Northeastern University
College of Engineering

2019 | 2020

SCHOLARSHIP REPORT
BIOENGINEERING

We are a leader in experiential education and interdisciplinary research, focused on Engineering for Society

DEAR COLLEAGUES, FRIENDS, AND STUDENTS,

The Department of Bioengineering is the newest department in Northeastern's College of Engineering. Building on the success of its PhD program, our department added BS and MS degree programs in the 2015-2016 academic year. We are now in an era of rapid growth with plans to continue to increase faculty size as our student body expands.

Our research into the fundamentals of cell and tissue engineering, biomedical device design, biomedical imaging and signal processing, biomechanics and biocomputing is providing a foundation on which a vibrant bioengineering community is developing—a community that spans the entire university. With over 40 affiliated faculty, the bioengineering department offers research opportunities that encompass the entire breadth of biological and biomedical engineering.

Our co-op program is working with companies across the sector to provide our students with a broad range of opportunities within the Boston biotech industry and beyond. Through the co-op program, we identify opportunities that make it possible for our students to work in research and development areas that most excite them.

I invite you to learn more about our new and fast-growing Department of Bioengineering. Our Scholarship Report provides a window into the many activities of our faculty and the energy and breadth of their research.

FOR MORE DETAILS, VISIT OUR WEBSITE AT BIOE.NORTHEASTERN.EDU.

Sincerely,

Lee Makowski
Department Chair
Bioengineering
l.makowski@northeastern.edu

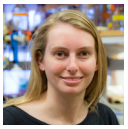
QUICK FACTS BIOENGINEERING

747 Students

54% Students are Women

32% **Graduate Enrollment Growth** (2018 to 2019)

NEW HIRES



Elizabeth Libby
PhD, University of Pennsylvania

Mingyang Lu
PhD, Baylor University

5 **Young Investigator Awards**

71 **TENURED/ TENURE-TRACK** Including T/TT Affiliated Faculty

National Academy Member
Herbert Levine, University Distinguished Professor

COLLEGE OF ENGINEERING

With **189** tenured/tenure-track faculty and **18** multidisciplinary research centers and institutes with funding by eight federal agencies, the College of Engineering is a leader in experiential education and interdisciplinary research, with a focus on discovering solutions to global challenges to benefit society.

5 **Engineering Departments**

95 **YOUNG INVESTIGATOR** Awards

Including **50** NSF CAREER Awards, and **18** DOD Young Investigator Awards

1038 **Graduate Students** Placed on Co-op (2019-20)

TOTAL ENROLLMENT (2019)

8460 53% Graduate
47% Undergraduate

Enrollment Growth
(2014 to 2019)

115% MS
36% PhD
24% BS

FACULTY BY RESEARCH AREAS

Biomechanics, Biotransport and MechanoBiology

Ambika Bajpayee
Chiara Bellini
Guohao Dai
Jessica Oakes
Harikrishnan Parameswaran
Jeffery Ruberti
Sandra Shefelbine

Computational and Systems Biology

Anand Asthagiri
Chiara Bellini
Erel Levine
Herbert Levine
Elizabeth Libby
Mingyang Lu
Mona Minkara
Jessica Oakes
Nikolai Slavov
Eduardo Sontag

Imaging, Instrumentation, and Signal Processing

Samuel Chung
Heather Clark
Qianqian Fang
Mark Niedre
Sara Rouhanifard
Mohammad Abbas Yaseen

Molecular, Cell, and Tissue Engineering

Anand Asthagiri
Ambika Bajpayee
Samuel Chung
Guohao Dai
Jiahe Li
Lee Makowski

Shefelbine Hopes Fulbright Award Creates Opportunities Beyond Her Research

Refresh, rejuvenate, and develop new collaborations. Those goals are just the tip of the iceberg for Professor Sandra Shefelbine, mechanical and industrial engineering, jointly appointed in bioengineering, who was recently awarded a Fulbright Futures Scholarship to study skeletal mechanobiology at the University of Melbourne from January to August 2021.

Shefelbine wants to explore how mechanical forces influence bone development, in particular with elite athletes. Specifically, single sport youth athletes can develop hip issues. Basketball, ice hockey, and soccer players can sometimes have their femur bone form differently.

"As an engineer, this is fascinating," Shefelbine said. "What about how those sports impact how the bone grows? This condition forms during adolescence but can affect performance at the professional level. Nobody knows what is causing it, but if we can learn that, we can then prevent it."

Called femoroacetabular impingement (FAI), the condition occurs when the shape of the hip joint changes. Participation in adolescent sports can potentially affect how bones are shaped as a young athlete is growing.

It's important to study how mechanics affect bones as they grow, Shefelbine explained. From there, different forms of therapy can be developed to help prevent FAI from happening.

Shefelbine is currenting studying FAI in elite youth athletes and has characterized "hip motion during sports practice, analyzing changes in proximal femoral head morphology using medical imaging, and measuring balance of hip musculature."

At the University of Melbourne, Shefelbine said she will be working in mechanical engineering and biomedical engineering.

First, Shefelbine will focus on more whole body questions, looking at how people move. Along with Marcus Pandy, a Professor of Mechanical and Biomedical Engineering at the University of Melbourne, Shefelbine will utilize his data set on people measured in a full body motion capture lab.

The Fulbright research will also integrate research on injuries that sprinters often sustain in their hamstrings. Cameron Nurse, who recently received his Master's in bioengineering, was a varsity sprinter during his undergrad at Boston University. Nurse sustained multiple hamstring injuries and was curious as to why.

"We measured mechanics during sprinting and found interesting lopsidedness," Shefelbine said. "We want to know: are they having injuries because they are lopsided or vice versa? We will probe that with a computational model. We want to understand, if you run a certain way, what implications does that have for your muscles?"

Additionally, Shefelbine said she will be working with Kathryn Stok, another professor at the University of Melbourne. Stok's research focused on cartilage. Seeing how the mechanics of cartilage change in arthritis, for example, can help in understanding what can lead to a joint getting to that level, Shefelbine said.

While the Fulbright research could lead to improvements with athletic training and even prevent future injury, Shefelbine added that she loves how the Fulbright scholarship also involves being an ambassador for your country.

"At this time, our country needs good ambassadors," Shefelbine said. "Through academic exchanges like this, we can show that our country is more than what is seen on the news. The focus is not just on how many papers you're going to publish with your research. You're a representative of the United States."

Slavov Named Paul G. Allen Distinguished Investigator for Pioneering Single Cell Proteomics Research

Bioengineering Assistant Professor Nikolai Slavov was recently named a prestigious Allen Distinguished Investigator, and was awarded a $1.5 million three-year grant to further his novel research on single cell proteomics. The Paul G. Allen Frontiers Group supports early-stage research with the potential to reinvent entire fields. Slavov is the first from Northeastern to receive the award.

Previously, Slavov's group developed mass spectrometry technologies for quantifying thousands of proteins across many single cells. The technology, Single Cell ProtEomics by Mass Spectrometry, offers a cheaper and faster technique enabling researchers to analyze a much larger number of single cells and gain much more accurate data.

The proteins in our cells are complex molecules working in synchrony. They orchestrate multifaceted chemical reactions resulting in the high-level functions that keep people alive and well, from growing tissue to fighting disease. Our bodies house thousands of different types of cells, which contain tens of thousands—if not millions—of different proteins.

With many proteins responsible for biomechanisms involved in crucial functions like the development of cancer cells, scientists need to increase the number of analyzed protein copies to thousands to capture single cell protein levels accurately.

With the new grant, Slavov will further his research in quantifying protein dynamics in single cells, which can help us better understand the exact sequence of signaling events that guide cells during development. "What I'm really most excited about is having the ability to carry out the research," Slavov says. "What I have proposed is very ambitious, but also very promising."

"All complex organisms start from a single cell, which then divides, and the cells differentiate," he says. "We haven't been able to trace this path of differentiation and information processing in complex organisms."

While there are many methods to measure single cells, all of these methods tend to measure only one snapshot of a cell, Slavov says. They capture the way a cell looks at one or two points in time. Computational approaches indirectly infer what the cell dynamics might be, but they're indirect.

"This research will directly measure up to a dozen and more time points that can give us information not just about the state of a cell at particular time, but give us information about its history," he explains. "It's not just the abundance of proteins, but how synthesis and degradation rates are regulated in its history."

While there has been exciting progress in DNA- and RNA-based methods, with a certain degree of tracing cells, this is still only an indirect way to measure signaling mechanisms that regulate those changes. Slavov hopes to directly identify the signals that instruct cells to become different cell types.

"When we understand the signals, how they occur in normal development, we should be in a better position to 'replay this music' in stem cells, for example," he says. "We could engineer cell types of specific properties, or engineer them for regenerative therapies. "

Working toward a brighter future

Slavov stressed that his immediate goal is to further basic research, continuing to learn more about what the proteins in specific cells do and how the methods can be replicated. But the research offers the potential for direct medical applications in the future.

"We could study how immune cells interact with cancer cells," Slavov says. "We could have a single snapshot of an interaction and follow it in time. It could resolve longstanding controversies where we haven't had direct data to determine what the mechanism is."

"Allen Distinguished Investigators are pioneers who aim to upend how we 'crack' hard biological mysteries," says Kathy Richmond, Ph.D., M.B.A., Director of The Paul G. Allen Frontiers Group. "Such technological breakthroughs could reveal the protein 'drivers' in disease and help further the development of more effective cancer therapies and treatments for autoimmune diseases."

"I hope this novel research and its impact attracts more people to the emerging field of single cell protein analysis," Slavov says. "There is a tremendous amount of potential in this field, but currently there are not enough people to develop it to its full potential."

This research was supported by an Allen Distinguished Investigator Award, a Paul G. Allen Frontiers Group advised grant of the Paul G. Allen Family Foundation. Visit allenfrontiersgroup.org.

Courtesy of Kritika Singh

Distinctive Excellence—2020 Rhodes Scholar

Kritika Singh, E'20, has achieved a rare distinction by being named a Rhodes Scholar, a Truman Scholar, and a Goldwater Scholar.

When Kritika Singh, E'20, bioengineering, was announced as one of 32 Rhodes Scholars for 2020, she achieved the rare distinction of being named a Rhodes Scholar, Truman Scholar, and Goldwater Scholar.

Singh, a member of the University Scholars and Honors Programs at Northeastern, will leverage full financial support from the Rhodes Scholarship to pursue a doctorate in biomedical sciences at Oxford University. Following her studies in the UK, Singh hopes to return to the U.S. and attend medical school. Her ultimate goal is to become a true "triple threat" by addressing critical emerging diseases as a physician, scientist, and advocate.

"In order to conquer the world's most pressing health challenges, we need to bring together biomedical research, clinical practice, and health policy. By being at the intersection of those fields, I hope to assume a leadership role and encourage professionals to collaborate more freely, across disciplines and national boundaries," she explains.

"We're incredibly proud of Kritika for winning these three major awards in three years—but even more proud of the person she is," says Jacqueline Isaacs, interim dean of Northeastern's College of Engineering. "With an infectious passion to make a difference in people's lives, Kritika has continuously forged ahead, embracing all that Northeastern has to offer to reach her bold and admirable ambitions. She embodies our mission of developing the next generation of engineering leaders to solve global challenges, and we are so excited to see where her career path will take her."

Making an early impact

Although just 22 years old, Singh has already made an extraordinary impact. After becoming aware of the continuing prevalence of malaria in India—despite the availability of affordable prevention—Singh started a nonprofit organization called Malaria Free World as a high school sophomore in Virginia. She traveled to India to speak with students and faculty in regions affected by malaria, and met with researchers and scientists at the National Institute of Malaria Research. This organization is still actively raising awareness and funds today.

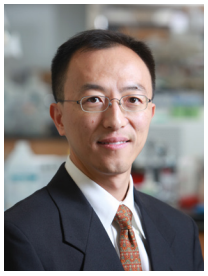
With support from Northeastern's Office of Undergraduate Research and Fellowships and the cooperative education program, Singh has continued to focus on the science behind malaria while expanding her scope to conduct research at the intersection of chemical biology and bioengineering at Massachusetts General Hospital, under the direction of Ralph Mazitschek. Singh's research there has focused on studying patients' resistance to antimalarial drugs in order to develop new pharmaceuticals, as well as investigating the role of genetics in determining malaria outcomes.

At Northeastern, Singh has founded the NU Global Health Initiative (NUGHI), which fosters interdisciplinary collaboration among students, medical practitioners, and public policy experts. Leveraging a Service/Research Project Award from the University, Singh organized the Northeastern Global Health Initiative Conference in October 2018. The largest student-led undergraduate global health conference in the nation, this event focused on wide-ranging topics such as tropical disease prevention, innovative surgical procedures, HIV prevention, the environment's effects on human health and the role of robots in tracking epidemics. An overarching theme was the role of government and public policy in fostering better health care.

"Kritika is a unique individual because she innately understands that public health issues cannot be addressed via science alone," notes Lee Makowski, professor and chair of the Department of Bioengineering at Northeastern. "Her skills in public policy, advocacy, and leadership have distinguished her from a young age. She truly embodies the multidisciplinary mindset of the College of Engineering at Northeastern."

Faculty Honors and Awards

Selected Highlights



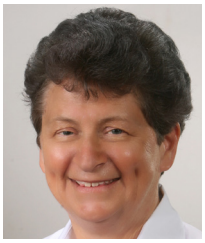
Associate Professor **Guohao Dai**, bioengineering, and Assistant Professors Ryan Koppes and Abigail Koppes, chemical engineering, were awarded $200K from the **American Heart Association (AHA) Innovative Project Award** for "Bioengineer an Autonomic Neurovascular System to Explore the Innervation of Arterial Grafts.

Assistant Professor **Nikolai Slovav**, bioengineering, was recently named a prestigious Allen Distinguished Investigator, and was awarded a **$1.5 million three-year grant** to further his novel research on single cell proteomics. The Paul G. Allen Frontier program supports early-stage research with the potential to reinvent entire fields. See page 4.

Research of University Distinguished Professor **Eduardo Sontag**, electrical and computer engineering, jointly appointed in bioengineering, on "In Vitro Implementation of Robust Gene Regulation in a Synthetic Biomolecular Integral Controller" was published in the journal ***Nature Communications***.

Professor **Sandra Shefelbine**, mechanical and industrial engineering, jointly appointed in bioengineering, was awarded a **Fulbright Futures Scholarship** to study skeletal mechanobiology at the University of Melbourne. See page 3. She was also named a **Fellow** of the American Institute for Medical and Biological Engineering (AIMBE) in recognition of "her distinguished and continuing achievements in medical and biological engineering." Additionally, Shefelbine, in collaboration with the College of Science, was awarded a **$650K National Science Foundation** grant for "Manipulating Fluid Flow in Mechanoadaptation of Bone."

COVID-19 Research Highlights



Bioengineering (BioE) Affiliated Faculty **Mary Jo Ondrechen**, BioE Assistant Professor **Mona Minkara**, and College of Science Assistant Professor Steven Lopez were awarded a $73K **National Science Foundation RAPID grant** for "Undergraduate Research in Modeling and Computation for Discovery of Molecular Probes for SARS-CoV-2 Proteins."

Professor **Jeffrey Ruberti**, bioengineering, in collaboration with the University of California-Los Angeles and University of Massachusetts Amherst, was awarded a $150K **National Science Foundation RAPID grant** for "Low-Cost, Non-invasive, Fast Sample Collection System for COVID-19 Viral Load Level Diagnosis: Point-of-Care and Environmental Testing."

Bioengineering alumnus **Craig Smallwood**, PhD'18, invented a **respiratory-assist device as an alternative to a ventilator** for low-resource environments.

Lee Makowski, professor and chair of the Department of Bioengineering, in collaboration with physicians at Korle Bu Hospital in Ghana, has made the first few of these devices available for use on patients suffering from respiratory distress.

View all department news.

Kritika Singh, E'20, bioengineering, is one of only 32 students from the U.S. selected as a **Rhodes Scholar**. See page 4. She was also named the winner of the Harold D. Hodgkinson Achievement Award for 2020, one of the highest honors a senior can receive, as well as named an NIH OxCam Scholar.

Jake Potts, BS/MS'20, bioengineering, was awarded a prestigious **Fulbright Fellowship**. He will conduct research at Sorbonne University in Paris to try to determine how certain cancerous mutations happen as DNA is "misrepaired,"–a process that occurs when radiation or harsh chemicals break the two strands of our DNA, and our cells respond by trying to repair this damage.

Kerry Eller, E'21, bioengineering, has been selected to receive the **Truman Scholarship**, the most prestigious award for junior-level undergraduate citizens of the United States who possess outstanding leadership skills and are interested in a career in public service.

PhD Student Spotlight

Morris Vanegas, PhD'21

BIOENGINEERING

ADVISED BY ASSOCIATE PROFESSOR QIANQIAN FANG, BIOENGINEERING

Morris Vanegas obtained his BS and MS degrees from MIT before joining the Computational Optics and Translational Imaging Lab (COTI Lab) in the Department of Bioengineering as a PhD student in the Fall of 2016. Since then, he has been the driving force for a number of research projects. In a project funded by the U.S. Agency for International Development (USAID), Morris applied his extensive skills in digital fabrication to develop mobile phone oximeters prototypes for use in low-income countries. He also contributed to a successful NIH BRAIN Initiative R01 grant submission to develop a wearable optical brain imaging system that has since led to a patent application. Morris has been leading the hardware and software design, fabrication, and testing of the probe, resulting in exciting progress toward building a one-of-a-kind modular, non-invasive brain imaging probe for monitoring stroke recovery. Outside of academia, Morris co-founded The Second L, which provides new professionals and those seeking transitions in careers and personal life with exposure to growth and wellness tools through experience-based mentorship models. He is also the acting director of TDC Makerspace, MIT's first residential-based fabrication shop. Morris is a 2019 Latino 30 Under 30 recipient, a 2018 MIT Impact Fellow, and a 2017 Dent the Future Scholar.

SEE RECENT PHD GRADUATE DISSERTATION SUMMARIES ON PAGE 41.

