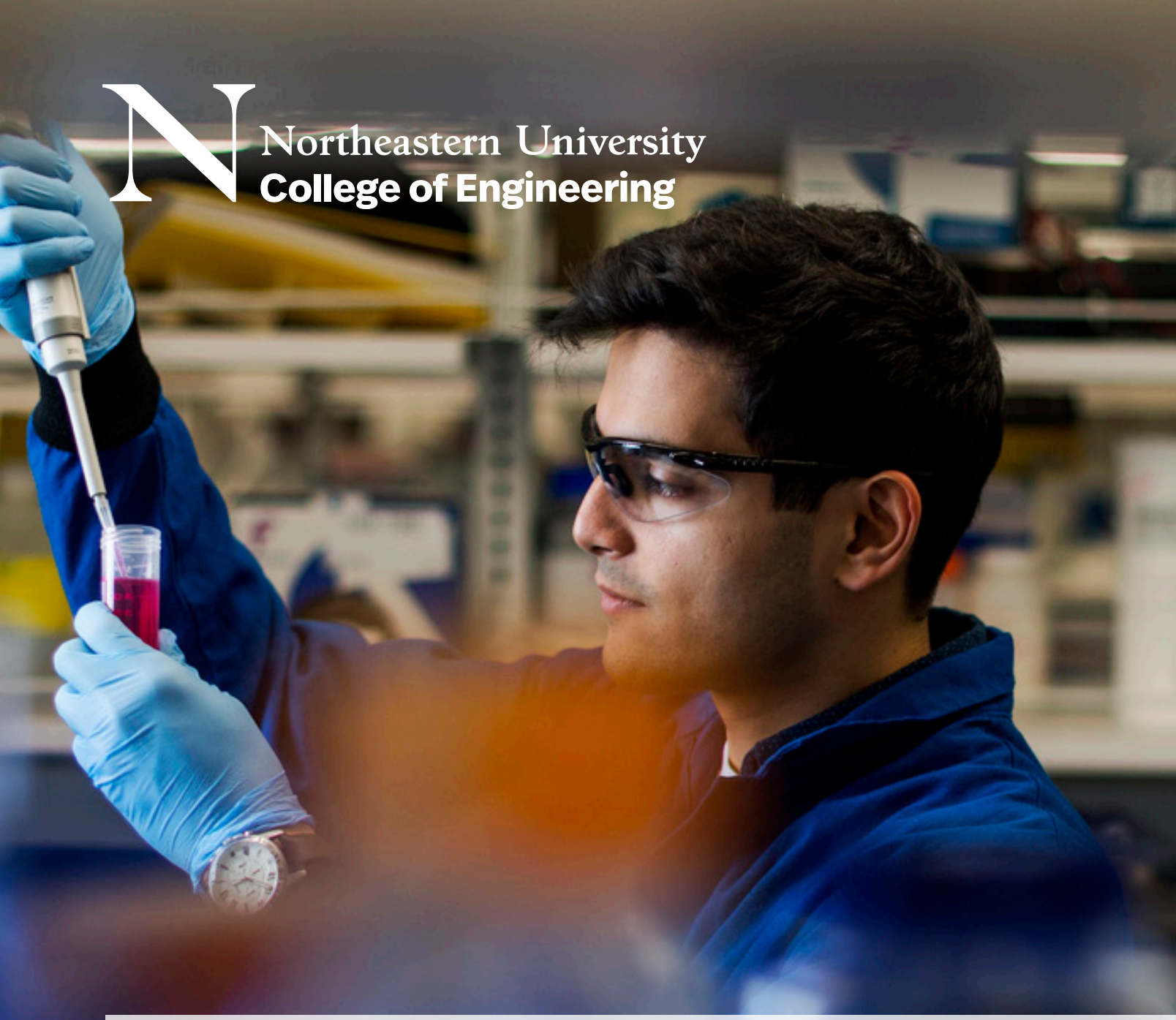
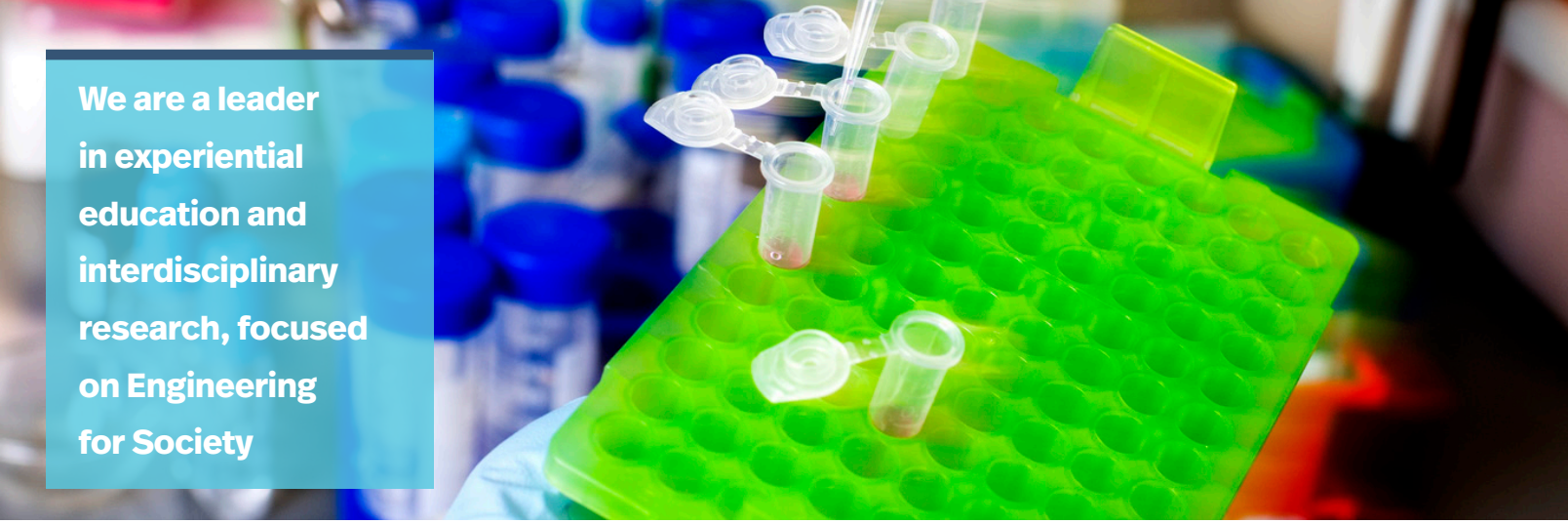


Northeastern University
College of Engineering

2018 | 2019

SCHOLARSHIP REPORT

BIOENGINEERING



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

Dear Colleagues and Students,

The Department of Bioengineering is the newest department in Northeastern's College of Engineering. Building on the success of its PhD program, BioE added BS and MS degree programs in the 2015 – 2016 academic year. We are now in an era of rapid growth with plans to double our faculty over the next three years and continue to increase 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 50 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 BioE 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.

