Northeastern University
College of Engineering

Engineering for Society

Boldly innovating to better our world

2016 | 2017
SCHOLARSHIP REPORT
Bioengineering

WE ARE A LEADER IN EXPERIENTIAL EDUCATION AND INTERDISCIPLINARY RESEARCH, FOCUSED ON ENGINEERING FOR SOCIETY

Dear Friends,

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 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 80 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 the 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 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 applications.

Sincerely,

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

QUICK FACTS — Bioengineering

RECENT HIRES:

SAMUEL CHUNG joins the college as an Assistant Professor of Bioengineering. Dr. Chung received his PhD from Harvard University in 2009. His research interests include central nervous system regeneration and low-cost fluorescence microscopy.

» See page 11

EDUARDO SONTAG joins the college as a University Distinguished Professor, jointly appointed between Electrical and Computer Engineering and Bioengineering. Dr. Sontag received his PhD from the University of Florida in 1977. His research interests include feedback control theory, systems biology, cancer, and biomedicine.

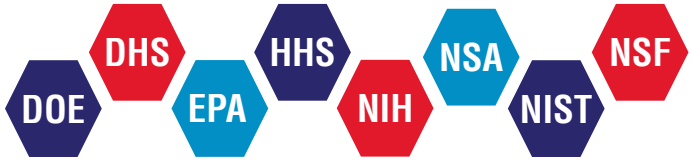
» See page 37

AFFILIATED AND T/TT FACULTY MEMBERS

331
STUDENTS

QUICK FACTS — College of Engineering

13 MULTI-INSTITUTIONAL RESEARCH CENTERS
funding by eight federal agencies



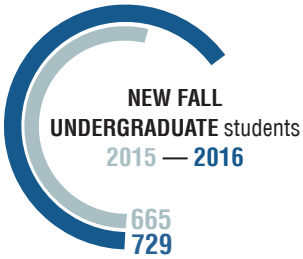
TENURED/ TENURE-TRACK Faculty

NSF CAREER Awards

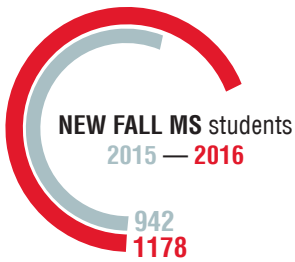
5 ENGINEERING DEPARTMENTS

Bioengineering
Chemical Engineering
Civil and Environmental Engineering
Electrical and Computer Engineering
Mechanical and Industrial Engineering

3566
UNDERGRADUATE students



3177
GRADUATE students



YOUNG INVESTIGATOR Awards

FACULTY HONORS AND AWARDS

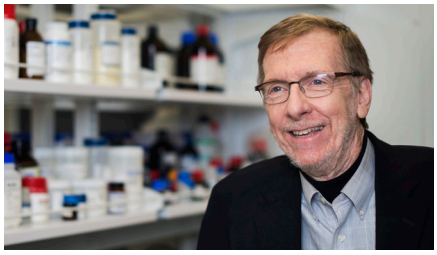
Assistant Professor **Ambika Bajpayee** was awarded a $310K DoD Peer Reviewed Medical Research Program Discovery Award. Collaborators on the grant include Sunny Zhou, professor of chemistry, and Sandra Shefelbine, associate professor of bioengineering. Bajpayee will design cartilage targeting therapies for the treatment of osteoarthritis (OA), a degenerative joint disease which affects 150 million people around the world but does not have a cure. The work promises to enable clinical translation of potential disease modifying OA drugs, which are currently limited by a lack of tissue targeting drug delivery systems.

Professor **Jeff Ruberti** was awarded a patent for "Collagen Fibrillar Construction." Methods and compositions are described for organizing collagen into fibrillar networks, e.g., short- and long-range organization. Collagen produced by the disclosed methods can be used for tissue engineering.

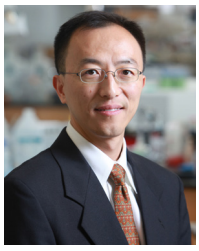
Jaclyn Lock, a PhD candidate in the Department of Bioengineering, advised by Chemical Engineering Professor **Rebecca Carrier**, was awarded first place in the Materials Engineering & Sciences Division (MESD) poster competition at the annual American Chemical Institute for Chemical Engineers (AIChE) meeting in San Francisco. Lock's poster "Dextran Sodium Sulfate Exposure Affects Intestinal Mucus Integrity" was selected out of 50 posters in the competition. Lock was also awarded a Travel Award from the Women Initiative's Committee to attend the conference.

Nikolai Slavov, assistant professor, was recognized with a $2.35 million National Institutes of Health Director's New Innovator Award. The award is part of the NIH Common Fund's High-Risk, High-Reward Research program, which supports highly creative early-career researchers taking out-of-the-box approaches to major challenges in biomedical research.

Associate Professor **Sandra Shefelbine**, jointly appointed between bioengineering and mechanial and industrial engineering, was awarded a $650K National Science Foundation grant for her project entitled, "Mechanobiology of Joint Morphogenesis: Manipulating Salamander Limbs." This project will examine the regenerating limbs of salamanders.



Bioengineering Professor and Chair **Lee Makowski's** new research findings on Alzheimer's progression were published in the journal *Scientific Reports*. The findings may mean that some strains of fibrils are associated with disease whereas others are not, and distinguishing between them may provide critical insights for developing therapies to slow, halt, or reverse the neurodegeneration associated with Alzheimer's disease.



Associate Professor **Guohao Dai** has developed a 3D bioprinter to create tissue cultures for use in disease modeling and drug discovery. Dai's research focuses on using bioengineering to generate insights into blood vessel regeneration and vascular disease. This research is a step toward fabricating tissue with blood flow, which will help the medical community.

Kritika Singh, E'21, bioengineering, was recognized with a $10,000 Thermo Fisher Scientific Antibody Scholarship based on her research, academics, and letters of recommendation. This top-level award is given annually to only two students nationwide.

Assistant Professor **Qianqian Fang** was awarded a five-year $1.7M National Institutes of Health grant for "A Versatile High-Performance Optical Mammography Co-Imager." The research will fundamentally address the current clinical limitations in x-ray mammography by developing a vendor-independent high-performance optical mammography co-imager with which optical measurements can be jointly reconstructed using the structural guidance from a separately acquired 2D or 3D digital x-ray mammogram.

FACULTY BY RESEARCH AREAS

BIOIMAGING AND SIGNAL PROCESSING

Dana Brooks
Octavia Camps
Samuel Chung
Charles DiMarzio
Jennifer Dy
Deniz Erdogmus
Qianqian Fang
Ying-Yee Kong
Lee Makowski
Edwin Marengo
Mark Niedre
Jessica Oakes
Rupal Patel
Carey Rappaport
Purnima Ratilal-Makris
Bahram Shafai
Milica Stojanovic
Gilead Tadmor
Vladmir Torchilin

BIOMEMS/BIONANO

Mansoor Amiji
Ahmed Busnaina
Heather Clark
Jack Dennerlein
Adam Ekenseair
Robert Hanson
Nicol McGruer
Hossein Mosallaei
Sanjeev Mukerjee
Shashi Murthy
Mary Jo Ondrechen
Matteo Rinaldi
Jeffrey Ruberti
Srinivas Sridhar
Nian Sun
Thomas Webster
Mark Williams

BIOMECHANICS AND MECHANOBIOLOGY

Anand Asthagiri
Ambika Bajpayee
Chiara Bellini
Guohao Dai
Eno Ebong
Andrew Gouldstone
Yingzi Lin
Sinan Müftü
Uichiro Narusawa
Hamid Nayeb-Hashemi
Jessica Oakes
Hari Parameswaran
Jeffrey Ruberti
Carmen Sceppa
Sandra Shefelbine
Ashkan Vaziri
Kai-Tak Wan

BIOCHEMICAL AND BIOENVIRONMENTAL ENGINEERING

Akram N. Alshawabkeh
Ambika Bajpayee
Rebecca Carrier
Edgar Goluch
April Gu
Robert Hanson
Ferdi Hellweger
Barry Karger
Carolyn W.T. Lee-Parsons
Kim Lewis
Shashi Murthy
Mary Jo Ondrechen

CELL AND TISSUE ENGINEERING

Anand Asthagiri
Penny Beuning
Rebecca Carrier
Erin Cram
Guohao Dai
Andrew Gouldstone
Carol Livermore
Donald O'Malley
Hari Parameswaran
Jeffrey Ruberti
Nikolai Slavov
Eduardo Sontag
Kai-Tak Wan

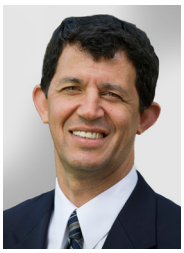
MOTOR CONTROL

Joseph Ayers
Nader Jalili
Bahram Shafai
Rifat Sipahi
Dagmar Sternad
Mario Sznaier
Gilead Tadmor

BIOCOMPUTING

Stefano Basagni
David Kaeli
Miriam Leeser
Waleed Meleis
Jessica Oakes
Hari Parameswaran

AKRAM ALSHAWABKEH



George A. Snell Professor of Engineering, Civil and Environmental Engineering; Associate Dean for Research; Director, PROTECT Superfund Research Center; affiliated faculty, Bioengineering

PhD, Louisiana State University, 1994
civ.neu.edu/people/alshawabkeh-akram

Scholarship focus: geoenvironmental engineering, soil and groundwater remediation; electrokinetic and electrochemical processes; contaminant fate and transport; environmental restoration

Honors and awards: Fellow, American Society of Civil Engineers; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

L. Rajic, R. Nazari, N. Fallahpour, A.N. Alshawabkeh
Electrochemical Degradation of Trichloroethylene in Aqueous Solution by Bipolar Graphite Electrodes, Journal of Environmental Chemical Engineering, 4(1), 2016, 197-202

N. Fallahpour, S. Yuan, L. Rajic, A.N. Alshawabkeh
Hydrodechlorination of TCE in a Circulated Electrolytic Column at High Flow Rate, Chemosphere, 144, 2016, 59-64

N. Yang, J. Cui, L. Zhang, W. Xiao, A.N. Alshawabkeh, X. Mao
Iron Electrolysis-Assisted Peroxymonosulfate Chemical Oxidation for the Remediation of Chlorophenol-contaminated Groundwater, Journal of Chemical Technology and Biotechnology, 91(4), 2016, 938-947

X. Yu, R. Ghasemizadeh, I.Y. Padilla, D. Kaeli, A.N. Alshawabkeh
Patterns of Temporal Scaling of Groundwater Level Fluctuation, Journal of Hydrology, 536, 2016, 485-495

A.M. Aker, D..J Watkins, L.E. Johns, K.K. Ferguson, O.P. Soldin, L.V. Anzalota Del Toro, A.N. Alshawabkeh, J.F. Cordero, J.D. Meeke
Phenols and Parabens in Relation to Reproductive and Thyroid Hormones in Pregnant Women, Environmental Research, 151, 2016, 30-37

SELECTED RESEARCH PROJECTS

Puerto Rico Testsite for Exploring Contamination Threats (PROTECT)
Principal Investigator, National Institutes of Health

The Center for Research on Early Childhood Exposure and Development in Puerto Rico (CRECE) Studies How Mixtures of Environmental Exposures and Other Factors Affect the Health and Development of Infants and Children Living in Puerto Rico
Director and Principal Investigator, National Institutes of Health/ Environmental Protection Agency

Induced Partial Saturation (IPS) Through Transport and Reactivity for Liquefaction Mitigation
Co-Principal Investigator, National Science Foundation

MANSOOR AMIJI

University Distinguished Professor, Pharmaceutical Sciences; affiliated faculty, Chemical Engineering, Bioengineering

PhD, Purdue University, 1992
che.neu.edu/people/amiji-mansoor

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

Honors and awards: Fellow, American Association of Pharmaceutical Scientists; Fellow, Controlled Release Society; T. Nagai Award, Controlled Release Society

SELECTED PUBLICATIONS

M. Talekar, M. Trivedi, P. Shah, Q. Ouyang, A. Oka, S.K. Gandham, M.M. Amiji
Combination wt-p53 and microRNA-125b Transfection in a Genetically Engineered Lung Cancer Model Using Dual EGFR/CD44 Targeted Nanoparticles, Molecular Therapy, 24(4), 2016, 759-769

A. Singh, J. Xu, G. Mattheolabakis, M.M. Amiji
EGFR-Targeted Gelatin Nanoparticles for Systemic Administration of Gemcitabine in an Orthotopic Pancreatic Cancer Model, Nanomedicine: Nanotechnology, Biology, and Medicine, 12(3), 2016, 589-600

S. Yadav, S.K. Gandham, R. Panicucci, M.M. Amiji
Intranasal Brain Delivery of Cationic Nanoemulsion-Encapsulated TNF siRNA for Prevention of Experimental Neuroinflammation, Nanomedicine: Nanotechnology, Biology, and Medicine, 12(4), 2016, 987-1002

D. Deshpande, S. Kethireddy, D.R. Janero, M.M. Amiji
Therapeutic Efficacy of an w-3-fatty Acid-containing Estradiol Nano-delivery System Against Experimental Atherosclerosis, PLoS ONE, 11(2), 2016

SELECTED RESEARCH PROJECTS

Combinatorial-designed Nano-platforms to Overcome Tumor Drug Resistance
Principal Investigator, National Institutes of Health

Multi-modal Gene Therapy for Pancreatic Cancer with Targeted Nanovectors
Principal Investigator, National Institutes of Health

IGERT: Nanomedical Science and Technology
Co-Investigator, National Science Foundation

Integrated Image-guided Targeted Therapy for Refractory Ovarian Cancer
Principal Investigator, Nemucore Medical Innovations, Inc.

Impact of Lipids on Compound Absorption: Mechanistic Studies and Modeling
Co-Investigator, National Institutes of Health

Hepatic Insulin Resistance and Metabolic Disease
Principal Investigator, National Institutes of Health

Targeted Platinates/siRNA Combination Therapy for Resistant Lung Cancer
Principal Investigator, National Institutes of Health

ANAND ASTHAGIRI

Associate Professor, Bioengineering; affiliated faculty, Chemical Engineering

PhD, Massachusetts Institute of Technology, 2000
bioe.neu.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

J.H. Kim, K. Kushiro, N.A. Graham, A.R. Asthagiri
Turnable Interplay Between Epidermal Growth Factor and Cell-Cell Contact Governs the Spatial Dynamics of Epithelial Growth, Proceedings of the National Academy of Sciences USA, 106(27), 2009, 11149-11153

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
bioe.neu.edu/people/ayers-joseph

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

SELECTED PUBLICATIONS

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, 2434-45

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

L. Lewis, J. Ayers
Temperature Preference and Acclimation in the Jonah Crab, Cancer Borealis, Journal of Experimental Marine Biology and Ecology, 455, 2014, 7-13

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

Biomimetics of Jellyfish Tentacles
Principal Investigator, Schlumberger Doll, Inc

RoboBees: A Convergence of Body, Brain and Colony
Principal Investigator, National Science Foundation

Modernization and Enhancement of the Seawater System and Research Infrastructure at Northeastern University's Marine Science Center
Co-Principal Investigator, National Science Foundation

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

AMBIKA BAJPAYEE

Assistant Professor, Bioengineering

PhD, Massachusetts Institute of Technology, 2015
bioe.neu.edu/people/bajpayee-ambika

Scholarship focus: targeted drug delivery to avascular connective tissues; polypeptide and protein based nanocarriers; bio-electrostatics; transport phenomena in biological systems; biomechanics; post-traumatic 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.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

A.G. Bajpayee, A.M. Sheu, A.J. Grodzinsky, R.M. Porter
Electrostatic Interactions Enable Rapid Penetration, Enhanced Uptake and Retention of Intra-articular Injected Avidin in Rat Knee Joints, Journal of Orthopaedic Research, 32(8), 2014, 1044-1051

A.G. Bajpayee, C.R. Wong, M.G. Bawendi, E.H. Frank, A.J. Grodzinsky
Avidin as a Model for Charge Driven Transport into Cartilage and Drug Delivery for Treating Early Stage PTOA, Biomaterials, 35(1), 2014, 538-549

STEFANO BASAGNI

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

PhD, University of Texas, Dallas, 2001
PhD, University of Milan, Italy, 1998
ece.neu.edu/people/basagni-stefano

Scholarship focus: Wireless networks, ad hoc networks, underwater and terrestrial sensor networking, and protocol design and testing

Honors and awards: Distinguished Scientist of the Association for Computing Machinery

SELECTED PUBLICATIONS

S. Basagni, V. Di Valerio, P. Gjanci, C. Petrioli
Finding MARLIN: Exploiting Multi-Modal Communications for Reliable and Low-latency Underwater Networking, In Proceedings of IEEE Infocom, Atlanta, GA, 2017, 1-9

M. Girolami, S. Basagni, F. Furfari, S. Chessa
SIDEMAN: Service Discovery in Mobile Social Networks, Ad Hoc & Sensor Wireless Networks, 34(1), 2016, 1-39

Y. M. Aval, Y. Han, A. Tu, S. Basagni, M. Stojanovic, Y. Fei
Testbed-Based Performance Evaluation of Handshake-Free MAC Protocols for Underwater Acoustic Sensor Networks, In Proceedings of MTS/IEEE OCEANS, Monterey, CA, 2016, 1-7

S. Basagni, C. Petrioli, D. Spenza
CTP-WUR: The Collection Tree Protocol in Wake-up Radio WSNs for Critical Applications, In Proceedings of IEEE ICNC 2016, Kauai, HI, 2016, 1-6

R.G. Cid-Fuentes, M.Y. Naderi, S. Basagni, K.R. Chowdhury, A. Cabellos-Aparicio, E. Alarcon
On Signaling Power: Communications over Wireless Energy, In Proceedings of IEEE Infocom 2016, San Francisco, CA, 2016

L. Chen, J. Warner, P.L. Yung, D. Zhou, W. Heinzelman, I. Demirkol, U. Muncuk, K.R. Chowdhury, S. Basagni
Reach2-Mote: A Range Extending Passive Wake-up Wireless Sensor Node, ACM Transactions on Sensor Networks 11, 4(64), 2015, 1-64

D. Spenza, M. Magno, S. Basagni, L. Benini, M. Paoli, et al.
Beyond Duty Cycling: Wake-up Radio with Selective Awakenings for Long-Lived Wireless Sensing Systems, Proceedings of IEEE Infocom 2015, Hong Kong, China, April 26-30, 2015

SELECTED RESEARCH PROJECTS

Cross Layer Approach to 5G: Models and Protocols
Principal Investigator, MathWorks, Inc.