Mansoor Amiji

University Distinguished Professor, Professor of Pharmaceutical Sciences, Chemical Engineering; affiliate faculty, Bioengineering

PhD, Purdue University, 1992
coe.northeastern.edu/people/amiji-mansoor

Scholarship focus: polymeric biomaterials, drug delivery systems, nanomedical technologies

Honors and awards: Fellow, American Association of Pharmaceutical Scientists (AAPS); Fellow, Controlled Release Society; Charivate Analytics Highly Cited Author (top 1%); Purdue University School of Pharmacy Distinguished Alumni Award

SELECTED PUBLICATIONS

J. Bae, N. Parayath, W. Ma, M. Amiji, N. Munshi, K. Anderson
Bcma Peptide Engineered Nanoparticles Enhance Induction and Function of Antigen Specific Cd8+ Cytotoxic T Lymphocytes Against Multiple Myeloma, Nature – Leukemia, 34, 2020, 210–223

N.N. Parayath, S. Padmakumar, M. Amiji
Extracellular Vesicle-Mediated Nucleic Acid Transfer and Reprogramming in the Tumor Microenvironment, Cancer Letters, 482(10), 2020, 33-43

G. Ahmad, G. Mackenzie, J. Egan, M. Amiji
Dha-Sbt-1214 Taxoid Nanoemulsion and Anti-Pd-L1 Antibody Combination Therapy Enhances Antitumor Efficacy in a Syngeneic Pancreatic Adenocarcinoma Model, Molecular Cancer Therapeutics, 18(11), 2019, 961-1972

D. Chen, N. Parayath, S. Ganesh, W. Wang, M. Amiji
Role of Apolipoprotein-and Vitronectin-Enriched Protein Corona on Lipid Nanoparticles for in Vivo Targeted Delivery and Transfection of Oligonucleotides in Murine Tumor Models, Nanoscale, 11, 2019, 18806–18824

SELECTED RESEARCH PROJECTS

Development and Validation of a Novel Cas13a and Nanoparticle Guide-RNA Delivery System that Allows Precise Ablation of Host Macrophage Populations in a Humanized Mouse Model
Principal Investigator, Jackson Laboratories on a National Institutes of Health

Direct CNS Delivery System for BDNF AntagoNATs using Heterotopic Mucosal Grafting for the Treatment of Parkinson's Disease
Principal Investigator, National Institutes of Health

Rouzbeh Amini

Associate Professor, Mechanical and Industrial Engineering; Associate Professor, Bioengineering

PhD, University of Minnesota, Minneapolis, 2010
coe.northeastern.edu/people/amini-rouzbeh

Scholarship focus: biomechanics, mechanobiology, biotransport

SELECTED PUBLICATIONS

S.D. Salinas, M.M. Clark, R. Amini
The Effects of− 80° C Short-Term Storage on the Mechanical Response of Tricuspid Valve Leaflets, Journal of Biomechanics, 98, 2020, 109462

V.S. Thomas, V. Lai, R. Amini
A Computational Multi-Scale Approach to Investigate Mechanically-Induced Changes in Tricuspid Valve Anterior Leaflet Microstructure, Acta Biomaterialia, 94, 2019, 524-535

K. Amini Khoiy, K.T. Asgarian, F. Loth, R. Amini
Dilation of Tricuspid Valve Annulus Immediately After Rupture of Chordae Tendineae in Ex-Vivo Porcine Hearts, PLOS One, 13(11), 2018, e0206744

A.D. Pant, P. Gogte, V. Pathak-Ray, S.K. Dorairaj, R. Amini
Increased Iris Stiffness in Patients with a History of Angle-Closure Glaucoma: An Image-Based Inverse Modeling Analysis, Investigative Ophthalmology & Visual Science, 59(10), 2018, 4134-4142

S.H. Pahlavian, J. Oshinski, X. Zhong, F. Loth, R. Amini
Regional Quantification of Brain Tissue Strain Using Displacement-Encoding with Stimulated Echoes Magnetic Resonance Imaging, Journal of Biomechanical Engineering, 140(8), 2018

SELECTED RESEARCH PROJECTS

In-vivo Assessment of Human Iris Mechanical Properties
Principal Investigator, BrightFocus Foundation

Multi-scale Assessment of Biomechanical Alterations in Tricuspid Valves Following Pregnancy
Principal Investigator, National Science Foundation

Javier Apfeld

Assistant Professor, Biology Department; affiliated faculty, Bioengineering

PhD, University of California San Francisco, 1999
coe.northeastern.edu/people/apfeld-javier

Scholarship focus: we study how the brain regulates aging and resilience to oxidative stress in the nematode *C. elegans*

Honors and awards: NSF CAREER Award, HHMI Predoctoral Fellowship

SELECTED PUBLICATIONS

J.A. Schiffer, F.A. Servello, W.R. Heath, F.R.G Amrit, S.V. Stumbur, M. Eder, O.M. Martin, S.B. Johnsen, J.A. Stanley, H. Tam, S.J. Brennan, N.G. McGowan, A.L. Vogelaar, Y. Xu, W.T. Serkin, A. Ghazi, N. Stroustrup, J. Apfeld
Caenorhabditis elegans Processes Sensory Information to Choose Between Freeloading and Self-Defense Strategies, Elife, 2020

J.A. Stanley, S.B. Johnsen, J. Apfeld
The SensorOverlord Predicts the Accuracy of Measurements with Ratiometric Biosensors, bioRxiv, 2020

J. Apfeld, S. Alper
What Can We Learn About Human Disease from the Nematode *C. elegans*?, Methods in Molecular Biology, 2018

J. Apfeld, W. Fontana
Age-Dependence and Aging-Dependence: Neuronal Loss and Lifespan in a *C. elegans* Model of Parkinson's Disease, Biology (Basel), 2017

N. Stroustrup, W.E. Anthony, Z.M. Nash, V. Gowda, A. Gomez, I.F. López-Moyado, J. Apfeld, W. Fontana
The temporal scaling of *Caenorhabditis elegans* ageing, Nature, 2016

SELECTED RESEARCH PROJECTS

Intercellular Regulation of Protein Oxidation during Aging
Principal Investigator, National Science Foundation

Modulation of Organismic Resilience by the Microbiome
Co-Principal Investigator, Northeastern Tier 1

Anand Asthagiri

Associate Professor, Bioengineering; affiliated faculty, Chemical Engineering

PhD, Massachusetts Institute of Technology, 2000
coe.northeastern.edu/people/asthagiri-anand

Scholarship focus: cell and tissue engineering, quantitative principles of cancer cell biology and developmental biology

SELECTED PUBLICATIONS

D.F. Milano, R.J. Natividad, Y. Saito, C.Y. Luo, S.K. Muthuswamy, A.R. Asthagiri
Positive Quantitative Relationship Between EMT and Contact-Initiated Sliding on Fiber-Like Tracks, Biophysical Journal, 111(7), 2016, 1569-1574

D.F. Milano, N.A. Ngai, S.K. Muthuswamy, A.R. Asthagiri
Regulators of Metastasis Modulate the Migratory Response to Cell Contact Under Spatial Confinement, Biophysical Journal, 110(8), 2016, 1886-1895

D.I. Walsh III, M.L. Lalli, J.M. Kassas, A.R. Asthagiri, S.K. Murthy
Cell Chemotaxis on Paper for Diagnostics, Analytical Chemistry, 87(11), 2015, 5505-5510

M.L. Lalli, A.R. Asthagiri
Collective Migration Exhibits Greater Sensitivity but Slower Dynamics of Alignment to Applied Electric Fields, Cellular and Molecular Bioengineering, 8(2), 2015, 247-257

K. Blogovic, E.S. Gong, D.F. Milano, R.J. Natividad, A.R. Asthagiri
Engineering Cell-Cell Signaling, Current Opinion in Biotechnology, 24(5), 2013, 940-947

K. Kushiro, A.R. Asthagiri
Modular Design of Micropattern Geometry Achieves Combinatorial Enhancements in Cell Motility, Langmuir, 28(9), 2012, 4357-4362

J.H. Kim, A.R. Asthagiri
Matrix Stiffening Sensitizes Epithelial Cells to EGF and Enables the Loss of Contact Inhibition of Proliferation, Journal of Cell Science, 124, 2011, 1280-1287

J.H. Kim, L.J. Dooling, A.R. Asthagiri
Intercellular Mechanotransduction During Multicellular Morphodynamics, Royal Society Interface, 7(3), 2010, 341-350

C.A. Giurumescu, P.W. Sternberg, A.R. Asthagiri
Predicting Phenotypic Diversity and the Underlying Quantitative Molecular Transitions, PLoS Computational Biology, 5(4), 2009, 1-13

Joseph Ayers

Professor, Marine and Environmental Sciences; affiliated faculty: Bioengineering, Civil and Environmental Engineering, Electrical and Computer Engineering

PhD, University of California, Santa Cruz, 1975
coe.northeastern.edu/people/ayers-joseph

Scholarship focus: development of underwater robots for civil infrastructure and explosive sensing; neurophysiology and behavior; biomimetics; synthetic biology

SELECTED PUBLICATIONS

R.T. Myers, J. Ayers
A Nitric Oxide Sensor Fabricated Through E-Jet Printing Towards Use in Bioelectronics Interfaces, Journal of Applied Electrochemistry, 48, 2018, 1-11

L.L. McGrath, S.V. Vollmer, S.T. Kaluziak, J. Ayers
De Novo Transcriptome Assembly for the Lobster Homarus Americanus and Characterization of Differential Gene Expression Across Nervous System Tissues, BMC Genomics, 17, 2016, 3-12

J. Ayers
Underwater Vehicles Based on Biological Intelligence, ASME Journal of Dynamic Systems, Measurement and Control, 138, 2016, 1-5

L. Zhu, A.I. Selverston, J. Ayers
The Role of Ih in Differentiating the Dynamics of the Gastric Mill and Pyloric Neurons in the Stomatogastric Ganglion of the Lobster, Homarus Americanus, Journal of Neurophysiology, 115(5), 2016, 2434-2445

J. Lu, J. Yang, Y.-B. Kim, J. Ayers, K.K. Kim
Implementation of Excitatory CMOS Neuron Oscillator for Robot Motion Control Unit, Journal of Semiconductor Technology and Science, 14(4), 2014, 383-390

J. Ayers, D. Blustein, A. Westphal
A Conserved Biomimetic Control Architecture for Walking, Swimming and Flying Robots, Lecture Notes in Artificial Intelligence, 2012, 1-12

SELECTED RESEARCH PROJECTS

Utilizing Synthetic Biology to Create Programmable Micro Bio-Robots
Co-Principal Investigator, Office of Naval Research

Ambika Bajpayee

Assistant Professor, Bioengineering; affiliated faculty, Mechanical Engineering and Global Resilience Institute

PhD, Massachusetts Institute of Technology, 2015
coe.northeastern.edu/people/bajpayee-ambika

Scholarship focus: drug delivery; bio-electrostatics; transport phenomena in biological systems; biomechanics; osteoarthritis

Honors and awards: US Department of Defense Discovery Award, National Institute of Health Trailblazer Award, MIT Women of Excellence, Meredith Kamm Memorial Award in Mechanical Engineering

SELECTED PUBLICATIONS

C. Young, A. Vedadghavami, A.G. Bajpayee
Bioelectricity For Drug Delivery: The Promise of Cationic Therapeutics, Bioelectricity, 2020

T. He, C. Zhang, A. Vedadghavami, S. Mehta, H. Clark, R. Porter, A.G. Bajpayee
Multi-Arm Avidin Cationic Nano-Construct as a Cationic Carrier for Intra-Cartilage Delivery of Small Molecules, Journal of Controlled Release, 318, 2020, 109-123

S. Mehta, S. Akhtar, R.M. Porter, P. Onnerfjord, A.G. Bajpayee
IL-1Ra Is More Effective in Suppressing Cytokine Induced Catabolism in Cartilage-Synovium Co-Culture Compared to Cartilage Monoculture, Arthritis Research and Therapy, 21, 2019, 238

A. Vedadghavami, E.K. Wagner, S. Mehta, T. He, C. Zhang, A.G. Bajpayee
Cartilage Penetrating Cationic Peptide Carriers for Applications in Drug Delivery to Avascular Negatively Charged Tissues, Acta Biomaterialia, 93, 2018, 258-269

A.G. Bajpayee, A.J. Grodzinsky
Cartilage Targeting Drug Delivery: Can Electrostatic Interactions Help?, Nature Rheumatology Reviews, 13, 2017, 183-193

SELECTED RESEARCH PROJECTS

Cationic Contrast Agents for Cartilage Imaging
Principal Investigator, NIH National Institute of Biomedical Imaging and Bioengineering

Cartilage Targeting Exosomes for Delivery of Anti-Catabolic Drugs for Osteoarthritis Treatment
Principal Investigator, NIH Trailblazer

Chiara Bellini

Assistant Professor, Bioengineering; affiliated faculty, Mechanical and Industrial Engineering

PhD, University of Calgary, 2012
coe.northeastern.edu/people/bellini-chiara

Scholarship focus: diseases of the cardiovascular system; effects of cell-mediated growth and remodeling processes on tissue and organ mechanics; cardiovascular outcomes of chronic exposure to environmental toxins

SELECTED PUBLICATIONS

Y.M. Farra, M.J. Eden, J. Coleman, P. Kulkarni, C. Ferris, J.M. Oakes, C. Bellini
Neurological, Behavioral, and Physiological Effects of Acute Cannabis Nose-Only Exposure in C57BL/6 Mice, Inhalation Toxicology, 2020

A. Korneva, L. Zilberberg, D.B. Rifkin, J.D. Humphrey, C. Bellini
Absence of LTBP-3 Attenuates the Aneurysmal Phenotype But Not Spinal Effects on the Aorta in Marfan Syndrome, Biomechanics and Modeling in Mechanobiology, 18(1), 2019,261-273

C. Bellini, N.J. Kristofik, M.R. Bersi, T.R. Kyriakides, J.D. Humphrey
A Hidden Structural Vulnerability in the Thrombospondin-2 Deficient Aorta Increases the Propensity to Intramural Delamination, Journal of the Mechanical Behavior of Biomedial Materials, 71, 2017, 397-406

C. Bellini, M.R. Bersi, A. Caulk, J. Ferruzzi, D.M. Milewicz, F. Ramirez, D.B. Rifkin, G. Tellides, H. Yanagiswa, J.D. Humphrey
Comparison of Ten Murine Models Reveals a Distinct Biomechanical Phenotype in Thoracuc Aortic Aneurysms, Journal of the Royal Society Interface, 14(130), 2017

SELECTED RESEARCH PROJECTS

Evaluation of Aortic Stiffening as an Early Indicator of Anthracycline-Induced Cardiotoxicity
Principal Investigator, National Institute of Health

Health Consequences Following Acute and Chronic Firefighter Exposure to Wildland Fire Smoke
Principal Investigator, Department of Homeland Security, Federal Emergency Management Agency

Pulmonary and Cardiovascular Health Consequences Following Electronic Cigarette Exposure
Principal Investigator, National Institute of Health

Sidi A. Bencherif

Assistant Professor, Chemical Engineering; affiliated faculty, Bioengineering

PhD, Carnegie Mellon University, 2009
coe.northeastern.edu/people/bencherif-sidi

Scholarship focus: polymer chemistry and engineering; biomaterials; biomedical engineering; drug delivery; tissue engineering; regenerative medicine; immunotherapy; immunoengineering; vaccines

Honors and awards: National Science Foundation CAREER Award, Thomas Jefferson Award, Burroughs-Wellcome Fund Travel Award, DFCI/Northeastern University Joint Program Award, GapFund360 Award, MTTC Acorn Award, Acta Biomaterialia Outstanding Reviewer Award, AAI Early Career Faculty Travel Award, Carl Storm Underrepresented Minority Fellowship

SELECTED PUBLICATIONS

L.J. Eggermont, T. Colombani, Z.J. Rogers, A. Memic, S.A. Bencherif
Injectable Cryogels for Biomedical Applications, Trends in Biotechnology, 38, 2020, 418–431

P. Villard, M. Rezaeeyazdi, T. Colombani, K. Joshi Navare, D. Rana, A. Memic, S.A. Bencherif
Autoclavable and Injectable Cryogels for Biomedical Applications, Advanced Healthcare Materials, 8, 2019, 1900679

A. Memic, T. Colombani, M. Rezaeeyazdi, L. Eggermont, J. Steingold, Z. Rogers, K.J. Navare, H.S. Mohammed, M. Sitkovsky, S.A. Bencherif
Latest Advances in Cryogel Technology for Biomedical Applications, Advanced Therapeutics, 2019, 1800114

S.A. Bencherif, R.W. Sands, O. Ali, S.A. Lewin, A. Li, T. Braschler, T. Shih, D. Bhatta, G. Dranoff, D.J. Mooney
Injectable Scaffold-Based Whole Tumor Cell Vaccines, Nature Communications, 6, 2015, 7556

SELECTED RESEARCH PROJECTS

Biomaterials for Wound Healing and Diabetic Ulcer Treatment
Co-Investigator, King Abdulaziz University

Hypoxia-Inducing Cryogels: A Hassle-Free and Low-Cost Hypoxic Cell Culture Solution
Principal Investigator, Center for Research Innovation, Northeastern University

Hypoxia-Inducing Cryogels As a Fast and Inexpensive Technology for Hypoxic Cell Culture Conditions
Principal Investigator, Massachusetts Technology Transfer Center (MTTC)

Modulating Local Tumor Hypoxia using Cryogel Scaffolds to Regulate Dendritic Cell Function and Activity
Principal Investigator, National Science Foundation

Penny Beuning

Professor, Chemistry and Chemical Biology; affiliated faculty, Bioengineering

PhD, University of Minnesota, 2000
coe.northeastern.edu/people/beuning-penny

Scholarship focus: chemical biology and biotechnology; DNA replication and repair; enzyme function

Honors and awards: Chemical Research in Toxicology Young Investigator Award, American Chemical Society; National Science Foundation CAREER Award; Cottrell Scholar Award; American Cancer Society Research Scholar Award

SELECTED PUBLICATIONS

L. Ngu, J.N. Winters, K. Nguyen, K.E. Ramos, N.A. DeLateur, L. Makowski, P.C. Whitford, M.J. Ondrechen, P.J. Beuning
Probing Remote Residues Important for Catalysis in *Escherichia Coli* Ornithine Transcarbamoylase, PLoS One 15(2), 2020, e0228487

K.R. Moulton, A. Sadiki, B.N. Koleva, L.J. Ombelets, T.H. Tran, S. Liu, B. Wang, H. Chen, E. Micheloni, P.J. Beuning, G.A. O'Doherty, Z.S. Zhou
Site-Specific Reversible Protein Modification: Transglutaminase-Catalyzed Glutamine Conjugation and Bioorthogonal Light-Mediated Removal, Bioconjugate Chemistry, 30, 2019, 1617-1621

N.M. Antczak, A.R. Walker, H.R. Stern, E.M. Leddin, T.A. Coulther, C. Palad, R.J. Swett, G.A. Cisneros, P.J. Beuning
Characterization of Nine Cancer-Associated Variants in Human DNA Polymerase K, Chemical Research in Toxicology, 31, 2018, 697-711

C.L. Mills, R. Garg, J.S. Lee, L. Tian, A. Suciu, G. Cooperman, P.J. Beuning, M.J. Ondrechen
Functional Classification of Protein Structures by Local Structure Matching in Graph Representation, Protein Science, 27, 2018, 1125-1135

R. Parasuram, T.A. Coulther, J.M. Hollander, E. Keston Smith, M.J. Ondrechen, P.J. Beuning
Prediction of Active Site and Distal Residues in *E. coli* DNA Polymerase III Alpha Polymerase Activity, Biochemistry, 57(7), 2018, 1063–1072

SELECTED RESEARCH PROJECTS

D3SC: Mining For Mechanistic Information to Predict Protein Function
Co-Principal Investigator, National Science Foundation

Dynamics of Processivity Clamp Proteins in Bacterial DNA Replication
Principal Investigator, National Institutes of Health

Ahmed Busnaina

William Lincoln Smith and University Distinguished Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering; affiliated faculty, Electrical and Computer Engineering

PhD, Oklahoma State University, 1983
coe.northeastern.edu/people/busnaina-ahmed

Scholarship focus: nanomanufacturing; nano and microscale printing of sensors and electronics; nano and micro scale defects in semiconductor manufacturing; high rate nanomanufacturing; power electronics, RF, NEMS devices and nanomaterials based nanoelectronics, flexible and hybrid electronics

Honors and awards: 2020 ASME William T. Ennor Manufacturing Technology Award and Medal, Fellow, National Academy of Inventors; Fulbright Senior Scholar; Life Fellow, American Society of Mechanical Engineers; Fellow, the Adhesion Society; Outstanding Translational Research Award, Institute of Environmental Sciences and Technology's 2013 Willis J. Whitfield Award

SELECTED PUBLICATIONS

S.A. Abbasi, T.H. Kim, S. Somu, H. Wang, Z. Chai, M. Upmanyu, A.A. Busnaina
Fabrication of a Nanoelectromechanical Bistable Switch Using Directed Assembly of SWCNTs, Journal of Physics D: Applied Physics, 53(23), 2020

Z. Chai, A. Korkmaz, C. Yilmaz, A.A. Busnaina
High-Rate Printing of Micro/Nanoscale Patterns Using Interfacial Convective Assembly, Advanced Materials, 2020, 2000747

Z. Chai, H. Jeong, S.A. Abbasi, A.A. Busnaina
Fabrication of Organic Field Effect Transistors using Directed Assembled and Transfer Printed Carbon Nanotube Source/Drain Electrodes, Applied Physics Letters, 114(10), 2019, 103301

Z. Chai, J. Seo, S.A. Abbasi, A. Busnaina
Assembly of Highly Aligned Carbon Nanotubes Using an Electro-Fluidic Assembly Process, ACS Nano, 12(12), 2018, 12315-12323

SELECTED RESEARCH PROJECTS

Advanced Manufacturing Cluster for Smart Sensors and Materials
Principal Investigator, Massachusetts Technology Collaborative

Novel Nanoprinting for Wireless Chemical Gas sensors
Principal Investigator, NASA

Rebecca L. Carrier

Professor, Chemical Engineering; affiliated faculty, Bioengineering

PhD, Massachusetts Institute of Technology, 2000
coe.northeastern.edu/people/carrier-rebecca