Sincerely,

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

QUICK FACTS

Bioengineering

616 Students

36% **BS enrollment growth** since 2017

National Academy Member
Herbert Levine, University Distinguished Professor

RECENT HIRES

Erel Levine
PhD, Weizmann Institute of Science

Herbert Levine
PhD, Princeton University

Jiahe Li
PhD, Cornell University

Sara Rouhanifard
PhD, Albert Einstein College of Medicine

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

4 **Young Investigator Awards**

Leading-edge Research

New Institute for the Chemical Imaging of Living Systems Led by Professor **Heather Clark**.
See page 4

College of Engineering

With **185** tenured/tenure-track faculty and **16** 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.

48 **NSF CAREER** Awards

5 **Engineering Departments**

90 **YOUNG INVESTIGATOR** Awards

993 **Graduate Students**
Placed on Co-op (2018-19)

STUDENTS ENROLLED
8080
52% Graduate
1485 New MS (Fall 2018)
48% Undergraduate
675 New BS (Fall 2018)

FACULTY BY RESEARCH AREAS

IMAGING, INSTRUMENTATION, AND SIGNAL PROCESSING

Samuel Chung
Heather Clark
Qianqian Fang
Mark Niedre
Sara Rouhanifard

BIOMECHANICS, BIOTRANSPORT AND MECHANOBIOLOGY

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

COMPUTATIONAL AND SYSTEMS BIOLOGY

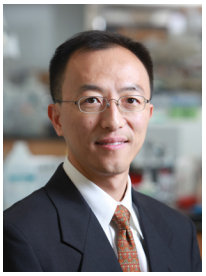
Anand Asthagiri
Chiara Bellini
Erel Levine
Herbert Levine
Jessica Oakes
Nikolai Slavov
Eduardo Sontag

Molecular, Cell, and Tissue Engineering

Anand Asthagiri
Ambika Bajpayee
Samuel Chung
Guohao Dai
Jiahe Li
Lee Makowski
Mark Niedre
Harikrishnan Parameswaran
Sara Rouhanifard
Jeffrey Ruberti
Eduardo Sontag

FACULTY HONORS AND AWARDS

Assistant Professors **Jessica Oakes** and **Chiara Bellini** are principal investigators for a $1.5M collaborative award from the Assistance to Firefighters Grant Program, administered through the Department of Homeland Security (DHS) Federal Emergency Management Agency's (FEMA) Grant Programs Directorate, for examining the "Health Consequences Following Acute and Chronic Firefighter Exposure to Wildland Fire Smoke."



Associate Professor **Guohao Dai** was selected as a Fellow of the American Heart Association (FAHA) by the Council of Basic Cardiovascular Sciences of AHA.

Assistant Professors **Ambika Bajpayee** and **Nikolai Slavov** were each recipients of a Sanofi iAward, created to promote scientific breakthroughs. Bajpayee's project is "Exosomes for oral delivery of Foxo1 SiRNA for treatment of Type 1 diabetes," and Slavov's project is "Developing a technology platform for discovering biomarkers and drug targets."

Assistant Professor **Ambika Bajpayee** (PI) and **Jiahe Li** (co-PI) were awarded a $628K NIH Trailblazer R21 grant for New and Early Stage Investigators from the National Institute of Biomedical Imaging and Bioengineering (NIBIB) for "Anti-Catabolic Drug Anchored Cationic Exosomes For Cartilage Targeting And Repair."

Professor **Heather Clark** directs Northeastern's new Institute for Chemical Imaging of Living Systems, which focuses on finding ways to image the chemistry of our bodies. She was also awarded a $1.5M grant from the National Institute of Neurological Disorders and Stroke for "Nanosensors for Chemical Imaging of Acetylcholine Using MRI."

Assistant Professor **Nikolai Slavov** has developed a data-driven technique to detect more than 2,000 proteins in a single cell. His single cell mass spectroscopy now offers a cheaper and faster technique that allows researchers to analyze a much larger number of single cells and results in much more accurate data. To further the research, Slavov is working collectively with another 200 labs from various countries in the Human Atlas Project, an effort to identify all of the different single cells comprising the human body. His part of the project is supported by the Chan Zuckerberg Initiative.

STUDENT HONORS AND AWARDS

Erica Wagner, E'20, earned the prestigious Barry Goldwater Scholarship, the United States' premier award for outstanding young researchers in STEM fields.

Congtin Justin Nguyen,E'19, received the German Academic Exchange Service (DAAD) Study Scholarship, which will support his Master of Science program in Regenerative Biology and Medicine at Germany's Technische Universität Dresden (TUD), one of that nations' finest universities in the sciences and engineering.

Minhal Ahmed, E'19, was selected as a George J. Mitchell Scholar, which sends future American leaders to the island of Ireland for a year of graduate study. He was also named the winner of the Harold D. Hodgkinson Achievement Award for 2019, one of the highest honors a senior can receive.

Kritika Singh, E'20, was named a 2019 Truman Scholar, a United States' premier graduate fellowship for those who intend to devote their careers to serving the public good.

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

Y. Cho, L. Milane, M. Amiji
Genetic and Epigenetic Strategies for Advancing Ovarian Cancer Immunotherapy, Expert Opinion on Biological Therapy, 19(6), 2019, 547-560

S. Iyer, A. Radwan, A. Hafezi-Moghadam, P. Malyala, M. Amiji
Long-Acting Intraocular Delivery Strategies for Biological Therapy of Age-Related Macular Degeneration, Journal of Controlled Release, 296, 2019, 140-149

D. Chen, S. Ganesh, W. Wang, M. Amiji
Role of surface Chemistry on Serum Protein Corona-Mediated Cellular Delivery and Gene Silencing with Lipid Nanoparticles, Nanoscale, 11, 2019, 8760-8775

N.N. Parayath, A. Parikh, M. Amiji
Repolarization of Tumor-Associated Macrophages in a Genetically Engineered Non-Small Cell Lung Cancer Model by Intraperitoneal Administration of Hyaluronic Acid-Based Nanoparticles Encapsulating MicroRNA-125b, Nano Letters, 18(6), 2018, 3571-3579

SELECTED RESEARCH PROJECTS

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

Reprogramming Tumor-Associated Macrophages in PDAC with MicroRNA Nano-Vectors
Principal Investigator, National Cancer Institute of the National Institutes of Health

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: MIT Post-doc Travel Grant Award; MIT Global Fellow Award; Meredith Kamm Memorial Award for Outstanding Performance, MIT; MIT Graduate Women of Excellence Award

SELECTED PUBLICATIONS

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, 2018

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

A.G. Bajpayee, R.E. De La Vega, M. Scheu, N.H. Varady, I.A. Yannatos, L.A. Brown, et al.
Sustained Intra-Cartilage Delivery of Low Dose Dexamethasone Using a Cationic Carrier for Treatment of Post Traumatic Osteoarthritis, European Cell & Materials, 34, 2017, 341-364

A.G. Bajpayee, M.A. Quadir, P.T. Hammond, A.J. Grodzinsky
Charge Based Intra-Cartilage Delivery of Single Dose Dexamethasone Using Avidin Nano-Carriers Suppresses Cytokine-Induced Catabolism Long Term, Osteoarthritis & Cartilage, 24(1), 2016, 71-81

A.G. Bajpayee, A.M. Sheu, A.J. Grodzinsky, R.M. Porter
A Rabbit Model Demonstrates the Influence of Cartilage Thickness on Intra-Articular Drug Delivery and Retention within Cartilage, Journal of Orthopaedic Research, 33(5), 2015, 660-667