Development of the Northeastern University Marine Observatory NETwork
Principal Investigator, National Science Foundation

Platforms for Advanced Wireless Research Project Office
Co-Principal Investigator for Platform Implementation, National Science Foundation

CHIARA BELLINI

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

PhD, University of Calgary, 2012
bioe.neu.edu/people/bellini-chiara

Scholarship focus: diseases of the cardiovascular system; effects of cell-mediated growth and remodeling processes on tissue and organ mechanics

SELECTED PUBLICATIONS

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

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

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

S. Roccabianca, C. Bellini, J.D. Humphrey
Computational Modelling Suggests Good, Bad and Ugly Roles of Glycosaminoglycans in Arterial Wall Mechanics and Mechanobiology, Journal of The Royal Society Interface, 2014

C. Bellini, S. Federico
Green-Naghdi Rate of the Kirchhoff Stress and Deformation Rate: the Elasticity Tensor, Zeitschrift fuer Angewandte Mathematik und Physik, 66(3), 2015, 1143-1163

C. Bellini, J. Ferruzzi, S. Roccabianca, E.S. Di Martino, J.D. Humphrey
A Microstructurally Motivated Model of Arterial Wall Mechanics with Mechanobiological Implications, Annals of Biomedical Engineering, 42(3), 2014, 488-502

SELECTED RESEARCH PROJECTS

Quantification of Pulomnary and Cardiovascular Structure and Function in Mice Exposed to Cigarettes and E-Cigarette Aerosols
Principal Investigator, Northeastern University

PENNY BEUNING

Associate Professor, Chemistry and Chemical Biology; affiliated faculty, Bioengineering

PhD, University of Minnesota, 2000
bioe.neu.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

D.A. Murison, J.N. Ollivierre, Q. Huang, D.E. Budil, P.J. Beuning
Altering the N-Terminal Arms of the Polymerase Manager Protein UmuD Modulates Protein Interactions, PLoS One, 12(3), 2017, e0173388

M. Nabuan Naufer, D.A. Murison, I. Rouzina, P.J. Beuning, M.C. Williams
Single-Molecule Mechanochemical Characterization of E. Coli pol III Core Catalytic Activity, Protein Science, 26(7), 2017, 1413-1426

L.A. Hawver, M. Tehrani, N. Antczak, D. Kania, S. Muser, J. Sefcikova, P.J. Beuning
Point Mutations in *Escherichia coli* DNA pol V that Confer Resistance to Non-Cognate DNA Damage also Alter Protein-protein Interactions, Mutation Research—Fundamental and Molecular Mechanisms of Mutagenesis, 780, 2015, 1-14

P. Nevin, X. Lu, K. Zhang, J.R. Engen, P.J. Beuning
Non-Cognate DNA Damage Prevents Formation of Active Conformation of Y-family DNA Polymerases DinB and Pol Kappa, The FEBS Journal, 282, 2015, 2646-2660

J. Fang, P. Nevin, V. Kairys, C. Venclovas, J.R. Engen, P.J. Beuning
Conformational Analysis of Processivity Clamps in Solution Demonstrates That Tertiary Structure Does not Correlate with Protein Dynamics, Structure, 22, 2014, 572-581

J.M. Walsh, P.J. Ippoliti, E.A. Ronayne, E. Rozners, P.J. Beuning
Discrimination Against Major Groove Adducts by Y Family Polymerases of the DinB Subfamily, DNA Repair, 12, 2013, 713-722

K.R. Chaurasiya, C. Ruslie, M.C. Silva, L. Voortman, P. Nevin, S. Lone, P.J. Beuning, M.C. Williams
Polymerase Manager Protein UmuD Directly Regulates *E. coli* DNA Polymerase III Binding to ssDNA, Nucleic Acids Research, 41, 2013, 8959-8968

SELECTED RESEARCH PROJECTS

Molecular Mechanisms of Polymerase Management
Principal Investigator, National Science Foundation

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

DANA BROOKS

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Northeastern University, 1991
ece.neu.edu/people/brooks-dana

Scholarship focus: Biomedical signal and image processing, medical imaging, statistical signal processing, inverse problems, electrocardiography, bio-optical imaging, magnetic resonance imaging, transcranial neuromodulation, estimation of protein conformations from x-ray scattering, regularization, and optimization

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

SELECTED PUBLICATIONS

S. Guler, M. Dannhauer, B. Erem, R. Macleod, D. Tucker, S. Turovets, P. Luu, D. Erdogmus, D.H. Brooks
Optimization of Focality and Direction in Dense Electrode Array Transcranial Direct Current Stimulation (tDCS), Journal of Neural Engineering, 13(3), 2016, 36020-36033

B. Erem, R. Martinez Orellana, D.E. Hyde, J.M. Peters, F.H. Duffy, P. Stovicek, S.K. Warfield, R.S. MacLeod, G. Tadmor, D.H. Brooks
Extensions to a Manifold Learning Framework for Time-Series Analysis on Dynamic Manifolds in Bioelectric Signals, Physical Review E, 93, 2016, 042218

A.E. Onut, M, Akcakaya, J.P. Bardhan, D. Erdogmus, D.H. Brooks, L. Makowski
Constrained Maximum Likelihood Estimation of Relative Abundances of Protein Conformation in a Heterogeneous Mixture from Small Angle X-Ray Scattering Intensity Measurements, IEEE Transactions on Signal Processing, 63(20), 2015, 5383-5394

S. Kurugol, K. Kose, B. Park, J.G Dy, D.H. Brooks, M. Rajadhyaksha
Automated Delineation of Dermal-Epidermal Junction in Reflectance Confocal Microscopy Image Stacks of Human Skin, Journal of Investigative Dermatology, 135(3), 2014

B. Erem, J. Coll-Font, R. Martinez-Orellana, P. Stovicek, D. Brooks
Using Transmural Regularization and Dynamic Modeling for non-Invasive Cardiac Potential Imaging of Endocardial Pacing with Imprecise Thoracic Geometry, IEEE Transactions on Medical Imaging, 3(3), 2014, 726-738

SELECTED RESEARCH PROJECTS

Center for Integrative Biomedical Computing
Principal Investigator, National Institutes of Health

Automated Image Guidance for Diagnosing Skin Cancer with Confocal Microscopy
Co-Investigator, National Institutes of Health

Collaborative Research: US-German Research Proposal Optimization of Human Cortical Stimulation
Principal Investigator, National Science Foundation

AHMED BUSNAINA

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

PhD, Oklahoma State University, 1983
mie.neu.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; Fulbright Senior Scholar, Outstanding Translational Research Award, Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

C. Yilmaz, A. Sirman, A. Halder, A. Busnaina
High-Rate Assembly of Nanomaterials on Insulating Surfaces Using Electro-Fluidic Directed Assembly, 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

H. Cho, S. Somu, J.-Y. Lee, H. Jeong, A. Busnaina
High–rate Nanoscale Offset Printing Process Using Directed Assembly and Transfer of Nanomaterials, Advanced Materials, 27, 2015, 1759-1766

C. Yilmaz, A.E. Cetin, G. Goutzamanidis, J. Huang, S. Somu, H. Altug, D. Wei, A. Busnaina
Three-Dimensional Crystalline and Homogeneous Metallic Nanostructures Using Directed-Assembly of Nanoparticles, ACS Nano, 8(5), 2014, 4547-4558

H.Y. Jung, Y.L. Kim, S. Park, A.A. Datar, H.–J. Lee, J. Huang, S. Somu, A. Busnaina, Y.J. Jung, Y.-K. Kwon
A High-performance H2S Detection by Redox Reactions in Semiconducting Carbon Nanotube-Based Devices, Analyst, 138(23), 2013, 7206-7211

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

Fabrication of Mechanical Metamaterials
Principal Investigator, Draper Laboratories

Development Work Regarding Biomarker Sensor Systems, Sensor Fabrication and Carbon Nanotube Material Optimization
Principal Investigator, Nano-Bio Manufacturing Consortium

OCTAVIA CAMPS

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Washington, 1992
ece.neu.edu/people/camps-octavia

Scholarship focus: robust computer vision; image processing; and machine learning

SELECTED PUBLICATIONS

O. Camps, M. Gou, T. Hebble, S. Karanam, O. Lehmann, Y. Li, R. Radke, Z. Wu, F. Xiong
From the Lab to the Real World: Re-Identification in an Airport Camera Network, IEEE Transactions on Circuits and Systems for Video Technology, 27(3), 2017, 540-553

M. Gou, S. Karanam, W. Liu, O. Camps, R.J. Radke
A Large-Scale Multi-Camera Person Re-Identification Dataset, Workshop on Target Re-Identification and Multi-Target Camera Tracking in Conjunction with Computer Vision and Pattern Recognition, 2017

X. Zhang, Y. Wang, M. Sznaier, O. Camps
Efficient Temporal Sequence Comparison and Classification Using Gram Matrix Embeddings on a Riemannian Manifold, IEEE Conference on Computer Vision and Pattern Recognition, 2016, 4498-4507

Y. Wang, O. Camps, M. Sznaier, B. Roig Solvas
Jensen Bregman LogDet Divergence Optimal Filtering in the Manifold of Positive Definite Matrices, 9911, 2016, 221-235

M. Gou, X. Zhang, A. Rates-Borras, S. Asghari-Esfeden, O. Camps, M. Sznaier
Person Re-Identification in Appearance Imparied Scenarios, British Machine Vision Conference, 2016

C. Dicle, B. Yilmaz, O. Camps, M. Sznaier
Solving Temporal Puzzles, IEEE Conference on Computer Vision and Pattern Recognition, 2016, 5896-5905

Y. Cheng, Y. Wang, M. Sznaier, O. Camps
Subspace Clustering with Priors via Sparse Quadratically Constrained Quadratic Programming, IEEE Conference on Computer Vision and Pattern Recognition, 2016, 5204-5212

SELECTED RESEARCH PROJECTS

Dynamic Invariants for Video Scenes Understanding
Principal Investigator, National Science Foundation

Robust Identification of a Class of Structured Systems with High Dimensional Outputs and Applications
Co-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
che.neu.edu/people/carrier-rebecca

Scholarship focus: interaction between biological systems and materials, with specific applications in drug delivery and regenerative medicine; intestinal and retinal engineering; oral lipid systems

Honors and awards: College of Engineering Faculty Fellow; National Academy of Engineering Frontiers of Engineering and Frontiers of Engineering Education, Selected Attendee; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

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, 035011

J. Kundu, A. Michaelson, K. Talbot, P. Baranov, M.J. Young, R.L. Carrier
Decellularized Retinal Matrix: Natural Platforms for Human Retinal Progenitor Cell Culture, Acta Biomaterialia, 31, 2016, 61-70

O. Rezhdo, L. Speciner, R.L. Carrier
Lipid-associated Oral Delivery: Mechanisms and Analysis of Oral Absorption, Journal of Controlled Release, 240, 2016, 544-560

H.M. Yildiz, L. Speciner, C. Ozdemir, D.E. Cohen, R.L. Carrier
Food-Associated Stimuli Enhance Barrier Properties of Gastrointestinal Mucus, Biomaterials, 54, 2015, 1-8

H.M. Yildiz, T.L. Carlson, A.M. Goldstein, R.L. Carrier
Mucus Barriers to Microparticles and Microbes are Altered in Hirschsprung's Disease, Macromol Biosci, 5(5), 2015, 712-718

J.R. Thiagarajah, H. Yildiz, T. Carlson, A.R. Thomas, C. Steiger, A. Pieretti, L.R. Zuckerberg, R.L. Carrier, A.M. Goldstein
Altered Goblet Cell Differentiation and Surface Mucus Properties in Hirschsprung Disease, PLoS ONE, 9(6), 2014, e99944

P. Baranov, A. Michaelson, J. Kundu, R.L. Carrier, M. Young
Interphotoreceptor Matrix-Poly(caprolactone) Composite Scaffolds for Human Photoreceptor Differentiation, Journal of Tissue Engineering, 5, 2014

SELECTED RESEARCH PROJECTS

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

Uncovering Regeneration-Permissive Cues in Lower Vertebrate Retina to Inform Retinal Regenerative Medicine
Principal Investigator, National Science Foundation

PAUL CHAMPION

Professor, Physics; affiliated faculty, Bioengineering

PhD, University of Illinois at Urbana Champaign
bioe.neu.edu/people/champion-paul

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

Honors and awards: NIH 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); Visiting Fellow, Institute of Molecular Science (Japan); Editorial Board Journal of Raman Spectroscopy

SELECTED PUBLICATIONS

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

Y. Sun, A. Benabbas, W. Zeng, S. Muralidharan, E.M. Boon, P.M. Champion
Kinetic Control of O_2 Reactivity in H-NOX Domains, Journal of Physical Chemistry B, 120, 2016, 5351-5358

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

A. Benabbas, B. Salna, J.T. Sage, P.M. Champion
Deep Proton Tunneling in the Electronically Adiabatic and Non-adiabatic Limits: Comparison of the Quantum and Classical Treatment of Donor-Acceptor Motion, Journal of Chemical Physics, 142, 2015, 114101

V. Karunakaran, Y. Sun, A. Benabbas, P.M. Champion
Investigations of the Low Frequency Modes of Ferric Cytochrome c Using Vibrational Coherence Spectroscopy, Journal of Physical Chemistry B, 118, 2014, 6062-6070

Y. Sun, A. Benabbas, W. Zeng, J.G. Kleingardner, K.L. Bren, P.M. Champion
Investigations of Heme Distortion, Low-Frequency Vibrational Excitations, and Electron Transfer in Cytochrome c, Proceedings of the National Academy of Sciences, 111, 2014, 6570-6575

SELECTED RESEARCH PROJECTS

Femtosecond Stimulated Raman Scattering, Time Resolved Dynamics, and Electron-Nuclear Coupling in Biomolecules
Principal Investigator, National Science Foundation

SAMUEL CHUNG

Assistant Professor, Bioengineering

PhD, Harvard University, 2009
bioe.neu.edu/people/chung-samuel

Scholarship focus: central nervous system regeneration model in C. elegans, femtosecond laser surgery; user-friendly and low-cost fluorescence microscopy

Honors and awards: Harvard GSAS Merit Fellowship, Newport Spectra-Physics Research Excellence Award

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

S.H. Chung, E. Mazur
Surgical Applications of Femtosecond Lasers, Journal of Biophotonics, 2, 2009, 557-572

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

PhD, University of Michigan, 1999
bioe.neu.edu/people/clark-heather

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

G. Rong, S. Corrie, H.A. Clark
In Vivo Biosensing: Progress and Perspectives, ACS Sensors, 2(3), 2017, 327-338

T.T. Ruckh, C.G. Skipwith, W. Chang, A.W. Senko, V. Bulovic, P. Anikeeva, H.A. Clark
Ion-switchable FRET Rates in Ratiometric Nanocrystal Potassium Sensors, ACS Nano, 10(4), 2016, 4020-4030

W. Di, R.S. Czarny, N.A. Fletcher, M.D. Krebs, H.A. Clark
Comparative Study of Poly(epsilon-caprolactone) and Poly(Lactic-co-Glycolic Acid)-Based Nanofiber Scaffolds for pH-Sensing, Pharmaceutical Research, 2016

A. Sahari, T.T. Ruckh, R. Hutchings, H.A. Clark
Development of an Ultra-Selective Optical Nanosensor for Potassium Imaging, Analytical Chemistry, 87(21), 2015, 10684-10687

R.P. Walsh, J. Morales, C.G. Skipwith, T.T. Ruckh, H.A. Clark
Enzyme Linked DNA Dendrimers for the Detection of Acetylcholine, Nature Scientific Reports, 2015

J.M. Morales, C.G. Skipwith, H.A. Clark
Quadruplex Integrated DNA (QuID) Nanosensors for Monitoring Dopamine, Sensors, 15(8), 2015, 19912-19924

K.J. Cash, C. Li, L.V. Wang, H.A. Clark
Photoacoustic Imaging of Nanosensors for Therapeutic Drugs, In Vivo, ACS Nano, 9(2), 2015, 1692-1698

M.K. Balaconis, Y. Luo, H.A. Clark
Glucose-Sensitive Nanofiber Scaffolds Prevent Sensor Diffusion, In Vivo, Analyst, 140, 2015, 716-723 *selected as a HOT article

SELECTED RESEARCH PROJECTS

Polymer-Free Nanosensors to Visualize Biochemical Dynamics in Dendritic Spines
Principal Investigator, National Institutes of Health

ERIN J. CRAM

Professor, Biology; affiliated faculty, Bioengineering

PhD, University of California, Berkeley, 2000
bioe.neu.edu/people/cram-erin

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

SELECTED PUBLICATIONS

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

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

M.F. Doherty, G. Adelmant, A.D. Cecchetelli, J.A. Marto, E.J. Cram
Proteomic Analysis Reveals CACN-1 is a Component of the Spliceosome in *C. elegans*, Genes, Genomes and Genetics: G3, 2014

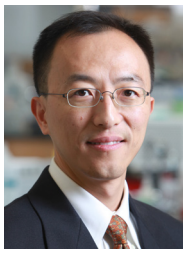
I. Kovacevic, J.M. Orozco, E.J. Cram
Filamin and Phospholipase C Epsilon are Required for Calcium Signaling in the *C. elegans* Spermatheca, PLOS Genetics,10, 2013, 1371

SELECTED RESEARCH PROJECTS

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
bioe.neu.edu/people/dai-guohao

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

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

SELECTED PUBLICATIONS

Y.W. Lu, A.M. Lowery, L.Y. Sun, H.A. Singer, G. Dai, A.P. Adam, P.A. Vincent, J.J. Schwarz
Endothelial Myocyte Enhancer Factor 2c Inhibits Migration of Smooth Muscle Cells Through Fenestrations in the Internal Elastic Lamina, Arteriosclerosis, Thrombosis, and Vascular Biology, 37(7), 2017, 1380-1390

T.B. Dorsey, A. Grath, A. Wang, C. Xu, Y, Hong, G. Dai
Evaluation of Photochemistry Reaction Kinetics to Pattern Bioactive Proteins on Hydrogels for Biological Applications, Bioactive Materials, 5, 2017

C.M. Dumont, J. Piselli, N. Kazi, E. Bowman, G. Li, R.J. Linhardt, G. Dai, D.M. Thompson
Factors Released from Endothelial Cells Exposed to Flow Impact Adhesion, Proliferation, and Fate Choise in the Adult Neural Stem Cell Lineage, Stem Cells and Development, 2017

D. Wu, R.T. Huang, R.B. Hamanaka, M.D. Krause, M.J. Oh, C.H. Kuo, R. Nigdelioglu, A.Y. Meliton, L. Witt, G. Dai, M. Civelek, N.R. Prabhakar, Y. Fang, G.M. Mutlu
HIF-1α is Required for Disturbed Flow-induced Metabolic Reprogramming in Human and Porcine Vascular Endothelium, eLife, 6, 2017, e25217

Y. Zheng, S. Wang, X. Xue, A. Xu, W. Liao, A. Deng, G. Dai, A.P. Liu, J. Fu
Notch Signaling in Regulating Angiogenesis in a 3D Biomimetic Environment, Lab Chip, 17(11), 2017, 1948-1959

SELECTED RESEARCH PROJECTS

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

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

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
bioe.neu.edu/people/dennerlein-jack

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

SELECTED PUBLICATIONS

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

J.H. Lee, D.S. Asakawa, J.T. Dennerlein, D.L. Jindrich
Finger Muscle Attachments for an OpenSim Upper-extremity Model, PLoS One, 10(4), 2015, e0121712

E.H. Sparer, R.H. Herrick, P. Catalano, J.T. Dennerlein
Safety Climate Improved Through a Safety Communication and Recognition Program for Construction: A Mixed Methods Study, Scandinavian Journal of Work, Environment, and Health, 42(4), 2016, 329-337

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

Randomized Controlled Trial of a Whole Body Vibration Intervention in Truck Drivers
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
ece.neu.edu/people/dimarzio-charles

Scholarship focus: optics, microscopy, coherent detection, interaction of light and sound waves, hyperspectral imaging, diffusive optical tomography and ultrasound, landmine detection, magneto-optic sensors, multi-model imaging, and activities include: computer modeling, designing, building and testing of hardware, and processing the resulting data

SELECTED PUBLICATIONS

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

Z. Lai, J. Kerimo, Y. Mega, C.A. DiMarzio
Stepwise Multiphoton Activation Fluorescence Reveals a New Method of Melanin Detection, Journal of Biomedical Optics,18(6), 2013, 061225

Z.R. Hoffman, C. DiMarzio
Structured Illumination Microscopy Using Random Intensity Incoherent Reflectance, Journal of Biomedical Optics, 2013

SELECTED RESEARCH PROJECTS

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

JENNIFER DY

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Purdue University, 2001
ece.neu.edu/people/dy-jennifer

Scholarship focus: machine learning; data mining; statistical pattern recognition; computer vision and image processing