Scholarship focus: intestinal tissue engineering, retinal regenerative medicine, oral drug delivery

Honors and awards: Fellow, American Institute for Medical and Biological Engineering; College of Engineering Soren Buus Outstanding Research Award; Society for Biomaterials Member-At-Large (2018-2019); College of Engineering Faculty Fellow; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

J. Kundu, A. Michaelson, P. Baranov, M. Chiumiento, T. Nigl, M.J. Young, R.L. Carrier
Interphotoreceptor Matrix Based Biomaterial: Impact on Human Retinal Progenitor Cell Attachment and Differentiation, Journal of Biomedical Materials Research B Applied Biomaterials, 106(2), 2018, 891-899

J.Y. Lock, T.L. Carlson, C.M. Wang, A. Chen, R.L. Carrier
Acute Exposure to Commonly Ingested Emulsifiers Alters Intestinal Mucus Structure and Transport Properties, Scientific Reports, 8(1), 2018, 10008

T.L. Carlson, J.Y. Lock, R.L. Carrier
Engineering the Mucus Barrier, Annual Reviews in Biomedical Engineering, 20, 2018, 197-220

R.L. Carrier, M. Cirit, L.G. Griffith, D.A. Lauffenburger, et al.
Integrated Gut/Liver Microphysiological Systems Elucidates Inflammatory Inter-Tissue Crosstalk, Biotechnology and Bioengineering, 114(11), 2017, 2648-2659

A.N. Koppes, M. Kamath, C.A. Pfluger, D.D. Burkey, M. Dokmeci, L. Wang, R.L. Carrier
Complex, Multi-Scale Small Intestinal Topography Replicated in Cellular Growth Substrates Fabricated via Chemical Vapor Deposition of Parylene C, Biofabrication, 8(3), 2016, 035011O

SELECTED RESEARCH PROJECTS

Impact of Lipids and Food on Oral Compound Absorption: Mechanistic Studies and Modeling
Principal Investigator, National Institutes of Health

GuMI: New In Vitro Platforms to Parse the Human Gut Epithelial-Microbiome-Immune Axis
Principal Investigator, National Institutes of Health

Paul M. Champion

Professor, Physics; affiliated faculty, Bioengineering

PhD, University of Illinois at Urbana Champaign
coe.northeastern.edu/people/champion-paul

Scholarship focus: experimental biological physics; inelastic light scattering; ultrafast pump-probe laser spectroscopy; proton tunneling

Honors and awards: National Institutes of Health Career Development Award; Fellow of the American Physical Society; Fellow, American Association for Advancement of Science; International Advisory Board: Japan Ministry of Education, Culture, Sports, Science and Technology; Board of Directors Telluride Science Research Center (2006-2008); Advisory Board NSF Frontier Center: University of Michigan; National Research Service Award; Fellow, Japanese Society for the Promotion of Science; NSF/CNRS Exchange Fellow; Divisional Editor Physical Review Letters (1994-2000)

SELECTED PUBLICATIONS

P.M. Champion, A. Bennabbas
Proton Tunneling and Proton-coupled Electron Transfer in Biological Systems: Theory and Experimental Analysis, Theoretical and Computational Chemistry Series, 18, Chap. 3, 2021, Royal Society of Chemistry, J. Kaestner and S. Kozuch, Eds.

Z. Hennighausen, C. Lane, A. Benabbas, K. Mendez, M. Eggenberger, P.M. Champion, J. Robinson, A. Bansil, S. Kar
Oxygen-Induced In Situ Manipulation of the Interlayer Coupling and Exciton Recombination in Bi2Se3/MoS2 2D Heterostructures, ACS Appl. Mater. Interfaces, 11, 2019, 15913–15921

A. Benabbas, P.M. Champion
Adiabatic Ligand Binding in Heme Proteins: Ultrafast Kinetics of Methionine Rebinding in Ferrous Cytochrome C, Journal of Physical Chemistry B, 122, 2018, 11431-11439

B. Salna, A. Benabbas, D. Russo, P.M. Champion
Tunneling Kinetics and Nonadiabatic Proton-Coupled Electron Transfer in Proteins: The Effect of Electric Fields and Anharmonic Donor-Acceptor Interactions, Journal of Physical Chemistry B, 121, 2017, 6869-6881

SELECTED RESEARCH PROJECTS

Electron-Nuclear Coupling, Charge Transport, and Catalysis in Biomolecules: The Role of Vibrational and Conformational Dynamics
Principal Investigator, National Science Foundation

Samuel Chung

Assistant Professor, Bioengineering

PhD, Harvard University, 2009
coe.northeastern.edu/people/chung-samuel

Scholarship focus: brain cell regeneration, automated microscopy and laser surgery, user-friendly and low-cost fluorescence microscopy

SELECTED PUBLICATIONS

M.B. Harreguy, V. Marfil, N.W. F. Grooms, C.V. Gabel, S.H. Chung, G. Haspel
Ytterbium-Doped Fibre Femtosecond Laser Offers Robust Operation with Deep and Precise Microsurgery of *C. elegans* Neurons, Scientific Reports, 10, 2020 4545

H. Cai, Y.L. Wang, R.T. Wainner, N.V. Iftimia, C.V. Gabel, S.H. Chung
Wedge Prism Approach for Simultaneous Multichannel Microscopy, Scientific Reports, 9, 2019, 17795

S.H. Chung, M.R. Awal, J. Shay, M.M. McLoed, E. Mazur, C.V. Gabel
Novel DLK-Independent Neuronal Regeneration in Caenorhabditis Elegans Shares Links with Activity-Dependent Ectopic Outgrowth, Proceedings of the National Academy of Sciences, 113, 2016, E2852-E2860

SELECTED RESEARCH PROJECTS

High-Throughput Microscopy Platform for Accelerating Regeneration Neuroscience
Principal Investigator, Northeastern TIER 1

Transcriptomic, Genetic, and Optogenetic Analysis of a Novel High-Throughput Model for Lesion-Conditioned Regeneration
Principal Investigator, Morton Cure Paralysis

Heather Clark

Professor, Bioengineering; joint appointment in College of Science; affiliated faculty, Chemical Engineering; Director, Institute for Chemical Analysis of Living Systems (CILS)

PhD, University of Michigan, 1999
coe.northeastern.edu/people/clark-heather

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

H. Seo, H.A. Clark
Gadolinium-Based MRI Contrast Agent for the Detection of Tyrosinase, Analyst, 145, 2020, 1169-1173

W. Di, H.A. Clark
Optical Nanosensors for in Vivo Physiological Chloride Monitoring for Cystic Fibrosis, Analytical Methods, 12 (11), 2020, 1441-1448

W. Di, X. Tan, I.A.C. Calderon, A.E. Neal Reilly, M. Niedre, H.A. Clark
Real-Time Particle-by-Particle Detection of Erythrocyte Camouflaged Microsensor with Extended Circulation Time in the Bloodstream, Proceedings of the National Academy of Sciences of the United States of America, 117(7), 2020, 3509-3517

J. Morales, R.H. Pawle, N. Akkilic, Y. Luo, M. Xavierselvan, R. Albokhari
DNA-Based Photoacoustic Nanosensor for Interferon Gamma Detection, ACS Sensors, 4(5), 2019, 1313-1322

C. Anderson, M. Johansen, B. Erokwu, H. Hu, Y. Gu, Y. Zhang, H.A. Clark, et al.
Simultaneous Concentration Mapping of Multiple MRI Contrast Agents with Dual Contrast - Magnetic Resonance Fingerprinting, Nature Scientific Reports, 9(1), 2019, 1-11

SELECTED RESEARCH PROJECTS

AChMRNS: Nanosensors for Chemical Imaging of Acetylcholine Using MRI
Principal Investigator, National Institutes of Health

Circulating Red Blood Cell Based Nanosensors for Continuous, Real-Time Drug Monitoring
Principal Investigator, National Institutes of Health

Optical Nanosensors Detect Neurotransmitter Release in the Peripheral Nervous System
Principal Investigator, National Institutes of Health

Erin J. Cram

Professor, Biology; affiliated faculty, Bioengineering

PhD, University of California, Berkeley, 2000
coe.northeastern.edu/people/cram-erin

Scholarship focus: cell migration and mechanotransduction in C. *elegans*; improving production of drug compounds by medicinal plants

SELECTED PUBLICATIONS

C.A. Kelley, S. De Henau, L. Bell, T.B. Dansen, E.J. Cram
Redox signaling modulates Rho activity and tissue contractility in the C. elegans spermatheca, Molecular Biology of the Cell, 2020, May 6

S. Mortensen, D. Bernal-Franco, L.F. Cole, S. Sathitloetsakun, E.J. Cram, C.W.T. Lee-Parsons
EASI Transformation: An Efficient Transient Expression Method for Analyzing Gene Function in Catharanthus Roseus Seedlings, Frontiers in Plant Science, 10, 2019, 755

J. Bouffard, A.D. Cecchetelli, C. Clifford, K. Sethi, R. Zaidel-Bar, E.J. Cram
The RhoGAP SPV-1 Regulates Calcium Signaling to Control the Contractility of the Caenorhabditis Elegans Spermatheca during Embryo Transits, Molecular Biology of the Cell, 30(7), 2019, 907-922

A.C.E Wirshing, E.J. Cram
Spectrin Regulates Cell Contractility through Production and Maintenance of Actin Bundles in the Caenorhabditis Elegans Spermatheca, Molecular Biology of the Cell, 29(20), 2018, 2433-2449

C.A. Kelley, A.C.E. Wirshing, R. Zaidel-Bar, E.J. Cram
The Myosin Light-Chain Kinase MLCK-1 Relocalizes during Caenorhabditis Elegans Ovulation to Promote Actomyosin Bundle Assembly and Drive Contraction, Molecular Biology of the Cell, 29(16), 2018, 1975-1991

A.C. Wirshing, E.J. Cram
Myosin Activity Drives Actomyosin Bundle Formation and Organization in Contractile Cells of the *C. Elegans* Spermatheca, Molecular Biology of the Cell, 28(14), 2017, 1815-1818

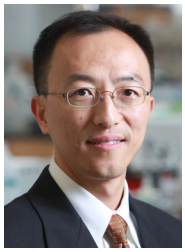
SELECTED RESEARCH PROJECTS

Elucidating the Role of ERM Proteins in Cytoskeletal Orientation in a Contractile Tissue
Principal Investigator, National Science Foundation

In Vivo Analysis of Mechanotransduction
Principal Investigator, National Institutes of Health

Zinc Finger Transcription Factors: Regulators of Growth, Development, and Alkaloid Biosynthesis
Co-Principal Investigator, National Science Foundation

Guohao Dai



Associate Professor, Bioengineering

PhD, Harvard–MIT Health Science and Technology, 2001
coe.northeastern.edu/people/dai-guohao

Scholarship focus: 3-D bioprinting technology, stem cells technology and vascular bioengineering

Honors and awards: Fellow, American Heart Association; National Science Foundation Faculty Early CAREER Award; Rising Star Award, Biomedical Engineering Society Cellular and Molecular Bioengineering; American Heart Association National Scientist Development Award

SELECTED PUBLICATIONS

M.S. Ozturk, V.K. Lee, H. Zou, R.H. Friedel, X.Intes, G.Dai
High Resolution Tomographic Analysis of in vitro 3D Glioblastoma Tumor Model under Long-Term Drug Treatment, Science Advances, 6(10), 2020, 7513

W. Song, A. Chiu, L.-H. Wang, R.E. Schwartz, B. Li, N. Bouklas, D.T. Bowers, V.K. Lee, G. Dai, M. Ma, et al.
Engineering Transferrable Microvascular Meshes for Subcutaneous Islet Transplantation, Nature Communications, 10, 2019, 4602

L. Niklason, G. Dai
Arterial Venous Differentiation for Vascular Bioengineering, Annual Review of Biomedical Engineering, 2018, 4(20), 431-447

C. Xu, W. Lee, G. Dai, Y. Hong
Highly Elastic Biodegradable Single-Network Hydrogel for Cell Printing, ACS Applied Materials & Interfaces, 10(12), 2018, 9969-9979

T.B. Dorsey, D. Kim, A. Grath, D. James, G. Dai
Multivalent Biomaterial Platform to Control the Distinct Arterial Venous Differentiation of Pluripotent Stem Cells, Biomaterials, 2018, 185, 1-12

SELECTED RESEARCH PROJECTS

CAREER: Engineer a Functional 3-D Vascular Niche to Support Neural Stem Cell Self-Renewal
Principal Investigator, National Science Foundation

Differentiation Arterial and Venous Endothelial Cells from Embryonic Stem Cells
Principal Investigator, National Institutes of Health

Elastic Printable Biomaterials for 3-D Bioprinting of Vascular Conduit
Principal Investigator, National Institutes of Health

Transcriptional Regulation of Arterial Venous Differentiation
Principal Investigator, American Heart Association

Jack Dennerlein

Professor, Physical Therapy, Movement, and Rehabilitation Sciences; affiliated faculty, Bioengineering

PhD, University of California, Berkeley, 1996
coe.northeastern.edu/people/dennerlein-jack

Scholarship focus: musculoskeletal disorders; work place injury prevention and health; occupational biomechanics; biomechanics of human movement

SELECTED PUBLICATIONS

J.T.Dennerlein, L. Burke, E.L.Sabbath, J.A.R Williams, S.E. Peters, L. Wallace, M. Karapanos, G. Sorensen
An Integrative Total Worker Health Framework for Keeping Workers Safe and Healthy During the COVID-19 Pandemic, Hum Factors, 62(5), 2020, 689-696

S.E. Peters, H.D. Trieu, J. Manjourides, J.N. Katz, J.T. Dennerlein
Designing a Participatory Total Worker Health® Organizational Intervention for Commercial Construction Subcontractors to Improve Worker Safety, Health, and Well-Being: The "ARM for Subs" Trial, International Journal of Environmental Research and Public Health , 17(14), 2020, E5093

G.S.Faber, I. Kingma, C.C. Chang, J.T. Dennerlein, J.H. van Dieën
Validation Of A Wearable System For 3D Ambulatory L5/S1 Moment Assessment During Manual Lifting Using Instrumented Shoes And An Inertial Sensor Suit, J. Biomechanics, 102, 2020, 109671

J.H. Kim, L.S. Marin, J.T. Dennerlein
Evaluation of Commercially Available Seat Suspensions to Reduce Whole Body Vibration Exposures in Mining Heavy Equipment Vehicle Operators, Applied Ergonomics, 71, 2018, 78-86

D.S. Asakawa, J.T. Dennerlein, D.L. Jundrich
Index Finger and Thumb Kinematics and Performance Measurements for Common Touchscreen Gestures, Applied Ergonomics, 58, 2017, 176-181

SELECTED RESEARCH PROJECTS

Cervical Biomechanics associated with Headmounted Displays
Principal Investigator Office Ergonomics Research Committee

Development and evaluation of a Total Worker Health® Intervention for Construction Subcontractors
Principal Investigator, National Institute for Occupational Safety and Health

Charles Dimarzio

Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering, Mechanical and Industrial Engineering

PhD, Northeastern University, 1996
coe.northeastern.edu/people/dimarzio-charles

Scholarship focus: Optics, microscopy, coherent detection, interaction of light and sound waves hyperspectral imaging, diffusive optical tomography and ultrasound, lidar and remote sensing, multi-model imaging, Activities include: computer modeling, designing, building and testing of hardware, and processing the resulting data

SELECTED PUBLICATIONS

A.E. Draghici, D. Potart, J.L. Hollmann, V. Pera, Q. Fang, C.A. DiMarzio, J.A. Taylor, M.J. Niedre, S.J. Shefelbine
Near Infrared Spectroscopy for Measuring Changes in Bone Hemoglobin Content after Exercise in Individuals with Spinal Cord Injury, Journal of Orthopaedic Research, 2017

Z.R. Hoffman, C.A. DiMarzio
Single-Image Structured Illumination Using Hilbert Transform Demodulation, Journal of Biomedical Optics, 22(5), 2017, 056011–056011

Z. R. Hoffman, C.A. DiMarzio
Super-Resolution Structured Illumination in Optically Thick Specimens Without Fluorescent Tagging, Journal of Biomedical Optics, 22(11), 2017, 1–11

A. Vakili, J.L. Hollmann, R.G. Holt, C.A. DiMarzio
Enhanced Tagging of Light Utilizing Acoustic Radiation Force with Speckle Pattern Analysis, Journal of Biomedical optics, 22(10), 2017, 106004

J.L. Hollmann, R. Horstmeyer, C. Yang, C.A DiMarzio
Diffusion Model for Ultrasound-Modulated Light, Journal of Biomedical Optics, 19(3), 2014, 035005

J.L. Hollmann, R. Horstmeyer, C. Yang, C.A. DiMarzio
Analysis and Modeling of an Ultrasound-Modulated Guide Star to Increase the Depth of Focusing in a Turbid Medium, Journal of Biomedical Optics, 18(2), 2013, 025004

SELECTED RESEARCH PROJECTS

Coded-Illumination Fourier Ptychography for High-Content MultiModal Imaging
Principal Investigator, National Science Foundation

Collagen Monomer Imaging
Co-Principal Investigator, National Institutes of Health

Light Scattering Research
Principal Investigator, Draper Labs

Eno Ebong

Associate Professor and Associate Chair for Graduate Studies, Chemical Engineering; Associate Professor, Bioengineering; affiliated faculty, Biology

PhD, Rensselaer Polytechnic Institute, 2006
coe.northeastern.edu/people/ebong-eno

Scholarship focus: studying the means by which endothelial cell mechanotransduction occurs in order to prevent or promote diseases related to blood vessel dysfunction

Honors and awards: National Science Foundation CAREER Award; National Institutes of Health Career Development Award; Gordon Research Conference Board of Trustees Carl Storm Fellowship

SELECTED PUBLICATIONS

S.A. Mensah, A.A. Nersesyan, I.C. Harding, C.I. Lee, X. Tan, S. Banerjee, M. Niedre, V.P. Torchilin, E.E. Ebong
Flow-Regulated Endothelial Glycocalyx Determines Metastatic Cancer Cell Activity, The FASEB Journal, 34(5), 2020, 6166-6184

X. Cai, J. Qiao, P. Kulkarni, I.C. Harding, E. Ebong, C.F. Ferris
Imaging the Effect of the Circadian Light-Dark Cycle on the Glymphatic System in Awake Rats, Proceedings of the National Academy of Sciences of the United States of America, 117(1), 2020, 668-676

M.J. Cheng, R. Mitra, C.C. Okorafor, A.A. Nersesyan, I.C. Harding, N.N. Bal, R. Kumar, H. Jo, S. Sridhar, E.E. Ebong
Targeted Intravenous Nanoparticle Delivery: Role of Flow and Endothelial Glycocalyx Integrity, Annals of Biomedical Engineering, 2020

J. Nagatomi, E.E. Ebong (co-editors)
2nd Edition Mechanobiology Handbook, CRC, Taylor and Francis Group, Boca Raton, 2019

I.C. Harding, R. Mitra, S.A. Mensah, A. Nersesyan, N.N. Bal, E.E. Ebong
Endothelial Barrier Reinforcement Relies on Flow-Regulated Glycocalyx, a Potential Therapeutic Target, Biorheology, 2019, 1-19

SELECTED RESEARCH PROJECTS

Atheroprotective vs Atherogenic Glycocalyx Mechanotransduction Mechanisms
Principal Investigator, National Institutes of Health

EMBRACE STEM (Endothelial MechanoBiology Research and multiCultural Education in STEM)
Principal Investigator, National Science Foundation

Deniz Erdogmus

Professor and Vice Chair of Research, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Florida, 2002
coe.northeastern.edu/people/erdogmus-deniz

Scholarship focus: machine learning, signal and image analytics, cyber-human systems

Honors and awards: Excellence in Mentoring Award; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

V. Yildiz, P. Tian, I. Yildiz, J.M. Brown, J. Kalpathy-Cramer, J. Dy, S. Ioannidis, D. Erdogmus, S. Ostmo, S.J. Kim, R.V.P. Chan, J.P. Campbell, M.F. Chiang
Plus Disease in Retinopathy of Prematurity: Convolutional Neural Network Performance Using a Combined Neural Network and Feature Extraction Approach, Translational Vision Science and Technology, 9(2), 2020, 10