SELECTED RESEARCH PROJECTS

Cartilage Targeting Cationic Nanocarriers for Delivering OA Drugs
Principal Investigator, Congressionally Directed Medical Research Programs - Department of Defense

Exosomes for Oral Delivery for Treatment of Diabetes
Principal Investigator, Sanofi iAwards

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

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

M.R. Bersi, C. Bellini, J. Wu, K. Montaniel, D.G. Harrison, J.D. Humphrey
Excessive Adventitial Remodeling Leads to Early Aortic Maladaptation in Angiotensin-Induced Hypertension, Hypertension, 67(5), 2016, 890-896

C. Bellini, S. Wang, D.M. Milewicz, J.D. Humphrey
Myh11$^{R247C/R247C}$ Mutations Increase Thoracic Aorta Vulnerability to Intramural Damage Despite a General Biomechanical Adaptivity, Journal of Biomechanics, 48(1), 2015, 113-121

SELECTED RESEARCH PROJECTS

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; polymer engineering; material science and engineering; biomedical engineering; drug/cell delivery; 3D scaffolds; tissue engineering; regenerative medicine; biomaterials for immunotherapy; immunoengineering

Honors and awards: National Science Foundation CAREER Award, Thomas Jefferson Award, Burroughs-Wellcome Fund Travel Award, DFCI/Northeastern University Joint Program Award, Acta Biomaterialia Outstanding Reviewer Award

SELECTED PUBLICATIONS

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

A. Memic, T. Abudula, H. Mohammed, K.J. Navare, T. Colombani, S.A. Bencherif
Latest Progress in Electrospun Nanofibers for Wound Healing Applications, ACS Applied Bio Materials, 2, 2019, 952-969

M. Rezaeeyazdi, T. Colombani, A. Memic, S.A. Bencherif
Injectable Hyaluronic Acid-Co-Gelatin Cryogels for Tissue Engineering Applications, Materials, 2018, 11, 1374

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

O. Chaudhuri, L. Gu, D. Klumpers, M. Darnell, S.A. Bencherif, J.C. Weaver, N. Huebsch, D.J Mooney
Substrate Stress Relaxation Regulates Cell Spreading, Nature Communications, 6, 2015, 6365

SELECTED RESEARCH PROJECTS

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

Cryogel-Supported Liver-On-A-Chip for Ex-vivo Hepatotoxicity and Anticancer Drug Screening
Principal Investigator, Burroughs-Wellcome Fund

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

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

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

N.M. Antczak, M. Packer, X. Lu, K. Zhang, P.J. Beuning
Human Y-Family DNA Polymerase Kappa is more Tolerant to Changes in its Active Site Loop than its Ortholog *E. coli* DinB, Chemical Research in Toxicology, 30(11), 2017, 2002–2012

SELECTED RESEARCH PROJECTS

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

Molecular Mechanisms of Polymerase Management
Principal Investigator, National Science Foundation

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 control; particulate and chemical defects in semiconductor manufacturing; high rate nanomanufacturing; NEMS devices and nanomaterials based nanoelectronics

Honors and awards: Fellow, American Society of Mechanical Engineers; Fellow, the Adhesion Society; Fellow, National Academy of Inventors; Fulbright Senior Scholar, Outstanding Translational Research Award, Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

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

Z. Chai, S.A. Abbasi, A. Busnaina
Scalable Directed Assembly of Highly Crystalline 2,7-Dioctyl[1]Benzothieno[3,2-b][1]Benzothiophene (C8-BTBT) Films, ACS Applied Materials & Interfaces, 10(21), 2018, 18123-18130

C. Yilmaz, A. Sirman, A. Halder, A. Busnaina
High-Rate Assembly of Nanomaterials on Insulating Surfaces Using Electro-Fluidic Directed Assemblys, ACS Nano, 11(8), 2017, 7679–7689

C. Yilmaz, C. Sarisozen, V. Torchilin, A. Busnaina
Novel Nanoprinting for Oral Delivery of Poorly Soluble Drugs, Methodist DeBakey Cardiovascular Journal, 12(3), 2016, 157-162

SELECTED RESEARCH PROJECTS

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

Novel Nanoprinting for Oral Delivery of Poorly Soluble Drugs
Principal Investigator, National Science Foundation

REBECCA L. CARRIER

Professor and Associate Chair of Research, 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 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

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

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, P.M. Champion
Proton-Coupled Electron Transfer and the Linear Approximation for Coupling to the Donor–Acceptor Distance Fluctuations, Journal of Physical Chemistry A, 121, 2017, 2199-2207

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

A. Benabbas, Y. Sun, T.L. Poulos, P.M. Champion
Ultrafast CO Kinetics in Heme Proteins: Adiabatic Ligand Binding and Heavy Atom Tunneling, Journal of the American Chemical Society, 139, 2017, 15738-15747

B. Salna, A. Benabbas, J.T. Sage, J. van Thor, P.M. Champion
Wide-Dynamic-Range Kinetic Investigations of Deep Proton Tunnelling in Proteins, Nature Chemistry, 8, 2016, 874-880

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

Honors and awards: Newport Spectra-Physics Research Excellence Award, Edmund Optics Educational Award Finalist

SELECTED PUBLICATIONS

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

L. Sun, J. Shay, M. McLoed, K. Roodhouse, S.H. Chung, C. Clark, J. Pirri, M. Alkema, C.V. Gabel
Neuronal Regeneration in C. Elegans Requires Subcellular Calcium Release by Ryanodine Receptor Channels and Can Be Enhanced by Optogenetic Stimulation, Journal of Neuroscience, 34, 2014, 15947-15956

S.H. Chung, A. Schmalz, R.C.H. Ruiz, C.V. Gabel, E. Mazur
Femtosecond Laser Ablation Reveals Antagonistic Sensory and Neuroendocrine Signaling that Underlie C. elegans Behavior and Development, Cell Reports, 4, 2013, 316-326

S.H. Chung, L. Sun, C.V. Gabel
In Vivo Neuronal Calcium Imaging in C. Elegans, Journal of Visualized Experiments, 74, 2013

SELECTED RESEARCH PROJECTS

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

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

G. Rong, E.E. Tuttle, A.N. Reilly, H.A. Clark
Recent Developments in Nanosensors for Imaging Applications in Biological Systems, Annual Review of Analytical Chemistry 12, 2019, 109-128

G. Rong, E.H. Kim, Y. Qiang, W. Di, Y. Zhong, X. Zhao, H. Fang, H.A. Clark
Imaging Sodium Flux During Action Potentials in Neurons with Fluorescent Nanosensors and Transparent Microelectrodes, ACS Sensors, 3(12), 2018, 2499-2505

Y. Luo, E. Kim, C.A. Flask, H.A. Clark
Nanosensors for Chemical Imaging of the Neurotransmitter Acetylcholine Using MRI, ACS Nano, 12(6), 2018, 5761–5773

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

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

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

A.D. Cecchetelli, J. Hugunin, H. Tannoury, E.J. Cram
CACN-1 is Required in the *C. elegans* Somatic Gonad for Proper Oocyte Development, Developmental Biology, 414(1), 2016, 58-71

