and Bioengineering

**Title of Project:** Near-Infrared Optogenetic Control of the Heart
- PIs: Emilia Entcheva, Igor Efimov
- Funding Agency: National Institute of Biomedical Imaging and Bioengineering

**Title of Project:** Exploration of Arrhythmogenic Triggers and Substrates in Heart Failure
- PIs: Igor Efimov, Julia Gerekl, Natalia Tsypanyeva
- Funding Agency: National Heart, Lung, and Blood Institute

**Title of Project:** Oxygen-Rich Perfuosate that is Compatible with Optical Assessments of Myocardial Function
- PI: Matthew Kay
- Co-investigators: Jack Rogers, Robert Balaban
- Funding Agency: National Heart, Lung, and Blood Institute

**Title of Project:** Restoration of Cardiovascular Parasympathetic Activity in Heart Failure
- PI: David Mandelowitz
- Co-investigator: Matthew Kay
- Funding Agency: National Heart, Lung, and Blood Institute

**Title of Project:** Cardiac Optogenetics: A Cell Delivery Approach
- PI: Emilia Entcheva
- Funding Agency: National Heart, Lung, and Blood Institute

**Title of Project:** New Generation of Catheters for Treatment of Atrial Fibrillation
- PI: Narine Sarvanyan
- Co-investigators: Murray Low
- Funding Agency: National Heart, Lung, and Blood Institute

**Title of Project:** Low-Intensity Ultrasound for Control of Cardiac Electromechanics: A Mechanistic Investigation
- PIs: Emilia Entcheva, Vesna Zderic
- Funding Agency: National Institute of Biomedical Imaging and Bioengineering

### Grant Applications

**Title of Project:** EFFI CEE: Human Cardiac Opto-Genetics with HDAC inhibitors
- PIs: Emilia Entcheva
- Co-investigators: Zhenyu Li, Alejandro Villagra, Shu Jia, Ralph Matzkeiek
- Funding Agency: National Science Foundation, Emerging Frontiers in Research and Innovation (EFRI)

**Title of Project:** EFFI: Automated Platform for Drug Testing in Human Heart Cells Using Light
- PI: Emilia Entcheva
- Funding Agency: National Science Foundation, Partnerships for Innovation (PFI)

**Title of Project:** On-Chip Optical Biosensing Method for Quantitative Measurement of Antibiotic Resistance
- PI: Zhenyu Li
- Funding Agency: National Science Foundation

**Title of Project:** A Cloud-based Wearable EEG Sensor on a Finger Ring
- PI: Zhenyu Li
- Funding Agency: National Science Foundation, I-Corps Program

**Title of Project:** Ultrasound-Enhanced Drug Delivery for Treatment of Onychomycosis
- PI: Vesna Zderic
- Funding Agency: National Science Foundation, I-Corps Program

**Title of Project:** All-Optical Interrogation System for Cardiac Dynamics
- PI: Emilia Entcheva
- Funding Agency: National Science Foundation - Biophotonics

**Title of Project:** Light-Enabled Gene Control for Cardiac Applications
- PI: Emilia Entcheva
- Funding Agency: National Science Foundation - Biophotonics

### Development of a Novel Radiometric Platform to Predict Outcomes in Advanced Head and Neck Cancer
- PIs: Murray Low, Sharad Goyal
- Funding Agency: GW Office of the Vice President for Research

**Title of Project:** Robot-Assisted Socio-Emotional Intervention Framework for Children with Autism Spectrum Disorder
- PI: Chung Hyuk Park
- Funding Agency: GW Office of Innovation and Entrepreneurship

**Title of Project:** Ultrasound-enhanced Delivery of Macromolecules for Treatment of Ocular Diseases
- PIs: Vesna Zderic, MA Steep, E. Rodriguez
- Funding Agency: GW Office of the Vice President for Research

**Title of Project:** Low-Intensity Ultrasound for Control of Cardiac Electromechanics: A Mechanical Investigation
- PI: Vesna Zderic
- Co-PI: Emilia Entcheva
- Funding Agency: GW Office of the Vice President for Research

