

DEPARTMENT OF BIOENGINEERING

Dear Friends,

The Bioengineering Department is the newest department at Northeastern University. 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 two 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.

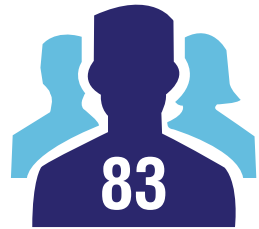
This Scholarship Report provides a window into the activities of the Bioengineering faculty and the energy and breadth of their explorations.



Sincerely,

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

QUICK FACTS



AFFILIATED AND T/TT FACULTY MEMBERS

5 RECENT HIRES

- AMBIKA BAJPAYEE
- CHIARA BELLINI
- GUOHAO DAI
- JESSICA OAKES
- HARIKRISHNAN PARAMESWARAN

DEPARTMENT OF BIOENGINEERING

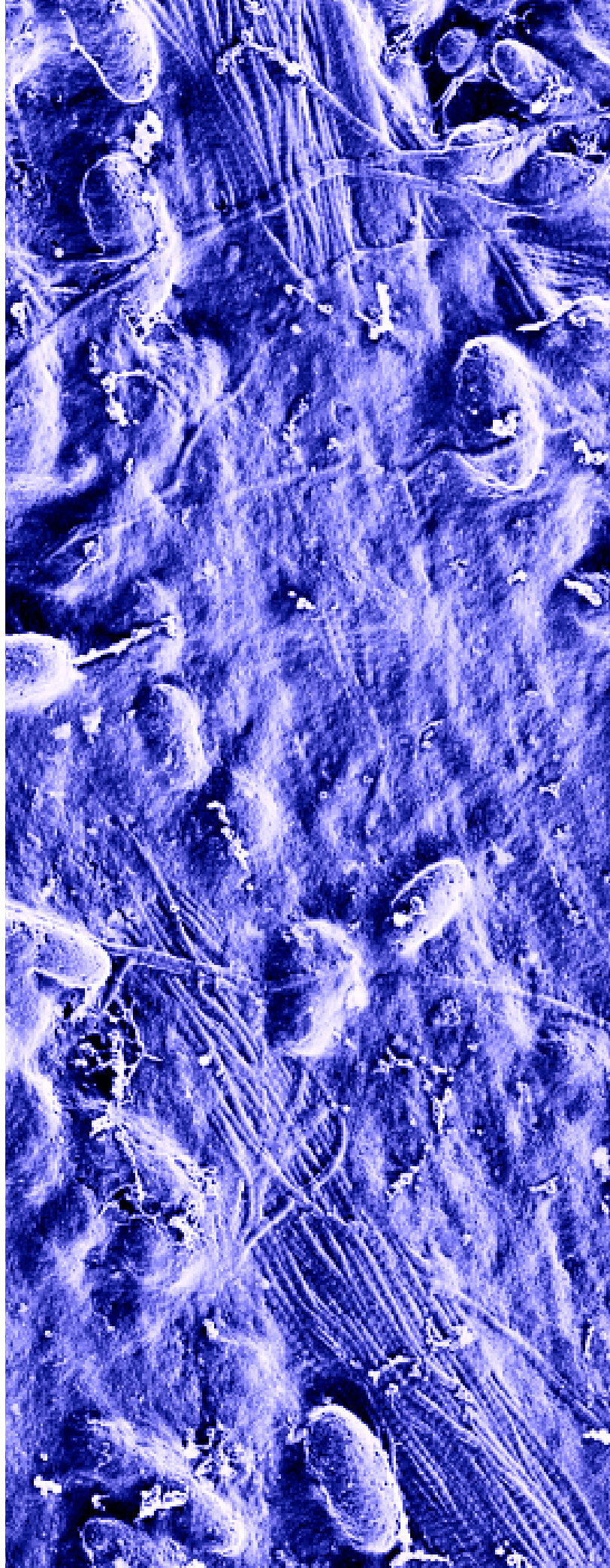
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COVER IMAGE

In this quick freeze deep etch electron micrograph, trails of ~50 nanometer diameter collagen fibrils (the strings that hold us all together) weave around pigment particles behind the mouse retina. The image is part of an atlas being put together by NU Bioengineering doctoral candidate Ebraheim Ismail in collaboration with Professor Goldis Malek of Duke University and Professor Jeffrey Ruberti of Northeastern Bioengineering. The effort is aimed at improving our understanding of Age-related Macular Degeneration and is funded by the National Eye Institute.