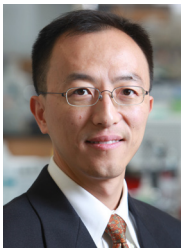
SELECTED RESEARCH PROJECTS

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

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

D. Kim, V. Lee, T.B. Dorsey, L.E. Niklason, L. Gui, G. Dai
Neuropilin-1 Mediated Arterial Differentiation of Murine Pluripotent Stem Cells, Stem Cells and Development, 27(7), 2018, 441-455

V.K. Lee, G. Dai
Printing of Three-Dimensional Tissue Analogs for Regenerative Medicine, Annals Biomedical Engineering, 45(1), 2017, 115-131

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

SELECTED PUBLICATIONS

P.C. Dixon, L. Stirling, X. Xu, C.C. Chang, J.T. Dennerlein J.M. Schiffman
Aging May Negatively Impact Movement Smoothness During Stair Negotiation, Human Movment Science, 60, 2018, 78-86

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

L.S. Marin, A. Rodriguez, E. Rey, H. Piedrahita, L.H. Barrero, J.T. Dennerlein, P.W. Johnson
Assessment of Whole Body Vibration Exposure in Heavy Equipment Mining Vehicles, Annals of Work Exposures and Health, 61(6), 2017, 669-680

M.Y. Lin, A. Barbir, J.T. Dennerlein
Evaluating Biomechanics of USer-Selected Sitting and Standing Computer Workstation, Applied Ergonomics, 2017

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

J.T. Dennerlein, E.T. O'Day, D.F. Mulloy, J. Somerville, A.M. Stoddard, C. Kenwood, E. Teeple, L.I. Boden, G. Sorensen, D. Hashimoto
Lifting and Exertion Injuries Decrease After Implementation of an Integrated Hopsital-Wide Safe Patient Handling and Mobilization Program, Occupational & Environmental Medicine, 74(5), 2017, 336-343

SELECTED RESEARCH PROJECTS

Development and Evaluation of Contractor Safety Pre-Qualification Tool
Principal Investigator, National Institute for Occupational Safety and Health

Enhancing Safety Climate Through Leadership
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

Light Scattering Research
Principal Investigator, Draper Labs

ENO EBONG

Assistant Professor, Chemical Engineering
affiliated faculty, Bioengineering

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

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

M.J. Cheng, N.N. Bal, P. Prabakaran, R. Kumar, T.J. Webster, S. Sridhar, E.E Ebong
Ultrasmall Gold Nanorods: Synthesis and Glycocalyx-Related Permeability in Human Endothelial Cells, International Journal of Nanomedicine, 14, 2019, 319-333

I. Harding, R. Mitra, S.A. Mensah, I.M. Herman, E.E. Ebong
Pre-Atherosclerotic Disturbed Flow Disrupts Caveolin-1 Expression, Localization, and Function via Glycocalyx Degradation, Journal of Translational Medicine, 16(1), 2018, 364

R. Mitra, J. Qiao, S. Madhavan, G. O'Neil, B.L. Ritchie, P. Kulkarni, S. Sridhar, A.L. van de Ven, E.M.C. Kemmerling, C. Ferris, J.A. Hamilton, E.E. Ebong
The Comparative Effects of High Fat Diet or Disturbed Blood Flow on Glycocalyx Integrity and Vascular Inflammation, Translational Medicine Communications, 3(10), 2018

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, 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: National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

P. Gonzalez-Navarro, Y.M. Marghi, B. Azari, M. Akcakaya, D. Erdogmus
An Event-Driven AR-process Model with Rapid Trial Sequences for EEG-based BCIs, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2019, 1-1

O. Ozdenizci, D. Erdogmus
Information Theoretic Feature Transformation Learning for Brain Interfaces, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2019

S. Salehi, S. Khan, D. Erdogmus, A. Gholipour
Real-Time Deep Pose Estimation With Geodesic Loss for Image-to-Template Rigid Registration, IEEE Transactions on Medical Imaging, 38(2), 2019, 470-481

A. Kocanaogullari, Y.M. Marghi, M. Akcakaya, D. Erdogmus
Optimal Query Selection Using Multi-Armed Bandits, IEEE Signal Processing Letters, 25(12), 2018, 1870–1874

SELECTED RESEARCH PROJECTS

Autism Inpatient Collection Phase III
Co-Investigator, Simons Foundation Autism Research Initiative

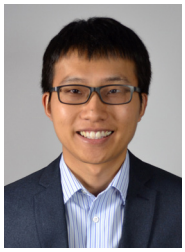
Collaborative Research: Assistive Integrative Support Tool for Retinopathy of Prematurity
Principal Investigator, National Science Foundation

Collaborative Research: EEG-guided Electrical Stimulation for Immersive Virtual Reality
Co-Principal Investigator, National Science Foundation

Collaborative Research: Nested Control of Assistive Robots Through Human Intent Inference
Principal Investigator, National Science Foundation

Collaborative Research: Understanding Motor Cortical Organization Through Engineering Innovation to TMS-based Brain Mapping
Co-Principal Investigator, National Science Foundation

HUI FANG



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

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

Scholarship focus: nano-electronics, bio-electronics, materials surfaces and interfaces

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

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

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

Assistant 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

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

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

R. Yao, X. Intes, Q. Fang
Direct Approach to Compute Jacobians for Diffuse Optical Tomography Using Perturbation Monte Carlo-Based Photon "Replay", Biomedical Optics Express, 9, 2018, 4588-4603

L. Yu, F. Nina-Paravecino, D. Kaeli, Q. Fang
Scalable and Massively Parallel Monte Carlo Photon Transport Simulations For Heterogeneous Computing Platforms, Journal Biomedical Optics Letters, 23(1), 2018, 010504

Y. Yuan, L. Yu, Z. Doğan, Q. Fang
Graphics Processing Units-Accelerated Adaptive Nonlocal Means Filter for Denoising Three-Dimensional Monte Carlo Photon Transport Simulations, Journal of Biomedical Optics, 23(12), 2018, 121618

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

C.F. Ferris, P. Kulkarni, J.R. Yee, M. Nedelman, I.E.M. de Jong
The Serotonin Receptor 6 Antagonist Idalopirdine and Acetylcholinesterase Inhibitor Donepezil Have Synergistic Effects on Brain Activity-A Functional MRI Study in the Awake Rat, Front Pharmacol, 12(8), 2017, 279

J.R.Yee, W.M. Kenkel, P. Kulkarni, K. Moore, A.M. Perkeybile, S. Toddes, J.A. Amacker, C.S. Carter, C.F. Ferris
BOLD fMRI in Awake Prairie Voles: A Platform for Translational Social and Affective Neuroscience, NeuroImage, 8, 2016, 221-232

W.M. Kenkel, J.R. Yee, K. Moore, D. Madularu, P. Kulkarni, K. Gamber, M. Nedelman, C.F. Ferris
Functional Magnetic Resonance Imaging in Awake Transgenic Fragile X Rats: Evidence of Dysregulation in Reward Processing in the Mesolimbic/Habenular Neural Circuit, Translational Psychiatry, 6, 2016, 763