### Industry

**Title of Project:** Gesture UI/UX Development for VR-based Rehabilitation and Learning
- PI: Chung Hyuk Park
- Funding Agency: Korea University of Technology and Education (KoreaTech)

**Title of Project:** Cultivating an Entrepreneurial Mindset in Capstone Design Preparation
- PI: Jason Zee
- Funding Agency: Kem Family Foundation, Kem Entrepreneurial Engineering Network (KEEKEN)

**Title of Project:** Repolarization Heterogeneity imaging for Early Therapy of Heart arrhythmia (RHYTHM)
- PI: Igor Efimov
- Funding Agency: Leducq Foundation

### Industry

**Title of Project:** All-Optical Interrogation System for Cardiac Dynamics
- PI: Emilia Entcheva
- Funding Agency: National Science Foundation - Biophotonics

**Title of Project:** A Cloud-based Wearable EEG Sensor on a Finger Ring
- PI: Zhenyu Li
- Funding Agency: National Science Foundation, I-Corps Program

**Title of Project:** Light-Enabled Gene Control for Cardiac Applications
- PI: Emilia Entcheva
- Funding Agency: National Science Foundation - Biophotonics

### Development of a Novel Radiometric Platform to Predict Outcomes in Advanced Head and Neck Cancer
- PIs: Murray Low, Sharad Goyal
- Funding Agency: GW Office of the Vice President for Research

**Title of Project:** Robot-Assisted Socio-Emotional Intervention Framework for Children with Autism Spectrum Disorder
- PI: Chung Hyuk Park
- Funding Agency: GW Office of Innovation and Entrepreneurship

**Title of Project:** Ultrasound-enhanced Delivery of Macromolecules for Treatment of Ocular Diseases
- PIs: Vesna Zderic, MA Steep, E. Rodriguez
- Funding Agency: GW Office of the Vice President for Research

**Title of Project:** Low-Intensity Ultrasound for Control of Cardiac Electromechanics: A Mechanical Investigation
- PI: Vesna Zderic
- Co-PI: Emilia Entcheva
- Funding Agency: GW Office of the Vice President for Research

### DEPARTMENT OF BIOMEDICAL ENGINEERING

**Title of Project:** Development of a Novel Radiometric Platform to Predict Outcomes in Advanced Head and Neck Cancer
- PIs: Murray Low, Sharad Goyal
- Funding Agency: GW Office of the Vice President for Research

**Title of Project:** Robot-Assisted Socio-Emotional Intervention Framework for Children with Autism Spectrum Disorder
- PI: Chung Hyuk Park
- Funding Agency: GW Office of Innovation and Entrepreneurship

**Title of Project:** Ultrasound-enhanced Delivery of Macromolecules for Treatment of Ocular Diseases
- PIs: Vesna Zderic, MA Steep, E. Rodriguez
- Funding Agency: GW Office of the Vice President for Research

**Title of Project:** Low-Intensity Ultrasound for Control of Cardiac Electromechanics: A Mechanical Investigation
- PI: Vesna Zderic
- Co-PI: Emilia Entcheva
- Funding Agency: GW Office of the Vice President for Research

### Student Research Highlight

#### Frederick Zasaday

In summer 2018, BME doctoral student Frederick Zasaday, M.Sc. received a prestigious predoctoral research fellowship from the American Heart Association (AHA) for his project “Rapid spectral mapping of ventricular absorbance to quantify homeostatic energetics in failing hearts.” The fellowship will provide two years of funding for Frederick to conduct his research under the mentorship of his research advisor, BME Professor Matthew Kay.

Before coming to GW, Frederick attended the University of Iowa as a student in the department of BME. As an undergraduate student he began studying cardiac and skeletal muscle metabolism in E. Dale Abele’s laboratory in the University of Iowa’s department of internal medicine. Frederick quickly began to appreciate the cardiovascular metabolic homeostatic mechanisms. After finishing his B.S. degree he enrolled in a fast-track master’s program in BME at the University of Iowa. For his master’s thesis, he designed biodegradable nanoparticles that restore lysosomal pH in lipid-stressed heart cells. In December 2016, he successfully defended his thesis and in January 2017 he moved to Washington, DC, to begin his doctoral studies in Professor Kay’s laboratory.