I. Yildiz, P. Tian, J. Dy, D. Erdogmus, J. Brown, J. Kalpathy-Cramer, S. Ostmo, J.P. Campbell, M.F. Chiang, S. Ioannidis
Classification and Comparison Via Neural Networks, Neural Networks, 118, 2019, 65-80

M. Han, S.Y. Gunay, G. Schirner, T. Padir, D. Erdogmus,
HANDS: A Multimodal Dataset for Modeling Toward Human Grasp Intent Inference in Prosthetic Hands, Intelligent Service Robotics, 13, 2019, 179–185

M.S. Goodwin, C.A. Mazefsky, S. Ioannidis, D. Erdogmus, M. Siegel
Predicting Aggression to Others in Youth with Autism Using Wearable Biosensor, Autism Research, 12(8), 1286-1296, 2019

SELECTED RESEARCH PROJECTS

Coordination of Dyadic Object Handover for Human-Robot Interaction
Co-Principal Investigator, National Science Foundation

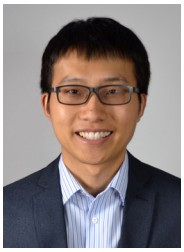
Mining for Mechanistic Information to Predict Protein Function
Co-Principal Investigator, National Science Foundation

Multimodal Signal Analysis and Data Fusion for Post-traumatic Epilepsy Prediction
Co-Principal Investigator, National Institutes of Health

Probabilistic Learning with Less Labeling
Co-Principal Investigator, Defense Advanced Research Projects Agency

Signal Processing in Neural Networks for Wireless IoT
Principal Investigator, Defense Advanced Research Projects Agency

Hui Fang



Assistant Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of California, Berkeley, 2014
coe.northeastern.edu/people/fang-hui

Scholarship focus: neural interfaces, biomimetic electronics, electronic materials & organisms

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

X. Han, K. J. Seo, Y. Qiang, Z. Li, S. Vinnikova, Y. Zhong, X. Zhao, P. Hao, S. Wang, H. Fang
Nanomeshed Si Nanomembranes, npj Flexible Electronics, 3(9), 2019

Y. Qiang, P. Artoni, K. J. Seo, S. Culaclii, V. Hogan, X. Zhao, Y. Zhong, X. Han, P.-M. Wang, Y.-K. Lo, Y. Li, H. A. Patel, Y. Huang, A. Sambangi, J.S.V. Chu, W. Liu, M. Fagiolini, H. Fang
Transparent Arrays of Bilayer-Nanomesh Microelectrodes for Simultaneous Electrophysiology and 2-Photon Imaging in the Brain, Science Advances, 4(9), 2018, eaat0626

H. Fang, K.J. Yu, C. Gloschat, Z. Yang, E. Song, C.-H. Chiang, J. Zhao, S.M. Won, S. Xu, M. Trumpis, Y. Zhong, S.W. Han, Y. Xue, D. Xu, S.W. Choi, G. Cauwenberghs, M. Kay, Y. Huang, J. Viventi, I.R. Efimov, J.A. Rogers
Capacitively Coupled Arrays of Multiplexed Flexible Silicon Transistors for Long-Term Cardiac Electrophysiology, Nature Biomedical Engineering, 1, 2017, 0038

H. Fang, C. Battaglia, C. Carraro, S. Nemsak, B. Ozdol, J.S. Kang, H.A. Bechtel, S.B. Desai, et. al
Strong Interlayer Coupling In Van Der Waals Heterostructures Built From Single-Layer Chalcogenides, Proceedings of the National Academy of Sciences, 111, 2014, 6198-6202

SELECTED RESEARCH PROJECTS

Massively Multiplexed Gold Microprobe Arrays for Whole-Mouse-Brain Recording
Principal Investigator, National Institutes of Health

Transforming Neural Interfaces Using Stretchable, Transparent, Multifunctional Nanomesh Microelectrodes
Principal Investigator, National Science Foundation

Transfer Printed, Single-Crystalline Si Nanomesh Thin Films
Principal Investigator, National Science Foundation

Qianqian Fang

Associate Professor, Bioengineering; affiliated faculty, Electrical and Computer Engineering

PhD, Dartmouth College, 2005
coe.northeastern.edu/people/fang-qianqian

Scholarship focus: innovations in translational medical imaging devices to better diagnose cancers and understand the human brain, low-cost point-of-care diagnostic tools to delivery life-saving medicines to the resource-poor regions, and high performance computing tools to facilitate the development of the next-generation imaging methods

Honors and awards: Leading Innovation in Reimagining Global Health, Innovation Countdown 2030 Initiative

SELECTED PUBLICATIONS

A. Phong Tran, S. Yan, Q. Fang
Improving Model-Based fNIRS Analysis Using Mesh-Based Anatomical and Light-Transport Models, Neurophotonics, 7(1), 2020, 015008

Y. Yuan, P. Cassano, M. Pias, Q. Fang
Transcranial Photobiomodulation with Near-Infrared Light from Childhood to Elderliness: Simulation of Dosimetry, Neurophotonics, 7(1), 2020, 015009

S. Yan, A.P. Tran, Q. Fang
A Dual-Grid Mesh-Based Monte Carlo Algorithm for Efficient Photon Transport Simulations in Complex 3-D Media, Journal of Biomedical Optics, 24(2), 2019, 020503

Q. Fang, S. Yan
Graphics Processing Unit-Accelerated Mesh-Based Monte Carlo Photon Transport Simulations, Journal of Biomed. Optics, 24(11), 2019, 115002

P. Cassano, A.P. Tran, H. Katnani, B.S. Bleier, M.R. Hamblin, Y. Yuan, Q. Fang
Selective Photobiomodulation for Emotion Regulation: Model-Based Dosimetry Study, Neurophotonics, 6(1), 2019, 015004

SELECTED RESEARCH PROJECTS

A Versatile High-Performance Optical Mammography Co-Imager
Principal Investigator, National Institutes of Health

GPU-Accelerated Monte Carlo Photon Transport Simulation Platform
Principal Investigator, National Institutes of Health

Next-Generation Optical Brain Functional Imaging Platform
Principal Investigator, National Institutes of Health

Craig Ferris

Professor, Psychology; affiliated faculty, Bioengineering

PhD, New York Medical College, 1979
coe.northeastern.edu/people/ferris-craig

Scholarship focus: magnetic resonance imaging and neurodegenerative disease

SELECTED PUBLICATIONS

J. Qiao, C.M. Lawson, K.F.G. Rentrup, P. Kulkarni, C.F. Ferris
Evaluating Blood-Brain Barrier Permeability in a Rat Model of Type 2 Diabetes, Journal of Translational Medicine, 18, 2020, 256

T.E. Ziegler, P. Kulkarni, H. Ash, X. Cai, M. Elizabeth Mayerand, B. Rauch, C.F. Ferris
Novel Imaging Technology and Procedures for Studying Brain Function in Preadolescent Awake Marmosets, J Neurosci Methods, 343, 2020, 108823

X. Cai, J. Qiao, P. Kulkarni, I.C. Harding, E. Ebong, C.F. Ferris
Imaging the Effect of the Circadian Light-Dark Cycle on the Glymphatic System in Awake Rats, Proceedings of the National Academy of Sciences of the USA, 117(1), 2020, 668-676

C.F. Ferris, X. Cai, J. Qiao, B. Switzer, J. Baun, T. Morrison, S. Iriah, D. Madularu, K.W. Sinkevicius, P. Kulkarni
Life Without a Brain: Neuroradiological and Behavioral Evidence of Neuroplasticity Necessary to Sustain Brain Function in the Face of Severe Hydrocephalus, Scientific Reports, 9, 2019, 16479

P. Kulkarni, T.R. Morrison, X. Cai, S. Iriah, N. Simon, J. Sabrick, L. Neuroth, C.F. Ferris
Neuroradiological Changes Following Single or Repetitive Mild, Frontiers in Systems Neuroscience, 13, 2019, 34

Edgar Goluch

Associate Professor, Chemical Engineering; affiliated faculty, Bioengineering, Biology, Civil and Environmental Engineering

PhD, University of Illinois, 2007
coe.northeastern.edu/people/goluch-edgar

Scholarship focus: detection of biomolecules at the nanoscale in micro and nanofluidic channels; biophysics; micro and systems biology; environmental sensing; analytical instrumentation

SELECTED PUBLICATIONS

M.K. Kimani, J. Mwagi, E.D. Goluch
Bacterial Sample Concentration and Culture Monitoring Using a PEG-Based Osmotic System with Inline Impedance and Voltammetry Measurements, Journal of Analysis and Testing, 3(2), 2019, 166-174

M.K. Kimani, R. Loo, E.D. Goluch
Biosample Concentration Using Microscale Forward Osmosis with Electrochemical Monitoring, Analytical Chemistry, 91, 2019, 7487-7494

P.J. Buch, Y. Chai, E.D. Goluch
Treating Polymicrobial Infections in Chronic Diabetic Wounds, Clinical Microbiology Reviews, 32(2), 2019, e00091-18

J. Sun, N. Tandogan, A.Z. Gu, S. Müftü, E.D. Goluch, K.T. Wan
Quantification of Colloidal Filtration of Polystyrene Micro-Particles on Glass Substrate Using a Microfluidic Device, Colloids and Surfaces B: Biointerfaces 165, 2018, 381-387

C.R. Santiveri, H.J. Sismaet, M. Kimani, E.D. Goluch
Electrochemical Detection of Pseudomonas Aeruginosa in Polymicrobial Environments, ChemistrySelect, 3(11), 2018 2926-2930

H.J. Sismaet, E.D. Goluch
Electrochemical Probes of Microbial Community Behavior, Annual Review of Analytical Chemistry, 2018

P.N. Abadian, P.J. Buch, E.D. Goluch, J. Li, Z. Zhang
Real-Time Monitoring of Urinary Encrustation Using a Quartz Crystal Microbalance, Analytical Chemistry, 90(3), 2018, 1531-1535

SELECTED RESEARCH PROJECTS

Point-of-Care Test for Identifying Gram Negative Urinary Tract Infections in Companion Animals
Principal Investigator, National Science Foundation

C.J. Hasson

Associate Professor, Physical Therapy; affiliated faculty, Bioengineering

PhD, UMass Amherst, 2009
coe.northeastern.edu/people/hasson-christopher

Scholarship focus: to understand how the complex interactions between the nervous system, musculoskeletal system and the environment affect movement, control, and learning in humans

SELECTED PUBLICATIONS

C.J. Hasson, S.E. Goodman
Learning to Shape Virtual Patient Locomotor Patterns: Internal Representations Adapt to Exploit Interactive Dynamics, Journal of Neurophysiology, 121(1), 2019, 321-335

C.J. Hasson
An Interactive Simulator for Imposing Virtual Musculoskeletal Dynamics, IEEE Transactions on Biomedical Engineering, 65(3), 2018, 539-549

S.E. Goodman, C.J. Hasson
Elucidating Sensorimotor Control Principles with Myoelectric Musculoskeltal Models, Frontiers in Human Neuroscience, 11, 2017, 531

C.J. Hasson, O. Gelina, G. Woo
Neural Control Adaptation to Motor Noise Manipulation, Frontiers in Human Neuroscience, 10, 2016, 59

C.J. Hasson, J. Manczurowsky
Effects of Kinematic Vibraotactile Feedback on Learning to Control a Virtual Prosthetic Arm, Journal of NeuroEngineering and Rehabilitation, 12(1), 2016, 31

David Kaeli

COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering, Khoury College of Computer Sciences

PhD, Rutgers University, 1992
coe.northeastern.edu/people/kaeli-david

Scholarship focus: computer architecture, GPUs, heterogeneous computing, performance analysis, security and information assurance, hardware reliability and recovery, big data analytics, workload characterization

Honors and awards: Fellow, Institute of Electrical and Electronics Engineers; Distinguished Scientist, Associate of Computing Machinery; Distinguish Professor, Heterogeneous Systems Architecture Foundation; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

F. Previlon, C. Kalra, D. Tiwari, D. Kaeli
Characterizing and Exploiting Soft Error Vulnerability Phase Behavior in GPU Applications, IEEE Transactions on Dependable and Secure Computing, 2020

T. Baruah, Y. Sun, A. Dincer, S. Mojumder, J. Abellan, Y. U., A. Josh, N. Rubin, J. Kim, D. Kaeli
Griffin: Hardware-Software Support for Efficient Page Migration in Multi-GPU Systems, Proceedings of the 26th IEEE International Symposium on High Performance Computer Architecture, 2020, 596-609

Y. Sun, T. Baruah, S.A. Mojumder, S. Dong, X. Gong, S. Treadway, Y. Bao, D. Kaeli, et al.
MGPUSim: Enabling Multi-GPU Performance Modeling and Optimization, Proceedings of the 46th International Symposium on Computer Architecture (ISCA '19), ACM, New York, NY, USA, 2019, 197-209

SELECTED RESEARCH PROJECTS

A Framework of Simultaneous Acceleration and Storage Reduction on Deep Neural Networks Using Structured Matrices
Co-Principal Investigator, National Science Foundation

DARPA HIVE
Principal Investigator, Defense Advanced Research Agency

Exploring Analysis of Environment and Health Through Multiple Alternative Clustering
Co-Principal Investigator, National Science Foundation

Porting and Accelerating High Performance Computing Applications to the AMD ROCm Runtime Environment
Principal Investigator, AMD

Alain Karma

Professor, Physics; affiliated faculty, Bioengineering

PhD, University of California at Santa Barbara, 1985
coe.northeastern.edu/people/karma-alain

Scholarship focus: computational modeling of cardiac arrhythmia mechanisms from cellular to organ scales including systems biology approaches

Honors and awards: Fellow of the American Physical Society, Northeastern University Robert D. Klein Lecturer, College of Arts and Sciences Distinguished Professor, Northeastern University

SELECTED PUBLICATIONS

Z. Song, A. Karma, J.N. Weiss, Z. Qu
Long-Lasting Sparks: Multi-Metastability and Release Competition in the Calcium Release Unit Network, Speech Communication, 12(1), 2016, e1004671

D. Terentyev, C.M. Rees, W. Li, L.L. Cooper, H.K. Jindal, X. Peng, Y. Lu, R. Terentyeva, K.E. Odening, J. Daley, K. Bist, B.-R. Choi, A. Karma, G. Koren
Hyperphosphorylation of RyRs Underlies Triggered Activity in Transgenic Rabbit Model of LQT2 Syndrome, Circulation Research, 115(11), 2014, 919-928

P.S. Skardal, A. Karma, J.G. Restrepo
Spatiotemporal Dynamics of Calcium-Driven Cardiac Alternans, Physical Review E, 89(5), 2014, 052707

A. Karma
Physics of Cardiac Arrhythmogenesis, Annual Review of Condensed Matter Physics, 4, 2013, 313-337

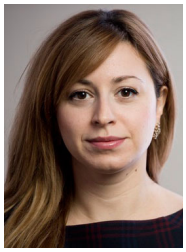
J.N. Weiss, A. Karma, W.R. MacLellan, M. Deng, C.D. Rau, C.M. Rees, J. Wang, N. Wisniewski, Eskin E, S Horvath, Z.Qu, Y.Wang, A.J. Lusis
Good Enough Solutions and the Genetics of Complex Diseases, Circulation Research, 111, 2012, 493-504

SELECTED RESEARCH PROJECTS

A Multi-Scale Approach to Cardiac Arrhythmia: from the Molecule to the Organ
Co-Principal Investigator, National Institutes of Health

Systems Approach to Unraveling the Genetic Basis of Heart Failure
Principal Investigator, National Institutes of Health

Tali Konry



Affiliated faculty, Bioengineering; assistant professor, Pharmaceutical Sciences

PhD, Ben Gurion University of Negev, 2007
coe.northeastern.edu/people/konry-tali

Scholarship focus: Single cell functional multi-omic analysis, Phenotypic drug profiling in droplet microfluidics for better targeting of drug-resistant tumors, Live single cell functional phenotyping and cell-cell communication in droplet nano-liter reactors

Honors and awards: Tufts Clinical and Translational Science Institute Pilot Award, Schumacher Faculty Award

SELECTED PUBLICATIONS

S. Sarkar, P. Sabhachandani, R. Dashnamoorthy, S. Potdar, S. Purvey, A. Beheshti, A.M. Evens, T. Konry
Dynamic Analysis of Human Natural Killer Cell Response at Single-Cell Resolution in B-cell Non-Hodgkin Lymphoma, Frontiers in Immunology, 8, 2017, 1736

P. Sabhachandani, S. Sarkar, P.C. Zucchi, B.A. Whitfield, J.E. Kirby, E.B. Hirsch, T. Konry
Integrated Microfluidic Platform for Rapid Antimicrobial Susceptibility Testing and Bacterial Growth Analysis using Bead Based Biosensor via Fluorescence Imaging, Microchimica Acta, 184(12), 2017, 4619-4628

N. Cohen, S. Sarkar, E. Hondroulis, P. Sabhachandani, T. Konry
Quantification of Intercellular Adhesion Forces Measured by Fluid Force Microscopy, Talanta, 2017

N. Cohen, P. Sabhachandani, S. Sarkar, L. Kahanovitz, N. Lautsch, S. Russell, T. Konry
Microsphere Based Continuous-Flow Immunoassay in a Microfluidic Device for Determination of Clinically Relevant Insulin Levels, Microchimica Acta, 184(3), 2017, 835-841

S. Sarkar, P. Sabhachandani, T. Konry
Ultrasensitive Isothermal Detection of Protein Analytes Using Rolling Circle Amplification in Microscale Platforms, Rolling Circle Amplification (RCA), 2016, 85-97

S. Sarkar, P. Sabhachandani, D. Stroopinsky, K. Palmer, N. Cohen, J. Rosenblatt, D. Avigan, T. Konry
Dynamic Analysis of Immune and Cancer Cell Interactions at Single Cell Level in Microfluidic Droplets, Biomicrofluidics, 1(10), 2016, 704-709

Abigail Koppes

Assistant Professor, Chemical Engineering, Affiliated Faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2013
coe.northeastern.edu/people/koppes-abigail

Scholarship focus: bioelectric medicine, development of novel interventions and tissue engineered platforms for nerve regeneration and repair, body-on-a-chip for enteric-gut interactions

Honors and awards: 2020 Young Innovator of Cellular and Molecular Bioengineering (BMES Society)

SELECTED PUBLICATIONS

S. Hosic, W. Lake, E. Stas, R. Koppes, D. Breault, S. Murthy, A. Koppes
Cholinergic Activation of Primary Human Derived Intestinal Epithelium does not Ameliorate TNF-α Induced Injury, Cellular and Molecular Bioengineering (Journal of BMES), CMBE 2020 Young Innovator Issue, 2020

S. Hosic, M. Puzan, F. Zhou, R. Koppes, D. Breault, S. Murthy, A. Koppes
Rapid Prototyping of a Multilayer Microphysiological System for Primary Human Intestinal Epithelial Culture, ACS Biomaterials Science & Engineering, 2020

K. Nichols, R. Koppes, A. Koppes
Recent Advancements in Microphysiological Systems for Neural Development and Disease, Invited Review; Current Opinion in Biomedical Engineering, 2020

M. Puzan, S. Hosic, C. Ghio, A.N. Koppes
Enteric Nervous System Regulation of Intestinal Stem Cell Differentiation and Epithelial Monolayer Function, Scientific Reports, 8(1), 2018, 6313

D. Ventre, M. Puzan, E. Ashbolt, A.N. Koppes
Enhanced Total Neurite Outgrowth and Secondary Branching in Dorsal Root Ganglion Neurons Elicited by Low Intensity Pulsed Ultrasound, Journal of Neural Engineering, 15(4), 2018, 046013

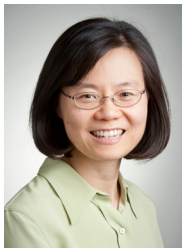
SELECTED RESEARCH PROJECTS

Bioengineer Autonomic Neurovascular System to Explore the Innervation of Vascular Grafts
Co-Investigator, American Heart Association

GUMI: New in Vitro Platforms to Parse the Human Gut Epithelial-Microbiome-Immune Axis
Co-Investigator, National Institutes of Health