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

S.M. Brown, A. Webb, R.S. Mangoubi, J.G. Dy
A Sparse Combined Regression-Classification Formulation for Learning a Physiological Alternative to Clinical Post-Traumatic Stress Disorder Scores, Twenty-Ninth AAAI Conference on Artificial Intelligence, 2015

J. Ross, P. Castaldi, M. Cho, J.G. Dy
Dual Beta Process Priors for Latent Cluster Discovery in Chronic Obstructive Pulmonary Disease, ACM SIGKDD Knowledge Discovery and Data Mining, 2014

D. Niu, J.G. Dy, M.I. Jordan
Iterative Discovery of Multiple Alternative Clustering Views, IEEE Transactions on Pattern Analysis and Machine Intelligence, 36(7), 2014, 1340-1353

Y. Yan, R. Rosales, G. Fung, J.G. Dy
Active Learning from Crowds, Proceedings of the 28th International Conference on Machine Learning (ICML), 2011, 1161-1168

Y. Guan, J.G. Dy, M.I. Jordan
A Unified Probabilistic Model for Global and Local Unsupervised Feature Selection, Proceedings of the 28th International Conference on Machine Learning (ICML), 2011, 1073-1080

M. Masaeli, G. Fung, J.G. Dy
From Transformation-Based Dimensionality Reduction to Feature Selection, Proceedings of the 27th International Conference on Machine Learning (ICML), 2010, 751-758

Y. Yan, R. Rosales, G. Fung, M. Schmidt, J.G. Dy, et al.
Modeling Annotator Expertise: Learning When Everybody Knows a Bit of Something, Proceedings of the Thirteenth International Conference on Artificial Intelligence and Statistics (AISTATS), 9, 2010, 932-939

SELECTED RESEARCH PROJECTS

Automated Image Guidance for Diagnosing Skin Cancer With Confocal Microscopy
Principal Investigator, National Institutes of Health

Genetic Epidemiology of COPD
Co-Principal Investigator, National Institutes of Health

Spatio-Temporal Extremes and Associations Marine Adaptation and Survivorship under Climate Change and Rising Ocean Temperatures
Principal Investigator, National Science Foundation

ENO EBONG

Assistant Professor, Chemical Engineering
affiliated faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2006
che.neu.edu/people/ebong-eno

Scholarship focus: studying the means by which endothelial cell mechanotransduction occurs in order to prevent or promote atherosclerosis

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

SELECTED PUBLICATIONS

S. Russell-Pulerim, N.G. Dela Paz, D. Adams, M. Chattopadhyay, L.E. Cancel, E.E. Ebong, A.W. Orr, J.A. Frangos, J.M. Tarbell
Fluid Shear Stress Induces Upregulation of COX-2 and PGI(2) Release in Endothelial Cells via a Pathway Involving PECAM-1, PI3K, FAK, and p38, American Journal of Physiology- Heart and Circulatory Physiology, 312(3), 2017, 485-500

W.T. Wong, S. Ma, X.Y. Tian, A.B. Gonzalez, E.E. Ebong, H. Shen
Targeted Delivery of Shear Stress-Inducible Micrornas by Nanoparticles to Prevent Vulnerable Atherosclerotic Lesions, Methodist Debakey Cardiovascular Journal, 12(3), 2016, 152-156

L.M. Cancel, E.E. Ebong, S. Mensah, C. Hirschberg, J.M. Tarbell
Endothelial Glycocalyx, Apoptosis and Inflammation in an Atherosclerotic Mouse Model, Atherosclerosis, 252, 2016, 136-146

M.J. Cheng, R. Kumar, S. Sridhar, T.J. Webster, E.E. Ebong
Endothelial Glycocalyx Conditions Influence Nanoparticle Uptake for Passive Targeting, International Journal of Nanomedicine, 11, 2016, 3305-3315

E. Ebong, S.V. Lopez-Quintero, V. Rizzo, D.C. Spray, J.M. Tarbell
Shear-Induced Endothelial NOS Activation and Remodeling via Heparin Sulfate, Glypican-1, and Syndecan-1, Integrative Biology: Quantitative Biosciences from Nano to Macro, 6(3), 2014, 338-347

M. Thi, E. Ebong, D. Spray, S. Suadicani
Interaction of the Glycocalyx with the Actin Cytoskeleton, Neuromethods, Springer Publishing, 79, 2013, 43-62

E. Ebong, N. Depaola
Specificity in the Participation of Connexin Proteins in Flow-Induced Endothelial Gap Junction Communication, European Journal of Physiology, 465(9), 2013, 1293-302

SELECTED RESEARCH PROJECTS

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

ADAM EKENSEAIR

Assistant Professor, Chemical Engineering;
affiliated faculty, Bioengineering

PhD, University of Texas at Austin, 2010
che.neu.edu/people/ekenseair-adam

Scholarship focus: synthesis and application of novel polymeric biomaterials for tissue engineering and regenerative medicine

SELECTED PUBLICATIONS

O.M. Pehlivaner Kara, A.K. Ekenseair
Free Epoxide Content Mediates Encapsulated Cell Viability and Activity through Protein Interactions in a Thermoresponsive, In Situ Forming Hydrogel, Biomacromolecules, 18(5), 2017, 1473-1481

O.M. Pehlivaner Kara, A.K. Ekenseair
In Situ Spray Deposition of Cell-Loaded, Thermally and Chemically Gelling Hydrogel Coatings for Tissue Regeneration, Journal of Biomedical Materials Research, Part A, 2016

T.N. Vo, A.K. Ekenseair, P.P. Spicer, B.M. Watson, S.N. Tzouanas, T.T. Roh, A.G. Mikos
In Vitro and In Vivo Evaluation of Self-Mineralization and Biocompatibility of Injectable, Dual-Gelling Hydrogels for Bone Tissue Engineering, Journal of Controlled Release, 205, 2015, 25-35

S.N. Tzouanas, A.K. Ekenseair, F.K. Kasper, A.G. Mikos
Mesenchymal Stem Cell and Gelatin Microparticle Encapsulation in Thermally and Chemically Gelling Injectable Hydrogels for Tissue Engineering, Journal of Biomedical Materials Research, Part A, 102(5), 2014, 1222-1230

A.K. Ekenseair, F.K. Kasper, A.G. Mikos
Perspectives on the Interface of Drug Delivery and Tissue Engineering, Advanced Drug Delivery Reviews, 65, 2013, 89-92

A.K. Ekenseair, K.W.M. Boere, S.N. Tzouanas, T.N. Vo, F.K. Kasper, A.G. Mikos
Structure-Property Evaluation of Thermally and Chemically Gelling Injectable Hydrogels for Tissue Engineering, Biomacromolecules, 13, 2012, 2821-2830

SELECTED RESEARCH PROJECTS

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

Injectable, Multifunctional Polymeric Nanocomposites for Osteochondral Tissue Repair
Principal Investigator, Northeastern University

Solid Supported Lipase Inhibitors for the Treatment of Acute Pancreatitis
Co-Principal Investigator, Northeastern University

DENIZ ERDOGMUS

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

PhD, University of Florida, 2002
ece.neu.edu/people/erdogmus-deniz

Scholarship focus: brain computer interfaces, cognitive and interactive systems, nonlinear and statistical signal processing, information theory, and machine learning

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

SELECTED PUBLICATIONS

B.S. Oken, U. Orhan, B. Roark, D. Erdogmus, A. Fowler, A. Mooney, B. Peters, M. Miller, M. Fried Oken
Brain Computer Interface with Language ModelEEG Fusion for Lockedin Syndrome, Neurorehabilitation and Neural Repair, 28(4), 2014, 387-394

A. Fowler, B. Roark, U. Orhan, D. Erdogmus, M. Fried-Oken
Improved Inference and Autotyping in EEGbased BCI Typing Systems, ASSETS 2013, Bellevue, WA, Oct 2013

H. Nezamfar, U. Orhan, S. Purwar, K. Hild, B. Oken, D. Erdogmus
Decoding of Multichannel EEG Activity from the Visual Cortex in Response to Pseudorandom Binary Sequences of Visual Stimuli, International Journal of Imaging Systems and Technology, 21(2), 2011, 139-147

Y. Huang, D. Erdogmus, M. Pavel, S. Mathan, K.E. Hild II
A Framework for Rapid Visual Image Search Using Singletrial Brain Evoked Responses, Neurocomputing, 74, 2011, 2041-2051

D. Erdogmus
BCI: A Timely Opportunity for Projectbased Learning, National Academy of Engineering Frontiers in Engineering Education Workshop, Irvine, California, Dec 2010

SELECTED RESEARCH PROJECTS

CAREER: Signal Models, Channel Capacity, and Information Rate for Noninvasive Brain Interfaces
Principal Investigator, National Science Foundation

Automated Classification of Retinopathy of Prematurity using Machine Learning
Investigator, National Institutes of Health

Strengthening Human Adaptive Reasoning and Problem Solving (SHARP)
Co-Principal Investigator, Intelligence Advanced Research Projects Activity

The Rehabilitation Engineering Research Center on Augmentative and Alternative Communication
Co-Principal Investigator, U.S. Department of Education

QIANQIAN FANG

Assistant Professor, Bioengineering

PhD, Dartmouth College, 2005
bioe.neu.edu/people/fang-qianqian

Scholarship focus: innovations in translational medical imaging devices to better diagnose cancers, 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

R. Yao, X. Intes, Q. Fang
Generalized Mesh-Based Monte Carlo for Wide-Field Illumination and Detection Via Mesh Retessellation, Biomedical Optics Express, 7(1), 2016, 171-184

B. Deng, M. Fradkin, J.M. Rouet, R.H. Moore, D.B. Kopans, D.A. Boas, M. Lundqvist, Q. Fang
Characterizing Breast Lesions Through Robust Multi-Modal Data Fusion Using Independent Diffuse Optical and X-Ray Breast Imaging, Journal of Biomedical Optics Letters, 20(8), 2015, 080502, 1-4

B. Deng, D. H. Brooks, D. A. Boas, M. Lundqvist, Q. Fang
Characterization of Structural-Prior Guided Optical Tomography Using Realistic Breast Models Derived from Dual-Energy X-Ray Mammography, Biomedical Optics Express, 6(7), 2015, 2366-2379

Q. Fang, J. Selb, S. A. Carp, et al.
Combined Optical and Tomosynthesis Breast Imaging, Radiology, 258(1), 2011, 89-97 *cover article

Q. Fang
Mesh-Based Monte Carlo Method Using Fast Ray-Tracing in Plücker Coordinates, Biomedical Optics Express, 1(1), 2010, 165-175 *top-downloaded paper

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

Non-contact Mobile Oximeter for Rapid Birth Asphyxia and Childhood Pneumonia Assessment
Principal Investigator, US Agency for International Development

EDGAR GOLUCH

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

PhD, University of Illinois, 2007
che.neu.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

H.J. Sismaet, A.J. Pinto, E.D. Goluch
Electrochemical Sensors for Identifying Pyocyanin Production in Clinical Pseudomonas Aeruginosa Isolates, Biosensors and Bioelectronics, 97, 2017, 65–69

H.J. Sismaet, A. Banerjee, S. McNish, Y. Choi, M. Torralba, S. Lucas, A. Chan, V.K. Shanmugam, E.D. Goluch
Electrochemical Detection of Pseudomonas in Wound Exudate Samples from Patients with Chronic Wounds, Wound Repair and Regeneration, 24(2), 2016, 366-372 *featured in a George Washington University press release

T.A. Webster, H.J. Sismaet, I.J. Chan, E.D. Goluch
Electrochemically Monitoring the Antibiotic Susceptibility of Pseudomonas aeruginosa Biofilms, Analyst, 140, 2015, 7195-7201

P.N. Abadian, N. Yildirim, A.Z. Gu, E.D. Goluch
SPRi-Based Adenovirus Detection Using a Surrogate Antibody Method, Biosensors and Bioelectronics, 74, 2015, 808-814

K. Mathwig, T. Albrecht, E.D. Goluch, L. Rassaei
Challenges of Biomarker Detection at the Nanoscale: Nanopores and Microelectrodes, Analytical Chemistry, 87, 2015, 5470-5475

T.A. Webster, H.J. Sismaet, A.F. Sattler, E.D. Goluch
Improved Monitoring of P. aeruginosa on Agar Plates, Analytical Methods, 7, 2015, 7150-7155 *emerging investigator themed issue

G.E. Aninwene II, P.N. Abadian, V. Ravi, E.N. Taylor, D.M. Hall, A. Mei, G.D. Jay, E.D. Goluch, T.J. Webster
Lubricin: A Novel Means to Decrease Bacterial Adhesion and Proliferation, Journal of Biomedical Materials Research, Part A, 103, 2015, 451-462

P.N. Abadian, E.D. Goluch
Using Surface Plasmon Resonance Imaging (SPRi) to Evaluate Bacterial Adhesion on Surface Coatings, Analytical Methods, 7, 2015, 115-122, *featured as a hot article in Analytical Methods

SELECTED RESEARCH PROJECTS

EAGER: Bio-Inspired Electrochemical Sensing of Small Molecules Using Antibodies
Principal Investigator, National Science Foundation

IDBR: TYPE A Nano-Constriction Devices for Isolation and Cultivation of Environmental Microbes
Principal Investigator, National Science Foundation

ANDREW GOULDSTONE

Associate Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering, Chemical Engineering

PhD, Massachusetts Institute of Technology, 2001
mie.neu.edu/people/gouldstone-andrew

Scholarship focus: biomechanics; material science; engineering mechanics

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

SELECTED PUBLICATIONS

T. Hu, S. Zhalehpour, A. Gouldstone, et al.
A Method for the Estimation of the Interface Temperature in Ultrasonic Joining, Metallurgical And Materials Transactions A-Physical Metallurgy And Materials Science, 45A(5), 2014, 2545-2552

C.T. Nguyen, H.M. Gonnermann, Y. Chen, A. Gouldstone
Film Drainage and the Lifetime of Bubbles, Geochemistry Geophysics Geosystems, 14(9), 2013, 3616-3631

J.H. Kim, A. Gouldstone, C.S. Korach
Analysis of Spherical Indentation of an Elastic Bilayer Using a Modified Perturbation Approach, MEMS and Nanotechnology, 4, 2011, 53-57

B. Choi, Y. Wu, S. Sampath, A. Gouldstone
Modified Indentation Techniques to Probe Inelasticity in Ni5%Al Coatings from Different Processes, Journal of Thermal Spray Technology, 18(1), 2009, 65-74

L.H. Weng, A. Gouldstone, Y.H. Wu, W.L. Chen
Mechanically Strong Double Network Photocrosslinked Hydrogels from N,N-Dimethylacrylamide and Glycidyl Methacrylated Hyaluronan, Biomaterials, 29(14), 2008, 2153-2163

SELECTED RESEARCH PROJECTS

GARDE: An Interdisciplinary Approach to Accommodate Fine Motor Control Disorders
Co-Principal Investigator, National Science Foundation

APRIL GU

COE Professor and Faculty Scholar, Civil and Environmental Engineering; affiliated faculty, Bioengineering, Marine and Environmental Sciences

PhD, University of Washington, 2003
civ.neu.edu/people/gu-april

Scholarship focus: application of biotechnology for water quality improvement; biological treatment processes andbioremediation; ecotoxicology and toxicity assessment; biosensors for water quality monitoring

Honors and awards: Fellow, Water Environment Federation; College of Engineering Faculty Fellow; National Science Foundation CAREER Award; National Science Foundation Education BRIGE Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

J. Lan, N. Gou, S. Rahman, C. Gao, M. He, A. Gu
A Quantitative Toxicogenomics Assay for High-Throughput and Mechanistic Genotoxicity Assessment and Screening of Environmental Pollutants, Environmental Science and Technology, 50(6), 2016, 3202–3214

S. Rahman, M. Eckelman, A. Onnis-Hayden, A. Gu
Life Cycle Assessment of Advanced Nutrient Removal Technologies for Wastewater Treatment, Environmental Science and Technology, 50(6), 2016, 3020-3030

D. Li, S. Zeng, M. He, A. Gu
Water Disinfection Byproducts Select for Antibiotic Resistance-Role of Environmental Pollutants in Resistance Phenomena, Environmental Science and Technology, 50(6), 2016, 3193-3201

Y. Li, X. Wang, A. Onnis-Hayden, K.-T. Wan, A. Gu
Universal Quantifier Derived from AFM Analysis Links Cellular Mechanical Properties and Cell-Surface Integration Forces with Microbial Deposition and Transport Behavior, Environmental Science and Technology, 48(3), 2014, 1769-1778

N. Yildirim, F. Long, C. Gao, M. He, H.C. Shi, A. Gu
Aptamer-Based Optical Biosensor for Rapid and Sensitive Detection of 17 ß-Estradiol in Water Samples, Environmental Science and Technology, 46(6), 2012, 3288-3294

SELECTED RESEARCH PROJECTS

CRECE-Center for Research on Early Childhood Exposure and Development in Puerto Rico
Project Principal Investigator, National Institute of Environmental Health Sciences

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

PROTECT-The Puerto Rico Testsite for Exploring Contamination Threats Program
Co-Principal Investigator, National Institute of Environmental Health Sciences

Mechanistic and Predictive Genotoxicity Assessment of Nanomaterials
Principal Investigator, National Science Foundation

ROBERT HANSON

Professor, Medicinal Chemistry; affiliated faculty, Bioengineering

PhD, University of California, Berkeley, 1973
bioe.neu.edu/people/hanson-robert

Scholarship focus: bioorganic and medicinal chemistry

Honors and awards: Fellow, National Science Foundation; Fellow, National Institutes of Health

SELECTED PUBLICATIONS

R.N. Hanson, P. Tongcharoensirikul, K. Barnesley, M.J. Ondrechen, A. Hughes, E.R. DeSombre
Synthesis and Evaluation of 2-halogenated-1,1-bis(4-hydroxyphenyl)-2-(3-hydroxyphenyl)-Ethylenes as Potential Estrogen Receptor-Targeted Radiodiagnostic and Radiotherapeutic Agents, Steroids, 96, 2015, 50-62

P.T. Weiser, C.-Y. Chang, DP. McDonnell, R.N. Hanson
Synthesis and Preliminary Evaluation of 4,4'-Unsymmetrically Substituted 3,3' Biphenyls as Alpha Helical Proteomimetics, Bioorganic and Medicinal Chemistry, 22, 2014, 917-926

E.B. Corcoran, R.N. Hanson
Imaging EGFR and HER2 by PET and SPECT: A Review, Medicinal Research Reviews, 34(3), 2013, 596-643

SELECTED RESEARCH PROJECTS

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

Combinatorial-Designed Nano-Platforms to Overcome Tumor Drug Resistance
Co-Principal Investigator, National Institutes of Health

FERDI HELLWEGER

Associate Professor, Civil and Environmental Engineering; affiliated faculty, Bioengineering, Marine and Environmental Sciences

ScD, Columbia University, 2004
civ.neu.edu/people/hellweger-ferdinand

Scholarship focus: surface water quality, microbial ecology and systems bioecology (the combination of systems biology and systems ecology)

Honors and awards: Environmental Merit Award, U.S. Environmental Protection Agency

SELECTED PUBLICATIONS

F.L. Hellweger
75 Years Since Monod: It is Time to Increase the Complexity of Our Predictive Ecosystem Models (opinion), Ecological Modelling, 346, 2017, 77-87

F.L. Hellweger, R.J. Clegg, J. Clark, C.M. Plugge, J.-U. Kreft
Advancing Microbial Research by Simulation: Tehcnologies for Individual-based Modelling, Nature Reviews Microbiology, 14, 2016, 461-471

F.L. Hellweger, N.D. Fredrick, M.J. McCarthy, W.S. Gardner, S. Wilhelm, H.W. Paerl
Dynamic, Mechanistic, Molecular-Level Modeling of Cyanobacteria: *Anabaena* and Nitrogen Interaction, Environmental Microbiology, 18(8), 2016, 2721-2731