Frederick’s AHA fellowship proposal is based upon his original ideas relating high-speed hyperspectral imaging to cardiac mitochondrial function with the aim of understanding normal and pathological mechanisms of altered cardiac metabolism. Frederick seeks to solve the difficulty in quantitatively assessing energy distribution throughout the myocardium of the heart. Within the last 5 years, imaging technologies used in space satellites have been miniaturized and made affordable by advances in nanofabrication. Frederick’s work will harness these technical advances to image failing hearts to visualize how the heart distributes energy when it is required to work harder. This will allow clinicians to better understand how the heart responds during exercise, stress, and disease. Ultimately, Frederick’s project will elevate our understanding of the cardiac energy distribution system, thereby improving treatment of heart failure, infarction, and reduce the incidence of sudden cardiac death.

#### Selected Student Funding

**Title of Project:** The Structure and Function of Cardiac Neurons in Transgenic Mice using Optogenetics and 2-photon Microscopy
- Students: Shirali Nigam
- Mentors: Matthew Kay
- Funding Agency: GW Undergraduate Research Award

**Title of Project:** Rapid Spectral Mapping of Ventricular Absorbance to Quantify Homeostatic Energetics in Failing Hearts
- Student: Frederick Zasaday
- Mentors: Matthew Kay
- Funding Agency: American Heart Association

**Title of Project:** Cubic: As an Alternative “Clearing” Method for Creating Hydrogel-based Structures in Organs
- Students: Meghan Tallam
- Mentors: Matthew Kay
- Funding Agency: AHA Student Research Grant

**Title of Project:** Ultrasound-enhanced Drug Delivery for Treatment of Parasitic and Fungal Eye Diseases
- Students: Bincia Karpincz
- Mentors: Vesna Zderic
- Funding Agency: Clare Boothe Luce Foundation

**Title of Project:** Antibiotic Resistance Monitoring and Counter Measures
- Students: Meghana Tallam
- Mentors: Vesna Zderic
- Funding Agency: Clare Boothe Luce Foundation

**Title of Project:** Ultrasound-enhanced Drug Delivery for Treatment of Parasitic and Fungal Eye Diseases
- Students: Bincia Karpincz
- Mentors: Vesna Zderic
- Funding Agency: Clare Boothe Luce Foundation
Professor Chung Hyuk Park’s Assistive Robotics and Tele-Medicine (ART-Med) Lab

Human-Robot Interaction (HRI) is an emerging field in Robotics, where many disciplines collaborate to investigate the realistic impact of robotic systems in human environments. Assistive Robotics is one of the core components in HRI, and Dr. Park has been actively investigating in the domains of assistive robotics for individuals with disabilities and tele-robotics for medical assistance.

Dr. Park obtained his Ph.D. degree from Georgia Institute of Technology where he had led many robotics projects (Robot-Learning from Teleoperation Based Instruction and Multi-modal Interaction, Accessible Robotic Programming for Students with Disabilities, Haptic Fusion of Multi-modal Perception with Mobile Manipulator for visually impaired users, and VR-in-a-Box: Surgical Simulator) funded by the National Science Foundation and the HIP/ACTSI Healthcare Innovation Program. During his Ph.D. studies, he also organized and led numerous outreach camps for students with disabilities for over three years in five cities (Atlanta, Cleveland, Baltimore, Denver, and Berkeley) where he provided multi-modal interfaces for robot programming and real-time feedback for remote learning and haptic experiences.

Dr. Park joined GW in 2015 and established the Assistive Robotics and Tele-Medicine (ART-Med) Lab. He is also affiliated with the Autism and Neurodevelopmental Disorders Institute (ANDI) at GW. He is the lead-PI for several projects including a NIH R01 project (R01 HD082714), a GW CDRF grant, and a CTSI-CN Device Development grant. He developed new courses such as “Principles of Assistive Robotics” and “Socially Assistive Robotics and Interactive Learning” at GW.