Trailblazer: Engineering a Humanized Gut-Enteric-Axis
Principal Investigator, National Institutes of Health

Carolyn Lee-Parsons



Associate Professor, Chemical Engineering; Jointly appointed, Chemistry; affiliated faculty, Bioengineering

PhD, Cornell University, 1995
coe.northeastern.edu/people/lee-parsons-carolyn

Scholarship focus: production of valuable pharmaceutical compounds from plant cell cultures, specifically the production of important anti-cancer drug molecules from cell cultures of Catharanthus Roseus

Honors and awards: National Science Foundation CAREER Award; College of Engineering Outstanding Teaching Award, University Excellence in Teaching Award

SELECTED PUBLICATIONS

R. Grützner, P. Martin, C. Horn, S. Mortensen, E.J. Cram, C.W.T. Lee-Parsons, J. Stuttmann, S. Marillonnet
Addition of Multiple Introns to a Cas9 Gene Results in Dramatic Improvement in Efficiency for Generation of Gene Knockouts in Plants, BioRxIV, 2020

S. Mortensen, D. Bernal-Franco, L.F. Cole, S. Sathitloetsakun, E.J. Cram, C.W.T Lee-Parsons
EASI transformation: An Efficient Transient Expression Method for Analyzing Gene Function in Catharanthus Roseus Seedlings, Frontiers in Plant Sciences, 2019

S. Mortensen, J. Weaver, S. Sathitloetsakun, L.F. Cole, N.F. Rizvi, E.J. Cram, C.W.T Lee-Parsons
The Regulation of Zct1, a Transcriptional Repressor of Monoterpenoid Indole Alkaloid Biosynthetic Genes in *Catharanthus roseus*, Plant Direct, 3, 2019, 1-13

L. Kirchner, A. Wirshing, L. Kurt, T. Reinard, J. Glick, E.J. Cram, H-J. Jacobsen, C.W.T. Lee-Parsons
Identification, Characterization, and Expression of Diacylglycerol Acyltransferase Type-1 from Chlorella Vulgaris, Algal Research, 13, 2016, 167-181

SELECTED RESEARCH PROJECTS

Production of Chemotherapeutic Drugs from the Periwinkle Plant
Principal Investigator, Massachusetts Technology Transfer Center

Production of Chemotherapeutic Drugs from the Periwinkle Plant
Principal Investigator, GapFund360

Zinc Finger (ZCT) Transcription Factors: Pivotal Regulators of Growth, Development, and Alkaloid Biosynthesis in Catharanthus Roseus
Principal Investigator, National Science Foundation

Danielle Levac

Assistant Professor, Physical Therapy, Movement and Rehabilitation Science; affiliated faculty, Bioengineering

PhD, McMaster University, 2012
coe.northeastern.edu/people/levac-danielle

Scholarship focus: virtual reality; video games; motor learning; rehabilitation; physical therapy; cerebral palsy; stroke; knowledge translation

Honors and awards: Early Career Investigator Award, International Society for Virtual Rehabilitation

SELECTED PUBLICATIONS

R. Proffitt, S. Glegg, D.E. Levac, B. Lange
End-User Involvement in Rehabilitation Virtual Reality Implementation Research: Benefits, Challenges and Lessons Learned, Journal of Enabling Technologies, 2019

N. Rohrbach, E. Chicklis, D.E. Levac
What is the Impact of User Affect on Motor Learning in Virtual Environments After Stroke? A scoping review, Journal of NeuroEngineering and Rehabilitation, 16(79), 2019

D.E. Levac, H. Dumas, W. Meleis
Development and Preliminary Usability Evaluation of a Tablet-Based Interactive Movement Tool for Pediatric Rehabilitation, JMIR: Rehabilitation and Assistive Technology, 5(2), 2018, e10307

R. Mills, D. Levac, H. Sveistrup
Kinematics and Postural Muscular Activity During Continuous Oscillating Platform Movement in Children and Adolescents with Cerebral Palsy, Gait & Posture, 66, 2018, 13-20

R. Mills, D.E. Levac, H. Sveistrup
The Effects of a 5-Day Intensive Virtual-Reality Based Exercise Programme on Kinematics and Postural Muscle Activity in Children and Adolescents with Cerebral Palsy – Preliminary Findings, Physical & Occupational Therapy in Pediatrics, 39(4), 2018, 1-16

SELECTED RESEARCH PROJECTS

Enhancing Transfer of Motor Skill Learning from Virtual to Physical Environments in Children with Cerebral Palsy
Principal Investigator, National Institutes of Health K01

Influence of Virtual Environment Complexity on Motor Learning in Children with Cerebral Palsy: Implications for Virtual Reality Use in Rehabilitation
Principal Investigator, Tufts Clinical and Translational Science Institute Pilot Grant

Erel Levine

Associate Professor, Bioengineering

PhD, Weizmann Institute of Science, 2005
coe.northeastern.edu/people/levine-erel

Scholarship focus: systems and synthetic biology of the Brain-Immune-Gut super-system; Interactions among hosts and microbes; Deep learning approaches to interpreting biological data and designing biomedical solutions

Honors and awards: National Science Foundation Postdoctoral Fellowship, Center for Theoretical Biological Physics

SELECTED PUBLICATIONS

K.S. Lee, E. Levine
Microfluidic Platform for Longitudinal Imaging in C. Elegans, Journal of Visualized Experiments, 135, 2017

E. Korkmazhan, H. Teimouri, N. Peterman, E. Levine
The Dynamics of Translation can Determine the Spatial Organization of Membrane-Bound Proteins and their mRNA, National Academy of Sciences, 114(51), 2017, 13424-13429

M. Scholtz, A. Diner, D. Biron, E. Levine
Feeding Dynamics are Controlled by the Need for Energy and for Information, National Academy of Sciences, 114(35), 2017, 9261–9266

H. Teimouri, E. Korkmazhan, J. Stavans, E. Levine
ESub-Cellular mRNA Localization Modulates the Regulation of Gene Expression by Small RNAs in Bacteria, Physical Biology, 14(5), 2017, 056001

A. Bitran, W.Y. Chiang, E. Levine, M. Prentiss
Mechanisms of Fast and Stringent Search in Homologous Pairing of Double-Stranded DNA, PLoS Computational Biology 13(3), 2017, e1005421

K.S. Lee, S. Iwanir, R. Kopito, D. Biron, E. Levine
Regulation of Food Uptake by Serotonin-Dependent Balance Between Two Modes of Feeding, Nature Commications, 8, 2017, 1422

SELECTED RESEARCH PROJECTS

Sub-Cellular Localization and Small RNA and Regulation of the Outer Membrane
Principal Investigator, National Science Foundation

Herbert Levine

University Distinguished Professor, Physics, jointly appointed in Bioengineering

PhD, Princeton University, 1979
coe.northeastern.edu/people/levine-herbert

Scholarship focus: physical modeling of cancer progression, metastasis and interaction with the immune system. Most recent interests include the role of metabolic plasticity in these processes and the co-evolution of the tumor and the adaptive immune system. Other areas include spatial organization of the actin cytoskeleton, the mechanics of collective cell motility, and the analysis of genetic circuits involved in cell fate decisions

Honors and awards: Member, National Academy of Sciences, Member, American Academy of Arts and Sciences, Fellow, American Physical Society, Alfred P. Sloan Foundation Research Fellowship (1988)

SELECTED PUBLICATIONS

J.T. George, H. Levine
Sustained Coevolution in a Stochastic Model of Cancer–Immune Interaction, Cancer Research 80(4), 2020, 811-819

L. James, C. Bueno, Y. Eliaz, N.P. Schafer, M.N. Waxham, P.G. Wolynes, H. Levine, M.S. Cheung
The Role of the Arp2/3 Complex in Shaping the Dynamics and Structures of Branched Actomyosin Networks, Proceedings of the National Academy of Sciences, 117(20), 2020, 10825-10831

M.K. Jolly, S.A. Mani, H. Levine
Hybrid Epithelial/Mesenchymal Phenotype(s): The 'Fittest' for Metastasis?, Biochimica et Biophysica Acta Reviews on Cancer (BBA), 2018

J.T. George, D.A. Kessler, H. Levine
Effects of Thymic Selection on T Cell Recognition of Foreign and Tumor Antigenic Peptides, Proceedings of the National Academy of Sciences, 114(38), 2017, E7875-E7881

M.K. Jolly, K.E. Ware, S. Gilja, J.A. Somarelli, H. Levine
EMT and MET: Necessary or Permissive for Metastasis?, Molecular Oncology, 11 (7), 2017, 755-769

SELECTED RESEARCH PROJECTS

The Cancer-Immune Interaction
Principal Investigator, Stand up to Cancer and the Breast Cancer Foundation

The Role of Epithelial Plasticity in Cancer Metastasis
Principal Investigator, National Science Foundation

Kim Lewis

University Distinguished Professor, Biology; Director, Antimicrobial Discovery Center; affiliated faculty, Bioengineering

PhD, Moscow University, 1980
coe.northeastern.edu/people/lewis-kim

Scholarship focus: antimicrobial drug tolerance, antibiotic discovery, microbiome therapeutics

SELECTED PUBLICATIONS

K. Lewis
The Science of Antibiotic Discovery, Cell, 181, 2020, 29-45

Y. Imai, K.J. Meyer, A. Iinishi, Q. Favre-Godal, R. Green, S. Manuse, A. O'Rourke, K. Lewis, et al.
A New Antibiotic Selectively Kills Gram-Negative Pathogens, Nature, 576, 2019, 459-464

B.P. Conlon, S.E. Rowe, A. Brown Gandt, A.S. Nuxoll, N.P. Donegan, E.A. Zalis, G. Clair, J.N. Adkins, A.L. Cheung, K. Lewis
ATP Depletion is Associated with Antibiotic Tolerance in Staphylococcus Aureus, Nature Microbiology, 1, 2016, 1-7

L.L. Ling, T. Schneider, A.J. Peoples, A.L. Spoering, I. Engels, B.P. Conlon, A. Mueller, T.F. Schäberle, D.E. Hughes, S. Epstein, M. Jones, L. Lazarides, V.A. Steadman, D.R. Cohen, C.R. Felix, K.A. Fetterman, W.P. Millett, A.G. Nitti, A.M. Zullo, C. Chen, K. Lewis
A New Antibiotic Kills Pathogens Without Detectable Resistance, Nature, 517, 2015, 455-459

M.A. Schumacher, P. Balani, J. Min, N.B. Chinnam, S. Hansen, M. Vulic, K. Lewis, R.G. Brennan
HipAB–Promoter Structures Reveal the Basis of Heritable Multidrug Tolerance, Nature, 524, 2015, 59-64

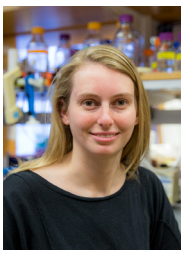
B.P. Conlon, E.S. Nakayasu, L.E. Fleck, M.D. LaFleur, V.M. Isabella, K. Coleman, S.N. Leonard, R.D. Smith, J.N. Adkins, K. Lewis
Activated ClpP Kills Persisters and Eradicates a Chronic Biofilm Infection, Nature, 503, 2013, 365-370

SELECTED RESEARCH PROJECTS

Friend or Foe, Determining the Pathogenic Potential of Environmental Bacteria
Principal Investigator, Defense Advanced Research Projects Agency

Resolving the Bottleneck in Antibiotic Discovery
Principal Investigator, National Institutes of Health

Elizabeth Libby



Assistant Professor, Bioengineering
(Joining Janurary 2021)

PhD, University of Pennsylvania, 2011
coe.northeastern.edu/people/libby-elizabeth

Scholarship focus: synthetic biology, microbiology, biosensor development

SELECTED PUBLICATIONS

E.A. Libby, S. Reuveni, J. Dworkin
Multisite Phosphorylation Drives Phenotypic Variation in (p)ppGpp Synthetase-Dependent Antibiotic Tolerance, Nat Commun, 10, 2019, 5133

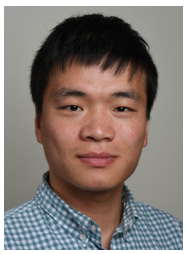
E.A. Libby, P.A. Silver
Harnessing Undomesticated Life, Nature Microbiology, 4(2), 2019, 212–213

E.A. Libby, J. Dworkin
Habits of Highly Effective Biofilms: Ion Signaling, Molecular Cell, 66(6), 2017, 733-734

S. Sarkar, E.A. Libby, S.E. Pidgeon, J. Dworkin, M.M. Pires
In Vivo Probe of Lipid II-Interacting Proteins, Angewandte Chemie Int Ed Engl, 2016

E.A. Libby, L.A. Goss, J. Dworkin
The Eukaryotic-Like Ser/Thr Kinase PrkC Regulates the Essential WalRK Two-Component System in Bacillus subtilis, PLoS Genet, 11(6), 2015, e1005275

Jiahe Li



Assistant Professor, Bioengineering

PhD, Cornell University, 2015
coe.northeastern.edu/people/li-jiahe

Scholarship focus: oral vaccine, host and oral microbiome interactions, microbiome engineering, and protein engineering-based cancer immunotherapy

Honors and awards: 2018 Peer Reviewed Medical Research Program Discovery Award, Department of Defense

SELECTED PUBLICATIONS

Yang M, Zhu G, Korza G, Sun X, Setlow P, J. Li
Engineering Bacillus subtilis as a Versatile and Stable Platform for Production of Nanobodies, Applied and Environmental Microbiology, 86(8), 2020

Y. He, C. Hong, Z.E. Yan, Y. Li, G. Zhu, M. Yang, Y. Li, X. Sun, D.J. Irvine, L. Li, P.T. Hammond
Self-Assembled cGAMP-STING ΔTM Signaling Complex as a Bioinspired Platform for cGAMP Delivery, Science Advances, 6(24), 2020, eaba7589

J. Li, Y. He, W. Wang, C. Wu, C. Hong, P.T. Hammond
Polyamine-Mediated Stoichiometric Assembly of Ribonucleoproteins for Enhanced mRNA Delivery, Angewandte Chemie, 2017

M.R. Zanotelli, Z.E. Goldblatt, J.P. Miller, F. Bordeleau, J. Li, J.A. VanderBurgh, M.C. Lampi, M.R. King, C.A. Reinhart-King
Regulation of ATP Uilization During Metastatic Cell Migration by Collagen Architecture, Molecular Biology of the Cell, 2017

J. Li, W. Wang, Y. He, Y. Li, E. Yan, D.J. Irvine, P.T. Hammond
Structurally Programmed Assembly of Translation Initiation Nanoplex for Superior mRNA Delivery, CS Nano, 11(3), 2017, 2531-2544

J. Li, C.C. Sharkey, J. Liesveld, M.R. King.
Genetic Engineering of Platelets to Neutralize Circulating Tumor Cells, J Control Release, 228, 2016, 38-47

J. Li, Y. Ai, L. Wang, P. Bu, C.C. Sharkey, Q. Wu, B. Wun, S. Roy, X. Shen, M.R. King
Platelet Membrane-Functionalized Particles to Target Tumor Cell-Associated Micro-Thrombi, Biomaterials, 76, 2016, 52-65

SELECTED RESEARCH PROJECTS

Research Capability Grant
Principal Investigator, Research and Innovation Agency at the Ministry of Education in Saudi Arabia

Cancer Drug Development Award
Principal Investigator, Dana-Farber Cancer Institute/ Northeastern University

Yingzi Lin

Professor, Mechanical and Industrial Engineering; affiliated faculty appointed in: Bioengineering

PhD, University of Saskatchewan, 2004
coe.northeastern.edu/people/lin-yingzi

Scholarship focus: Human-machine systems, human factors, biosensing and smart systems, human state and behavior modeling, transportation safety, healthcare and patient safety, human friendly mechatronics and human-robot interaction

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

J. Du, Q. Zhu, Y. Shi, Q. Wang, Y. Lin, D. Zhao
Cognition-Digital Twins (Cog-DT) for Personalized Information Systems of Smart Cities – A Proof of Concept, ASCE Journal of Management in Engineering, 36(2), 2020

D. Schmidt, Y. Lin
Development Towards Simple Fabrication Steps for Flexible Optoelectronic Films, Thin Solid Films, 665, 2018, 59-67

X. Wanyan, D. Zhuang, Y. Lin, X. Xiao, J.-W. Song
Influence of Mental Workload on Detecting Information Varieties Revealed by Mismatch Negativity During Flight Simulation, International Journal of Industrial Ergonomics, 64, 2018, 1–7

B. Liang, Y. Lin
Using Physiological and Behavioral Measurements in a Picture-Based Road Hazard Perception Experiment to Classify Risky and Safe Drivers, Transportation Research Part F: Psychology and Behaviour, 58, 2018, 93-105

Y. Lin, J. Breugelmans, M. Iverson, D. Schmidt
An Adaptive Interface Design (AID) for Enhanced Computer Accessibility and Rehabilitation, International Journal of Human Computer Studies, 98, 2017, 14–23

SELECTED RESEARCH PROJECTS

Cognition-Driven Display for Navigation Activities (Cog-DNA): Personalized Spatial Information System Based on Information Personality of Firefighters
Co-Investigator, National Institute of Standards and Technology

Computational Methods for Continuous Objective Multimodal Pain Assessment Sensing System (COMPASS)
Principal Investigator, National Science Foundation

Decoding Multi-Modal Physiological Response Patterns for Assessing Post-Stroke Cognitive Impairment in VR-based Driving
Co-Investigator, National Institutes of Health

Carol Livermore

Associate Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering, Electrical and Computer Engineering

PhD, Harvard University, 1998
coe.northeastern.edu/people/livermore-clifford-carol

Scholarship focus: MEMS-enabled systems for assistive technologies, energy harvesting, and microscale vacuum applications; origami-enabled microfluidics and tissue engineering; carbon nanomaterials

Honors and awards: College of Engineering Faculty Fellow; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

X. Xie, S. Maharjan, S. Liu, Y.S. Zhang, C. Livermore
A Modular, Reconfigurable Microfabricated Assembly Platform for Microfluidic Transport and Multitype Cell Culture and Drug Testing, Micromachines, 11(1), 2020, 2

X. Xie, M. Bigdeli Karimi, S. Liu, B. Myanganbayar, C. Livermore
Micro Motion Amplifiers for Compact Out-of-Plane Actuation, Micromachines, 9(7), 2018, 365

X. Xie, C. Kelly, T. Liu, R.J. Lang, S. Gandolfo, Y. Boukataya, C. Livermore
Origami-Enabled Microfluidics, Proceedings of the 2018 Hilton Head Solid State Sensors, Actuators, and Microsystems Workshop, 2018, 376-377

X. Xie, C. Livermore
Passively Self-Aligned Assembly of Compact Barrel Hinges for High-performance, Out-of-Plane MEMS Actuators, IEEE 30th International Conference on Micro Electro Mechanical Systems, 2017, 813-816

C. Yang, X. Xie, S. Liu, C. Livermore
Resealable, Ultra-Low Leak Micro Valve Using Liquid Surface Tension Sealing for Vacuum Applications, Proceedings of Transducers, 2017, 2071-2074

C. Yang, S. Liu, X. Xie, C. Livermore
Compact, Planar, Translational Piezoelectric Bimorph Actuator with Archimedes' Spiral Actuating Tethers, Journal of Micromechanics and Microengineering, 26(2), 2016, 124005

Mingyang Lu

Assistant Professor, Bioengineering

PhD, Baylor University, 2010
coe.northeastern.edu/people/lu-mingyang

Scholarship focus: computational systems biology, an integration of mathematical modeling and bioinformatics for studying gene regulatory networks, single cell genomics, epithelial-mesenchymal transition, coarse-graining, reverse engineering, machine learning, stochasticity and heterogeneity in gene expression

Honors and awards: Cancer Prevention Research Institute of Texas (CPRIT) Computational Cancer Biology Training Grant RP140113

SELECTED PUBLICATIONS

A. Katebi, V. Kohar, M. Lu
Random Parametric Perturbations of Gene Regulatory Circuit Uncover State Transitions in Cell Cycle, iScience, 23(6), 2020, 101150

D. Ramirez, V. Kohar, M. Lu
Toward Modeling Context-Specific EMT Regulatory Networks Using Temporal Single Cell RNA-Seq Data, Front Mol Biosci, 7, 2020, 54