Northeastern University
College of Engineering

BIOENGINEERING

2015 | 2016

SCHOLARSHIP REPORT

QUICK FACTS — Bioengineering

RECENT HIRES:



AMBIKA BAJPAYEE joins the college as an Assistant Professor of Bioengineering. Dr. Bajpayee received her PhD from the

Massachusetts Institute of Technology in 2015. Her research interests include nanomedicine and bio-electrostatics.

» See page 5



CHIARA BELLINI joins the college as an Assistant Professor of Bioengineering. Dr. Bellini received her PhD from The University

of Calgary in 2012. Her research interests include mechanics and mechanobiology of soft biological tissues.

» See page 6



AFFILIATED AND T/TT FACULTY MEMBERS



GUOHAO DAI joins the college as an Associate Professor of Bioengineering. Previously he was an Associate Professor

at Rensselaer Polytechnic Institute. Dr. Fang received his PhD from Harvard-MIT in 2001. His research lab pioneered the development of 3-D bioprinting technology.

» See page 10



JESSICA OAKES joins the college as an Assistant Professor of Bioengineering. Dr. Oakes received her PhD from the University

of California, San Diego in 2013 and subsequently became a Postdoctoral Fellow at the University of California, Berkeley. Her research interests include computational fluid dynamics.

» See page 27



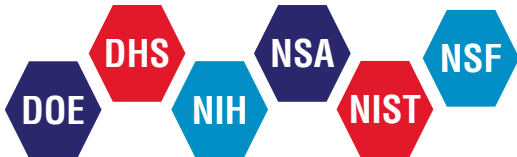
HARI PARAMESWARAN joins the college as an Assistant Professor of Bioengineering. Dr. Parameswaran received

his PhD from Boston University in 2009 where he continued his postdoctoral research. His research interests include the understanding of mechanical forces on the cellular and subcellular level.

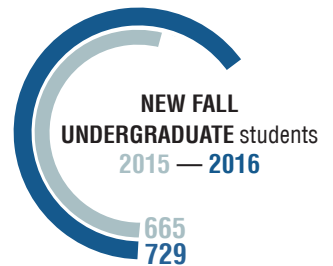
» See page 29

QUICK FACTS — College of Engineering

12 MULTI-INSTITUTIONAL RESEARCH CENTERS funded by six federal agencies



TENURED/ TENURE-TRACK Faculty



3550 UNDERGRADUATE students

5 ENGINEERING DEPARTMENTS

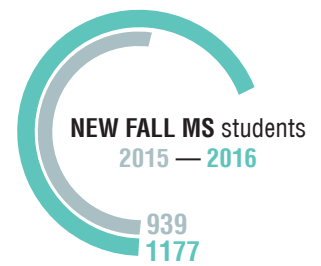
- Bio
- Chemical
- Civil and Environmental
- Electrical and Computer
- Mechanical and Industrial



YOUNG INVESTIGATOR Awards



NSF CAREER Awards



3210 GRADUATE students

HONORS

ACHIEVEMENTS

IN THE NEWS

Bioengineering **Professor Jeffrey Ruberti** was awarded two patents for “Microparticle Organization” and “Systems, Methods, and Devices for Frozen Sample Distribution.”

PhD Students **Fanny Nina-Paravecino** and **Leiming Yu** received a best poster award at the 2016 High Performance Computing Day held at UMASS Dartmouth.

Assistant Professor in electrical and computer engineering, and affiliated bioengineering **Matteo Rinaldi** and his group have published a new paper in Nature Communications titled “Plasmonic Piezoelectric Nanomechanical Resonator for Spectrally Selective Infrared Sensing.”

Affiliated bioengineering Professor **Shashi Murthy** was elected as a Fellow of the American Institute for Medical and Biological Engineering for outstanding contributions to the science and technology of cell purification for therapeutic and analytical applications.