The research goals of ART-Med lab are centered on developing novel frameworks to integrate human intelligence and robotic technology, utilizing diverse methodologies in human-robot interaction, machine learning, computer vision, haptics, and telepresence robotics. The current and future research topics include 1) multi-modal human-robot interaction and machine learning (including deep learning), virtual reality, and mobile manipulation, 2) robotic learning and humanized intelligence, and 3) tele-medical robotic assistance and virtual reality. In the first research topic, the impacts of multi-modal feedback are studied on the aspects of human-robot interaction and its application in assistive scenarios, such as telepresence for individuals with visual impairments or socio-emotional interactive robotic systems for children with autism spectrum disorder (ASD). In the second line of research, the computational methodologies of machine learning are investigated on the aspects of robotic learning of human behaviors and intelligence. Through the last research goal, novel methodologies for utilizing robotic systems in biomedical applications are being researched, from simple care-giving tasks towards intelligent surgical assistance and training systems, fusing latest findings from medicine, virtual reality (VR), and deep-learning.

His former M.S. student, Rachael Bevill, published a journal paper in Applied Science with Dr. Park and has been awarded the Whitaker International Program Fellowship. His Ph.D. students Hifza Javed and Baijun Xie are investigating the feasibility of robotic interventions in HRI and the effective frameworks to utilize machine learning techniques in their research. And several M.S. students and undergraduate students are developing their own research topics, including soft robotics and safe physical human-robot interaction (pHRI). Dr. Park is rigorously collaborating with researchers from multiple disciplines and schools, including Dr. Ayanna Howard (Georgia Tech), Dr. Raymond S. Turner (Georgetown), Dr. Myounghoon Jeon (Virginia Tech), Dr. Chien-Ming Huang (Johns Hopkins), Dr. Kevin Pelphrey (U. Virginia), Dr. Jennifer Frey (GW GSEHD), and Dr. Ashley Darcy-Mahoney (GW SoN).

Dr. Park is rigorously collaborating with researchers from multiple disciplines and schools, including Dr. Ayanna Howard (Georgia Tech), Dr. Raymond S. Turner (Georgetown), Dr. Myounghoon Jeon (Virginia Tech), Dr. Chien-Ming Huang (Johns Hopkins), Dr. Kevin Pelphrey (U. Virginia), Dr. Jennifer Frey (GW GSEHD), and Dr. Ashley Darcy-Mahoney (GW SoN). 2018
Dr. Luyao Lu

Dr. Luyao Lu joined the Department of Biomedical Engineering from the Center for Bio-integrated Electronics at Northwestern University in August, as an assistant professor. His research interests include designing and developing novel classes of organic/inorganic materials, devices, and systems to address fundamental biological and complicated clinical questions. Specifically, he is interested in exploring biomedical engineering, nano-photonic, soft electronics, chemistry, and biology to seamlessly integrate advanced bio-inspired optoelectronic platforms with biological tissues/human bodies for better understanding and controlling the functions of living systems.

Optical techniques such as optogenetics, photometry, and fluorescence imaging are increasingly essential in many fields of cardiac and neuroscience research. Further advances in these methods will continue to contribute strongly to the pace of progress in the community. One direction of Dr. Lu’s current research is to design soft, miniaturized, and injectable classes of optical tools/platforms for recording and manipulating specific cell activities from a large cell population across the targeted organs with high spatiotemporal resolution in behaving animals. These systems will not only help us to better understand heart and brain functions but also greatly facilitate the development of therapeutic interventions for further diseases such as atrial fibrillation and neurological disorders such as Parkinson's disease.

Besides devices and integrated systems that go into the body, another aspect of his work is developing flexible/stretchable wearable sensors that laminate on the skin to measure vital physiological information from the inner organs, blood vessels, and dermis/epidermis for health monitoring. The third direction is to design unconventional wireless, high-performance, and light-weight power supplies for both wearable and implantable biomedical implants. The long-term goal is to develop self-powering systems by integrating energy harvesting devices with batteries or supercapacitors.