D. Jia, M. Lu, K.H. Jung, J.H. Park, L. Yu, J. Onuchic, B.A. Kaipparettu, H. Levine
Elucidating Cancer Metabolic Plasticity by Coupling Gene Regulation with Metabolic Pathways, Proceedings of the National Academy of Sciences of the United States of America, 116(9), 2019, 3909-3918

V. Kohar, M. Lu.
Role of Noise and Parametric Variation in the Dynamics of Gene Regulatory Circuits, NPJ Systems Biology and Applications, 4(40), 2018

B. Huang, M. Lu, D. Jia, E. Ben-Jacob, H. Levine, J. Onuchic
Interrogating the Topological Robustness of Gene Regulatory Circuits by Randomization, PLOS Computational Biology, 13(3), 2017, e1005456

L. Yu, M. Lu, D. Jia, J. Ma, E. Ben-Jacob, H. Levine, B.A. Kaipparettu, J. Onuchic
Modeling the Genetic Regulation of Cancer Metabolism: Interplay Between Glycolysis and Oxidative Phosphorylation, Cancer Research, 77(7), 2017, 1564

SELECTED RESEARCH PROJECTS

New Computational Systems Biology Methods for Modeling Gene Regulatory Circuits
Principal Investigator, National Institutes of Health

Lee Makowski

Professor and Chair, Bioengineering; jointly appointed, Chemistry and Chemical Biology; affiliated faculty, Electrical and Computer Engineering

PhD, Massachusetts Institute of Technology, 1976
coe.northeastern.edu/people/makowski-lee

Scholarship focus: image and signal processing as applied to biophysical data designed to answer fundamental questions about the molecular basis of living systems, and progression of Alzheimer's Disease

SELECTED PUBLICATIONS

B. Roig-Solvas, D.H, Brooks, L. Makowski
FiXR: A Framework to Reconstruct Fiber Cross-Sections from X-Ray Fiber Diffraction Experiments, Acta Crystallographica, 2020, D76

B. Roig-Solvas, B.T. Hyman, L. Makowski
In Situ Saxs of Protein Deposits in Alzheimer's Disease, bioRxiv, 2019

L. Makowski
The Structural Basis of Amyloid Strains in Alzheimer's Disease, ACS Biomaterials Science and Engineering, 2019

H. Zhou, H. Guterres, C. Mattos, L. Makowski
Predicting X-Ray Solution Scattering from Flexible Macromolecules, Protein Science, 27, 2018, 2023-2036

B. Roig-Solvas, L. Makowski
Calculation of the Cross-Sectional Shape of a Fibril from Equatorial Scattering, Journal of Structural Biology 200(3), 2017, 248-257

SELECTED RESEARCH PROJECTS

Cultivating Biomedical Entrepreneurship and Innovation in Ghana
Principal Investigator, Northeastern University

Localization of Fibrillar Polymorphs in Human Brain Tissue
Principal Investigator, National Institutes of Health

Waleed Meleis

Associate Dean for Graduate Education; Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Michigan, 1996
coe.northeastern.edu/people/meleis-waleed

Scholarship focus: combinatorial optimization; algorithm design and analysis; scheduling; large-scale machine learning; parallel computing

Honors and awards: COE Outstanding Faculty Service Award in, COE Fostering Engineering Innovation in Education Award; Black Engineering Student Society Professor Appreciation Award; Invited to represent Northeastern at the National Academy of Engineering's Frontiers of Engineering Education Symposium; College of Engineering Outstanding Teacher Award; Martin W. Essigmann Outstanding Teaching Award, College of Engineering; Eta Kappa Nu Professor of the Year Award; Center for Innovative Course Design Teaching Award, EdTech

SELECTED PUBLICATIONS

W. Li, W. Meleis
Adaptive Adjacency Kanerva Coding for Memory-Constrained Reinforcement Learning, In International Conference on Machine Learning and Data Mining in Pattern Recognition (MLDM), Springer, New York, 2018

D. Levac, H. Dumas, W. Meleis
Development and Preliminary Usability Evaluation of a Tablet-Based Interactive Movement Tool for Pediatric Rehabilitation, JMIR Rehabilitation Assistive Technologies 25(2), 2018, e1030

W. Li, F. Zhou, K. Chowdhury, W. Meleis
QTCP: Adaptive Congestion Control with Reinforcement Learning, IEEE Transactions on Network Science and Engineering, 2018, 1-1

W. Li, F. Zhou, W. Meleis, K. Chowdhury
Dynamic Generalization Kanerva Coding in Reinforcement Learning for TCP Congestion Control Design, Proceedings of the 16th International Conference on Autonomous Agents and Multiagent Systems, Sao Paolo, Brazil, 2017

J. Radford, A. Pilny, A. Reichelmann, B. Keegan, B. Welles, J. Hoye, K. Ognyanova, W. Meleis, D. Lazer
Volunteer Science: An Online Laboratory for Experiments in Social Psychology, Social Psychology Quarterly, 79(4), 2016

Mona Minkara

Assistant Professor, Bioengineering; Affiliated Faculty, Chemistry & Chemical Biology

PhD, University of Florida, 2015
bioe.neu.edu/people/minkara-mona

Scholarship focus: computational modeling of molecular interactions that occur at biological interfaces, pulmonary surfactant, Monte Carlo and molecular dynamics simulations, molecular docking for targeted drug design

Honors and awards: Ford Foundation Fellowship from the National Academies of Sciences, Engineering, and Medicine; National Science Foundation Graduate Research Fellowship

SELECTED PUBLICATIONS

M.S. Minkara, R.H. Hembree, S.N. Jamadagni, A.F. Ghobadi, D.M. Eike, J.I. Siepmann
A New Equation of State for Homo-Polymers in Dissipative Particle Dynamics, The Journal of Chemical Physics, 150, 2019, 124104

T.R. Josephson, R. Singh, M.S. Minkara, E.O. Fetisov, J.I. Siepmann
Partial Molar Properties From Molecular Simulation Using Multiple Linear Regression, Molecular Physics, 117, 2019, 3589-3602

M.S Minkara, T. Josephson, C.L. Venteicher, J.L. Chen, D.J. Stein, C.J. Peters, J.I. Siepmann
Monte Carlo Simulations Probing the Liquid/Vapour Interface of Water/Hexane Mixtures: Adsorption Thermodynamics, Hydrophobic Effect, and Structural Analysis, Molecular Physics, 116, 2018, 3283-3291

M.S. Minkara, R.K. Lindsey, R.H. Hembree, C.L. Venteicher, S.N. Jamadagni, D.M. Eike, A.F. Ghobadi, P.H. Koenig, J.L. Siepmann
Probing Additive Loading in the Lamellar Phase of a Nonionic Surfactant: Gibbs Ensemble Monte Carlo Simulations using the SDK Force Field, Langmuir, 34(28), 2018, 8245-8254

L. Macomber, M.S. Minkara, R.P. Hausinger, K.M. Merz Jr.
Reduction of Urease Activity by Interaction with the Flap Covering the Active Site, Journal of Chemical Information and Modeling, 55(2), 2015, 354-361

SELECTED RESEARCH PROJECTS

Modeling and Computation for Discovery of Molecular Probes for SARS-CoV-2 Proteins
Co-Principal Investigator, National Science Foundation

Mark Niedre

Professor and Associate Chair for Research, Bioengineering

PhD, University of Toronto, 2004
coe.northeastern.edu/people/niedre-mark

Scholarship focus: biomedical optics and non-invasive imaging, rare cell detection and tracking in the body, ultrafast time-domain diffuse optical imaging, image reconstruction and biomedical signal processing

Honors and awards: College of Engineering Faculty Fellow; Massachusetts Life Sciences Center New Investigator Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

R. Patil, M. Srinivasarao, M. Amiji, P.S. Low, M. Niedre
Fluorescence Labeling of Circulating Tumor Cells with a Folate Receptor-Targeted Molecular Probe for Diffuse In Vivo Flow Cytometry, Molecular Imaging and Biology, 2020

W. Di, X. Tan, I.A.C. Calderon, A.E. Reilly, M. Niedre, H.A. Clark
Real-time Particle-By-Particle Detection of Erythrocyte-Camouflaged Microsensor With Extended Circulation Time in the Bloodstream, Proceedings of the National Academy of Sciences USA, 11(7), 2020, 3509-3517

X. Tan, R. Patil, P. Bartosik, J. Runnels, C.P. Lin, M. Niedre
Ultra-Rare In Vivo Flow Cytometry, Scientific Reports, 9(1), 2019, 3366

V. Pera, X. Tan, J. Runnels, N. Sardesai, C.P. Lin, M. Niedre
Diffuse Fluorescence Fiber Probe for In Vivo Detection of Circulating Cells, Journal of Biomedical Optics, 22(3), 2017, 037004

C. Hartmann, R. Patil, C.P. Lin, M. Niedre
Fluorescence Detection, Enumeration and Characterization of Single Circulating Cells In Vivo: Technology, Applications and Future Prospects, Physics in Medicine and Biology, 63 (1), 2017, 01TR01

Y. Mu, V. Pera, M. Niedre
Multiplexed Fluorescence Mediated Tomography with Temporal and Spectral Data, Journal of Biomedical Optics, 21(10), 2016, 105001

SELECTED RESEARCH PROJECTS

High Resolution Multiplexed Fluorescence Tomography
Principal Investigator, National Institutes of Health

Ultra-Rare Cell In Vivo Flow Cytometry
Principal Investigator, National Institutes of Health

Jessica Oakes

Assistant Professor, Bioengineering; affiliated faculty, Mechanical and Industrial Engineering

PhD, University of San Diego, 2013
coe.northeastern.edu/people/oakes-jessica

Scholarship focus: pulmonary physiology, biofluids and transport phenomenon, computational biomechanics, magnetic resonance imaging, multi-scale modeling

SELECTED PUBLICATIONS

J.M. Oakes, D.G. Mummy, K. Poorbahrami, W. Zha, S. Fain
Patient-Specic Computational Simulations of Hyperpolarized ^{3}He MRI Ventilation Defects in Healthy and Asthmatic Subjects, IEEE Transactions of Biomedical Engineering, 66, 2019, 1318-1327

K. Poorbahrami, J.M. Oakes
Regional Flow and Deposition Variability in Adult Female Lungs: A Numerical Simulation Pilot Study, Clinical Biomechanics, 66, 2019, 66: 40-49

J.M. Oakes, S.C. Roth, S.C. Shadden
Airflow Simulations in Infant, Child, and Adult Pulmonary Conducting Airways, Annals of Biomedical Engineering, 46, 2018, 498-512

J.M. Oakes, S.C. Shadden, C. Grandmont, I.E. Vignon-Clementel
Aerosol Transport Throughout Inspiration and Expiration in the Pulmonary Airways, International Journal of Numerical Methods in Biomedical Engineering, 33, 2017, e2847

J.M. Oakes, P. Hofemeier, I.E. Vignon-Clementel, J. Sznitman
Aerosols in Healthy and Emphysematous *In Silico* Pulmonary Acinar Rat Models, Journal of Biomechanics, 49(11), 2016, 2213-2220

SELECTED RESEARCH PROJECTS

Coupling MRI with Modeling to Assess Treatment Feasibility in Asthma
Principal Investigator, National Institutes of Health

Health Consequences Following Firefighter Exposure to Wildland Fire Smoke
Principal Investigator, Department of Homeland Security, Federal Emergency Management Agency, Assistance to Firefighters Grants Program

Pulmonary Health Consequences Following E-Cigarette Exposure
Principal Investigator, National Institutes of Health

Donald O'Malley

Associate Professor, Biology; affiliated faculty, Bioengineering

PhD, Harvard, 1989
coe.northeastern.edu/people/omalley-donald

Scholarship focus: cellular and systems neurobiology biological imaging, cognitive neurodynamics, neuroethology

SELECTED PUBLICATIONS

D.M. O'Malley, M. Orger, F. Engert
Neural Control and Modulation of Swimming Speed in the Larval Zebrafish, Neuron, 83(3), 2014, 692-707

L. Ricci, C.H. Summers, E.T. Larson, D.M. O'Malley, R.H. Melloni
Development of Aggressive Phenotypes: Interactions of Age, Experience, and Social Status, Animal Behaviour, 86(2), 2013, 245-252

R.E. Westphal, D.M. O'Malley
Fusion of Locomotor Maneuvers, and Improving Sensory Capabilities, Give Rise to the Flexible Homing Strikes of Juvenile Zebrafish, Front, Neural Circuits, 7(108), 2013, 1-18

N. Sankrithi, D.M. O'Malley
Activation of a Multisensory, Multifunctional Nucleus in the Zebrafish Midbrain During Diverse Locomotor Behaviors, Neuroscience, 166(3), 2010, 970-993

M. Kamali, L. Day, D. Brooks, X. Zhou, D.M. O'Malley
Automated Identification of Neurons in 3D Confocal Datasets from Zebrafish Brainstem, Journal of Microscopy, 233(1), 2009, 114-131

Mary Jo Ondrechen

Professor, Chemistry and Chemical Biology; affiliated faculty, Bioengineering

PhD, Northwestern University, 1978
coe.northeastern.edu/people/ondrechen-mary-jo

Scholarship focus: enzyme catalysis; functional genomics; modeling of enzyme substrate interactions; drug discovery; bioinformatics; protein design

SELECTED PUBLICATIONS

L. Ngu, J.N. Winters, K. Nguyen, K.E. Ramos, N.A. DeLateur, L. Makowski, P.C. Whitford, M.J Ondrechen, P.J. Beuning
Probing Remote Residues Important for Catalysis In Escherichia Coli Ornithine Transcarbamoylase, PLoS ONE 15(2), 2020, e0228487

R.N. Hanson, E. McCaskill, E. Hua, P. Tongcharoensirikul, R. Dilis, J.L. Silver, T.A. Coulther, M.J. Ondrechen, D. Labaree, R.B. Hochberg
Synthesis of Benzoylbenzamide Derivatives of 17α-E-Vinyl Estradiol and Evaluation as Ligands for the Estrogen Receptor-a Ligand Binding Domain, Steroids, 144, 2019, 15-20

D.J. MacPherson, C.L. Mills, M.J. Ondrechen, J.A. Hardy
Tri-Arginine Exosite Patch of Caspase-6 Recruits Substrates for Hydrolysis, Journal of Biological Chemistry, 294(1), 2019, 71-88

C.L. Mills, R. Garg, J.S. Lee, L. Tian, A. Suciu, G. Cooperman, P.J. Beuning, M.J. Ondrechen
Functional Classification of Protein Structures by Local Structure Matching in Graph Representation, Protein Science, 27, 2018, 1125-1135

SELECTED RESEARCH PROJECTS

Lighting the Pathway to Faculty Careers for Natives in STEM
Co-Principal Investigator, National Science Foundation

Mining for Mechanistic Information to Predict Protein Function
Principal Investigator, National Science Foundation

Northeastern University Skills and Capacity for Inclusion: Inclusive Excellence Catalyzed by Experiential Education
Principal Investigator, Howard Hughes Medical Institute

RAPID: Identification of Chemical Probes and Inhibitors Targeting Novel Sites on SARS-CoV-2 Proteins for COVID-19 Intervention
Principal Investigator, National Science Foundation

Tethering SOD1 Cysteine Pairs with Cyclic Disulfides: a New Method for Protein Stabilization
Co-Principal Investigator, ALS Association

Hari Parameswaran

Assistant Professor, Bioengineering

PhD, Boston University, 2009
coe.northeastern.edu/people/parameswaran-harikrishnan

Scholarship focus: mechanobiology of the smooth muscle, mechanisms of force transmission in multicellular ensembles, methods for targeting extracellular matrix for asthma therapy

SELECTED PUBLICATIONS

D.A. Vargas, T. Heck, B. Smeets, H. Ramon, H. Parameswaran, H. Van Oosterwyck
Intercellular Adhesion Stiffness Moderates Cell Decoupling as a Function of Substrate Stiffness, Biophysical Journal, 2020

S.E. Stasiak, R.R. Jamieson, J. Bouffard, E.J. Cram, H. Parameswaran
Intercellular Communication Controls Agonist-Induced Calcium Oscillations Independently of Gap Junctions in Smooth Muscle Cells, Science Advances, 6(32),2020

J.R. Mondoñedo, S. Sato, T. Oguma, S. Muro, A.H. Sonnenberg, D. Zeldich, H. Parameswaran, T. Hirai, B. Suki
CT Imaging-Based Low-Attenuation Super Clusters in Three Dimensions and the Progression of Emphysema, Chest, 155(1), 2019, 79-87

S.R. Polio, S.E. Stasiak, R.R. Jamieson, J.L. Balestrini, R. Krishnan, H. Parameswaran
Extracellular Matrix Stiffness Regulates Human Airway Smooth Muscle Contraction by Altering the Cell-Cell Coupling, Scientific Reports, 9, 2019, 9564

J. Imsirovic, E. Bartolák-Suki, S.B. Jawde, H. Parameswaran, B. Suki
Blood Pressure-Induced Physiological Strain Variability Modulates Wall Structure and Function in Aorta Rings, Physiological Measurement, 39(10), 2018, 105014

H. Parameswaran, B. Suki
Assessing Structure-Function Relations in Mice Using the Forced Oscillation Technique and Quantitative Histology, Methods in Molecular Biology, 1639, 2017, 77-91

S.M. Cloonan, K. Glass, A.R. Bhashyam, M.E. Laucho Contreras, H. Parameswaran, et al.
Mitochondrial Iron Chelation Ameliorates Cigarette Smoke-Induced Bronchitis and Emphysema in Mice, Nature Medicine, 22, 2016, 163-174

SELECTED RESEARCH PROJECTS

Extracellular Determinants of Airway Smooth Muscle Force: A New Paradigm for Sustained Airway Constriction
Principal Investigator, R00 Award, National Institutes of Health

Carey Rappaport

COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Massachusetts Institute of Technology, 1987
coe.northeastern.edu/people/rappaport-carey

Scholarship focus: antennas, electromagnetic computation, subsurface sensing and imaging, explosives detection, security system conceptualization and design. Bioelectromagnetics, microwave tissue imaging, electromagnetic breast cancer detection and treatment, cardiac ablation therapy, microwave assisted balloon angioplasty, catheter-based sensing

Honors and awards: Fellow and Distinguished Lecturer, Institute of Electrical and Electronics Engineers; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

M. Tajdini, B. Gonzalez-Valdes, J.A. Martinez-Lorenzo, A. Morgenthaler, C. Rappaport
Real-Time Modeling of Forward-Looking Synthetic Aperture Ground Penetrating Radar Scattering From Rough Terrain, IEEE Transactions on Geoscience and Remote Sensing, 57(5), 2019, 2754-2765

Y. Fuse, B. Gonzalez-Valdes, J.A. Martinez-Lorenzo, C. Rappaport
Model-Based Clutter Reduction Method for Forward Looking Ground Penetrating Radar Imaging Ground Penetrating Radar, 1(2), 2018, 96-112

C. Rappaport, B. Gonzalez-Valdes
Multistatic Nearfield Imaging Radar for Portal Security Systems Using a High Gain Toroidal Reflector Antenna, European Conference on Antennas and Propagation (EuCAP), Lisbon, Portugal, 2015, *best paper award

SELECTED RESEARCH PROJECTS

Awareness and Localization of Explosive-Related Threats (ALERT)
Co-Principal Investigator, Department of Homeland Security

Improved Millimeter Wave Radar AIT Characterization of Concealed Low-Contrast Body-Bourne Threats
Principal Investigator, Department of Homeland Security

Sara Rouhanifard

Assistant Professor, Bioengineering

PhD, Albert Einstein College of Medicine, 2014
coe.northeastern.edu/people/rouhanifard-sara

Scholarship focus: developing chemical approaches to track, quantify and model the behaviors of RNA processing events and modifications in single cells. Understanding DNA: protein interactions that drive differences in RNA expression

Honors and awards: Ruth S. Kirschstein F32 National Research Service Award

SELECTED PUBLICATIONS

S.H. Rouhanifard, I.A. Mellis, M. Dunagin, S. Bayatpour, C.L. Jiang, I. Dardani, O. Symmons, B. Emert, E. Torre, A. Cote, A. Sullivan, J.A. Stamatoyannopoulos, A. Raj
ClampFISH Detects Individual Nucleic Acid Molecules Using Click Chemistry–Based Amplification, Nature Biotechnology, 37(1), 2019, 84-89