P. Kulkarni, W. Kenkel, S.P. Finklestein, T.M. Barchet, J. Ren, M. Davenport, M.E. Shenton, Z. Kikinis, M. Nedelman, C.F. Ferris
Use of Anisotropy, 3D Segmented Atlas, and Computational Analysis to Identify Gray Matter Subcortical Lesions Common to Concussive Injury from Different Sites on the Cortexd Odor, PLoS One, 10(5), 2015

C.F. Ferris, J.R. Yee, W.M. Kenkel, K.M. Dumais, K. Moore, A.H Veenema, P. Kulkarni, A.M. Perkybile, C.S. Carter
Distinct BOLD Activation Profiles Following Central and Peripheral Oxytocin Administration in Awake Rats, Front Behavioral Neuroscience, 9, 2015, 245

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, specifically inside micro and nanofluidic channels. This is applied to a broad range of scientific fields including: biophysics, micro and systems biology, ecology, environmental sensing, and 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

CHRISTOPER HASSON

Assistant 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

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.F.D. Santos, P.F. Pimento, C.B. Lunardi, L. Draghetti, L. Carro, D. Kaeli, P. Rech
Analyzing and Increasing the Reliability of Convolutional Neural Networks on GPUs, IEEE Transactions on Reliability, 68(2), 2019, 663-677

L. Wang, X. Zhao, D. Kaeli, Z. Wang, L. Eeckhout
Intra-Cluster Coalescing and Distributed-Block Scheduling to Reduce GPU NoC Pressure, IEEE Transactions on Computers, 68(7), 2019, 1064-1076

Y. Sun, T. Baruah, S. A. Mojumder, S. Dong, X. Gong, S. Treadway, Y. Bao, S. Hance, C. McCardwell, V. Zhao, H. Barclay, A.K. Ziabari, Z. Chen, R. Ubal, J.L. Abellán, J. Kim, A. Joshi, D. Kaeli
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

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

Leveraging Intra-Chip/Inter-Chip Silicon Photonic Networks for Designing Next-Generation Accelerators
Principal Investigator, National Science Foundation

TA2: Dynamic Hardware/Software Compilers for High-Level Languages
Principal Investigator, Defense Advanced Research Projects Agency Software-Defined Hardware Program

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

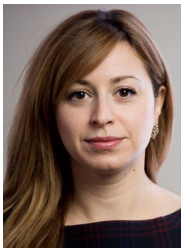
J.N. Weiss, A. Karma, W.R. MacLellan, M. Deng, C.D. Rau, C.M. Rees, J. Wang, N. Wisniewski, Eskin E, S Horvath, Z.Qu, Y.Wang, A.J. Lusis
Good Enough Solutions and the Genetics of Complex Diseases, Circulation Research, 111, 2012, 493-504

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

SELECTED PUBLICATIONS

M.L. Puzan, B. Legesse, R.A. Koppes, H. Fenniri, A.N. Koppes
Bioactive Organic Rosette Nanotubes Support Sensory Neurite Outgrowth, ACS Biomaterials Science & Engineering, 4(5), 2018, 1630-1640

A.R. Spencer, A. Primbetova, A.N. Koppes, R.A. Koppes, H. Fenniri, N. Annabi
Electroconductive Gelatin Methacryloyl-PEDOT: PSS Composite Hydrogels: Design, Synthesis, and Properties, ACS Biomaterials Science & Engineering, 4(5), 2018, 1558-1567

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

J.R. Soucy, E. Shirzaei Sani, R.P. Lara, D. Diaz, F. Dias, A.S. Weiss, A.N. Koppes, R.A. Koppes, N. Annabi
Photocrosslinkable Gelatin/Tropoelastin Hydrogel Adhesives for Peripheral Nerve Repair, Tissue Engineering Part A, 2018

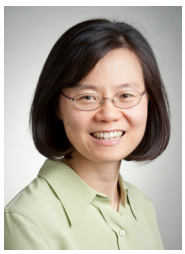
SELECTED RESEARCH PROJECTS

Biomanufactured Nerve Guidance Channels for Complex Nerve Repair
Co-Principal Investigator, Northeastern University

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

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

CAROLYN LEE-PASONS



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

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

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

N.F. Rizvi, J. Weaver, E.J. Cram, C.W.T. Lee-Parsons
Silencing the Transcriptional Repressor, ZCT1, Illustrates the Tight Regulation of Terpenoid Indole Alkaloid Biosynthesis, PLoS ONE, 11(7), 2016, e0159712

N. Rizvi, M. Cornejo, K. Stein, J. Weaver, E.J. Cram, C.W.T. Lee-Parsons
An Efficient Transformation Method for Estrogen-Inducible Transgene Expression in Catharanthus Roseus Hairy Roots, Plant Cell, Tissue and Organ Culture (PCTOC), 120(2), 2015, 475-487

J. Weaver, S. Goklany, N. Rizvi, E.J. Cram, C.W.T. Lee-Parsons
Optimizing the Transient Fast Agro-Mediated Seedling Transformation (FAST) Method in Catharanthus Roseus Seedlings, Plant Cell Reports, 33(1), 2014, 89-97

SELECTED RESEARCH PROJECTS

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: eukaryotic chemotaxis, using Dictyostelium as a model system; mechanics of cell motility, being studied both at the single cell and multicellular levels; Spatial organization of bacterial colonies, including coupling to genetic decision-making circuits, a new effort on the physics of cancer

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

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

D. Jia, J.H. Park, K.H. Jung, H. Levine, B.A. Kaipparettu
Elucidating the Metabolic Plasticity of Cancer: Mitochondrial Reprogramming and Hybrid Metabolic States, Cells, 7(3), 2018, 21

J. Kim, J. Feng, C.A.R. Jones, X. Mao, L.M. Sander, H. Levine, B. Sun
Stress-Induced Plasticity of Dynamic Collagen Networks, Nature Communications, 8(1), 2017, 842

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

M.K. Jolly, M. Boareto, B. Huang, D. Jia, M. Lu, E. Ben-Jacob, J.N. Onuchic
Implications of the Hybrid Epithelial/Mesenchymal Phenotype in Metastasis, Frontiers in Oncology, 5, 2015, 155

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

Professor, Biology; affiliated faculty, Bioengineering

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

Scholarship focus: molecular microbiology; antimicrobial drug tolerance; drug discovery

SELECTED PUBLICATIONS

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

B. Sharma, A.V. Brown, N.E. Matluck, L.T. Hu, K. Lewis
Borrelia Burgdorferi, the Causative Agent of Lyme Disease, Forms Drug-Tolerant Persister Cells, Antimicrob Agents Chemother, 59, 2015, 4616-4624

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

E. Gavrish, C.S. Sit, S. Cao, O. Kandror, A. Spoering, A. Peoples, L. Ling, A. Fetterman, D. Hughes, A. Bissell, H. Torrey, T. Akopian, A. Mueller, S. Epstein, A. Goldberg, J. Clardy, K. Lewis
Lassomycin, a Ribosomally Synthesized Peptide, Kills Mycobacterium Tuberculosis by Targeting the ATP-Dependent Protease ClpC1P1P2, Chemistry and Biology, 21, 2014, 509-518