Luyao received his Ph.D. in Chemistry from the University of Chicago in 2015. He was then a postdoctoral fellow with Professor John A. Rogers at Department of Materials Science and Engineering at University of Illinois at Urbana-Champaign and Center for Bio-integrated Electronics at Northwestern University. He employed optoelectronic techniques to create novel interfaces for recording deep brain activity. Luyao has received a number of awards including the 2016 IUPAC-Solvay International Award for Young Chemists, which was awarded to the best Ph.D. theses in the chemical sciences worldwide. BME

Can you please tell us a little about yourself? KM: I grew up in Belgrade, Serbia. I was raised by a single mother, along with my twin brother. After high school, I received a full scholarship from the GW Men’s Rowing team, a Division 1 team at GW, and moved to the United States in August of 2014. Rowing was very time-consuming, and most of my college experience was spent on the Potomac River, dusk or dawn, rain or shine. I came to GW with a fair knowledge of English, but it was not even close to a university level. I spent many hours of my freshman year just memorizing entire passages of books, in order to do well on exams. This is because some of the information was too complicated for me to process with the weak English vocabulary that I possessed. I remember taking a chemistry exam and not remembering half of the English terms. Although, I was easily able to remember the terms in my native language, Serbian. Eventually, after a year of constantly utilizing the English language, I started doing a lot better in all of my classes.

I spent three years rowing for GW and after a career-ending back injury, I devoted most of my free time to truly learning the practical skills of engineering. One of the greatest takeaways I gained from my 10 year-long athletic career was grit. I learned to truly immerse myself in everything that I do, in order to obtain the results I desire.

During my senior year at GW, I started going to Medical Hackathons. I won 3rd place at VCU Health Hacks and 2nd place at RPI Engineering for Society. These two events inspired me so much that, when I came back to GW, I co-founded George Hacks, an interdisciplinary innovation competition organization, which focuses on project-based learning and innovating for social good. Our first event was a Medical Hackathon, which was more of a success than we had ever expected. Aside from this project, I have also competed in the GW New Venture Competition. I was able to make it to the semifinals of the competition with my back-brace medical device. Additionally, throughout my entire senior year at GW’s School of Engineering and Applied Sciences, along with my senior design team, I developed a unique patient transfer system. We won the prestigious Pelton Award, which is given to the most outstanding senior design project in the engineering school.

After graduation, did you continue your career in the Biomedical Engineering field? KM: Yes, I am working on developing my Senior Design Project into a startup. Additionally, I will also soon start working full-time at the Med-Tech Innovation Specialist at the GW Innovation Center (GWIC). Although I am developing a startup in my free time, my primary project at GWIC will be development of affordable upper limb prostheses for children in need. I will be working with the FDA for this project, as well as with experienced prosthetists.

What is the most rewarding aspect of your career? KM: I get to interact with bright minds, as well as inspire students to act, innovate, and make a positive impact on the world.

What might you tell someone who’s interested in becoming a Biomedical Engineer? KM: If you want to change the world and help people, do it! I was very lucky to switch into Biomedical Engineering and find a “home” for my passion of helping people.

What are some of your favorite memories so far from GW? KM: Listening to the students give the final presentations that they prepared at the inaugural George Hacks Medical Solutions events, graduation week in which I won the Pelton competition and the next day I graduated as a Biomedical Engineer; and finally, the memories of rowing on the Potomac in April while passing by the breathtaking monuments.

What advice would you give to current BME students on how they can optimize their time, learn, and gain experience here at GW? KM: Come visit me at the GW Innovation Center, I am always happy to help. Take a moment every day to give yourself some credit for your daily accomplishments, even if they are little things like making dinner or meal prepping. Go to your professors with questions and ask for help. My final piece of advice would be to do things and act—if you would like to do something at GW but GW has not done it yet, then be the first one at GW to do it!
Tania Singh
Research: Ultrasound-Induced Insulin Release as a Potential Novel Treatment for Type 2 Diabetes Mellitus
Type 2 diabetes mellitus (T2DM) is a complex metabolic disease that has reached epidemic proportions in the United States, affecting approximately 29 million Americans as of 2015, with an additional 1.4 million people being diagnosed every year. The aim of this work is to both study the calcium-dependent mechanisms of ultrasound-mediated insulin release from pancreatic beta cells using three complementary modalities – carbon fiber amperometry, ELISA studies, and Ca2+ fluorescence imaging – and to study the translational potential of therapeutic ultrasound through terminal and survival studies on transgenic mice and finite-element analysis of the human abdomen to investigate the thermal effects of extra-corporeal therapeutic ultrasound application.