F.L. Hellweger, E. van Sebille, B.C. Calfee, J.W. Chandler, E.R. Zinser, B.K. Swan, N.D. Fredrick
Ocean Currents Distort Temperature Selection of Plankton: Insights from an Individual-Based Model, PLoS ONE, 11(12), 2016, e0167010

F.L. Hellweger
100 Years Since Streeter and Phelps: It is Time to Update the Biology in Our Water Quality Models, Environmental Science and Technology, 49(11), 2015, 6372-6373

F.L. Hellweger, N. Fredrick, J.A. Berges
Age-correlated Stress Resistance Improves Fitness of Yeast: Support from Agent-Based Simulations, BMC Systems Biology, 8(18), 2014, 1-10

F.L. Hellweger, E. van Sebille, N.D. Fredrick
Biogeographic Patterns in Ocean Microbes Emerge in a Neutral Agent-Based Model, Science, 345(6202), 2014, 1346-1349

SELECTED RESEARCH PROJECTS

Charles River Swimming Water Quality Monitoring and Assessment
Principal Investigator, Charles River Conservancy

Development of a Next Generation Model for Predicting Cyanobacterial Toxicity: Integrating Molecular, Cellular, and Environmental Dynamics
Principal Investigator, Environmental Protection Agency/Sceince To Acheive Results

NADER JALILI

Professor and Associate Chair for Graduate Studies and Research, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering

PhD, University of Connecticut, 1998
mie.neu.edu/people/jalili-nader

Scholarship focus: piezoelectric-based actuators and sensors, dynamic modeling and vibration control of distributed-parameters systems, dynamics and control of MEMS and NEMS sensors and actuators, control and manipulation at the nanoscale

Honors and awards: Fellow, American Society of Mechanical Engineers; National Science Foundation CAREER Award; Northeastern University Excellence in Teaching Award; College of Engineering Translational Research Award; College of Engineering Martin Essigman Outstanding Teaching Award

SELECTED PUBLICATIONS

M. Khabiry, N. Jalili
A Microfluidic Platform Containing Sidewall Microgrooves for Cell Positioning and Trapping, Nanobiomedicine, 2015

S. Faegh, N. Jalili, S. Sridhar
A Novel Sensor System Utilizing Piezoelectric Microcantilever Coupled with Resonating Circuit, US Patent, 2015

S. Faegh, N. Jalili, S. Sridhar
Ultrasensitive Piezoelectric-Based Microcantilever Biosensor: Theory and Experiment, IEEE/ASME Transactions on Mechatronics, 20(1), 2015, 308-312

S. Eslami, N. Jalili
Model Development and Boundary Interaction Force Control of A Piezoresistive-based Microcantilever, Robotica, 2014, 1-19

S. Faegh, N. Jalili
Comprehensive Distributed-parameters Modeling and Experimental Validation of Microcantilever-based Biosensor with Application to Ultrasmall Biological Species Detection, Journal of Micromechanics and Microengineering, 23(2), 2013, 025007

N. Jalili
Piezoelectric-Based Vibration Control: From Macro to Micro/Nano Scale Systems, Springer, New York, NY, 1st Ed., 2010, 517 pages, with 293 figures

SELECTED RESEARCH PROJECTS

High Temperature and High Acceleration End-effector Pads for Semiconductor Applications – Phases I-III: Carbon Nanotube (CNT)-Based Surface Treatment for Improved Adhesion and Friction Properties
Principal Investigator, Brooks Automation Inc.

Robotic Leg Advancement Device
Principal Investigator, National Science Foundation

The Gear Bearing Drive: A Novel Compact Actuator for Robotic Joints
Principal Investigator, National Science Foundation

DAVID KAELI

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

PhD, Rutgers University, 1992
ece.neu.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

A. Jadidi, M. Arjomand, M. Tavana, D. Kaeli, M. Kandemir, C. Das
Exploring the Potential for Collaborative Data Compression and Hard-Error Tolerance in Resistive Memories, 47th IEEE/IFIP International Conference on Dependable Systems and Networks, 2017

X. Gong, Z. Chen, A. K. Ziabari, R. Ubal, David Kaeli
TwinKernels: An Execution Model to Improve GPU Hardware Scheduling at Compile Time, Proceedings of the 2017 International Symposium on Code Generation and Optimization, 2017, 39-49

Z.-H. Jiang, Y. Fei, D. Kaeli
A Complete Key Recovery Timing Attack on a GPU, Proceedings of the IEEE International Symposium on High Performance Computer Architecture, 2016, 394-405

SELECTED RESEARCH PROJECTS

Engineering Strong, Highly Conductive Nanotube Fibers via Fusion
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

Multi-Agent Modeling Framework for Mitigating Distributed Disruptions in Critical Supply Chains
Co-Principle Investigator, National Science Foundation

Puerto Rico Testsite for Exploring Environmental Contamination Threats
Co-Principal Investigator, National Institutes of Environmental Health Sciences

Side-Channel Analysis and Resiliency Targeting Accelerators
Principle Investigator, National Science Foundation and Semiconductor Research Corporation

ALAIN KARMA

Professor, Physics; affiliated faculty, Bioengineering

PhD, University of California at Santa Barbara, 1985
coe.neu.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

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

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

YING-YEE KONG

Associate Professor, Speech Language Pathology and Audiology; affiliated faculty, Bioengineering

PhD, University of California, Irvine, 2004
bioe.neu.edu/people/kong-ying-yee

Scholarship focus: auditory perception in hearing-impaired and cochlear-implant listeners

SELECTED PUBLICATIONS

Y.-Y. Kong, A. Mullangi, K. Kokkinakis
Classification of Fricative Consonants for Speech Enhancement in Hearing Devices, PLOS One, 9(4), 2014, e95001

R.W. Schlosser, Howard C. Shane, Ying-Yee Kong, et al.
Effects of Environmental Sounds on the Guessability of Animated Graphic Symbols, Augmentative and Alternative Communication, 30(4), 2014, 298-313

T. Lee, S. Yu, M. Yuan, T. Wong, Y.-Y. Kong
The Effect of Enhancing Temporal Periodicity Cues on Cantonese Tone Recognition by Cochlear Implantees, International Journal of Audiology, 53(8), 2014, 546-557

Y.-Y. Kong, A. Mullangi
Using a Vocoder-Based Frequency-Lowering Method and Spectral Enhancement to Improve Place-of-Articulation Perception for Hearing-impaired Listeners, Ear and Hearing, 34, 2013, 300-312

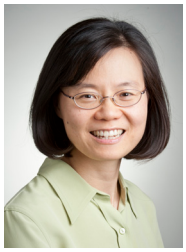
Y.-Y. Kong, A. Mullangi
On the Development of a Frequency-Lowering System that Enhances Place-of-Articulation Perception, Speech Communication, 54, 2012, 147-160

SELECTED RESEARCH PROJECTS

Hearing Acuity Cognitive Aging and Memory for Speech
Principal Investigator, National Institutes of Health

Speech Perception with Combined Electric and Acoustic Stimulation
Principal Investigator, National Institutes of Health

CAROLYN LEE-PARSONS



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

PhD, Cornell University, 1995
che.neu.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

SELECTED PUBLICATIONS

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

S. Goklany, N. Rizvi, R.H. Loring, E.J. Cram, C.W.T. Lee-Parsons
Jasmonate-dependent Alkaloid Biosynthesis in *Catharanthus roseus* is Correlated with the Relative Expression of Orca and Zct Transcription Factors, Biotechnology Progress, 29(6), 2013, 1367-1376

N. Rizvi, S. Goklany, E.J. Cram, C.W.T. Lee-Parsons
Rapid Increases of Key Regulators Precede the Increased Production of Pharmaceutically Valuable Compounds in *Catharanthus roseus*, Pharmaceutical Engineering, 33(6), 2013, 1-8

SELECTED RESEARCH PROJECTS

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

MIRIAM LEESER

Professor and Interim Chair, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Cambridge University, 1988
ece.neu.edu/people/leeser-miriam

Scholarship focus: accelerators for compute intensive applications: reconfigurable hardware and graphics processing units (GPUs); applications including biocomputing, machine learning, software-defined radio; uses and implementations of computer arithmetic

SELECTED PUBLICATIONS

M. Sabbagh, M. Uecker, A.J. Powell, M. Leeser, M.H. Moghari
Cardiac MRI Compressed Sensing Image Reconstruction with a Graphics Processing Unit, International Symposium on Medical Information and Communication Technology (ISMICT), 2016

R. Subramanian, B. Drozdenko, E. Doyle, R. Ahmed, M. Leeser, K.R. Chowdhury
High-Level System Design of IEEE 802.11b Standard-Compliant Link Layer for MATLAB-Based SDR, IEEE Access, 4, 2016, 149-1509

B. Drozdenko, M. Zimmermann, T. Dao, K. Chowdhury, M. Leeser
Modeling Considerations for the Hardware-Software Co-design of Flexible Modern Wireless Transceivers, 22nd International Conference on Field Programmable Logic and Applications (FPL), 2016

X. Fang, M. Leeser
Open-source Variable-precision Floating-point Library for Major Commercial FPGAs, ACM Transactions on Reconfigurable Technology Systems, 9(3), 2016

N. Moore, M. Leeser, L. Smith King
Kernel Specialization Provides Adaptable GPU Code for Particle Image Velocimetry, IEEE Transactions on Parallel and Distributed Systems, 26(4), 2015, 1049-1058

M. Leeser, S. Mukherjee, J. Brock
Fast Reconstruction of 3D Volumes from 2D CT Projection Datawith GPUs, Biomed Central Research Notes, 7(528), 2014

X. Wang, M. Leeser
VFloat: A Variable Precision Fixed and Floating-Point Library for Reconfigurable Hardware, ACM Transactions on Reconfigurable Technology and Systems, 3(3), 2010, 1-34

X. Wang, M. Leeser
K-means Clustering for Multispectral Images Using Floating point Divide, IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM), 2007, 151-162

SELECTED RESEARCH PROJECTS

Ensuring Reliability and Portability of Scientific Software for Heterogeneous Architectures
Co-Principal Investigator, National Science Foundation

Hardware/Software Implementations of WiFi and LTE Communications
Principal Investigator, Mathworks

DANIELLE LEVAC

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

PhD, McMaster University, 2012
bioe.neu.edu/people/levac-danielle

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

SELECTED PUBLICATIONS

D. Levac, H. Sveistrup, M. Levin, A. McCormack, M. Brien, R. Mills
Active Video Gaming Home Exercise Programs for Children with Cerebral Palsy: Does a Clinic-Based Virtual Reality Intervention Component Offer an Additive Benefit? A Pilot Study, Physical & Occupational Therapy in Pediatrics, 2017, 1-14

D. Levac, J. Nawrotek, E. Deschenes, T. Giguere, J. Serafin, M. Bilodeau, H. Sveistrup
Development and Reliability Evaluation of the Movement Rating Instrument for Virtual Reality Video Game Play, JMIR Serious Games, 4(1), 2016

C. Dematteo, M. Rubinoff, D. Greenspoon, D. Levac
Evaluating the Contribution of the Nintendo Wii in Assessing Return to Activity Readiness in Youth With Mild Traumatic Brain Injury, Physical and Occupational Therapy in Pediatrics, 34(3), 2014, 229-244

D. Levac, P. Miller
Integrating Virtual Reality Video Games into Therapy: Clinician's Experiences, Physiotherapy Theory Practice, 29(7), 2013, 504-512

D. Levac, C. Missiuna, L. Wishart, C. DeMatteo, V. Wright
The Motor Learning Strategy Instrument: Inter-rater Reliability Within Usual and Virtual Reality Physical Therapy Interventions, Pediatric Physical Therapy, 25(1), 2013, 53-60

D. Levac, J. Galvin
When is Virtual Reality 'Therapy'?, Archives of Physical Medicine and Rehabilitation, 94(4), 2013, 795-798

SELECTED RESEARCH PROJECTS

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

Is Motor Leanring Enhanced by Practice in a Virtual Environment for Children with Cerebral Palsy?
Principal Investigator, Charles H. Hood Foundation

Usability Evaluation of the FITBoard: A Motivating, Movement-based Rehabilitation Tool for Children with Disabilities
Principal Investigator, Deborah C. Noonan Memorial Research Fund

KIM LEWIS

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

PhD, Moscow University, 1980
bioe.neu.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

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
*co-corresponding authors

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

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

K. Lewis
Platforms for Antibiotic Discovery, Nature Reviews Drug Discovery, 12, 2013, 371-387

I. Keren, Y. Wu, J. Innocencio, L. Mulcahy, K. Lewis
Killing by Bactericidal Antibiotics Does Not Depend on Reactive Oxygen Species, Science, 339, 2013, 1213-1216

K. Lewis
Recover the Lost Art of Drug Discovery, Nature, 485, 2012, 439-440

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

YINGZI LIN

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

PhD, University of Saskatchewan, 2004
mie.neu.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

M. Yu, Y. Lin, J. Breugelmans, X. Wang, G. Gao, X. Tang
A Spatial-Temporal Trajectory Clustering Algorithm for Eye Fixations Identification, International Journal of Intelligent Data Analysis, 20(2), 2016, 377-393

P. Wan, C. Wu, Y. Lin, X. Ma, Z. Huang
A Recognition Model of Driving Anger Based on Belief Rule Base, Transportation Systems Engineering and Information, 15(5), 2015, 1-8

M. Yu, Y. Lin, X. Wang, D. Schmidt, Y. Wang
Human-Robot Interaction Based on Gaze Gesture for the Drone Teleoperation, Journal of Eye Movement Research, 7(4), 2014, 1-14

S. Radhakrishnan, Y. Lin, A. Zeid, S. Kamarthi
Design, Evaluation and Implementation of Gesture Based Functions for CAD Modeling System Using the Multitouch Interface, International Journal of Human-computer Studies, 71(3), 2013, 261-275

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

G. Yang, Y. Lin, P. Bhattacharya
A Driver Fatigue Recognition Model Based on Information Fusion and Dynamic Bayesian Network, Information Sciences, 180, 2010, 1942-1954

SELECTED RESEARCH PROJECTS

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

Integrated Individualized Modeling towards Cognitive Control of Human-Machine Systems
Principal Investigator, National Science Foundation

CAROL LIVERMORE

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

PhD, Harvard University, 1998
mie.neu.edu/people/livermore-clifford-carol

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

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

SELECTED PUBLICATIONS

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

Yang, C., 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

S. Liu, C. Martin, D. Lashmore, M. Schauer, C. Livermore
Carbon Nanotube Torsional Springs for Regenerative Braking Systems, Journal of Micromechanics and Microengineering, 25(10), 2015, 104005

N.S. Shaar, G. Barbastathis, C. Livermore
Integrated Folding, Alignment, and Latching for Reconfigurable Origami MEMS, Journal of Microelectromechanical Systems, 24(4), 2015, 1043-1051

T. Liu, R. St. Pierre, C. Livermore
Passively-Switched Energy Harvester for Increased Operational Range, Smart Materials and Structures, 23(9), 2014, e095045

X. Xie, Y. Zaitsev, L.F. Velásquez-García, S. Teller, C. Livermore
Scalable, MEMS-enabled, Vibrational Tactile Actuators for High Resolution Tactile Displays, Journal of Micromechanics and Microengineering, 24(12), 2014, 125014

SELECTED RESEARCH PROJECTS

DMREF: Engineering Strong, Highly Conductive Nanotube Fibers Via Fusion
Co-Principal Investigator, National Science Foundation

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
bioe.neu.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

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, 55, Biochemistry, 2016, 3251-3260

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. 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

H. Inouye, D. Houde, D.B. Temel, L. Makowski
Utility of Solution X-Ray Scattering for the Development of Antibody Biopharmaceuticals, Journal of Pharmaceutical Science, 105, 2016, 3278-3289

SELECTED RESEARCH PROJECTS

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

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.

EDWIN MARENGO

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

PhD, Northeastern University, 1997
ece.neu.edu/people/marengo-fuentes-edwin

Scholarship focus: theoretical and applied electromagnetics, theoretical and applied optics, scattering theory, wave inverse problems, noniterative inverse scattering, physics-based signal processing and imaging, change detection theory and applications, compressive sensing, electromagnetic information theory, analysis and design of optical and quantum holographic detectors

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

J. Tu, E.A. Marengo
Generalized Likelihood Ratio Test Change Detection with Optical Theorem Constraint, Journal of the Optical Society of America A, 33, 2016, 2225-2236

E.A. Marengo, J. Tu
Generalized Optical Theorem in the Time Domain, Progress in Electromagnetics Research B, 65, 2016, 1-18

E.A. Marengo, J. Tu
Optical Theorem Detectors for Active Scatterers, Waves in Random and Complex Media, 25, 2015, 682-707

E.A. Marengo
Nonuniqueness of Optical Theorem Detectors, Journal of the Optical Society of America A, 32, 2015, 1936-1942

E.A. Marengo
Inverse Diffraction Theory and Computation of Minimum Source Regions of far Fields, Mathematical Problems in Engineering, 513953, 2014, 1-18

E.A. Marengo, J. Tu
Optical Theorem for Transmission Lines, Progress in Electromagnetics Research B, 61, 2014, 253-268

E.A. Marengo
A New Theory of the Generalized Optical Theorem in Anisotropic Media, IEEE Transactions on Antennas and Propagation, 61, 2013, 2164-2179

NICOL MCGRUER

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

PhD, Michigan State University, 1983
ece.neu.edu/people/mcgruer-nicol

Scholarship focus: MEMS, NEMS, RF MEMS; nanotechnology; micro/nanofabrication; microsystems; microrelay; nanoswitch; microspectrometer; microfluidics; organic FETs, organic solar cells

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

SELECTED PUBLICATIONS

S.D. Berger, N.E. McGruer, G.G. Adams
Simulation of Dielectrophoretic Assembly of Carbon Nanotubes Using 3D Finite Element Analysis, Nanotechnology, 26(15), 2015, 155602

A. Basu, R.P. Hennessy, G.G. Adams, N.E. McGruer
Hot Switching Damage Mechanisms in MEMS Contacts - Evidence and Understanding, Journal of Micromechanics and Microengineering, 24, 2014, 105004

Y.-C. Wu, N. McGruer, G.G. Adams
Adhesive Slip Process Between a Carbon Nanotube and a Substrate, Journal of Physics D: Applied Physics, 46, 2013, 175305

R.P. Hennessy, A. Basu, G.G. Adams, N. McGruer
Hot-switched Lifetime and Damage Characteristics of MEMS Switch Contacts, Journal of Micromechanics and Microengineering, 23, 2013

H. Pan, Y.-C. Wu, G.G. Adams, G.P. Miller, N. McGruer
Interfacial Shear Stress Between Single-walled Carbon Nanotubes and Gold Surfaces With and without an Alkanethiol Monolayer, Journal of Colloid and Interface Science, 407, 2013, 133-139

C. Pramanik, Y. Li, A. Singh, W. Lin, J.L. Hodgson, J.B. Briggs, S. Ellis, P. Müller, N.E. McGruer, G.P. Miller
Water Soluble Pentacene, Journal of Materials Chemistry C, 1, 2013, 2193-2201

P. Ryan, Y.-C. Wu, S. Somu, G. Adams, N. McGruer
Single Walled Carbon Nanotube Electromechanical Switching Behavior with Shoulder Slip, Journal of Micromechanics and Microengineering, 21, 2011, 045028

SELECTED RESEARCH PROJECTS

PLASMID (Plasmonic Microelectromechanical Infrared Digitizer), Zero-Power Sensor
Co-Principal Investigator, Defense Advanced Research Projects Agency

Zero Power Sensors (ZePS), RF Wake-up
Co-Principal Investigator, Defense Advanced Research Projects Agency