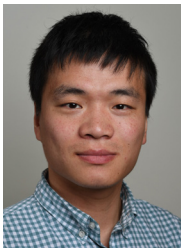
B.P. Conlon, E.S. Nakayasu, L.E. Fleck, M.D. LaFleur, V.M. Isabella, K. Coleman, S.N. Leonard, R.D. Smith, J.N. Adkins, K. Lewis
Activated ClpP Kills Persisters and Eradicates a Chronic Biofilm Infection, Nature, 503, 2013, 365-370

SELECTED RESEARCH PROJECTS

The Mechanism of Persister Cell Drug Tolerance
Principal Investigator, National Institutes of Health

Uncultured Bacteria in Drug Discovery and the Human Microbiome
Principal Investigator, The Bill and Melinda Gates Foundation, The Kohen Foundation, The Global Lyme Alliance, Pazala Foundation

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: David Koch Institute Quinquennial Postdoctoral Fellowship

SELECTED PUBLICATIONS

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

S. Chandrasekaran, M.F. Chan, J. Li, M.R. King
Super Natural Killer Cells that Target Metastases In The Tumor Draining Lymph Nodes, Biomaterials, 77, 2016, 66-76

C.C. Sharkey, J. Li, S. Roy, Q. Wu, M.R. King
Two-Stage Nanoparticle Delivery of Piperlongumine and Tumor Necrosis Factor-Related Apoptosis-Inducing Ligand (TRAIL) Anti-Cancer Therapy, Technology, 2016

SELECTED RESEARCH PROJECTS

Nanobiotech Center Training Grant
Principal Investigator, Cornell Nanobiotech Center

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 interactions, interface design and user experiences, system integration and evaluation; smart systems and nonintrusive sensors, human friendly mechatronics, human state detection and information fusion; human factors in transportation and healthcare

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

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

H. Cai, Y. Lin
Coordinating Cognitive Assistances with Cognitive Engagement Control Approaches in Human-Machine Interactions, IEEE Transactions on Systems, Man and Cybernetics Part A: Humans and Systems, 42(2), 2012, 286-294

Y. Lin
A Natural Contact Sensor Paradigm for Non-intrusive and Real-time Sensing of Bio-Signals in Human-Machine Interactions, IEEE Sensors Journal, Special Issue on Cognitive Sensor Networks, 11(3), 2011, 522-529

SELECTED RESEARCH PROJECTS

CAREER: Bridging Cognitive Science and Sensor Technology: Nonintrusive and Multimodality Sensing in Human Machine Interactions
Principal Investigator, National Science Foundation

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

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, 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

SELECTED RESEARCH PROJECTS

EFRI-ODISSEI: Origami and Assembly Techniques for Human-Tissue-Engineering (OATH)
Principal Investigator, National Science Foundation

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

SELECTED PUBLICATIONS

P.S. Rushton, A.T. Olek, L. Makowski, J. Badger, C.N. Steussy, N.C. Carpita, C.V. Stauffacher
Rice Cellulose SynthaseA8 Plant-Conserved Region is an Anti-Parallel Coiled-Coil Located at the Catalytic Core Entrance, Plant Physiology, 173, 2017, 482-494

J. Liu, I. Costantino, N. Venugopalan, R.F. Fischetti, B.T. Hyman, M.P. Frosch, T. Gomez-Isla, L. Makowski
Amyloid Structure Exhibits Polymorphism on Multiple Length Scales in Human Brain Tissue, Science Reports, 6, 2016, 33079

Y. Zhang, H. Inouye, M. Crowley, L. Yu, D. Kaeli, L. Makowski
Diffraction Pattern Simulation of Cellulose Fibrous Molecules Using Distributed and Quantized Pair-Distances, Journal of Applied Crystallography, 49, 2016, 2244-2248

J. Badger, P. Grover, S.B. Panjarian, J.R. Engen, T.E. Smithgall, L. Makowski
The C-Abl Tyrosine Kinase Adopts Multiple Active Conformational States in Solution, Biochemistry, 55, 2016, 3251-3260

J. Liu, J.I. Kim, J.C. Cusumano, C. Chapple, N. Venugopalan, R.F. Fischetti, L. Makowski
The Impact of Alterations in the Lignin Biosynthetic Pathway on Molecular Architecture of the Plant Cell Wall, Biotechnology For Biofuels, 9, 2016, 126-143

SELECTED RESEARCH PROJECTS

An Integrated Process for Identifying Lead Compounds for "Non-Druggable" Targets using Biophysical Screening, X-ray Solution Scattering and Singlecrystal Diffraction
Principal Investigator, Zenobia Therapeutics, Inc

Center for Direct Catalytic Conversion of Biomass to BioFuels (C3Bio)
Co-Investigator, Department of Energy

WALEED MELEIS

Interim Associate Dean of Graduate Education, Associate Professor and 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

MARK NIEDRE

Associate 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

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

S. Markovic, S. Li, M. Niedre
Performance of Computer Vision In Vivo Flow Cytometry with Low Fluorescence Contrast, Journal of Biomedical Optics, 20(3), 2015, 35005

V. Pera, D.H. Brooks, M. Niedre
On the use of Cramer-Rao Bounds in Diffuse Optical Tomography, Journal of Biomedical Optics, 19(2), 2014, 025002

S. Markovic, B. Li, V. Pera, M. Sznaier, O. Camps, M. Niedre
A Computer Vision Approach to RareCell In Vivo Flow Cytometry, Cytometry A, 83A, 2013, 1113-1123

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

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

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

Chemical Signatures for the Discovery of Protein Function
Principal Investigator, National Science Foundation

Distal Residues in Enzyme Catalysis and Protein Design
Principal Investigator, National Science Foundation

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

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

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: Cell-extracellular matrix interactions, force transmission in multicellular ensembles, asthma, pulmonary physiology

SELECTED PUBLICATIONS

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, M. Cervo, M.A. Pabon, C. Konrad, F. Polverino, K. Miziumura, M. Ghosh, H. Parameswaran, et al.
Mitochondrial Iron Chelation Ameliorates Cigarette Smoke-Induced Bronchitis and Emphysema in Mice, Nature Medicine, 22, 2016, 163-174

B. Suki, H. Parameswaran, J. Imsirovic, E.B. Suki
Regulatory Roles of Fluctuation-Driven Mechanotransduction in Cell Function, Physiology, 31(5), 2016, 346-358

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; Associate Director, CenSSIS

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

B. Gonzalez-Valdes, Y. Alvarez, Y. Rodriguez-Vaqueiro, A. Arboleya-Arboleya, A. Garcia-Pino, C. Rappaport, F. Las-Hera, J.A. Martinez-Lorenzo
Millimeter Wave Imaging Architecture for the On-the-Move Whole Body Imaging, IEEE Transactions on Antennas and Propagation, 64(6), 2016, 2328-2338

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

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

T.K. Tonge, J.W. Ruberti, T.D. Nguyen
A Micromechanical Modeling Study of the Mechanical Stabilization of Enzymatic Degradation of Collagen Tissues, Biophysical Journal, 109(12), 2015, 2689-2700

E.H. Zhou, C. Watson, R. Pizzo, J. Cohen, Q. Dang, P.M. DeBarros, C.Y. Park, C. Chen, J.D. Brain, J.P. Butler, J.W. Ruberti, J.J. Fredberg, P. Demokritou
Assessing the Impact of Engineered Nanoparticles on Wound Healing Using a Novel in Vitro Bioassay, Nanomedicine, 9(18), 2014, 2803-2815