What is the most rewarding aspect of your career?
TS: I haven’t really started my career at this point but I think the most rewarding aspect is being able to work on problems that make a difference in people’s lives.

What might you tell someone who’s interested in becoming a Biomedical Engineer?
TS: Biomedical Engineers are, by their nature, interdisciplinary, which is part of what I love about biomedical engineering. So be prepared to delve into lots of different fields including biology, chemistry, physics, mechanics, electronics, etc. However, also be aware that at some point, it will be necessary to narrow your focus and specialize in a specific field.

What are some of your favorite memories so far from GW?
TS: Some of my favorite memories at GW are from some of the various conferences I’ve been able to attend through my research. I’ve been able to travel all over the country including Tampa, Minneapolis, Phoenix, San Francisco, and even Honolulu.

What advice would you give to current BME students on how they can optimize their time, learn, and gain experience here at GW?
TS: My advice to current BME students would be to get as much exposure to different fields as early as possible in their time at GW. This exposure will allow them to determine how they wish to focus their careers. The earlier you figure out how you want to specialize, the better you can utilize your time at GW.

Jeannette Rodriguez Gonzalez
Research
Cardiovascular disease is the leading cause of death in developed countries around the world, including the United States. My research focuses on studying the heart during normal and disease conditions; specifically, I focus on understanding the effect factors like ischemia and heart failure can have on left ventricular function and the development of arrhythmias. I use the Langendorff isolated heart preparation to study the heart without the confounding variables present in vivo studies, in tandem with methods to investigate receptor sensitivity and the heart’s mechanical properties. I also employ imaging methodologies to further understand the anatomy and physiology of specific regions of the heart.

Can you please tell us a little about yourself?
JR: I was born in Cuba, moved to the U.S. when I was five and completed a bachelor’s degree in bioengineering at Clemson University (Go Tigers!). One year ago, I started my Ph.D. program here at GW and, so far, it’s been great. I love everything about DC (except the heat) and I spend my free time cooking and reading.

What influence has your education at GW had on your career?
JR: So far, my education at GW has given me greater insight into the BME field, as well as invaluable critical thinking skills that will undoubtedly help me in any future role of my career.

What might you tell someone who’s interested in becoming a Biomedical Engineer?
JR: Being a biomedical engineer requires knowledge and mastery of a lot of different subjects, it can be a lot of hard work but it has been the most rewarding experience of my life. I would advise anyone interested in becoming a biomedical engineer to not be daunted by this because there will be someone to help you every step of the way, especially at GW.

What advice would you give to current BME students on how they can optimize their time, learn, and gain experience here at GW?
JR: I highly recommend staying organized in order to optimize your time as a student. The best way to gain experience here at GW, in my opinion, is to do research in one of the labs of our incredible faculty members. By doing this, even if you decide that research isn’t for you, you’ll have gained really valuable experience and insight into the field.

What are some of your favorite memories so far from GW?
JR: All of my favorite memories from GW so far have been bonding with the other graduate students in the BME department.

Can you please tell us a little about yourself?
JR: I am originally from New Jersey. I graduated from GW with my bachelor’s degree in Biomedical Engineering with a minor in Biophysics. I’m currently pursuing my Master’s degree under Dr. Vesna Zderic through the 5-year combined B.S./M.S. program. I also volunteer as an EMT in Bethesda.

After graduation, did you continue your career in the Biomedical Engineering field?
JR: I’m currently pursuing my Master’s degree under Dr. Vesna Zderic through the 5-year combined B.S./M.S. program.

What degrees did you obtain at GW?
JR: I obtained my B.S. in Biomedical Engineering with a minor in Biophysics at GW. I’m currently pursuing my Master’s degree in Biomedical Engineering.