WALEED MELEIS

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

PhD, University of Michigan, 1996
ece.neu.edu/people/meleis-waleed

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

Honors and awards: 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, 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

L. Hayward, S. Ventura, M. Mahanna, W. Meleis
Inter-Professional Collaboration between Physical Therapy, Speech Language Pathology and Engineering Faculty and Students to Address Global Pediatric Rehabilitation Needs: A Case Report, Journal of Physical Therapy Education, 30(4), 2016

C. Wu, W. Li, W. Meleis,
Rough Sets-based Prototype Optimization in Kanerva-based Function Approximation, IEEE/WIC/ACM International Conference on Intelligent Agent Technology, 2015

J. Radford, B. Keegan, J. Hoye, C. Karbeyaz, K. Ognyanova, B. Foucault Welles, W. Meleis, D. Lazer
Conducting Massively Open Online Social Experiments with Volunteer Science, International AAAII Conference on Web and Social Media, 2015

L. Sallaway, S. Magee, J. Shi, F. Quivira, K. Tgavalekos, D. Brooks, S, Muftu, W. Meleis, R. Moore, D. Kopans, K-T, Wan
Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, Experimental Mechanics, 54(6), 2014, 935-942

J. Tai, J. Zhang, J. Li, W. Meleis, N. Mi
ArA: Adaptive Resource Allocation for Clouds under Burst Workloads, Proceedings of the IEEE International Performance Computing and Communications Conference, Orlando, Florida, 2011, 1-8

HOSSEIN MOSALLAEI

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of California, Los Angeles, 2001
ece.neu.edu/people/mosallaei-hossein

Scholarship focus: electromagnetics and optics, quantum systems, nanoscale materials and metamaterials, nanoantennas, THz-IR Devices, multiscale computation and mathematical-numerical models

SELECTED PUBLICATIONS

S. Jafar-Zanjani, M.M. Salary, H. Mosallaei
Metafabrics for Thermoregulation and Energy-Harvesting Applications, ACS Photonics, 4(4), 2017, 915-927

A. Forouzmand, H. Mosallaei
Real-Time Controllable and Multi-Functional Metasurfaces Utilizing Indium Tin Oxide Materials: A phased Array Prospective, IEEE Transactions on Nanotechnology, 16(2), 2017, 296-306

A. Forouzmand, H. Mosallaei
Shared Aperture Antenna for Simultaneous Two-Dimensional Beam Steering at Near-Infrared and Visible, Journal of Nanophotonics, 11(1), 2017, 010501

M.M. Salary, A. Forouzmand, H. Mosallaei
Model Order Reduction of Large-Scale Metasurfaces Using a Hierarchical Dipole Approximation, ACS Photonics, 4(1), 2016, 63-75

J. Cheng, H. Mosallaei
Truly Achromatic Optical Metasurfaces: A Filter Circuit Theory Based-Design, JOSA B, 32(10), 2015, 2115-2121

J. Cheng, D. Ansari, H. Mosallaei
Wave Manipulation with Designer Dielectric Metasurfaces, Optics Lett, 39(21), 2014, 6285-6288

SELECTED RESEARCH PROJECTS

Designer Solids Nanoantennas and Material
Principal Investigator, Army Research Office

MURI, Multiscale Mathematical Modeling and Design Realization of Novel 2D Functional Materials
Co-Principal Investigator, Army Research Office

Nanoantennas for Engineering Waves on the Surface
Principal Investigator, Air Force Office of Scientific Research

SİNAN MÜFTÜ

Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering, Civil and Environmental Engineering

PhD, University of Rochester, 1994
mie.neu.edu/people/muftu-sinan

Scholarship focus: mechanics and tribology of axially moving materials, webs; numerical simulation of tissue healing and bone remodeling; high velocity impact of micron scale particles

Honors and awards: Fellow, American Society of Mechanical Engineers; Søren Buus Outstanding Research Award, College of Engineering; Martin W. Essigman Outstanding Teaching Award, College of Engineering

SELECTED PUBLICATIONS

B. Yildirim, H. Yang, A. Gouldstone, S. Müftü
Rebound Mechanics of Micrometre-Scale, Spherical Particles in High Velocity Impacts, Proceedings of the Royal Society of London A, 473, 2017, 20160936

T. Kaşikci, M.-C. Weng, A. Nayak, T. Goker, S. Müftü
Contact Mechanics of a Thin, Tensioned, Translating Tape with a Grooved Roller, Journal of Tribology, 2017

W. Xie, A. Alizadeh-Dehkharghani, Q. Chen, V.K. Champagne, X. Wang, A. Nardi, S. Kooi, S. Müftü, J.-H. Lee
Dynamics and Extreme Plasticity of Metallic Microparticles in Supersonic Collisions, Nature Scientific Reports, 2017

Q. Sheng, A.J. White, S. Müftü
Indentation of Polytetrafluoroethylene (PTFE) Thin-Film: Simulations by Using Continuum Damage Mechanics, Tribology Transactions, 60(1), 2017, 114-120

H. Yang, J.B.C. Engelen, W.A. Haberle, M. Lantz, S. Müftü
Lateral Friction Behavior of a Thin, Tensioned Tape Wrapped over a Grooved-Roller: Experiments and Theory, Journal of Tribology, 139(2), 2017, 021605

Q. Chen, F.C. Meral, S. Müftü, M. Akcakaya, K. Tuncali
Model-based Optimal Planning of Hepatic Radiofrequency Ablation, Mathematical Medicine and Biology, 2016

SELECTED RESEARCH PROJECTS

Collaborative Research: Mechano-Lipidomics and Mechano-Cytosis of Drug Delivery Liposomes
Co-Principal Investigator, National Science Foundation

Improving Theoretical Models of Advanced Tape Transport Systems
Principal Investigator, Oracle Corporation

Multi-Scale Investigations of Particle Impact in Cold-Spray
Technical Point of Contact, Army Research Laboratory

SANJEEV MUKERJEE

College of Science Distinguished Professor, Chemistry and Chemical Biology; affiliated faculty, Bioengineering, Chemical Engineering

PhD, Texas A&M University, 1994
bioe.neu.edu/people/mukerjee-sanjeev

Scholarship focus: physical/materials chemistry

SELECTED PUBLICATIONS

Q. Jia, N. Ramaswamy, U. Tylus, K. Strickland, J. Li, A. Serov, K. Artyushkova, P. Atanassov, J. Anibal, C. Gumeci, S. Calabrese Barton, M.-T. Sougrati,.F. Jaouen, B. Halevi, S. Mukerjee
Spectroscopic Insights into the Nature of Active Sites in Iron-Nitrogen-Carbon Electrocatalysts for Oxygen Reduction in Acid and the Redox Mechanisms, Nano Energy, 2016, A290-A301

M.K. Bates, Q. Jia, H. Doan, W. Liang, S. Mukerjee
Charge-Transfer Effects in Ni–Fe and Ni–Fe–Co Mixed-Metal Oxides for the Alkaline Oxygen Evolution Reaction, ACS Catalysis, 6, 2016, 155-161

Q. Jia, J. Li, K. Caldwell, D.E. Ramaker, J.M. Ziegelbauer, R.S. Kukreja, A. Kongkanand, S. Mukerjee
Circumventing Metal Dissolution Induced Degradation of Pt-Alloy Catalysts in Proton Exchange Membrane Fuel Cells: Revealing the Asymmetric Volcano Nature of Redox Catalysis, ACS Catalysis, 6, 2016, 928-938

E. Bayram, G. Yilmaz, S. Mukerjee
A Solution-Based Procedure for Synthesis of Nitrogen Doped Graphene as an Efficient Electrocatalyst for Oxygen Reduction Reactions in Acidic and Alkaline Electrolytes, Applied Catalysis B: Environmental, 192, 2016, 26-34

G. Lin, P.Y. Chong, V. Yarlagadda, T.V. Nguyen, R.J.Wycisk, P.N. Pintauro, M. Bates, S. Mukerjee, M.C. Tucker, A.Z. Weber
Advanced Hydrogen-Bromine Flow Batteries with Improved Efficiency, Durability and Cost, Journal of The Electrochemical Society, 163(1), 2016, A5049

K. Strickland, E. Miner, Q. Jia, U. Tylus, N. Ramaswamy, W. Liang, M.-T. Sougrati, F. Jaouen, S. Mukerjee
Highly Active Oxygen Reduction Non-Platinum Group Metal Electrocatalyst Without Direct Metal–Nitrogen Coordination, Nature Communications, 6, 2015, 7343

SELECTED RESEARCH PROJECTS

Innovative Non-PGM Catalysts for CH P Relevant Proton Conducting Membranes
Principal Investigator, US Department of Energy

Solid Acid Fuel Cell Stack for Distributed Generation Applications
Co-Principal Investigator, Advanced Research Projects Agency-Energy

Precious Metal Free Regenerative Hydrogen Electrode
Co-Principal Investigator, Advanced Research Projects Agency-Energy

SHASHI MURTHY

Professor, Chemical Engineering; Director, Sherman Center; affiliated faculty, Bioengineering, Mechanical and Industrial Engineering

PhD, Massachusetts Institute of Technology, 2003
che.neu.edu/people/murthy-shashi

Scholarship focus: microfluidic isolation of stem and progenitor cells, point-of-care diagnostics, cell surface phenomena during microfluidic flow, nanoscale probes for cell stimulation, and biopassive/bioactive coatings for neurological implants

Honors and awards: Fellow, American Institute for Medical and Biological Engineering; College of Engineering Faculty Fellow; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

C.H. Do Prado, T. Narahari, F.H. Holland, H-N. Lee, S.K. Murthy, H.C. Brenhouse
Effects of Early Adolescent Environmental Enrichment on Cognitive Dysfunction, Prefrontal Cortex Development, and Inflammatory Cytokines After Early Life Stress, Developmental Psychobiology, 2016, 58, 482-491

L. Calvier, E. Legchenko, L. Grimm, H. Sallmon, A. Hatch, B. D. Plouffe, C. Schroeder, J. Bauersachs, S.K. Murthy, G. Hansmann
Galectin-3 and Aldosterone as Potential Tandem Biomarkers in Pulmonary Arterial Hypertension, Heart, 102, 2016, 390-396
Editor's Choice

D. Bavli, E. Ezra, D. Kitsberg, M. Vosk-Artzi, S.K. Murthy, Y. Nahmias
One Step Antibody-Mediated Isolation and Patterning of Multiple Cell Types in Microfluidic Devices, Biomicrofluidics,10, 2016, 024112

D.I. Walsh, S.K. Murthy, A. Russom
Ultra-High-Throughput Sample Preparation System for Lymphocyte Immunophenotyping Point-of-Care Diagnostics, Journal of Laboratory Automation 2016

SELECTED RESEARCH PROJECTS

Automated Patient-Specific Dendritic Cell Generation for Transciptomics-Drive Vaccinology
Principal Investigator, National Institutes of Health

Cleavable Surface Coatings for Microfluidic Devices
Principal Investigator, US-Israel Binational Science Foundation

EAGER: Biomanufacturing: Development of a Quantitative Framework of Directed Stem Cell Differentiation in Scalable Bioreactors
Co-Principal Investigator, National Science Foundation

Testing and Characterization of Endovascular Shunt Prototypes
Principal Investigator, CereVasc, LLC

UICHIRO NARUSAWA

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

PhD, University of Michigan, 1972
mie.neu.edu/people/narusawa-uichiro

Scholarship focus: biomechanics on respiratory systems; turbine blade cooling

SELECTED PUBLICATIONS

F. Forghan, O. Askari, U. Narusawa, H. Metghalchi
Computational Design of Turbine Blade Film Cooling with Expanded Exit Holes, Proceedings of ASME Turbo Expo, 2015

M. Nabian, U. Narusawa
Ventilator Optimization from P-V (Pressure-Volume) Curve Analyses of Animal Models for Lung Injury, International Mechanical Engineering Congress & Exposition (IMECE), 2015, 52472

F. Forghan, O. Askari, U. Narusawa, H. Metghalchi
Film Cooling of Turbine Blade Surface with Extended Exit Holes, Proceedings of the ASME 2014 8th International Conference on Energy Sustainability and 12th Fuel Cell Sci. Eng. Tech. Conf., ES-FuelCell, 2014, 1-7

F. Forghan, U. Narusawa, H. Metghalchi
Discharge Coefficient of an Expanded Exit Hole for Film Cooling of Turbine Blades, American Institute of Aeronautics and Astronautics Journal of Propulsion Power, 26, 2010, 1322-1325

H. Liu, P.R. Patil, U. Narusawa
On Darcy-Brinkman Equation: Viscous Flow Between Plates Packed with Regular Square Arrays of Cylinders, Entropy, 9, 2007,118-131

R. Amini, K. Creeden, U. Narusawa
A Mechanistic Model for Quasi-Static Pulmonary Pressure-Volume Curves for Inflation, Journal of Biomechanical Engineering, 127, 2005, 619-629

H. Liu, U. Narusawa
Flow-Induced Endothelial Surface Reorganization and Minimization of Entropy Generation Rate, ASME Journal of Biomechanical Engineering, 126, 2004, 346-350

HAMID NAYEB-HASHEMI

Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering

PhD, Massachusetts Institute of Technology, 1982
mie.neu.edu/people/nayeb-hashemi-hamid

Scholarship focus: biomechanics and mechanics

Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

A. Orsi, S. Chakravarthy, P. Canavan, E. Pena, R. Goebel, A. Vaziri, H. Nayeb-Hashemi
The Effect of Knee Joint Kinematics on the Anterior Cruciate Ligament Injury and Articular Cartilage Damage, Computer Methods in Biomechanics and Biomedical Engineering, 19(5), 2015, 493-506

R. Oftadeh, V. Entezari, G. Sporri J. C. Villa-Camacho, H. Krigbaum, E. Strwich, L. Graham, C. Rey, H. Chiu, R. Muller, H. Nayeb-Hashemi, A.Vaziri, A. Nazarian
Hierarchical Analysis and Multi-Scale Modelling of Rat Cortical and Trabecular Bone, Journal of the Royal Society Interface, 2015

M. Ashrafi, C.J. Woodsum, J. Papadopoulos, A.S. Hamouda, H. Nayeb-Hashemi, A. Vaziri
In Situ Strengthening of Thin-Wall Structures Using Pressurized Foam, Construction and Building Materials, 100, 2015, 298-304

J. Papadopoulos, H. Nayeb-Hashemi, A. Vaziri, et al.
Buckling of Regular, Chiral and Hierarchical Honeycombs Under a General Macroscopic Stress State, Proceedings of The Royal Society A, 470(2167), 2014, 1-23

S. Banijamali, A. Vaziri, H. Nayeb-Hashemi, et al.
Effects of Different Loading Patterns on the Trabecular Bone Morphology of the Proximal Femur Using Adaptive Bone Remodeling, Journal of Biomechanical Engineering, ASME, 137(1), 2014, 1-10

A. Ajdari, A.Hamouda, H. Nayeb-Hashemi, A. Vaziri, et al.
Impact Resistance and Energy Absorption of Regular and Functionally Graded Hexagonal Honeycombs with Cell Wall Material Strain Hardening, International Journal of Mechanical Sciences, 89, 2014, 413-422

SELECTED RESEARCH PROJECTS

High-Performance Biodegradable Composites from Qatari Date Palm Waste
Principal Investigator, National Priorities Research Program

Knee Injury Prevention and Osteoarthritis Risk in Obesity
Co-Principal Investigator, National Priorities Research Program

Novel Multi Functional Composite Sandwich Panel
Principal Investigator, National Priorities Research Program

MARK NIEDRE

Associate Professor Bioengineering

PhD, University of Toronto, 2004
ece.neu.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

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

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

N. Pestana, L. Mortensen, J. Runnels, M. Niedre, et al.
An Improved Prototype Diffuse Fluorescence Flow Cytometer for High Sensitivity Detection of Rare Circulating Cells In Vivo, Journal of Biomedical Optics, 18(7), 2013, 77002

Y. Mu, N. Valim, M. Niedre
Evaluation of a Fast Single-photon Avalanche Photodiode for Measurement of Early Transmitted Photons Through Diffusive Media, Optics Letters, 38(12), 2013, 2098-2100

N. Valim, J. Brock, M. Leeser, M. Niedre
The Effect of Temporal Impulse Response on Experimental Reduction of Photon Scatter in Time-Resolved Diffuse Optical Tomography, Physics in Medicine and Biology, 58(2), 2013, 335-349

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

PhD, University of San Diego, 2013
bioe.neu.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, 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

J.M. Oakes, A.L. Marsden, C. Grandmont, C. Darquenne, I.E. Vignon-Clementel
Distribution of Aerosolized Particles in Healthy and Emphysematous Rat Lungs: Comparison Between Experimental and Numerical Studies, Journal of Biomechanics, 48(6), 2015, 1147-1157

C. Darquenne, M.G. Borja, J.M. Oakes, E.C. Breen, I.M. Olfert, M. Scadeng, G.K. Prisk
Increase in Relative Deposition of Fine Particles in the Rat Lung Periphery in the Absence of Gravity, Journal of Applied Physiology, 117(8), 2014, 880-886

J.M. Oakes, E. Breen, M. Scadeng, G.S. Tchantchou, C. Darquenne
MRI-Based Measurements of Aerosol Deposition in the Lung of Healthy and Elastase-Treated Rats, Journal of Applied Physiology, 116(12), 2014, 1561-1568

J.M. Oakes, A.L. Marsden, C. Grandmont, S.C. Shadden, C. Darquenne, I.E. Vignon-Clementel
Airflow and Particle Deposition Simulations in Health and Emphysema: From in Vivo to in Silico Animal Experiments, Annals of Biomedical Engineering, 42(4), 2014, 899-914

J.M. Oakes, M. Scadeng, E.C. Breen, G. Kim Prisk, C. Darquenne
Regional Distribution of Aerosol Deposition in Rat Lungs Using Magnetic Resonance Imaging, Annals of Biomedical Engineering, 41(5), 2013, 967-978

J.M. Oakes, M. Scadeng, E.C. Breen, A.L. Marsden, C. Darquenne
Rat Airway Morphometry Measured from in Situ MRI-Based Geometric Models, Journal of Applied Physiology. 112(11), 2012, 1921-1931

DONALD O'MALLEY

Associate Professor, Biology; affiliated faculty, Bioengineering

PhD, Harvard, 1989
bioe.neu.edu/people/omalley-donald

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

SELECTED PUBLICATIONS

D. 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. 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. 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; affiliated faculty, Bioengineering

PhD, Northwestern University, 1978
bioe.neu.edu/people/ondrechen-mary-jo

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

SELECTED PUBLICATIONS

E. Mongeau, G. Yuan, Z. Minden, S. Waldron, R. Booth, D. Felsing, M.J. Ondrechen, G.B. Jones
Homology Modeling Inspired Synthesis of 5-HT2A Inhibitors: A Diazepine Analogue of the Atypical Antipsychotic JL13, Central Nervous System Agents in Medicinal Chemistry, 2017

R. Parasuram, C.L. Mills, Z. Wang, S. Somasundaram, P.J. Beuning, M.J. Ondrechen
Local Structure Based Method for Prediction of the Biochemical Function of Proteins: Application to Glycoside Hydrolases, Methods, 93, 2016, 51-63

C.L. Mills, P.J. Beuning, M.J. Ondrechen
Biochemical Functional Predictions for Protein Structures of Unknown or Uncertain Function, Computational and Structural Biotechnology Journal, 13, 2015, 182-191

H.R. Brodkin, N.A. DeLateur, S. Somarowthu, C.L. Mills, W.R. Novak, P.J. Beuning, D. Ringe, M.J. Ondrechen
Prediction of Distal Residue Participation in Enzyme Catalysis, Protein Science, 24(5), 2015, 762-778