D. Karamichos, C.B. Rich, R. Zareian, A.E.K. Hutcheon, J.W. Ruberti, V. Trinkaus-Randall, J.D. Zieske
TGF-ß3 Stimulates Stromal Matrix Assembly by Human Corneal Keratocyte-like Cells, Investigative Ophthalmology and Visual Science, 54(10), 2013, 6612-6619

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; digital signal processing; robust and optimal control

Honors and awards: Associate Editor, Editorial Board and Program Chair of ISIAC-WAC; Senior Life Member, Institute of Electrical and Electronics Engineers, Lifetime Achievement Award from World Automation Congress, 2018; Certificate of Appreciation for Technical Seminar Institute of Electrical and Electronics Engineers, Young Professionals

SELECTED PUBLICATIONS

G. Eftekhari Yazdi, H. Nezamfar, M. Moghadamfalahi, M. Akcakaya, B. Shafai, D. Erdogmus
An Adaptive Proportional BCI-Controller for Linear Dynamic Systems, Proceedings of ISIAC-WAC, 2018

A. Oghbaee, B. Shafai, S. Nazari
Complete Characterization of Disturbance Estimation and Fault Detection for Positive Systems, IET Journal of Control Theory and Applications, 12, 2018, 883-891

A. Oghbaee, B. Shafai
Eigenvalue Assignment for Positive Discrete-Time Linear Systems, Proceedings of ISIAC-WAC, 2018

S. Nazari, B. Shafai
Positive Unknown Input Observer for Fault Detection of Positive Distributed Systems, Proceedings of 26th Mediterranean Conference on Control and Automation (MED) Zadar, Croatia, 2018, 715-720

S. Nazari, B. Shafai, A. Oghbaee
Design of Attack Tolerant Detection Topologies for Distributed Systems, Proceedings of 2017 IEEE 56th Annual Conference on Decision and Control (CDC), Melbourne, Australia, 2017, 5385-5390

B. Shafai, C. Li
Positive Stabilization of Singular Systems by Proportional Derivative State Feedback, Proceedings of IEEE Conference on Control Technology and Applications (CCTA), Mauna Lani, HI, 2017, 1140-1146

A. Oghbaee, B. Shafai, M. Sznaier
Symmetric Positive Stabilization of Linear Time-Invariant Systems, IEEE 30th Canadian Conference on Electrical and Computer Engineering (CCECE), Windsor, CA, 2017, 1–7

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

R.B. Woodward, S.J. Shefelbine, R. Vaidyanathan
Pervasive Monitoring of Motion and Muscle Activation: Inertial and Mechanomyography Fusion, IEEE/ASME Transactions on Mechatronics, 22(5), 2017, 2022-2033

R. DeSouza, B. Javaheri, R.S. Collinson, C. Chenu, S.J. Shefelbine, P.D. Lee, A.A. Pitsillides
Prolonging Disuse in Aged Mice Amplifies Cortical But Not Trabecular Bones' Response to Mechanical Loading, Journal of Musculoskeletal & Neuronal Interactions, 17(3), 2017, 218-225

K.P. Chadwick, S.J. Shefelbine, A. Pitsillides, J.R. Hutchinson
Finite-Element Modelling of Mechanobiological Factors Influencing Sesamoid Tissue Morphology in the Patellar Tendon of an Ostrich, Royal Society Open Science, 4(6), 2017, 170133

P. Yadav, S.J. Shefelbine, E. Pontén, E.M. Gutierrez-Farewik
Influence of Muscle Groups' Activation on Proximal Femoral Growth Tendency, Biomechanics and Modeling in Mechanobiology, 2017

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: Official Publication of the Orthopaedic Research Society, 36(1), 2017, 183-191

A.E. Draghici, G. Picard, J.A. Taylor, S.J. Shefelbine
Assessing Kinematics and Kinetics of Functional Electrical Stimulation Rowing, Journal of Biomechanics, 53, 2017, 120-126

SELECTED RESEARCH PROJECTS

Hetrogeneity and Anisotropy in Fracture Toughness
Principal Investigator, National Science Foundation

Mechanobiology of Joint Morphogenesis: Manipulating Salamander Limbs
Prinicple 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: New Innovator Award, National Institutes of Health; Broad Institute SPARC; IRCSET Postgraduate Research Fellowship; Eureka Fellowship for Academic Excellence

SELECTED PUBLICATIONS

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

N. Slavov, B. Budnik, D. Schwab, E. Airoldi, et al.
Constant Growth Rate Can Be Supported by Decreasing Energy Flux and Increasing Aerobic Glycolysis, Cell Reports, 7(3), 2014, 705-714

SELECTED RESEARCH PROJECTS

Developing a Technology Platform for Discovering Biomarkers and Drug Targets
Principal Investigator, Sanofi iAward

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

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

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

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

E.V. Nikolaev, S.J. Rahi, E.D. Sontag
Chaos in Simple Periodically-Forced Biological Models, Biophysical Journal, 114, 2018, 1232-1240

T.H. Segall-Shapiro, E.D. Sontag, C.A. Voigt
Engineered Promoters Enable Constant Gene Expression at any Copy Number in Bacteria, Nature Biotechnology, 36, 2018, 352-358

E.D. Sontag
A Dynamical Model of Immune Responses to Antigen Presentation Predicts Different Regions of Tumor or Pathogen Elimination, Cell Systems, 4, 2017, 1-11

SELECTED RESEARCH PROJECTS

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

Model-Guided Discovery and Optimization of Navy-Relevant Cell-Based Sensors
Co-Principal Investigator, Office of Naval Research

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

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.T. Lang, E.M. Kercher, I. Rizvi, R.M. Wenham J.R. Conejo-Garcia, T. Hasan, R.A. Gatenby, H. Enderling
Illuminating the Numbers: Integrating Mathematical Models to Optimize Photomedicine Dosimetry and Combination Therapies, Frontiers of Physics, 7(46), 2019

G. Obaid, B.Q. Spring, S. Bano, T. Hasan
Activatable Clinical Fluorophore-Quencher Antibody Pairs as Dual Molecular Probes for the Enhanced Specificity of Image-Guided Surgery, Journal of Biomedical Optics, 22(12), 2017, 121607

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

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

C. Versek, A. Rissmiller, A. Tran, M. Taya, K. Chowdhury, P. Bex, S. Sridhar
Portable System for Neuro-Optical Diagnostics Using Virtual Reality Display, Military Medicine, 184(Issue Supplement_1), 2019, 584-592

P. Baldwin, A.W. Ohman, S. Tangutoori, D.M. Dinulescu, S. Sridhar
Intraperitoneal Delivery of NanoOlaparib for Disseminated Late-Stage Cancer Treatment, International Journal of Nanomedicine, 13, 2018, 8063-8074

J.E. Belz, R. Kumar, P. Baldwin, N.C. Ojo, A.S. Leal, D.B. Royce, D. Zhang, A.L. Van de Ven, K.T. Liby, S. Sridhar
Sustained Release Talazoparib Implants for Localized Treatment of BRCA1-deficient Breast Cancer, Theranostics, 7(17), 2017, 4340-4349