What influence has your education at GW had on your career?
JR: My education at GW has shown me the value of an interdisciplinary approach to problem-solving. In addition, the opportunities GW has afforded me has allowed me to explore a number of different fields in biomedical engineering and work on problems that I’m passionate about.
by the desire to prepare myself for both industrial and academic careers.

What is the most rewarding aspect of your career?
NR: To me, the most rewarding aspect of my career is presenting my work during conferences.

What might you tell someone who’s interested in becoming a Biomedical Engineer?
NR: There are many training and career paths in the Biomedical Engineering field. I would advise to be open-minded and take advantage of all the opportunities for career options.

What are your favorite memories so far during your time at GW and in DC area?
NR: My favorite memories at GW are definitely the ones with our lab members. Also, outside of work, DC is a beautiful city that offers a plethora of things to do.

What advice would you give to current BME students on how they can optimize their time, learn, and gain experience here at GW?
NR: My first advice is that it is never too early to think about what you want to do in your career and what you want to accomplish in your life. Second, be curious and take opportunities to broaden your education every step of your way. Last but not least, build your professional network with knowledgeable people who can help you accomplish your future career goals.

Can you please tell us a little about yourself?
NR: I joined the Biomedical Engineering Department in May 2017 from LIRYC (Electrophysiology and Heart Modeling Institute) at the University of Bordeaux (France). I am currently a postdoctoral scientist in Professor Igor Efimov’s laboratory and my research interests focus on the investigation of the mechanisms of human heart diseases and the development of novel techniques for cardiac imaging modalities.

Please tell us about your education and career path so far?
NR: After my master’s degree in biochemistry at the University of Bordeaux in 2014. Then, thanks to my interdisciplinary background, I got my initial postdoctoral training at LIRYC in the field of cardiac electrophysiology. It was during my time at LIRYC that I acquired skills in cardiac electrophysiology.

What research focus do you have?
NR: My research focuses on studying heterogeneities of ventricular repolarization and the maintenance of ventricular arrhythmias. I am currently investigating key genes and proteins (key substrates of potassium channels IKs and IKr, calcium handling proteins RyR, SERCA, etc.) which underline regional variations in conduction and repolarization properties on organotypic human ventricular slices. In addition, I am conducting studies to advance our understanding of sex hormones and how they affect the electrophysiology of male and female hearts. These studies could be beneficial for gender-specific drug development and personalized medicine. To achieve my research objectives, I utilize a wide range of tools and techniques, including conventional (2D) and three dimensional (3D) optical imaging techniques as well as molecular and structural biology methods. I am also collaborating with pharmaceutical companies for new drugs testing and validation in human cardiac tissue preparations.

What influenced your decision to come to GW?
NR: My first advice is that it is never too early to think about what you want to do in your career and what you want to accomplish in your life. Second, be curious and take opportunities to broaden your education every step of your way. Last but not least, build your professional network with knowledgeable people who not only know what you can do skill-wise, but what you want to accomplish in your future career. BME

The department would like to thank Alixann and Terry Collins for their support and dedication to the Biomedical Engineering Department.

The department would like to thank David Wang for his continued support and dedication to the Biomedical Engineering Department. Dr. Donald Ingber was chosen as the David Wang Distinguished Lecturer this past spring.

Dr. Emilia Entcheva received major NSF and NIH funding to develop new technologies for the advancement of human stem-cell derived cells for use in personalized medicine. She is the PI on a highly competitive four-year $2 million EFRI (Emerging Frontiers in Research and Innovation) grant “EFRI CEE: Human cardiac opto-epigenetics with HDAC inhibitors”, a collaborative effort between BME (Drs. E. Entcheva and Z. Li), the GW Cancer Center (Dr. A. Villagra), Harvard/Mass General (Dr. R. Mazitschek), and Georgia Tech (Dr. S. Jia).

Dr. Entcheva is also the PI on a translational $200,000 grant “PFLTT: Automated Platform for Drug Testing in Human Heart Cells Using Light” to advance the all-optical technology for cardiac electrophysiology, developed in her laboratory over the last decade, closer to commercial use for drug screening by miniaturization and validation.