R.N. Hanson, P. Tongcharoensirikul, K. Barnsley, M.J. Ondrechen, A. Hughes, E.R. DeSombre
Synthesis and Evaluation of 2-halogenated-1,1-bis(4-hydroxyphenyl)-2-(3-hydroxyphenyl)-ethylenes as Potential Estrogen Receptor-targeted Radiodiagnostic and Radiotherapeutic Agents, Steroids, 96, 2015, 50-62

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

HARI PARAMESWARAN

Assistant Professor, Bioengineering

PhD, Boston University, 2009
bioe.neu.edu/people/parameswaran-harikrishnan

Scholarship focus: In-situ interactions of organized cellular structures in tissue with their extracellular matrix (ECM); airway smooth muscle-ECM interactions under static and dynamic stretch conditions

SELECTED PUBLICATIONS

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, N.M. Williams, K.T. Rooney, Z.H. Chen, M.P. Goldklang, G. Yuan, S.C. Moore, D.L. Demeo, T.A. Rouault, J.M. D'Armiento, E.A. Schon, G. Manfredi, J. Quackenbush, A. Mahmood, E.K. Silverman, C.A. Owen, A.M. Choi
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

E.B.Suki, J. Imsirovic, H. Parameswaran, T. Wellman, N Martinez, P.G. Allen, U. Frey, B. Suki
Fluctuation-Driven Mechanotransduction Regulates Mitochondrial-Network Structure and Function, Nature Materials, 14, 2015, 1049-1057

B. Suki, H. Parameswaran
Computational Modeling Helps Uncover Mechanisms Related to the Progression of Emphysema, Drug Discovery Today, 70(27-28), 2014, 4245-4249

H. Parameswaran, K.R. Lutchen, B. Suki
A Computational Model of the Response of Adherent Cells to Stretch and Changes in Substrate Stiffness, Journal of Applied Physiology 116(7), 2014, 825-834

S.R. Polio, H. Parameswaran, E.P. Canovic, D. Stamenovic, M.L. Smith
Topographical Control of Multiple Cell Adhesion Molecules for Traction Force Microscopy, Integrative Biology, 6(3), 2014, 357-365

SELECTED RESEARCH PROJECTS

Advanced Image-Based Approach to Assess How Fibrillar Collagen Modulates Airway Reactivity
Principal Investigator, R21 Award, National Institutes of Health/ National Heart, Lung, and Blood Institute

Extracellular Determinants of Airway Smooth Muscle Force: A New Paradigm for Sustained Airway Constriction
Principal Investigator, R00 Award, National Institutes of Health/ National Heart, Lung, and Blood Institute

RUPAL PATEL

Professor, Communication Science and Disorders; jointly appointed, College of Computer and Information Science; affiliated faculty, Bioengineering, Electrical and Computer Engineering

PhD, University of Toronto, 2000
ece.neu.edu/people/patel-rupal

Scholarship focus: speech sciences; speech motor control in neuromotor speech disorders; multimodal interfaces for assistive communication; personal health informatics

SELECTED PUBLICATIONS

R.I Patel, D. Erdogmus, et al.
RSVP IconMessenger: Icon-Based Brain-Interfaced Alternative and Augmentative Communication, Brain-Computer Interfaces, 1(3-4), 2014, 192-203

R. Patel, H. Kember, S. Natale
Feasibility of Augmenting Text With Visual Prosodic Cues to Enhance Oral Reading, Speech Communication, 65, 2014, 109-118

T. Mills, H.T. Bunnell, R. Patel
Towards Personalized Speech Synthesis for Augmentative and Alternative Communication, Augmentative and Alternative Communication, 30(3), 2014, 226-236

R. Patel, K. Connaghan, D. Franco, E. Edsall, D. Forgit, et al.
"The Caterpillar": A Novel Reading Passage for Assessment of Motor Speech Disorders, American Journal of Speech-Language Pathology, 22(1), 2013, 1-9

K. Wiegand, R. Patel
Non-syntactic Word Prediction for AAC, Proceedings of the Third Workshop on Speech and Language Processing for Assistive Technologies, 2012, 28-36

K. Wiegand, R. Patel
SymbolPath: A Continuous Motion Overlay Module for Icon-Based Assistive Communication, Proceedings of the 14th International ACM SIGACCESS Conference on Computers and Accessibility, 2012, 209-210

SELECTED RESEARCH PROJECTS

EAGER: Wireless Sensing of Speech Kinematics and Acoustics for Remediation
Principal Investigator, National Science Foundation

Minimally Verbal ASD: From Basic Mechanisms to Innovative Interventions
Co-Principal Investigator, National Institutes of Health

Multimodal Speech Translation for Assistive Communication
Principal Investigator, National Institutes of Health

CAREY RAPPAPORT

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

PhD, Massachusetts Institute of Technology, 1987
ece.neu.edu/people/rappaport-carey

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

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

SELECTED PUBLICATIONS

G. Ghazi, C. Rappaport, J.A. Martinez-Lorenzo
Improved SAR Imaging Contour Extraction Using Smooth Sparsity-Driven Regularization, IEEE Antennas and Wireless Propagation Letters, 15(2), 2016, 266-269

B. Gonzalez-Valdes, Y. Alvarez, S. Mantzavinos, C.M. Rappaport, F. Las-Heras, J.A. Martinez-Lorenzo
Improving Security Screening: A Comparison of Multistatic Radar Configurations for Human Body Imaging, IEEE Antennas and Propagation Magazine, 58(4), 2016, 35-47

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

Y. Alvarez, Y. Rodriguez-Vaqueiro, B. Gonzalez-Valdes, C. Rappaport, F. Las-Heras, J.A. Martinez-Lorenzo
Three-Dimensional Compressed Sensing-based Millimeter-Wave Imaging, IEEE Transactions on Antennas and Propagation, 63(12), 2015, 5868-5873

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

PURNIMA RATILAL-MAKRIS

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

PhD, Massachusetts Institute of Technology, 2002
ece.neu.edu/people/ratilal-makris-purnima

Scholarship focus: remote sensing; underwater acoustics; acoustical oceanography; bioacoustics; ultrasound imaging; nonlinear scattering; wave propagation in random media; signal, image and array processing; statistical inference theory

Honors and awards: Presidential Early Career Award for Scientists and Engineers; Office of Naval Research Young Investigator Award

SELECTED PUBLICATIONS

Z. Gong, A.D. Jain, D. Tran, P. Ratilal, et al.
Ecosystem Scale Acoustic Sensing Reveals Humpback Whale Behavior Synchronous with Herring Spawning Processes and Re-Evaluation Finds No Effect of Sonar on Humpback Song Occurrence in the Gulf of Maine in Fall 2006, PLoS ONE, 9(10), 2014, e104733

D. Tran, W. Huang, A. Bohn, D. Wang, N. Makris, P. Ratilal, et al.
Using a Coherent Hydrophone Array for Observing Sperm Whale Range, Classification, and Shallow-water Dive Profiles, The Journal of the Acoustical Society of America, 135(6), 2014, 3352-3363

Z. Gong, D. Tran, P. Ratilal
Comparing Passive Source Localization and Tracking Approaches With a Towed Horizontal Receiver Array in an Ocean Waveguide, The Journal of the Acoustical Society of America, 134, 2013, 3705-3720

Z. Gong, T. Chen, P. Ratilal, N. Makris
Temporal Coherence of the Acoustic Field Forward Propagated Through a Continental Shelf with Random Internal Waves, The Journal of the Acoustical Society of America, 134, 2013, 3476-3485

D. Tran, M. Andrews, P. Ratilal
Probability Distribution for Energy of Saturated Broadband Ocean Acoustic Transmission: Results from Gulf of Maine 2006 Experiment, Journal of the Acoustical Society of America, 132, 2012, 3659-2672

M. Andrews, Z. Gong, P. Ratilal
Effects of Multiple Scattering, Attenuation and Dispersion in Waveguide Sensing of Fish, Journal of the Acoustical Society of America, 130, 2011, 1253-1271

MATTEO RINALDI

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

PhD, University of Pennsylvania, 2010
ece.neu.edu/people/rinaldi-matteo

Scholarship focus: understanding and exploiting the fundamental properties of micro/nanomechanical structures and advanced nanomaterials to engineer new classes of micro and nanoelectromechanical systems (M/NEMS) with unique and enabling features applied to the areas of chemical, physical and biological sensing and low power reconfigurable radio communication systems

Honors and awards: IEEE Sensors Council Early Career Award; National Science Foundation CAREER Award; Defense Advanced Research Projects Agency Young Faculty Award

SELECTED PUBLICATIONS

Z. Qian, S. Kang, V. Rajaram, C. Cassella, N. McGruer, M. Rinaldi
Zero Power Infrared Digitizers Based on Plasmonically-enhanced Micromechanical Photoswitches, Nature Nanotechnology, 2017

C. Cassella, Y. Hui, Z. Qian, G. Hummel, M. Rinaldi
Aluminum Nitride Cross-Sectional Lamé Mode Resonators, IEEE/ASME Journal of Microelectromechanical Systems, 25(2), 2016, 275-285

C. Cassella, G. Chen, Z. Qian, G. Hummel, M. Rinaldi
Cross-sectional Lamé Mode Ladder Filters for UHF Wideband Applications, IEEE Electron Device Letters, 37, 2016, 681-683

Y. Hui, J. S. Gomez-Diaz, Z. Qian, A. Alu', M. Rinaldi
Plasmonic Piezoelectric Nanomechanical Resonator for Spectrally Selective Infrared Sensing, Nature Communications, 7, 2016, 11249

Z. Qian, F. Liu, Y. Hui, S. Kar and M. Rinaldi
Graphene as a Massless Electrode for Ultra-high-frequency Piezoelectric Nano Electro Mechanical Systems, Nano Letters, 15(7), 2015, 4599-4604

SELECTED RESEARCH PROJECTS

Microelectromechanical Resonant Circulator (MIRC)
Principal Investigator, DARPA MTO SPAR program

Plasmonic Microelectromechanical Infrared Digitizer (PLASMID)
Principal Investigator, DARPA MTO N-Zero program

Zero Power Sensors (ZePS)
Principal Investigator, DARPA MTO N-Zero program

CAREER: Nano Electro Mechanical Resonant Sensing Platform for Chip Scale, High Resolution and Ultra-fast Terahertz Spectroscopy and Imaging
Principal Investigator, National Science Foundation

Intrinsically Switchable and Programmable MEMS Filter Array
Principal Investigator, Defense Advanced Research Projects Agency

JEFFREY RUBERTI

Professor, Bioengineering

PhD, Tulane University, 1998
bioe.neu.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

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

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

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

CARMEN SCEPPA

Professor and Associate Dean for Undergraduate Education, Bouve College of Health Sciences; affiliated faculty, Bioengineering

PhD, Tufts University, 1994
MD, Francisco Marroquin University, 1987
bioe.neu.edu/people/sceppa-carmen

Scholarship focus: aging and gerontology; physical activity, exercise, and nutrition science

SELECTED PUBLICATIONS

P. Filanowski, L. Milliken, R.J. Iannotti, S.E. Crouter, A. Vermeulen, E.L. Schmidt, J.A. Hoffman, C. Castaneda-Sceppa
Physical Activity or Parents and Children Playing Together and the Effects of Varying Structured Activity, Medicine & Science in Sports & Exercise, 49(5S), 2017, 225

C. Castaneda-Sceppa, G. Cloutier, M. Sands, K. Karliyil, S. Strode, D. Isaacowitz, D. John
Effects of Improved Physical Function on Emotion Regulation Strategies and Daily Physical Activity, The Gerontologist, 56, 2016

I. Todorova, H. Turner, C. Sceppa-Castaneda, D. Young, A. Bonner
"I Do it with Love": Engagement in Caring for People with Dimentia, Global Qualitative Nursing Research, 3, 2016, 1-14

M.P. Shiyko, S. Hallinana, M. Seif El-Nasr, S. Durga, C. Castaneda-Sceppa
Effects of Playing a Serious Computer Game on Body Mass Index & Nutrition Knowledge in Women, Journal of Medical Internet Research, 4(1), 2016

J. Hoffman, C. Wirth, S. Johnson, S. Carter, M. DuBois, C. Cox, C. Castaneda-Sceppa
Engaging Head Start Families in Childhood Obesity Prevention: School-Home Communication about Children's Height and Weight Screenings, National Head Start Association Dialog, 18, 2015, 92-99

H. Saksono, A. Ranade, G. Kamarthi, C. Castaneda-Sceppa, J. Hoffman, C. Wirth, A. Parker
Spaceship Launch: Designing a Collaborative Exergame for Families, Computer-Supported Cooperative Work and Social Computing, 2015, 1776-1787

SELECTED RESEARCH PROJECTS

Boston Area Roybal Center
Co-Principal Investigator, National Institutes of Health

Development of an Exergame for Caregivers of Family Members with Alzheimer's Disease
Co-Principal Investigator, National Institutes of Health

Modifying the Workplace to Decrease Sedentary Behavior
Co-Investigator, The National Institute for Occupational Safety and Health

Northeastern Center for Technology Supporting Self Management in Older Adults
Co-Investigator, National Institutes of Health

Improving Outcomes in People with Dementia
Co-Principal Investigator, Senior Link

BAHRAM SHAFAI

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, George Washington University, 1985
ece.neu.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 Member, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

B. Shafai, S. Nazari, A. Oghbaee
Positive Unknown Input Observer Design for Positive Linear Systems, Proceedings 19th International Conference on System Theory, Control and Computing (ICSTCC), Cheile Gradistei, Romania, 2015, 360-365

B. Shafai, M. Saif
Proportional-Integral Observer in Robust Control, Fault Detection, and Decentralized Control of Dynamic Systems, Control and Systems Engineering, Springer International Publishing, 2015, 13-43

S.M.M. Alavi, M. Saif, B. Shafai
Accurate State Estimation in DC-DC Converters Using a Proportional Integral Observer (PIO), Proceedings of 23rd IEEE International Symposium on Industrial electronics (ISIE), 2014, 1304-1309

R. Ghadami, B. Shafai
Distributed Observer-based LQR Design for Multi-agent Systems, Proceeding of ISIAC, World Automation Congress, Kona, HI, 2014, 520-526

P. Brunet, B. Shafai
Identification of Loudspeakers Using Fractional Derivatives, Journal of the Audio Engineering Society, 62(7/8), 2014, 505-515

B. Shafai, A Oghbaee
Positive Observer Design for Fractional Order Systems, Proceeding of ISIAC, World Automation Congress, Kona, HI, 2014, 531-537

B. Shafai, A Oghbaee
Positive Quadratic Stabilization of Uncertain Linear System, Proceeding of IEEE Multi-conference on Systems and Control, CAA, Antibes, France, 2014, 1412-1417

B. Shafai, A. Oghbaee, T. Tanaka
Positive Stabilization with Maximum Stability Radius for Linear Time-Delay Systems, 2014 IEEE 53rd Annual Conference on Decision and Control, 2014, 1948-1953

R. Ghadami, B. Shafai
Decomposition-Based Distributed Control for Continuous-Time Multi-Agent Systems, IEEE Transactions on Automatic Control, 58(1), 2013, 258-264

SANDRA SHEFELBINE

Associate Professor, Mechanical and Industrial Engineering; joint appointment in Bioengineering

PhD, Stanford University, 2002
mie.neu.edu/people/shefelbine-sandra

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

SELECTED PUBLICATIONS

B. Depalle, Z. Qin, S.J. Shefelbine, M.J. Buehler
Large Deformation Mechanisms, Plasticity, and Failure of an Individual Collagen Fibril With Different Mineral Content, Journal of Bone and Mineral Research, 31(2), 2016, 380-390

P. Yadav, S.J. Shefelbine, E.M. Gutierrez-Farewik
Effect of Growth Plate Geometry and Growth Direction on Prediction of Proximal Femoral Morphology, Journal of Biomechanics, 49(9), 2016, 1613-1619

M. Giorgi, A. Carriero, S.J. Shefelbine, N.C. Nowlan
Effects of Normal and Abnormal Loading Conditions on Morphogenesis of the Prenatal Hip Joint: Application to Hip Dysplasia, Journal of Biomechanics, 48(12), 2015, 3390-3397

B. Depalle, Z. Qin, S.J. Shefelbine, M.J. Buehler
Influence of Cross-link Structure, Density and Mechanical Properties in the Mesoscale Deformation Mechanisms of Collagen Fibrils, Journal of the Mechanical Behavior of Biomedical Materials, 52, 2015, 1-13

B. Javaheri, A. Carriero, K.A. Staines, Y.-M. Chang, D.A. Houston, K.J. Oldknow, J.L. Millán, B.N. Kazeruni, P. Salmon, S.J. Shefelbine, C. Farquharson, A.A. Pitsillides
Phospho 1 Deficiency Transiently Modifies Bone Architecture yet Produces Consistent Modification in Osteocyte Differentiation and Vascular Porosity with Ageing, Bone, 81, 2015, 277-291

A.F. Pereira, B. Javaheri, A.A. Pitsillides, S.J. Shefelbine
Predicting Cortical Bone Adaptation to Axial Loading in the Mouse Tibia, Journal of the Royal Society, Interface, 12(110), 2015

O.G. Andriotis, S.W. Chang, M. Vanleene, P.H. Howarth, D.E. Davies, S.J. Shefelbine, M.J. Buehler, P.J. Thurner
Structure-Mechanics Relationships of Collagen Fibrils in the Osteogenesis Imperfecta Mouse Model, Journal of the Royal Society, Interface/the Royal Society, 12(111), 2015

SELECTED RESEARCH PROJECTS

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

Keeping Hockey Hips Healthy
Principal Investigator, US Hockey Foundation

Multi-Scale Characteristics of Bone Toughness
Principal Investigator, National Science Foundation

RIFAT SIPAHI

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

PhD, University of Connecticut, 2005
mie.neu.edu/people/sipahi-rifat

Scholarship focus: control systems and mechatronics; stability analysis and control synthesis of dynamical systems with delays; interplay between stability, delays, and graphs; control-systems-aided human-machine systems; engineering education research; disability research; systems biology

Honors and awards: Outstanding Young Investigator, Dynamic Systems and Control Division/American Society of Mechanical Engineers; College of Engineering Faculty Fellow; Defense Advanced Research Projects Agency Young Faculty Award; Fellow, American Society of Mechanical Engineers; Senior Member, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

A. Ramirez, S. Mondie, R. Garrido, R. Siphai
Design of Maximum Exponential Decay Rate for LTI-SISO Systems via Delay-based Controllers, SIAM Control and Optimization, 55(1), 2017, 397-412

T. Yucelen, Y. Yildiz, R. Sipahi, E. Yousefi, N. Nguyen
Stability Limit of Human-in-the-Loop Model Reference Adaptive Control Architechtures, International Journal of Control, 2017, 1-18

S. Nourazari, D.B. Hoch, S. Capawanna, R. Sipahi, J.C. Benneyan
Can Improved Specialty Access Moderate Emergency Department Overuse? Effect of Neurology Appointment Delays on ED Visits, Neurology Clinical Practice, 6(6), 2016, 498-505

M.H. Koh, R. Sipahi
A Consensus Dynamics with Delay-Induced Instability Can Self-Regulate for Stability via Agent Regrouping, Chaos: An Interdisciplinary Journal of Nonlinear Science, 26(11), 2016, 116313

D. Tian, R. Sipahi
Creating Two Disjoint Stability Intervals Along the Delay Axis via Controller Design: Linear SISO Case, International Journal of Dynamics and Control, 2016

SELECTED RESEARCH PROJECTS

Graph-Based Control Design for Network Dynamics with Time Delays
Principal Investigator, National Science Foundation

A Three-Dimensional Model of Spinal Cord Growth and Repair in a Regeneration-Competent Organism
Co-Principal Investigator, National Science Foundation