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

Z. Zhang, D. Sternad
The Primacy of Rhythm: How Discrete Actions Merge into a Stable Rhythmic Pattern, Journal of Neurophysiology, 121, 2019, 574-587

S. Bazzi, J. Ebert, N. Hogan, D. Sternad
Convergence and Predictability in Human Control of Dynamically Complex Objects, Chaos: An Interdisciplinary Journal of Nonlinear Science, 28(10), 2018, 103103

Z. Zhang, D. Guo, M.E. Huber, S.W. Park, D. Sternad
Exploiting the Geometry of Solution Space to Reduce Sensitivity to Neuromotor Noise, PLoS Computational Biology, 14(2), 2018, e1006013

D. Sternad
It's Not (Only) the Mean that Matters: Variability, Noise and Exploration in Skill Acquisition, Current Opinion in Behavioral Sciences, 20, 2018, 183-195

P. Maurice, N. Hogan, D. Sternad
Predictability, Effort, and (Anti-)Resonance in Complex Object Control, Journal of Neurophysiology, 120(2), 2018, 765-780

SELECTED RESEARCH PROJECTS

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

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

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

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

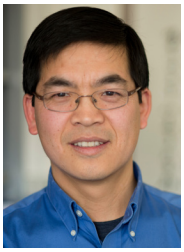
P. Qarabaqi, M. Stojanovic
Statistical Characterization and Computationally Efficient Modeling of a Class of Underwater Acoustic Channels, IEEE Journal of Oceanic Engineering, Special Issue on Underwater Communications, 38(4), 2013, 701-717

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

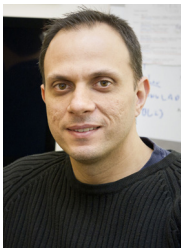
M. Yarossi, S. Adamovich, E. Tunik
Sensorimotor Cortex Reorganization in Subacute and Chronic Stroke: A Neuronavigated TMS Study, Proceedings of the IEEE Engineering in Medicine and Biology Society Annual Conference, 2014, 5788-5791

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

K.M. Goodfellow, C. Chakraborty, K. Sowers, P. Waduge, M. Wanunu, T. Krauss, K. Driscoll, A.N. Vamivakas
Distance-Dependent Energy Transfer Between CdSe/CdS Quantum Dots and a Two-Dimensional Semiconductor, Applied Physics Letters, 108, 2016, 021101

R.Y. Henley, B.A. Ashcroft, I. Farrell, B.S. Cooperman, S. Lindsay, M. Wanunu
Electrophoretic Deformation of Individual Transfer RNA Molecules Reveals Their Identity, Nano Letters, 16(1), 2016, 138-144

G-M. Mustata, Y.H. Kim, J. Zhang, W.F. DeGrado, G. Grigoryan, M. Wanunu
Graphene Symmetry Amplified by Designed Peptide Self-Assembly, Biophysical Journal, 110(11), 2016, 2507-2516

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

Patrick Bradley

PhD 2019, Bioengineering; Advisor, Jeffrey Ruberti

On The Physicochemical Control Of Collagen Fibrillogenesis And Biomineralization

Tissue engineered collagen-based scaffolds have been widely explored for their ability to provide a three-dimensional, variable-stiffness extracellular matrix mimic capable of directing local cellular morphology, differentiation, and gene expression. Of the numerous approaches to fabricate collagen scaffolds, the method that most closely emulates the density and architecture of native tissue is the liquid crystal manipulation method. Despite significant advances in the last 25 years, the development of collagen scaffolds from liquid crystal phase solutions still faces two major hurdles: 1) an inability to control orientation of fibril arrays over clinically-relevant distances; 2) an inability to recapitulate the native-state morphology of collagen fibrils in connective tissues. The goal of this dissertation was to overcome the limitations of collagen self-assembly in the crowded state through the tuning of relevant physicochemical assembly parameters.

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

Judith Piet

PhD 2019, Bioengineering; Advisor, Sandra Shefelbine

Restoring Mechano-adaptation In Aged Murine Bone

Osteoporosis is an age-related deterioration of bone mass and structure, which leads to debilitating and costly fractures. Bone is a dynamic tissue that adapts to external loads. In young and mature healthy bone, high loads promote bone formation by osteoblasts, and reduced loads promote bone resorption by osteoclasts. With age, a myriad of factors contribute to bone loss. In particular, the mechano-adaptive response is impaired in old bone, which is the focus of this thesis. The central idea behind this work is that old bone is lacking cells to respond to mechanical cues: compared to young bone, osteoclasts are more numerous and active, osteoblasts are fewer and less active, and mesenchymal stem cells in the marrow tend to differentiate into adipocytes rather than osteoblasts. In turn, osteoclastic resorption overtakes osteoblastic formation. This thesis used a mouse model to examine the decrease in mechano-adaptation in aged bone (over 20 months of age). The research questions underlying this thesis are the following: Is old bone capable of a robust osteogenic response? Can old bone be primed to increase the adaptive response to loading? This thesis used the in vivo tibial loading model to deliver controlled compressive loads, intense treadmill running to deliver physiological loading, and sciatic neurectomy to induce disuse. Marrow aspiration was used to alter marrow adipose content. Intermittent parathyroid hormone (iPTH) and IL-15 were injected to promote a potential systemic response.

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

Daniel Ventre

PhD 2019, Bioengineering; Advisor, Abigail Koppes

The Effects Of Low Intensity Focused Ultrasonic Stimulation On Dorsal Root Ganglia Neurons And Schwann Cells In Vitro

Despite current therapies for peripheral nerve injuries (PNIs), only approximately half of 20 million of patients receiving treatment each year regain satisfactory motor and sensory functionality (Grinsell & Keating, 2014). Both the prevalence and poor prognosis for PNI patients underscore a need for novel treatment options. While electrical stimulation has shown promise for nerve regeneration, it often requires invasive surgery to implant electrodes and can result in scar tissue and introduce infection. Ultrasound stimulation (US) can achieve similar regenerative effects as electrical stimulation but can be delivered completely non-invasively and at sub-millimeter resolution. In fact, US has been shown to facilitate action potential firing and synaptic vesicle release in neurons. To implement US safely as a potential therapy for PNI, the effect of US on neuronal cytoskeletal rearrangement and its effect on proximal glial cells such as Schwann cells (SCs) needs to be investigated further. Therefore, this dissertation aims to expand upon previous studies of US on neurons alone, by observing the impact of US on neuron/SC cocultures and on the SCs alone. In the studies described herein, it was determined that US can enhance neurite outgrowth and branching in DRG neurons in an acoustic intensity-dependent manner in both DRG neuron cultures alone and in DRG/SC cocultures.

See full dissertation at
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COVER IMAGE

Minhal Ahmed, E'19, bioengineering, was selected as a George J. Mitchell Scholar and named the winner of the Harold D. Hodgkinson Achievement Award for 2019, one of the highest honors a senior can receive. He is also a prior recipient of the prestigious Barry Goldwater Scholarship. Ahmed studied the gut microbiome, which refers to the bacteria, virus, and fungi in the intestines while working with Assistant Professor Abigail Koppes' Advanced Biomaterials for NeuroEngineering Laboratory (ABNEL).