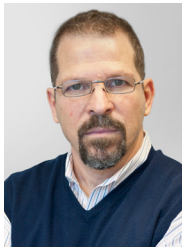
S.H. Rouhanifard, A.L. Aguilar, L. Meng, K.W. Moremen, P. Wu
Engineered Glycocalyx Regulates Stem Cell Proliferation in Murine Crypt Organoids, Cell Chemical Biology, 25(4), 2018, 439-446

C.N. Casson, J.L. Doerner, A.M. Copenhaver, J. Ramirez, A.M. Holmgren, M.A. Boyer, I.J. Siddarthan, S.H. Rouhanifard, A. Raj, S. Shin
Neutrophils and Ly6Chi Monocytes Collaborate in Generating an Optimal Cytokine Response that Protects Against Pulmonary Legionella Pneumophila Infection, PLOS Pathogens, 13(4), 2017

I.A. Mellis, R. Gupte, A. Raj, S.H. Rouhanifard
Visualizing Adenosine to Inosine RNA Editing in Single Mammalian Cells, Nature Methods, 8, 2017, 801-804

S.H. Rouhanifard, A. Lopez-Aguilar, P. Wu
CHoMP: A Chemoenzymatic Histology Method Using 'Clickable' Probes, ChemBioChem, 15(18), 2014, 2667-2673

Jeffrey Ruberti



Professor, Bioengineering

PhD, Tulane University, 1998
coe.northeastern.edu/people/ruberti-jeffrey

Scholarship focus: tissue engineering of load-bearing matrix (bone, cornea); bioreactor design; multi-scale mechanobiochemistry; statistical mechanics; energetics microscopy; high-resolution imaging; biopolymer self-assembly

Honors and awards: Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

H. Hosseini, A. Rangchian, M.L. Prins, C.L. Giza, J.W. Ruberti, H.P. Kavehpour
Probing Flow-Induced Biomolecular Interactions with Micro-Extensional Rheology: Tau Protein Aggregation, J. Biomech Eng., 142(3), 2020

M. Chaudhary, E.N. Ismail, P. Yao, F. Tayyari, R.A. Radu, S. Nusinowitz, M.E. Boulton, R.S. Apte, J.W. Ruberti, J.T. Handa, P. Tontonoz, G. Malek
LXRs Regulate Features of Age-Related Macular Degeneration and May be a Potential Therapeutic Target, JCI Insight, 5(1), 2020

J.A. Paten, C.L. Martin, J.T. Wanis, S.M. Siadat, A.M. Figueroa-Navado, J.W. Ruberti, L.F. Deravi
Molecular Interactions Between Collagen and Fibronectin: A Reciprocal Relationship that Regulates De Novo Fibrillogenesis, Chem, 5, 2019, 2126-2145

B. Wingender, P. Bradley, N. Saxena, J.W. Ruberti, L. Gower
Biomimetic Organization of Collagen Matrices to Template Bone-Like Microstructures, Matrix Biology, 52-54, 2016, 384-396

M. Susilo, J. Paten, E. Sander, T.D. Nguyen, J.W. Ruberti
Collagen Network Strengthening Following Cyclic Tensile Loading, Interface Focus, 6(1), 2016

J.A. Paten, S. Siadat, M.E. Susilo, I.N. Ebraheim, J.L. Stoner, J.P. Rothstein, J.W. Ruberti
Flow-Induced Crystallization of Collagen: A Potentially Critical Mechanism in Early Tissue Formation, ACS Nano, 10(5), 2016, 5027-5040

SELECTED RESEARCH PROJECTS

Biomimetic Bone: From Nano to Micro
Principal Investigator, National Science Foundation

Mechanobiology of Matrix Production
Principal Investigator, National Institutes of Health

Bahram Shafai

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, George Washington University, 1985
coe.northeastern.edu/people/shafai-bahram

Scholarship focus: control systems and signal processing; robust and optimal control, positive dynamic systems, fault detection, observer theory, robotics and distributed control of multi-agent systems, control of biological systems

Honors and awards: Associate Editor, Systems Man and Cybernetics; Member of Program Committee IEEE CCTA 2020, Senior Life Member, Institute of Electrical and Electronics Engineers, Lifetime Achievement Award from World Automation Congress, Certificate of Appreciation for Technical Seminar Institute of Electrical and Electronics Engineers, Young Professionals

SELECTED PUBLICATIONS

B. Shafai, S. Nazari, A. Moradmand
A Direct Algebraic Approach to Design State Feedback and Observers for Singular Systems, Proceedings of 2019 IEEE Conference on Control Technology and Applications (CCTA), Hong Kong, China, 2019, 835-842

S. Nazari, B. Shafai
Distributed Unknown Input Observers for Fault Detection and Isolation, Proceedings of 2019 IEEE 15th International Conference on Control and Automation (ICCA), Edinburgh, United Kingdom, 2019, 319-324

B. Shafai, A. Moradmand, S. Nazari
Observer-based Controller Design for Systems with Derivative Inputs, Proceedings of 2019 57th Annual Allerton Conference on Communication, Control, and Computing, IL, 2019, 1038-1044

S. Nazari, B. Shafai, A. Moradmand
Robust Intrusion Detection in Dynamic Networks, Proceedings of 2019 IEEE Conference on Control Technology and Applications (CCTA), Hong Kong, China, 2019, 988-993

S. Nazari, B. Shafai
Robust Fault Detection & Isolation in Distributed Dynamic Systems, Proceedings of 2019 6th International Conference on Control, Decision and Information Technologies (CoDIT), Paris, France, 2019, 1941-1946

B. Shafai, M. Naghnaeian, J. Chen
Stability Radius Formulation of Lσ-Gain in Positive Stabilization of Regular and Time-Delay Systems, IET Journal of Control Theory and Applications, 2019, 2327-2335

Sandra Shefelbine

Professor, Mechanical and Industrial Engineering; joint faculty, Bioengineering

PhD, Stanford University, 2002
coe.northeastern.edu/people/shefelbine-sandra

Scholarship focus: multi-scale bone biomechanics–how the structure and composition of bone influences its mechanical properties; mechano-adaptation of bone and joint– how tissue responds to mechanical signals

SELECTED PUBLICATIONS

B.K. Connizzo, J.M. Piet, S.J. Shefelbine, A.J. Grodzinsky
Age-Associated Changes in the Response of Tendon Explants to Stress Deprivation is Sex-Dependent, Connective Tissue Research, 61(1), 2020, 48-6

R.P. Main, S.J. Shefelbine, L.B. Meakin, M.J. Silva, M.C.H van der Meulen, B.M. Willie
Murine Axial Compression Tibial Loading Model to Study Bone Mechanobiology: Implementing the Model and Reporting Results, Journal of Orthopaedic Research, 38, 2020, 233–252

B. Depalle, C.M. McGilvery, S. Nobakhti, N. Aldegaither, S.J. Shefelbine, A.E. Porter
Osteopontin Regulates Type I Collagen Fibril Formation In Bone Tissue, Acta Biomaterialia, 2020

S.M. Sadeghian, C.L. Lewis, S.J. Shefelbine
Predicting Growth Plate Orientation with Altered Hip Loading: Potential Cause of Cam Morphology, Biomech Model Mechanobiol, 19(2), 2020, 701-712

V. Kondiboyina, L.B. Raine, A.F. Kramer, N.A. Khan, C.H. Hillman, S.J. Shefelbine
Skeletal Effects of Nine Months of Physical Activity in Obese and Healthy-Weight Children, Medicine and Science in Sports and Exercise, 52(2), 2020, 434-440

A.E. Draghici, J.A. Taylor, M.L. Bouxsein, S.J. Shefelbine
Effects of FES-Rowing Exercise on the Time-Dependent Changes in Bone Microarchitecture After Spinal Cord Injury: A Cross-Sectional Inves-tigation, JBMR Plus, 3(9), 2019, e10200

J. Piet, D. Hu, Q. Meslier, R. Baron, S.J. Shefelbine
Increased Cellular Presence After Sciatic Neurectomy Improves the Bone Mechano-adaptive Response in Aged Mice, Calcified Tissue International, 105(3), 2019, 316–330

SELECTED RESEARCH PROJECTS

Manipulating Fluid Flow in Mechanoadaptation of Bone
Principal Investigator, National Science Foundation

Mechanobiology of Joint Morphogenesis: Manipulating Salamander Limbs
Principal Investigator, National Science Foundation

Nikolai Slavov

Assistant Professor, Bioengineering; affiliated faculty, Biology

PhD, Princeton University, 2010
coe.northeastern.edu/people/slavov-nikolai

Scholarship focus: single-cell proteomics, Ribosome-mediated translational regulation, quantitative systems biology

Honors and awards: Allen Distinguished Investigator Award; NIH Director's New Innovator Award, National Institutes of Health; Broad Institute SPARC; IRCSET Postgraduate Research Fellowship; Eureka Fellowship for Academic Excellence

SELECTED PUBLICATIONS

N. Slavov
Unpicking the Proteome in Single Cells, Science, 367(6477), 2020, 512-513

E. Emmott, M. Jovanovic, N. Slavov
Ribosome Stoichiometry: From Form to Function, Trends in Biochemical Sciences, 44(2), 2019, 95-109

R. Gary Huffman, A. Chen, H. Specht, N. Slavov
DO-MS: Data-Driven Optimization of Mass Spectrometry Methods, Journal of Proteome Research, 18(6), 2019, 2493-2500

B. Budnik, E. Levy, G. Harmange, N. Slavov
SCoPE-MS: Mass Spectrometry of Single Mammalian Cells Quantifies Proteome Heterogeneity During Cell Differentiation, Genome Biology, 19, 2018, 161

H. Specht, N. Slavov
Transformative Opportunities for Single Cell Proteomics, Journal of Proteome Research, 17(8), 2018, 2565-2571

E. Levy, N. Slavov
Single Cell Protein Analysis for Systems Biology, Essays in Biochemistry, 2018, EBC20180014

A. Franks, E. Airoldi, N. Slavov
Post-transcriptional Regulation Across Human Tissues, PLoS Computational Biology, 13(5), 2017, e100553

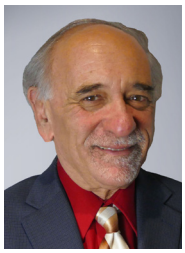
N. Slavov, S. Semrau, E. Airoldi, B. Budnik, A. Van Oudenaarden
Differential Stoichiometry Among Core Ribosomal Proteins, Cell Reports, 13(5), 2015, 865-873

SELECTED RESEARCH PROJECTS

Ribosome-Mediated Translational Regulation During Stem Cell Differentiation
Principal Investigator, National Institutes of Health

Tracking Proteome Dynamics In Single Cells
Principal Investigator, Allen Distinguished Investigator Award

Eduardo Sontag



University Distinguished Professor, Electrical and Computer Engineering; jointly appointed, Bioengineering

PhD, University of Florida, 1977
coe.northeastern.edu/people/sontag-eduardo

Scholarship focus: feedback control theory, systems biology, cancer, and biomedicine

Honors and awards: IEEE Control Systems Field Award; IFAC Fellow; AMS Fellow; SIAM Fellow; IEEE Fellow; Reid Prize in Applied Mathematics, SIAM; Bode Prize, IEEE

SELECTED PUBLICATIONS

A.P. Tran, M. Ali Al-Radhawi, I. Kareva, J. Wu, D.J. Waxman, E.D. Sontag
Delicate Balances in Cancer Chemotherapy: Modeling Immune Recruitment and Emergence of Systemic Drug Resistance, Frontiers in Immunology, 12(12), 2020,874891

J. Greene, C. Sanchez-Tapia, E.D. Sontag
Mathematical Details on a Cancer Resistance Model, Frontiers in Bioengineering and Biotechnology, 2020

J.M. Greene, J.L. Gevertz, E.D. Sontag
A Mathematical Approach to Distinguish Spontaneous from Induced Evolution of Drug Resistance during Cancer Treatment, JCO Clinical Cancer Informatics, 3, 2019, 1-20

D.K. Agrawal, R. Marshall, V. Noireaux, E.D. Sontag
In Vitro Implementation of Robust Gene Regulation in a Synthetic Biomolecular Integral Controller, Nature Communications, 10, 2019, 1-12

E.V. Nikolaev, A. Zloza, E.D. Sontag
Immunobiochemical Reconstruction of Influenza Lung Infection -Melanoma Skin Cancer Interactions, Frontiers in Immunology, 10, 2019, 4

M.A. Al-Radhawi, D. Del Vecchio, E.D. Sontag
Multi-Modality in Gene Regulatory Networks with Slow Gene Binding, PLoS Computational Biology, 15, 2019, e1006784

SELECTED RESEARCH PROJECTS

Design Principles of Molecular Computing Using Engineered Enzymes
Co-Principal Investigator, National Science Foundation

SemiSynBio: Very Large-Scale Genetic Circuit Design Automation
Principal Investigator, Seminconductor Research Corporation

Theory-Based Engineering of Biomolecular Circuits in Living Cells
Co-Principal Investigator, Air Force Office of Scientific Research

Bryan Spring

Assistant Professor, Physics; Affiliated Faculty, Bioengineering

PhD, University of Illinois 2008
coe.northeastern.edu/people/spring-bryan

Scholarship focus: targeted photomedicine, biophysical microscopy and cancer biology

Honors and awards: Smith Family Awards Program for Excellence in Biomedical Research; The National Cancer Institute Transition Career Development Award

SELECTED PUBLICATIONS

E.M. Kercher, S. Nath, I. Rizvi, B.Q. Spring
Cancer Cell-Targeted and Activatable Photoimmunotherapy Spares T Cells in a 3D Co-Culture Model, Photochemistry and Photobiology, 96(2), 2020, 295–300

N. Davoudzadeh, G. Ducourthial, B.Q. Spring
Custom Fabrication and Mode-Locked Operation of a Femtosecond Fiber Laser for Multiphoton Microscopy, Scientific Reports, 9, 2019, 4233

B.Q. Spring, R.B. Sears, L.Z. Zheng, Z.Mai, R. Watanabe, M.E. Sherwood, D.A. Schoenfeld, B.W. Pogue, S.P. Pereira, E. Villa, T. Hasan
A Photoactivable Multi-Inhibitor Nanoliposome for Tumour Control and Simultaneous Inhibition of Treatment Escape Pathways, Nature Nanotechnology, 11(4), 2016, 378

B.Q. Spring, A.O. Abu-Yousif, A. Palanisami, I. Rizvi, X. Zheng, Z. Mai, S. Anbil, R.B. Sears, L.B. Mensah, R. Goldschmidt, S.S. Erdem, E. Oliva E, T. Hasan
Selective Treatment and Monitoring of Disseminated Cancer Micrometastases in Vivo using Dual-Function, Activatable Immunoconjugates, Proceedings of the National Academy of Sciences of the United States of America, 111(10), 2014, E933–E942

SELECTED RESEARCH PROJECTS

Multiplexed and Dynamically Targeted Photoimmunotherapy of Heterogeneous, Chemo-resistant Micrometastases Guided by Online In Vivo Optical Imaging of Cell-Surface Biomarkers
Principal Investigator, National Cancer Institute

Peering into Cancer Stem Cell Niches to Guide Suppression of Multiple Signaling Loop Pathways
Principal Investigator, Richard and Susan Smith Family Foundation

Srinivas Sridhar

University Distinguished Professor, Physics; affiliated faculty, Bioengineering, Chemical Engineering

PhD, California Institute of Technology, 1984
coe.northeastern.edu/people/sridhar-srinivas

Scholarship focus: nanomedicine; neurotechnology; drug delivery, MRI imaging

Honors and awards: University Distinguished Professorship; Biomedical Engineering Diversity Award 2016

SELECTED PUBLICATIONS

D. Zhang, P. Baldwin, A.S. Leal, S. Carapellucci, S. Sridhar, K.T. Liby
A Nano-Liposome Formulation of the Parp Inhibitor Talazoparib Enhances Treatment Efficacy and Modulates Immune Cell Populations in Mammary Tumors of BRCA-Deficient Mice, Theranostics, 9(21), 2019, 6224-6238

J. Qiao, X. Cai, Q. Xiao, Z. Chen, P. Kulkarni, C. Ferris, S. Kamarthi, S. Sridhar
Data on MRI brain Lesion Segmentation using K-means and Gaussian Mixture Model-Expectation Maximization, Data Brief, 27, 2019, 104628

P. Baldwin, A.W. Ohman, J.E. Medina, E.T. McCarthy, D.M. Dinulescu, S. Sridhar
Nanoformulation of Talazoparib Delays Tumor Progression and Ascites Formation in a Late Stage Cancer Model, Frontiers in Oncology, 9(353), 2019

SELECTED RESEARCH PROJECTS

CaNCURE: Cancer Nanomedicine Co-ops for Undergraduate Research Experiences
Principal Investigator, National Institutes of Health

Nanoformulations and Sustained Delivery of PARP Inhibitors for Breast Cancer
Principal Investigator, Department of Defense

Nanomedicine Academy of Minority Serving Institutions
Principal Investigator, National Science Foundation Development

Nanoscale Magnetism of Novel Structures
Principal Investigator, Air Force Research Laboratory

Neuro-Optical Diagnostic System for Macular Degeneration
Principal Investigator, National Institutes of Health

Quantitative Non-Invasive Brain Imaging using Magnetic Nanoparticles
Principal Investigator, National Institutes of Health

Armen Stepanyants

Professor, Physics; affiliated faculty, Bioengineering

PhD, University of Rhode Island, 1999
coe.northeastern.edu/people/stepanyants-armen

Scholarship focus: theoretical neuroscience, bioimaging & signal processing, integrated modeling, inference, and computing

Honors and awards: NIH/NINDS K25 Mentored Quantitative Career Development Award, Shared first prize at Digital Reconstruction of Axonal and Dendritic Morphology (DIADEM) challenge

SELECTED PUBLICATIONS

S.M.M. Kahaki, S.L. Wang, A. Stepanyants
Accurate Registration of In Vivo Time-Lapse Images, SPIE Medical Imaging, 10949, 2019, 109491D

S.L. Wang, S.M.M. Kahaki, A. Stepanyants
Artificial Neural Network Filters for Enhancing 3D Optical Microscopy Images of Neurites, SPIE Medical Imaging, 10949, 2019, 109490G

D. Zhang, C. Zhang, A. Stepanyants
Robust Associative Learning is Sufficient to Explain the Structural and Dynamical Properties of Local Cortical Circuits, Journal of Neuroscience, 2019, 3218

R. Gala, D. Lebrecht, D.A. Sahlender, A. Jorstad, G. Knott, A. Holtmaat, A. Stepanyants
Computer Assisted Detection of Axonal Bouton Structural Plasticity in In Vivo Time-Lapse Images, eLife, 6, 2017, e29315

B.E.P Mizusaki, A. Stepanyants, D.B. Chklovskii, P.J. Sjöström
Neocortex: A Lean Mean Memory Storage Machine, Nature Neuroscience, 19(5), 2016, 643-644

J. Chapeton, R. Gala, A. Stepanyants
Effects of Homeostatic Constraints on Associative Memory Storage and Synaptic Connectivity of Cortical Circuits, Frontiers in Computational Neuroscience, 9(74), 2015

SELECTED RESEARCH PROJECTS

Principles of Robust Learning Derived from the Structure and Function of the Cortical Column
Principal Investigator, Air Force

Software for Automated Reconstruction of Structure and Dynamics of Neural Circuits
Principal Investigator, National Institutes of Health

RI Small: Theory of Robust Learning in the Brain
Principal Investigator, National Science Foundation

Dagmar Sternad

University Distinguished Professor, Biology; jointly appointed: Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Connecticut, 1995
coe.northeastern.edu/people/sternad-dagmar

Scholarship focus: motor control and learning, variability and stability, human-robot interaction, dynamic modeling

Honors and awards: Faculty of the Year, Award from Residential Life, Klein Lectureship Award; Distinguished Lecturer on Life and the Sciences of Complexity, University of Connecticut