NIKOLAI SLAVOV

Assistant Professor, Bioengineering

PhD, Princeton University, 2010
bioe.neu.edu/people/slavov-nikolai

Scholarship focus: Ribosome-mediated translational regulation, statistical inference, mass-spectrometry; quantitative systems biology; bioinformatics

Honors and awards: New Innovator Award, National Institutes of Health; Broad Institute SPARC; IRCSET Postgraduate Research Fellowship; Eureka Fellowship for Academic Excellence

SELECTED PUBLICATIONS

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

D. Malioutov, N. Slavov
Convex Total Least Squares, Journal of Machine Learning Research, W&CP, 32(1), 2014, 109-117

N. Slavov, J. Carey, S. Linse
Calmodulin Transduces Ca^{+2} Oscillations into Differential Regulation of its Target Proteins, ACS Chemical Neuroscience, 4(4), 2013, 601-612

N. Slavov, D. Botstein
Decoupling Nutrient Signaling from Growth Rate Causes Aerobic Glycolysis and Deregulation of Cell Size and Gene Expression, Molecular Biology of the Cell, 24(2), 2013, 157-168

N. Slavov, A. Van Oudenaarden
How to Regulate a Gene: to Repress or to Activate?, Molecular Cell, 46(5), 2012, 551-552

SELECTED RESEARCH PROJECTS

Broad Institute SPARC
Co-Principal Investigator, Broad Institute

Characterization of Ribosome Remodeling During Stem Cell Differentiation by Top-Down and Native Mass Spectrometry
Principal Investigator, Northeastern University

Ribosome-Mediated Translational Regulation During Stem Cell Differentiation *National Institutes of Health Director's New Innovator Award
Principal Investigator, Northeastern University

EDUARDO SONTAG

University Distinguished Professor, Electrical and Computer Engineering; jointly appointed, Bioengineering (starting January 2018)

PhD, University of Florida, 1977
ece.neu.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

SELECTED PUBLICATIONS

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

E.D. Sontag
Dynamic Compensation, Parameter Identifiability, and Equivariances, PLoS Computational Biology, 13, 2017, 1005447

S. Barish, M.F. Ochs, E.D. Sontag, J.L. Gevertz
Evaluating Optimal Therapy Robustness by Virtual Expansion of a Sample Population, with a Case Study in Cancer Immunotherapy, Proceedings of the National Academy of Sciences, 114, 2017, 6277-6286

F. Menolascina, R. Rusconi, V.I. Fernandez, S.P. Smriga, Z. Aminzare, E.D. Sontag, R. Stocker
Logarithmic Sensing in Bacillus Subtilis Aerotaxis, Nature Systems Biology and Applications, 3, 2017, 16036

J. K. Kim, E.D. Sontag
Reduction of Multiscale Stochastic Biochemical Reaction Networks Using Exact Moment Derivation, PLoS Computational Biology, 13(6)m, 2017, 1005571

E.V. Nikolaev, E.D. Sontag
Quorum-Sensing Synchronization of Synthetic Toggle Switches: A Design Based on Monotone Dynamical Systems Theory, PLoS Computational Biology, 12, 2016, e1004881

SELECTED RESEARCH PROJECTS

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

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

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

Self-Modifying and Fast Analog Molecular Computing with Designed Enzymes
Co-Principal Investigator, DARPA

SRINIVAS SRIDHAR

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

PhD, California Institute of Technology, 1984
che.neu.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

P. Baldwin, S. Tangutoori, S. Sridhar
Generation of Dose-Response Curves and Improved IC50s for PARP Inhibitor Nanoformulations, Cancer Nanotechnology: Methods and Protocols, 2017, 337-342

J. Barlow, K. Gozzi, C.P. Kelley, B.M. Geilich, T.J. Webster, Y. Chai, S. Sridhar, A.L. van de Ven
High Throughput Microencapsulation of Bacillus Subtilis in Semi-Permeable Biodegradable Polymersomes for Selenium Remediation, Applied Microbiology and Biotechnology, 101(1), 2017, 455-464

A.L. van de Ven, S. Tangutoori, P. Baldwin, J. Qiao, C. Gharagouzloo, N. Seitzer, J.G. Clohessy, G.M. Makrigiorgos, R. Cormack, P.P. Pandolfi, S. Sridhar
Nanoformulation of Olaparib Amplifies PARP Inhibition and Sensitizes PTEN/TP53-deficient Prostate Cancer to Radiation, Molecular Cancer Therapeutics, 16(7), 2017, 1279-1289

J. Belz, N. Castilla-Ojo, S. Sridhar, R. Kumar
Radiosensitizing Silica Nanoparticles Encapsulating Docetaxel for Treatment of Prostate Cancer, Cancer Nanotechnology: Methods and Protocols, 2017, 403-409

M.J. Cheng, R. Kumar, S. Sridhar, T.J. Webster, E.E. Ebong
Endothelial Glycocalyx Conditions Influence Nanoparticle Uptake for Passive Targeting, International Journal of Nanomedicine, 11, 2016, 3305-3315

SELECTED RESEARCH PROJECTS

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

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

Nanoscale Magnetism In Next Generation Magnetic Nanoparticles Sub-Project II: Organically Modified Magnetic Nanoparticles
Principal Investigator, Asian Office of Aerospace Research and Development

PARP Inhibitor Nanotherapy for Ovarian Cancer
Principal Investigator, Department of Defense, Ovarian Cancer Research Program

DAGMAR STERNAD

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

PhD, University of Connecticut, 1995
ece.neu.edu/people/sternad-dagmar

Scholarship focus: motor control and learning, variability and stability, virtual rehabilitation, dynamic modeling, rhythmic and discrete movements as primitives for action

Honors and awards: Klein Lectureship Award; Distinguished Lecturer on Life and the Sciences of Complexity, Center for the Ecological Study of Perception and Action

SELECTED PUBLICATIONS

S.W. Park, H. Marino, S. Charles, D. Sternad, N. Hogan
Moving Slowly is Hard for Humans: Limitations of Dynamic Primitives, Journal of Neurophysiology, 118(1), 2017, 69-83

P. Stein, E.L. Saltzman, K.G. Holt, D. Sternad
Is Failed Predictive Control a Risk Factor for Focal Dystonia?, Motor Disorders, 31(12), 2016, 1772-1777

C.J. Hasson, Z. Zhang, M.O. Abe, D. Sternad
Neuromotor Noise is Malleable by Amplification of Perceived Error, PLoS Computational Biology, 2016

M.E. Huber, N. Kuznetsov, D. Sternad
Persistence of Reduced Neuromotor Noise in Long-Term Motor Skill Learning, Journal of Neurophysiology, 116(6), 2016, 2922-2935

SELECTED RESEARCH PROJECTS

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

Collaborative Research: Challenging the Cognitive-control Divide
Principal Investigator, National Science Foundation

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

Quantification of Predictive Motor Impairments in Individuals with ASD
Principal Investigator, National Institutes of Health

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

Multi-Center Trial of Augmented Sensory Feedback in Children with Dyskinetic CP
Co-Investigator, National Institute of Health

MILICA STOJANOVIC

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Northeastern University, 1993
ece.neu.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, IEEE Ocean Engineering Society; Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

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

S. Yerramalli, M. Stojanovic, U. Mitra
Partial FFT Demodulation: A Detection Method for Doppler Distorted OFDM Systems, IEEE Transactions on Signal Processing, 60(11), 2012, 5906-5918

J. Heidemann, M. Stojanovic, M. Zorzi
Underwater Sensor Networks: Applications, Advances, and Challenges, Philosophical Transactions of the Royal Society A, 2012, 158-175

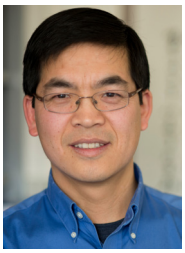
SELECTED RESEARCH PROJECTS

NeTS: Large: Collaborative Research: Exploration and Exploitation in Actuated Communication Networks
Principal Investigator, National Science Foundation

Intelligent Coordination and Adaptive Classification for Naval Autonomous Systems
Principal Investigator, Office of Naval Research

MRI: Development of the Northeastern University Marine Observatory NETwork (NU MONET)
Co-Principal Investigator, National Science Foundation

NIAN SUN



Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Stanford University, 2002
ece.neu.edu/people/sun-nian-xiang

Scholarship focus: magnetic, ferroelectric and magnetoelectric materials; RF/microwave magnetic and magnetoelectric devices design, fabrication and testing; materials properties at RF/microwave frequency; range self-assembly of magnetic nanostructures

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. 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

T. Nan, Y. Hui, M. Rinaldi, N.X. Sun
Self-Biased 215MHz Magnetoelectric NEMS Resonator for Ultra-Sensitive DC Magnetic Field Detection, Scientific Reports, 3, 2013, 1985

M. Liu, Z. Zhou, T. Nan, B.M. Howe, G.J. Brown, N.X. Sun
Voltage Tuning of Ferromagnetic Resonance with Bistable Magnetization Switching in Energy-Efficient Magnetoelectric Composites, Advanced Materials, 25(10), 2013, 1435-1439

J. Lou, M. Liu, D. Reed, Y. Ren, N.X. Sun
Giant Electric Field Tuning of Magnetism in Novel Multiferroic FeGaB/Lead Zinc Niobate Lead Titanate Heterostructures, Advanced Materials, 21(46), 2009, 4711-4715

S.X. Wang, N.X. Sun, M. Yamaguchi, S. Yabukami
Sandwich Films: Properties of a New Soft Magnetic Material, Nature, 407, 2000, 150-151

SELECTED RESEARCH PROJECTS

Integrated Thermoelectric Materials and Devices
Principal Investigator, Analog Devices, Incorporated

Multiferroic Materials for RF Applications
Principal Investigator, Defense Advanced Research Projects Agency

Nanofabricated Neural Probes with Ultra-sensitive Integrated Compact RF NEMS Magnetoelectric Sensors for Electro-magneto-brain Activity Mapping
Principal Investigator, Keck Foundation

Novel Multiferroic Heterostructures for Translational Compact and Power Efficient Voltage Tunable Devices
Principal Investigator, National Science Foundation

Power Efficient Voltage Tunable Spin Hall Nano Oscillators with Multiferroic Heterostructures
Principal Investigator, Air Force Research Laboratory

Sensitive and Selective Chemical Sensor Using Molecularly-Imprinted Single Layer Graphene
Principal Investigator, Air Force

MARIO SZNAIER

Dennis Picard Trustee Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Washington, 1989
ece.neu.edu/people/sznaier-mario

Scholarship focus: robust control; reduced order models; video-based control; applications to dynamics in imaging and video processing; information extraction from high volume data streams

Honors and awards: IEEE Control Systems Society Distinguished Member Award

SELECTED PUBLICATIONS

B. Yilmaz, C. Lagoa, M. Sznaier
An Efficient Atomic Norm Minimization Approach to Identification of Low Order Models, 2013 IEEE 52nd Annual Conference on Decision and Control, 2013, 5834-5839

M. Ayazoglu, B. Yilmaz, M. Sznaier, O. Camps
Finding Causal Interactions in Video Sequences, IEEE International Conference on Computer Vision, Sydney, 2013

C. Dicle, O. Camps, M. Sznaier
The Way They Move: Tracking Multiple Targets with Similar Appearance, IEEE International Conference on Computer Vision, Sydney, Australia, 2013

K. Bekiroglu, M. Sznaier, C. Lagoa, B. Shafai
Vision Based Control of an Autonomous Blimp with Actuator Saturation Using Pulse Width Modulation, Proceedings of the 2013 IEEE International Conference on Control Applications, 2013, 1036-1041

Y. Cheng, Y. Wang, M. Sznaier
Worst Case Optimal Estimators for Switched Linear Systems, Proceedings of the 52nd IEEE Conference on Decision and Control, 2013, 4036-4041

SELECTED RESEARCH PROJECTS

Robust Identification and Model (in) Validation of Switched Hammerstein/Wiener Systems and Applications
Principal Investigator, National Science Foundation

GILEAD TADMOR

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Weizmann Institute of Science, 1984
ece.neu.edu/people/tadmor-gilead

Scholarship focus: control systems; dynamical systems; low order modeling and estimation in complex systems; medical imaging

SELECTED PUBLICATIONS

V. Troshin, A. Seifert, D. Sidilkover, G. Tadmor
Proper Orthogonal Decomposition of Flow-Field in Non-Stationary Geometry, Journal of Computational Physics, 311, 2016, 329-337

B. Erem, R. Martinez Orellana, D.E. Hyde, J.M. Peters, F.H. Duffy, P. Stovicek, S.K. Warfield, R.S. MacLeod, G. Tadmor, D.H. Brooks
Extensions to a Manifold Learning Framework for Time Series Analysis on Dynamic Manifolds in Bioelectric Signals, Physical Review E, 93, 2016, 042218

K. Aleksic-Roeßner, R. King, O. Lehmann, G. Tadmor, et al.
On the Need of Nonlinear Control for Efficient Model-based Wake Stabilization, Theoretical and Computational Fluid Dynamics, 28(1), 2014, 23-49

L. Mirkin, T. Shima, G. Tadmor
Sampled-Data H^2 Optimization of Systems with I/O Delays via Analog Loop Shifting, IEEE Transactions on Automatic Control, 59, 2014, 787-791

M. Schlegel, B.R. Noack, P. Jordan, A. Dillman, G. Tadmor, et al.
On Least-order Flow Representations of Aerodynamics and Aeroacoustics, Journal of Fluid Mechanics, 697, 2012, 367-398

S. Laxminarayan, G. Tadmor, et al.
Modeling Habituation in Rat EEG Evoked Responses via a Neural Mass Model with Feedback, Biological Cybernetics, 105, 2011, 371-397

A. Cavalieri, G. Daviller, P. Comte, P. Jordan, G. Tadmor, et al.
Using Large Eddy Simulation to Explore Sound-Source Mechanisms in Jets, Journal of Sound and Vibration, 330, 2011, 4098-4113

VLADIMIR TORCHILIN

University Distinguished Professor, Pharmaceutical Sciences; affiliated faculty, Bioengineering, Chemical Engineering

PhD, Moscow State University, 1971
DSc, Moscow State University, 1980
bioe.neu.edu/people/torchilin-vladimir

Scholarship focus: nanomedicine, drug delivery, drug targeting, biomedical polymers, experimental oncology, experimental pharmacology

Honors and awards: 2015 Chair, XX International Symposium on Microencapsulation; Best Paper Award 2014, European Journal of Pharmaceutics and Biopharmaceutics; 2016 President and Plenary Speaker, BIONANOTOX; 2016 International Chair of Therapeutic Innovation, LabEx LERMIT; 2016 Highly Cited Researcher from Thomson Reuters; Outstanding Excellence Award, Pharmaceutica 2017 Congress

SELECTED PUBLICATIONS

S. Erdogan, V.P. Torchilin
Gadolinium-Loaded Polychelating Polymer-Containing Tumor-Targeted Liposomes, Methods in Molecular Biology, 1522, 2017, 179-182

S.K. Sriraman, G. Salzano, C. Sarosozen, V.P. Torchilin
Anti-Cancer Activity of Doxorubicin-Loaded Liposomes Co-Modified with Transferrin and Folic Acid, European Journal of Pharmaceutics and Biopharmaceutics, 105, 2016, 40-49

R. Riehle, B. Pattni, A. Jhaveri, A. Kulkarni, G. Thakur, A. Degterev, V.P. Torchilin
Comination Nanopreparations of a Novel Proapoptotic Drug-NCL-240, TRAIL and siRNA, Pharmaceutical Research, 33(7), 2016, 1587-1601

T. Wang, B. Narayanaswamy, H. Ren, V.P. Torchilin
Combination Therapy Targeting Both Cancer Stem-Like Cells and Bulk Tumor Cells for Imporved Efficacy of Breast Cancer Treatment, Cancer Biology Therapy, 17(6), 2016, 698-707

S.K. Sriraman, J. Pan, C. Sarisozen, E. Luther, V.P. Torchilin
Enhanced Cytotoxicity of Folic Acid-Targeted Liposomes Co-Loaded with C6 Ceramide and Doxorubicin: In Vitro Evaluation on HeLa, A2780-ADR and H69-AR Cells, Molecular Pharmaceutics, 13(2), 2016, 428-437

SELECTED RESEARCH PROJECTS

Combination On-Demand Cancer Therapy
Co-Investigator, National Institutes of Health

Dendrimer-Based Nanomedicines
Principal Investigator, National Institutes of Health

Multifunctional Matrix Metalloprotease-2-Sensitive Anti-Cancer Nanopreparations
Principal Investigator, National Institutes of Health

Targeted PEG-PE-Based Polymeric Micelles Co-Loaded with Curcumin and Doxorubicin
Principal Investigator, Immix Biopharma, LLC

EUGENE TUNIK

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

PhD, Rutgers University, 2003
bioe.neu.edu/people/tunik-eugene

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

SELECTED PUBLICATIONS

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

S. Saleh, S.V. Adamovich, E. Tunik
Mirrored Feedback in Chronic Stroke: Recruitment and Effective Connectivity of Ipsilesional Sensorimotor Networks, Neurorehabilitation and Neural Repair, 28(4), 2014, 344-354

J.R. Lukos, J. Snider, M.E. Hernandez, E. Tunik, S. Hillyard, H. Poizner
Parkinson's Disease Patients Show Impaired Corrective Grasp Control and Eye-hand Coupling When Reaching to Grasp Virtual Objects, Neuroscience, 2013, 205-221

E. Tunik, S. Saleh, S.V. Adamovich
Visuomotor Discordance During Visually-Guided Hand Movement in Virtual Reality Modulates Sensorimotor Cortical Activity in Healthy and Hemiparetic Subjects, IEEE-Transactions on Neural Systems & Rehabilitation Engineering, 21(2), 2013, 198-207

H. Bagce, S.V. Adamovich, S. Saleh, J.W. Krakauer, E. Tunik
Corticospinal Excitability is Enhanced After Visuomotor Adaptation and Depends on Learning Rather Than Performance Or Error, Journal of Neurophysiology, 109(4), 2012, 1097-1106

H.F. Bagce, S. Saleh, S.V. Adamovich, E. Tunik
Visuomotor Gain Distortion Alters Onlinemotor Performance and Enhances Primary Motor Cortex Excitability in Patients with Stroke, Neuromodulation, 15(4), 2012, 361-366

SELECTED RESEARCH PROJECTS

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

ASHKAN VAZIRI

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

PhD, Northeastern University, 2004
mie.neu.edu/people/vaziri-ashkan

Scholarship focus: solid mechanics, materials, computational methods, biomechanics, nanotechnology

Honors and awards: Air Force Office of Scientific Research Young Investigator Award; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

J Xiong, R. Ghosh, L. Ma., H. Ebrahimi, A. Vaziri, L. Wu, et al.
Bending Behavior of Lightweight Sandwich-Walled Shells with Pyramidal Truss Cores, Composite Structures, 116, 2014, 793-804

B. Haghpanah, H. Nayeb-Hashemi, A. Vaziri, et al.
Buckling of Regular, Chiral, and Hierarchical Honeycombs Under a General Macroscopic Stress State, Proceedings of the Royal Society A, 470(2167), 2014, 20130856

R. Ghosh, H. Ebrahimi, A. Vaziri
Contact Kinematics of Biomimetic Scales, Applied Physics Letters, 2014, 105.23, 233701

R. Ghosh, A. Ajdari, H. Nayeb-Hashemi, A. Vaziri, et al.
Impact Resistance and Energy Absorption of Regular and Functionally Graded Hexagonal Honeycombs with Cell Wall Material Strain Hardening, International Journal of Mechanical Sciences, 89, 2014, 413-422

R. Oftadeh, B. Haghpanah, D. Vella, A. Boudaoud, A. Vaziri
Optimal Fractal-like Hierarchical Honeycombs, Physical Review Letters, 113, 2014, 104301