SELECTED PUBLICATIONS

S. Bazzi, D. Sternad
Human Control of Complex Objects: Towards More Dexterous Robots, Advanced Robotics, 2020, 1-19

M.E. Huber, E. Chiovetto, M.A. Giese, D. Sternad
Rigid Foot Soles Improve Balance in Beam Walking but Improvements do not Persist with Bare Feet, Scientific Reports, 10(1), 2020, 7629

J. Hermus, J.A. Doeringer, D. Sternad, N. Hogan
Separating Neural Influences from Peripheral Mechanics: The Speed-Curvature Relation in Mechanically-Constrained Actions, Journal of Neurophysiology, 123, 2020, 1870–1885

D. Levac, M.E. Huber, D. Sternad
Learning and Transfer of Complex Motor Skills in Virtual Reality: A Perspective Review, Journal of NeuroEngineering and Rehabilitation, 16(1), 2019, 121

W.J. Sohn, R. Sipahi, T.D. Sanger, D. Sternad
Portable Motion-Analysis Device for Upper Limb Research, Assessment and Rehabilitation in Non-Laboratory Settings, IEEE Journal of Translational Engineering in Health and Medicine, 7, 2019, 1-14

SELECTED RESEARCH PROJECTS

Collaborative Research: Learning to Control Dynamically Complex Objects
Co-Investigator, National Science Foundation

Collaborative Research: Neural Basis of Motor Expertise
Principal Investigator, National Institutes of Health

Collaborative Research: Towards Robots with Human Dexterity
Principal Investigator, National Science Foundation

Predictability in Complex Object Control
Principal Investigator, National Institutes of Health

US-German-Israeli Collaborative Research: Hierarchical Coordination of Complex Actions
Principal Investigator, National Science Foundation

Milica Stojanovic

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Northeastern University, 1993
coe.northeastern.edu/people/stojanovic-milica

Scholarship focus: wireless communications and networks, underwater acoustic transmission, statistical system characterization, adaptive signal processing

Honors and awards: Distinguished Technical Achievement Award and Distinguished Lecturer, IEEE Ocean Engineering Society; Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

R. Ahmed, M. Stojanovic
Grouped Packet Coding: A Method for Reliable Communication Over Fading Channels With Long Delays, IEEE Journal of Oceanic Engineering, 99, 2018, 1-11

A. Tadayon, M. Stojanovic
Low-Complexity Super-Resolution Frequency Offset Estimation for High Data Rate Acoustic OFDM Systems, IEEE Journal of Oceanic Engineering, 2018, 1-11

R. Ahmed, M. Stojanovic
Joint Power and Rate Control for Packet Coding Over Fading Channels, IEEE Journal of Oceanic Engineering, 42(3), 2016, 697-710

Y. Aval, S.K. Wilson, M. Stojanovic
Capacity of Acoustic Channels and Practical Power-Allocation Strategies, IEEE Journal of Oceanic Engineering, Special Issue on Underwater Communications, 40(4), 2015, 785-795

Y. Aval, M. Stojanovic
Differentially Coherent Multichannel Detection of Acoustic OFDM Signals, IEEE Journal of Oceanic Engineering, 40(2), 2015, 251-268

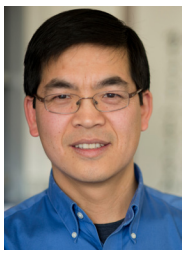
P. Qarabaqi, M. Stojanovic
Statistical Characterization and Computationally Efficient Modeling of a Class of Underwater Acoustic Channels, IEEE Journal of Oceanic Engineering, Special Issue on Underwater Communications, 38(4), 2013, 701-717

SELECTED RESEARCH PROJECTS

Active Communication, Sensing and Control in Actuated Underwater Sensing Networks
Principal Investigator, Office of Naval Research

Development of a Software-Defined Networking Testbed for the Internet of Underwater Things
Principal Investigator, National Science Foundation

Nian Sun



Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Stanford University, 2002
coe.northeastern.edu/people/sun-nian-xiang

Scholarship focus: micro/nanofabricated sensors, including antennas, electrochemical gas sensors, magnetic field sensors, strain and pressure sensors, etc.; magnetic, ferroelectric and magnetoelectric materials; RF/microwave magnetic and magnetoelectric devices design, fabrication and testing; materials properties at RF/microwave frequency

Honors and awards: Fellow, Institute of Physics; Fellow, Institute of Engineering and Technology; Office of Naval Research Young Investigator Award; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

Z. Wang, C. Dong, X. Wang, M. Li, T. Nan, X. Liang, H. Chen, Y. Wei, H. Zhou, N.X. Sun
Highly Sensitive Integrated Flexible Tactile Sensors with Piezoresistive Ge 2 Sb 2 Te 5 Thin Films, npj Flexible Electronics, (1), 2018, 17

T. Nan, H. Lin, Y. Gao, A. Matyushov, G. Yu, H. Chen, N. Sun, S. Wei, Z. Wang, N.X. Sun
Acoustically Actuated Ultra-Compact NEMS Magnetoelectric Antennas, Nature Communications, 8(1), 2017, 296

S. Emori, B.A. Gray, H.M. Jeon, J. Peoples, M. Schmitt, K. Mahalingam, M. Hill, N.X. Sun
Coexistence of Low Damping and Strong Magnetoelastic Coupling in Epitaxial Spinel Ferrite Thin Films, Advanced Materials 29(34), 2017, 1701130

Z. Zhou, M. Trassin, Y. Gao, Y. Gao, D. Chen, N.X. Sun
Probing Electric Field Control of Magnetism Using Ferromagnetic Resonance, Nature Communications, 6, 2015, 6082

SELECTED RESEARCH PROJECTS

Novel Implantable Smart Magnetoelectric NanoRFIDs for Large-Scale Neural Magnetic Recording and Modulation
Principal Investigator, National Institutes of Health

NSF Nanosystems Engineering Research Center (ERC) for Translational Applications of Nanoscale Multiferroic Systems (TANMS)
Co-Principal Investigator, National Science Foundation Engineering Research Centers

Eugene Tunik

Associate Professor, Physical Therapy, Movement and Rehabilitation Science; affiliated faculty, Bioengineering, Electrical and Computer Engineering

PhD, Rutgers University, 2003
coe.northeastern.edu/people/tunik-eugene

Scholarship focus: human motor control/learning, neurorehabilitation neuroscience, brain stimulation, brain imaging, virtual reality

SELECTED PUBLICATIONS

G. Chen, M. Yarossi, S. Gordon, S. Gomes, A. Rubakhina, S. Adamovich, E. Tunik
Concurrent tDCS and Mirror Feedback has Additive Effects on M1 Excitability, Brain Stimulation, 10(4), 2018, e39-e40

M. Yarossi, M. Dannhauer, D. Erdogmus, D. Brooks, E. Tunik
Multi-Muscle TMS Mapping Using Subject-Specific FEA Models of Induced Currents, Brain Stimulation, 10(4), 2017, e28

L.F. Schettino, S.V. Adamovich, E. Tunik
Coordination of the Pincer Grasp and Transport Following a Haptic Perturbation of the Index Finger, Journal of Neurophysiology, 117(6), 2017, 2292-2297

M. Yarossi, S.V. Adamovich, E. Tunik
Facilitation of Ipsilateral Corticospinal Excitability During Mirror Visual Feedback Requires Target Directed Actions, Frontiers Human Neuroscience, 11, 2017, 242

L.F. Schettino, S.V. Adamovich, H. Bagce, M. Yarossi, E. Tunik
Disruption of Activity in the Ventral Premotor but not the Anterior Intraparietal Area Interferes with On-Line Correction to a Haptic Perturbation During Grasping, The Journal of Neuroscience, 35(5), 2014, 2112-2117

M. Yarossi, S. Adamovich, E. Tunik
Sensorimotor Cortex Reorganization in Subacute and Chronic Stroke: A Neuronavigated TMS Study, Proceedings of the IEEE Engineering in Medicine and Biology Society Annual Conference, 2014, 5788-5791

SELECTED RESEARCH PROJECTS

Optimizing Hand Rehabilitation Post-Stroke Using Interactive Virtual Environments
Principal Investigator, National Institutes of Health

Planning and Updating in Frontoparietal Networks for Grasping
Principal Investigator, National Institutes of Health

Meni Wanunu

Associate Professor, Physics; affiliated faculty, Bioengineering

PhD, Weizmann Institute, 2005
coe.northeastern.edu/people/wanunu-meni

Scholarship focus: development of next-generation DNA and RNA sequencing methods; nanopores as molecular sensors; bioinspired sustainability solutions; optical and electrical analysis of biomolecular systems; electron microscopy and electron-beam shaping of nanomaterials

SELECTED PUBLICATIONS

P. Tripathi, L. Shuai, H. Joshi, H. Yamazaki, W.H. Fowle, A. Aksimentiev, H. Fenniri H, M. Wanunu
Rosette Nanotube Porins as Ion Selective Transporters and Single-Molecule Sensors, Journal of the American Chemical Society, 142, 2020, 1680-1685

X. Kang, M.A. Alibakhshi, M. Wanunu
One-Pot Species Release and Nanopore Detection in a Voltage-Stable Lipid Bilayer Platform, Nano Letters 19, 2019, 9145-9153

M. Mojtabavi, A. VahidMohammadi, W. Liang, M. Beidaghi M. Wanunu
Single-Molecule Sensing Using Nanopores in Two-Dimensional Transition Metal Carbide (MXene) Membranes, ACS Nano, 13, 2019, 3042-3053

SELECTED RESEARCH PROJECTS

Direct Picogram DNA and RNA Sequencing Using Nanopore Zero-Mode
Principal Investigator, National Institutes of Health

Engineering Tunable Portal Hybrid Nanopores for High-Resolution Sequence Mapping
Principal Investigator, National Science Foundation

Nanopores in 2D Materials
Principal Investigator, Oxford Nanopore Technology

Recognition Tunneling for Single Molecule RNA Sequencing
Co-Principal Investigator, National Institutes of Health

Two-Dimensional Nanopores with Electro-Optical Control for Next Generation Biotechnological Applications
Co-Principal Investigator, National Science Foundation

Understanding Transport in Biomimetic Carbon Nanotube Porin Membranes for Water Treatment and Osmotic Energy Harvesting
Co-Principal Investigator, National Science Foundation

Paul Whitford

Associate Professor, Physics; affiliated faculty, Bioengineering

PhD, University of California, 2009
coe.northeastern.edu/people/whitford-paul

Scholarship focus: dynamics of large-scale molecular machines, working to identify the physical principles that guide biomolecular dynamics, using molecular simulation approaches to interpret experimental data from a wide range of techniques, including biochemical, small-angle X-ray scattering and cryogenic electron microscopy

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

P. Waduge, R. Hu, P. Bandarkar, H. Yamazaki, B. Cressiot, Q. Zhao, P.C. Whitford, M. Wanunu
Nanopore-Based Measurements of Protein Size, Fluctuations, and Conformational Changes, ACS Nano, 11, 2017, 5706-5716

M. Levi, K. Nguyen, L. Dukaye, P.C. Whitford
Quantifying the Relationship Between Single-Molecule Probes and Subunit Rotation in the Ribosome, Biophysical Journal, 113, 2017, 2777-2786

K. Nguyen, P.C. Whitford
Steric Interactions Lead to Collective Head Tilting During mRNA-tRNA Translocation on the Ribosome, Nature Communications, 7, 2016, 10586

J.K. Noel, P.C. Whitford
How EF-Tu Can Contribute to Efficient Proofreading of aa-tRNA by the Ribosome, Nature Communications, 7, 2016, 13314

P.C. Whitford
Disorder Guides Protein Function, Proceedings of the National Academy of Sciences USA, 110, 2013, 7114-7115

SELECTED RESEARCH PROJECTS

Disorder, tRNA Composition and Energy Transduction in the Ribosome
Principal Investigator, National Science Foundation

Quantifying the Effects of Ions and Collective Rearrangements During Ribosome Function
Principal Investigator, National Science Foundation

Rebecca Kuntz Willits

Professor and Chair, Chemical Engineering; affiliated faculty, Bioengineering

PhD, Cornell University, 1999
coe.northeastern.edu/people/willits-rebecca

Scholarship focus: neural regenerative strategies, neural mechanosensing, diversity and inclusion in engineering

Honors and awards: Council for Advancement and Support of Education (CASE) Missouri Professor of the Year; AIMBE Fellow

SELECTED PUBLICATIONS

C.M.M. Motta, K.J. Endres, C. Wesdemiotis, R.K. Willits, M.L. Becker
Enhancing Schwann Cell Migration Using Concentration Gradients of Laminin Derived-Peptides, Biomaterials, 218, 2019, 119335

E.A. Silantyeva, R.K. Willits, M.L. Becker
Postfabrication Tethering of Molecular Gradients on Aligned Nanofibers of Functional Poly(Îµ-caprolactone)s, Biomacromolecules, 20(12), 2019, 4494-4501

D.L. Philip, E.A. Silantyeva, M.L. Becker, R.K. Willits
RGD-Functionalized Nanofibers Increase Early GFAP Expression during Neural Differentiation of Mouse Embryonic Stem Cells, Biomacromolecules, 20(3), 2019, 1443-1454

M. Cavanaugh, E. Silantyeva, G. Pylypiv Koh, E. Malekzadeh, W. Lanzinger, R. Willits, M. Becker
Rgd-Modified Nanofibers Enhance Functional Outcomes in Rats after Sciatic Nerve Injury, Biomimetic Materials for Regenerative Medicine; Journal of Functional Materials, 10(2), 2019, 24

SELECTED RESEARCH PROJECTS

Toward a Mechanotransduction Mimic of the Neural Stem Cell Niche
Principal Investigator, National Science Foundation

Collaborative Research: Professional Preparation of Underrepresented Minority PhD's and Post-Docs for a Career in Engineering Academia
Co-Principal Investigator, National Science Foundation

Mohammad Abbas Yaseen

Assistant Professor, Bioengineering

PhD, Rice University, 2008
coe.northeastern.edu/people/syaseen-mohammad-abbas

Scholarship focus: advanced microscopy for minimally invasive, in vivo characterization of brain function

SELECTED PUBLICATIONS

B. Li, R. Ohtomo, M. Thunemann, S.R. Adams, J. Yang, B. Fu, M.A. Yaseen, C. Ran, J.R. Polimeni, D.A. Boas, A. Devor, E.H. Lo, K. Arai, S. Sakadžić
Two-photon Microscopic Imaging of Capillary Red Blood Cell Flux in Mouse Brain Reveals Vulnerability of Cerebral White Matter to Hypoperfusion, Journal of Cerebral Blood Flow and Metabolism, 40(3), 2020, 501-512

B. Li, T.V. Esipova, I. Sencan, K. Kilic, B.Y. Fu, M. Desjardins, M. Moeini, S. Kura, M.A. Yaseen, F. Lesage, L. Ostergaard, A. Devor, D.A. Boas, S.A. Vinogradov, S. Sakadžić
More Homogeneous Capillary Flow and Oxygenation in Deeper Cortical Layers Correlate with Increased Oxygen Extraction, ELife, 8, 2019, e42299

C.A. Gomez, S. Sakadzic, J. Sutin, W. Wu, B. Fu, D.A. Boas, M.A. Yaseen
Phasor Analysis of NADH HIM Identifies Pharmacological Disruptions to Mitochondrial Metabolic Processes in the Rodent Cerebral Cortex, PLoS One, 13(3), 2018, e0194578

SELECTED RESEARCH PROJECTS

Relating Neuroimmune and Neurovascular Alterations during Alzheimer's Disease Progression
Principal Investigator, National Institute of Health

Selected PhD Theses

Paige Baldwin

PhD 2019, Bioengineering; Advisor, Srinivas Sridhar

Development of Molecular Inhibitor Nanoformulations for Cancer Therapy

Molecular inhibitors rely on tumor biology for precision cancer therapy and provide novel therapeutic options for patients. These drugs tend to be advantageous in combination with other therapeutics. However, combination therapy has been plagued by off target toxicity, requiring dose reduction or delay. In addition, the complexity of cancer has resulted in either intrinsic or acquired resistance to these compounds. Nanoparticles have been widely studied as drug delivery systems due to their inherent ability to reduce toxicity while maintaining therapeutic efficacy. It was hypothesized that the formulation of molecular inhibitors in nanoparticle delivery systems could reduce toxicity and enhance efficacy, leading to more effective combination therapy. A nanoformulation of the PARP inhibitor Talazoparib (TLZ) was optimized for intravenous therapy. This formulation was more versatile than the FDA-approved oral drug and allowed for delivery to the peritoneal cavity for local treatment of disseminated ovarian cancer, leading to a decrease in the number of animals developing tumor associated ascites.

See full dissertation at
coe.northeastern.edu/19/PaigeBaldwin

Jeff Bouffard

PhD 2019, Bioengineering; Advisor, Erin Cram

Development of a Lab Bioimage Informatics System for Fluorescence Microscopy Data, With Application to Experimental Studies of Rhogap Regulation of Calcium Signaling and Actomyosin Contractility

Microscopic imaging is a powerful tool to advance our understanding of biological systems. Image-based biological investigations can be large and complex, requiring bioimage informatics solutions to manage and examine large amounts of information. This dissertation describes the development of a lab bioimage informatics system to organize and analyze fluorescence microscopy movies. This system is applied here to investigate the regulation of calcium signaling and actomyosin contractility in the C. elegans spermatheca, a multicellular contractile tube with stereotyped tissue function and conserved genes and regulatory networks. The lab bioimage informatics system standardizes the organization, processing, and analysis of calcium sensor movies by using computer programs to automate processes. The motivations, design goals, and implementation for this lab bioimage informatics system are presented. The experimental investigation revealed a new role for a RhoGAP known to regulate actomyosin contractility. For this work, the lab bioimage informatics system supported analysis of almost 500 fluorescence microscopy movies, acquired by 4 different people over 4 years. These data show that the RhoGAP SPV-1 is a key regulator of calcium signaling and tissue function in the C. elegans spermatheca. Experiments to establish mechanism suggest SPV-1 coordinates the activity of multiple GTPases to control tissue contractility.

See full dissertation at
coe.northeastern.edu/19/JeffBouffard

Solomon Mensah

PhD 2019, Bioengineering; Advisor, Eno Ebong

Endothelial Glycocalyx-mediated Intercellular Interactions : Mechanisms and Implications for Health And Disease

The endothelial glycocalyx (GCX) plays a critical role in the health of the vascular system. Degradation of the GCX has been implicated in the onset of diseases like atherosclerosis and cancer because it disrupts endothelial cell (EC) function that is meant to protect from atherosclerosis and cancer. Intercellular interactions are physiologically relevant activities that ensure proper EC function. Various intercellular interactions including those mediated by gap junction proteins, like connexin, for maintaining cell to cell communication, and adhesion molecules, like those mediated by E-selectin and integrins for regulating cell to cell contact between ECs and leukocytes, cancer cells, or other circulating cells. To-date, limited progress has been made to best understand the role of the GCX in intercellular interactions. Previous work demonstrated that GCX degradation disrupts EC gap junction connexin (Cx) proteins, likely blocking interendothelial communication that maintains EC and vascular tissue homeostasis to resist disease. Other reports suggest that the ability of immune cells to interact with EC could be a model for the way cancer cells interact with EC, and these interactions are modulated by the GCX. We hypothesize that the GCX controls the opening and closing of Cx containing gap junction proteins for regulating communication and also controls accessibility to receptors on the surface of the endothelium for regulating intercellular interactions.

See full dissertation at
coe.northeastern.edu/19/SolomonMensah

DEPARTMENT OF BIOENGINEERING

Northeastern University
206 Interdisciplinary Science
and Engineering Complex
805 Columbus Avenue
Boston, MA 02118

P 617.373.7805

bioe.northeastern.edu
coe.northeastern.edu

COVER IMAGE

Graduate student Suzanne Stasiak, working in Bioengineering Assistant Professor Hari Parameswaran's lab, is exploring how smooth muscle cells sense the concentration of contractile stimulus, which can trigger asthma attacks, to gain a better understanding of why asthmatics can still be at risk for an asthma attack even when there is no inflammation in their airways and the patient is symptom free. The research team's findings, recently published in *Science Advances*, indicate that asthma attacks may be the result of when the body incorrectly senses the concentration or dose of inhaled agonists.