H. Abdi, H. Nayeb-Hashemi, A.M.S. Hamouda, A. Vaziri
Torsional Dynamic Response of a Shaft with Longitudinal and Circumferential Cracks, Journal of Vibration and Acoustics, 136, 2014, 61011-61018

R. Ghosh, A. Kumar, A. Vaziri
Type-IV Pilus Deformation can Explain Retraction Behavior, PLOS ONE, 2014, 9, 114613

SELECTED RESEARCH PROJECTS

Functional Biomimetic Materials with Extreme Topology
Principal Investigator, National Science Foundation

Mechanics of Carbon Nanotube Surface Decontamination
Principal Investigator, FM Global

Multifunctional Cellular Structures for Energy Harvesting and Energy Management Applications
Principal Investigator, Qatar Foundation

KAI-TAK WAN

Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering, Civil and Environmental Engineering

PhD, University of Maryland at College Park, 1993
mie.neu.edu/people/wan-kai-tak

Scholarship focus: cellular biomechanics; water filtration; thin film adhesion and characterization; subsurface mechano-sensing; shell adhesion; fundamental intersurface forces

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

SELECTED PUBLICATIONS

T. Zhu, G. Li, S. Müftü, Kai-Tak Wan
Revisiting the Constrained Blister Test to Measure Thin Film Adhesion, Journal of Applied Mechanics, 84, 2017, 071005

X. Wang, B. Li, J. Hao, Y.J. Jung, K.-T. Wan
Mechanical Characterization of Suspended Strips of Meshed Single-walled Carbon Nanotubes, Journal of Applied Physics, 119, 2017, 045305

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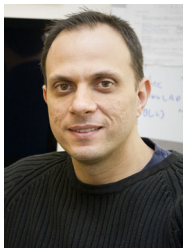
SELECTED RESEARCH PROJECTS

Mechanics of Fusion of Dissimilar Lipid BiLayers and Multi-Lamellar Vesicles
Principal Investigator, National Science Foundation

Mechanical Integrity and Long Term Reliability of Photovoltaic Panels
Principal Investigator, National Institute of Standards and Technology/Department of Energy

A Novel Biomechanical Model of Bacterial Adhesion and Aggregation
Principal Investigator, National Science Foundation

MENI WANUNU



Associate Professor, Physics; affiliated faculty, Bioengineering

PhD, Weizmann Institute, 2005
bioe.neu.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

G-M. Mustata, Y.H. Kim, J. Zhang, W.F. DeGrado, G. Grigoryan, M. Wanunu
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Distance-dependent Energy Transfer Between CdSe/CdS Quantum Dots and a Two-Dimensional Semiconductor, Applied Physics Letters, 108, 2016, 021101

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

THOMAS WEBSTER

Professor and Department Chair, Chemical Engineering; Art Zafiropoulo Chair in Engineering; affiliated faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2000
che.neu.edu/people/webster-thomas

Scholarship focus: design, synthesis, and evaluation of nanomaterials for various medical applications, including self-assembled chemistries, nanoparticles, nanotubes, and nanostructured surfaces

Honors and awards: Fellow, Biomaterials Science and Engineering; Fellow, American Institute for Medical and Biological Engineers; Fellow, American Society for Nanomedicine; Fellow, Biomedical Engineering Society; Fellow, Ernst Strungmann Foundation; Wenzhou 580 Elite Scientist Award, China; Zhejiang Province Talent Program; Acta Biomaterialia Silver (under 45) Award; Hsu Chinese Academy of Sciences OuTwi tstanding Lecture Award

SELECTED PUBLICATIONS

G. Mi, D. Shi, W. Herchek, T.J. Webster
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Superparamagnetic Iron Oxide-Encapsulating Polymersome Nanocarriers for Biofilm Eradication, Biomaterials, 119, 2017, 78-85

P. Tran, L. Sarin, R. Hurt, T.J. Webster
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E.M. Christenson, K. Anseth, T.J. Webster, A.G. Mikos, et al.
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SELECTED RESEARCH PROJECTS

Development and Commercialization of Nanostructured Resorbable Urogenital Grafts
Principal Investigator, National Institutes of Health

Developing Injectable Materials for Cartilage Applications: Part 1
Principal Investigator, Audax, Inc.

Long-term Prevention of Peri-Implantitis via Nano-Textured, TiO/Ag Surfaces
Co-Principal Investigator, National Institutes of Health

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

Testing Orthopedic Materials for Ionic Fusion, Inc.
Principal Investigator, Ionic Fusion, Inc.

Testing RTI Materials for Orthopedic Applications
Principal Investigator, RTI, Inc.

MARK C. WILLIAMS

Professor, Physics; affiliated faculty, Bioengineering

PhD, University of Minnesota, 1998
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Scholarship focus: biophysics of DNA-protein interactions

Honors and awards: Fellow, American Physical Society

SELECTED PUBLICATIONS

M. Nabuan Naufer, D.A. Murison, I. Rouzina, P.J. Beuning, M.C. Williams
Single-Molecule Mechanochemical Characterization of *E. coli* Pol III Core Catalytic Activity, Protein Science, 26, 2017, 1413-1426

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A.A. Almaqwashi, J. Andersson, P. Lincoln, I. Rouzina, F. Westerlund, M.C. Williams
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M.J. McCauley, I. Rouzina, K.A. Manthei, R.J. Gorelick, K. Musier-Forsyth, M.C. Williams
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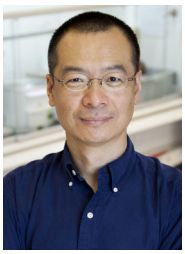
SELECTED RESEARCH PROJECTS

Single Molecule HIV-1 Replication Interactions
Principal Investigator, National Institutes of Health

Quantifying Single Molecule DNA-ligand Interactions
Principal Investigator, National Science Foundation

SUNNY ZHOU



Professor, Chemistry and Chemical Biology; affiliated faculty, Bioengineering

PhD, The Scripps Research Institute, 1997
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Scholarship focus: protein chemistry and analysis, enzymology, biotherapeutics and biomaterials

SELECTED PUBLICATIONS

W. Qu, K.C. Catcott, K. Zhang, S. Liu, J.J. Guo, J. Ma, M. Pablo, J. Glick, Y. Xiu, N. Kenton, X. Ma, R.I. Duclos, Z.S. Zhou
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N.W. Hodgson, M.I. Waly, Y.M. Al-Farsi, M.M. Al-Sharbati, O. Al-Farsi, A. Ali, A. Ouhtit, T. Zang, Z.S. Zhou, R.C. Deth
Decreased Glutathione and Elevated Hair Mercury Levels are Associated with Nutritional Deficiency-Based Autism in Oman, Experimental Biology and Medicine, 239(6), 2014, 697-706

Jodi Belz

PhD 2017, Bioengineering; Advisor, Srinivas Sridhar

SMART BRACHYTHERAPY SPACERS FOR COMBINED CHEMO-RADIATION THERAPY: LOCAL DELIVERY OF NANOPARTICLES, CHEMOTHERAPEUTICS, AND MOLECULAR INHIBITORS FOR CANCER TREATMENT

In this work, I have developed, characterized, and extensively tested a docetaxel loaded biodegradable implant for the treatment of prostate cancer. Our spacers were fabricated with a docetaxel loaded Poly(lactic-co-glycolic) acid cylindrical implant for intratumoral injection via an 18 gauge applicator needle for local, sustained therapy. Our spacers exhibit diffusion driven release in vitro over 75 days, designed to sensitize I-125 (t1/2= 60 days) brachytherapy seeds most commonly used for treatment of prostate cancer. The spacers were tested for therapeutic efficacy against clinically administered docetaxel and resulted in significant tumor inhibition and improved survival (median survival time (MST) of spacers 52 days versus 26 with IV DTX, $p<0.01$). Next the docetaxel spacer was combined with fractionated radiation therapy at reduced doses, to determine the radiosensitization and synergistic therapeutic response. Mice treated with local combined chemo-radiation resulted in significant survival improvement (MST 209 days vs. 120 in radiation therapy alone and 85 in spacers alone, $p<0.01$) and tumor inhibition, with 33% of mice cured. These results combined with a full toxicity study were completed and prove the therapeutic potential for successful clinical translation and impact.

See full dissertation at **coe.neu.edu/17/JodiBelz**

Adina Draghici

PhD 2017, Bioengineering; Advisor, Sandra Shefelbine

RESCUING OSTEOPOROTIC BONE IN INDIVIDUALS WITH SPINAL CORD INJURY

The central idea behind the work presented in this thesis is the mechanoadapatation of bone to external loading: bone continually remodels in response to the stresses and strains applied. High loads promote bone formation, while unloading results in bone resorption. During my doctoral training, I focused on bone loss in SCI and I investigated the potential of a rehabilitation exercise, namely functional electrical stimulation rowing (FES-rowing) to address disuse osteoporosis. FES-rowing is a whole body exercise, that allows for the simultaneous engagement of both the innervated arms and the non-innervated legs in those with SCI.

Additionally, this thesis presents a custom made device that investigates another contributor to skeletal health and disuse osteoporosis, bone blood perfusion. The custom built near infrared spectroscopy device was effectively used to non-invasaviely monitor hemoglobin concentration changes in the tibia during exercise in both able-bodied and individuals with SCI. The work presented in this thesis suggests that FES-rowing might be insufficient to promote bone formation, but slows down bone resorption and trabecular microstructure degradation. The results indicate that the magnitude of loading is more important than the frequency of exercise in preventing bone loss and possibly addressing disuse osteoporosis in those with SCI.

See full dissertation at **coe.neu.edu/17/AdinaDraghici**

Benjamin Geilich

PhD 2016, Bioengineering; Advisor, Thomas J. Webster

DRUG- AND NANOPARTICLE-ENCAPSULATING POLYMERSOME NANOCARRIERS FOR THE TREATMENT OF ANTIBIOTIC-RESISTANT INFECTIONS

The rising prevalence and severity of antibiotic-resistant infections poses an alarming threat to public health worldwide. The rapid pace at which bacteria are evolving resistance, combined with the lack of new antibiotic drugs in development, threatens to return humanity to a "pre-antibiotic" era where even minor infections are life threatening. Thus, there is a dire need for creative solutions which do not rely on the discovery of new chemical agents, and instead aim to restore efficacy to existing drugs. To this end, this dissertation describes the development of a robust, nanomedicine-based platform for the treatment of antibiotic-resistant infections. Here, biocompatible multi-compartment nanocarriers were synthesized to co-encapsulate both hydrophobic metallic nanoparticles and hydrophilic antibiotics, and were tested for antibacterial efficacy against a variety of clinically relevant infections.

For the treatment of Gram-negative acute infections, a polymersome formulation was designed to co-encapsulate silver nanoparticles and the antibiotic ampicillin. Results showed that these silver nanoparticle-encapsulating polymersomes (AgPs) inhibited the growth of ampicillin-resistant Escherichia coli (bla) in a dose-dependent fashion. Free ampicillin, AgPs without ampicillin, and ampicillin polymersomes without silver nanoparticles had no effect on bacterial growth. The relationship between the silver nanoparticles and ampicillin was determined to be synergistic and produced complete growth inhibition at a silver-to-ampicillin ratio of 1:0.64.

See full dissertation at **coe.neu.edu/17/BenjaminGeilich**

Codi Amir Gharagouzloo

PhD 2016, Bioengineering; Advisor, Srinivas Sridhar

QUANTITATIVE MAGNETIC RESONANCE IMAGING WITH MAGNETIC NANOPARTICLES

In this dissertation we demonstrate a novel technique that can produce CE-MRAs using magnetic nanoparticles including the FDA approved super paramagnetic iron-oxide nanoparticle (SPION) ferumoxytol with very high Contrast to Noise Ratio (CNR) in cardiovascular, cerebral, and tumor imaging in mice and rats. First, the technique is established and shown to measure clinically relevant concentrations of ferumoxytol with high fidelity range in mice. Next, a unique feature of the methodology to produce high-contrast images of purely T1-weighted signal is employed to unambiguously delineate nanoparticle accumulation in a PC3 subcutaneous tumor model with ferumoxytol accumulation 24 hours after just one dose. From this, contrast efficiency was produced compared to standard techniques with the additional benefit that pre-contrast images are not necessitated. Finally, we show unprecedented accuracy in measuring the CBV in absolute terms throughout the whole rat brain. We create a quantitative blood volume atlas and demonstrate that absolute functional measurements of CBV can be assessed by comparing the awake, CO2-challenged and anesthetized states. The method is anchored in theory and is compatible with existing clinical SPION formulations and scanners. Thus QUTE-CE shows high potential for quantitative imaging immediately applicable to human scans.

See full dissertation at **coe.neu.edu/17/CodiAmirGharagouzloo**

Meghan Huber

PhD 2016, Bioengineering; Advisor, Dagmar Sternad

ASSESSING AND ENHANCING COMPLEX SKILL LEARNING WITH VIRTUAL ENVIRONMENTS : BASIC INSIGHTS FOR MOTOR REHABILITATION

Over recent decades, virtual reality (VR) and robotic technologies have demonstrated the potential to enhance physical therapy. Despite their advantages, clinical adoption of these technology-based systems have been slow due to limited evidence that they are more effective than traditional therapy. Currently, VR and robotic technologies are used to automate conventional therapy. Hence, the success of technology-driven rehabilitation relies on the efficacy of conventional therapy. This efficacy, in turn, is limited by our knowledge of motor learning and recovery.

See full dissertation at **coe.neu.edu/17/MeghanHuber**

Ryan Myers

PhD 2017, Bioengineering; Advisor, Joseph Ayers

ELECTROHYDRODYNAMIC JET PRINTED MULTI-MATERIAL, MULTI-LAYER ELECTRONICS AND INTERFACIAL LAYERS FOR USE IN BIOELECTRONIC INTERFACES

Bioelectronic interfaces and biohybrid technologies have emerged as powerful solutions for sensing and manipulation applications. A unique method of underwater chemical sensing via a combination of engineered microbes and bioelectronic interfaces is discussed here with the goal of reporting to autonomous robotics through an electronic nervous system. The fabrication of these interfaces warrants a deposition method capable of precisely implementing the electronic, interfacial, and biological layers necessary for reliable devices. Electrohydrodynamic jet (e-jet) printing has been shown capable of doing so at a biologically relevant scale of 240 ± 50 nm. An e-jet printing system was fabricated and modified to use additive manufacturing to fabricate heterogeneous interfaces for the biological reporters Nitric Oxide and luminescence. These tasks included the fabrication of electronics that typically have multiple materials and thus multiple layers in their architecture; a potential point of failure in this liquid phase deposition method. The implementation of code based ejection modalities and a heated vacuum chuck allow for controlled volume deposition and rapid solvent evaporation, alleviating dissolution events in the sublayer. By eliminating these events, controlling film thickness to deter pinhole formation, and generating inks with solvents that were incompatible with sublayers, multi-layer electrochemical nitric oxide sensors and photosensors were produced.

See full dissertation at **coe.neu.edu/17/RyanMyers**

Robert Natividad

PhD 2016, Bioengineering; Advisor, Anand Asthagiri

INVESTIGATING THE ROLE OF SPATIAL PRESENTATION OF PHYSICAL AND CHEMICAL CUES IN REGULATING NORMAL AND CANCER CELL POLARITY

Throughout the body, different cell types are required to move in order to perform their normal physiological functions. Immune cells constantly patrol the body in search of infections. Epidermal cells remain stationary until required to move to heal a nearby wound. Cells in hair follicles or intestinal crypts continuously migrate outward to replace routine losses. These processes all require cells to move at a specific rate and in a given direction appropriate to their task and environment. Sometimes, the cellular programming that dictates these movements malfunctions, leading to disease. Preventing these diseases or enhancing these functions requires a fundamental understanding of cell migration.

Placing cells in flat, plastic dishes and analyzing their movement, has led to a great many discoveries about the mechanics of how cells move. However, the same lack of environmental features that enables studies of unbiased cell movement, makes it challenging to study how cells migrate in response to external mobilizing signals. On the other extreme, watching cells move in an intact organism, such as axon growth in C. elegans or border cell migration in Drosophila, runs the risk of having too many external signals to account for.

To address this gap, we have developed an experimental platform that enables select soluble cues to be presented to cells in a controllable fashion, such as a gradient. The substrate of the platform is modified to present patterns of physical cues at well-defined orientations to the soluble cue. This system allows the application of multiple, physiologically relevant cues to cells while minimizing external influences and maintaining the accessibility and ease of measurement common to traditional cell culture dishes.

See full dissertation at **coe.neu.edu/17/RobertNatividad**

Michelle Stolzoff

PhD 2017, Bioengineering; Advisor, Thomas J. Webster

DESIGN AND MECHANISM OF SELENIUM NANOPARTICLES FOR TREATMENT OF COMMON SKIN INFECTIONS

With the prevalence of antibiotic resistance increasing at an alarming rate, a new strategy for treatment and the prevention of infections is necessary. According to a recent CDC report, over 2 million people in the US alone are infected by resistant strains per year, with at least 23,000 dying from these infections. Acne vulgaris, is a skin condition that affects nearly all adolescents worldwide and can continue to burden adults well into their 40s. The pathogenesis of acne is largely attributed to the anaerobic, Gram-positive microbes, Propionibacterium acnes, which in the last few decades has grown to resist antibiotic treatment. Selenium is a trace element micronutrient that is associated with antioxidant and metabolic mechanisms in the body. Selenium nanoparticles (SeNP) have been demonstrated to be effective antibacterial treatments, while having a safe toxicity profile to healthy mammalian cells. Here, we have modified the SeNP synthesis process to implement a stabilizing shell consisting of biocompatible chitosan, while also investigating the mechanism of antibacterial action as well as demonstrating the SeNPs ability to fight acne infections.

See full dissertation at **coe.neu.edu/17/MichelleStolzoff**

Yujing Wang

PhD 2016, Bioengineering; Advisor, Lee Makowski

MOLECULAR DYNAMICS OF ADENYLATE KINASE IN DIFFERENT CONFORMATIONAL TRANSITION STATES

Adenylate kinase (ADK) catalyzes the reversible Mg2+-dependent phosphoryl transfer reaction Mg2+ + 2ADP Mg2+ + ATP + AMP in essential cellular systems. This reaction is a major player in cellular energy homeostasis and the isoform network of ADK plays an important role in AMP metabolic signaling circuits.[12] As a well-studied protein, the structures of ADK from various organisms have been solved by x-ray crystallography. ADK has three domains, the LID, NMP and CORE domains. Comparison of crystal structures reveals that the three domains undergo large conformational rearrangement during ADK's catalytic cycle. The LID and NMP domains are directly involved in the dynamics and close over the enzyme's ATP and AMP binding sites on ligand binding. The conformational switching and protein dynamics are recognized to be important for the enzyme functions. In this thesis I explore the molecular motions which connect the simple static crystal structures.

The conformational transitions of ADK are characterized while it undergoes conformational changes required for catalytic cycling in order to understand the contributions of intermediate sub-states to catalysis. As a first step, the intermediate, partially open conformation is divided into sub-states using K-means clustering based on RMS differences. We then characterize the dynamic behavior of each structural domain in the different sub-states using a number of metrics including radius of gyration, dihedral angle fluctuation, interatomic pair fluctuation and others. This allows us to determine whether or not there are correlations between the transitions among sub-states and the conformational fluctuations in the different domains of ADK. In this research, we use the SMOG model (a structure based model for biomolecular dynamics) to perform long time scale molecular dynamics simulations. In these simulations, the MD parameters are chosen such that ADK transits from an initial open conformation to a closed state.

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COVER IMAGE

Bioengineering student Kritika Singh, E'21, does research in a lab. She recently won the top-level award of the Thermo Fisher Scientific Antibody Scholarship, which is given to only two students nationwide annually for their research and academic accomplishments.