Associate Professor in electrical and computer engineering, and affiliated bioengineering Professor **Stefano Basagni** was named a Distinguished Scientist of the Association for Computing Machinery.

Akram Alshwabkeh, George A. Snell Professor of Engineering and bioengineering affiliated faculty, and his team were awarded a **\$2.9M** grant for the Center for Research on Early Childhood Exposure and Development in Puerto Rico (CRECE). This is the college’s 12th federally funded research center.

Bioengineering Assistant Professor **Nikolai Slavov** wrote the feature article in eLIFE about “Making the Most of Peer Review.”

FACULTY BY RESEARCH AREAS

BIOIMAGING AND SIGNAL PROCESSING

Dana Brooks
Octavia Camps
Charles DiMarzio
Jennifer Dy
Deniz Erdogmus
Qianqian Fang
Ying-Yee Kong
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
Nikolai Slavov
Srinivas Sridhar
Nian Sun
Thomas Webster
Mark Williams

MOTOR CONTROL

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

BIOCOMPUTING

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

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. Alshwabkeh
Ambika Bajpayee
Rebecca Carrier
Edgar Goluch
April Gu
Robert Hanson
Ferdinand Hellweger
Barry Karger
Carolyn W.T. Lee-Parsons
Kim Lewis
Lee Makowski
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
Kai-Tak Wan

AKRAM ALSHAWABKEH



George A. Snell Professor of Engineering and Civil and Environmental Engineering; Associate Dean for Research; 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), a National Institute of Environmental Health Sciences Superfund Research Center. PROTECT investigates the relationship between environmental contamination and preterm birth
 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 ω-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, 1995
bioe.neu.edu/people/asthagiri-anand

Scholarship focus: elucidates design
principles for engineering living cells
and tissues

SELECTED PUBLICATIONS

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

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

K.S. Kushiro, A. Chang, A.R. Asthagiri
Reprogramming Directional Cell Motility by Tuning Micropattern
Features and Cellular Signals, *Advanced Materials*, 22, 4516,
2010, 4516-4519

C.A. Giurumescu, A.R. Asthagiri
Systems Approaches to Developmental Patterning, *Systems
Biomedicine*, Eds: Douglas A. Lauffenburger, Edison Liu and
Garry Nolan, Elsevier Press, 2010

S.A. Chapman, A.R. Asthagiri
Quantitative Role of Scaffolding on Signal Propagation,
Molecular Systems Biology, 5(313), 2009

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

SELECTED RESEARCH PROJECTS

Multi-scale Complex Systems Transdisciplinary Analysis of
Response to Therapy

Co-Principal Investigator, National Institutes of Health

Quantitative Analysis of Epithelial Cell Scatter

Principal Investigator, National Institutes of Health

JOSEPH AYERS



Professor, Marine and Environmental Sciences;
affiliated faculty: Biology, 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. Qadir, 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, 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
- D. Mishra, S. De, S. Jana, S. Basagni, K.R. Chowdhury, et al.
 Smart RF Energy Harvesting Communications: Challenges and Opportunities, *Communications Magazine*, IEEE, 53(4), 2015, 70-78
- M.Y. Naderi, K.R. Chowdhury, S. Basagni
 Wireless Sensor Networks with RF Energy Harvesting: Energy Models and Analysis, *Proceedings of IEEE WCNC 2015*, New Orleans, LA, March 9-12, 2015, 1494-1499
- C. Petrioli, M. Nati, P. Casari, M. Zorzi, S. Basagni
 ALBA-R: Load-balancing Geographic Routing Around Connectivity Holes in Wireless Sensor Networks, *IEEE Transactions on Parallel and Distributed Systems*, 24(3), 2014, 529-539

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

CHIARA BELLINI



Assistant Professor, Bioengineering

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, S. Wang, D.M. Milewicz, J.D. Humphrey
 Myh11R247C/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-naghdhi 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
- A. Satriano, C. Bellini, E.S. Di Martino, E.J. Vigmond
 A Feature-based Morphing Methodology for Computationally Modeled Biological Structures Applied to Left Atrial Fiber Directions, *Journal of Biomechanical Engineering*, 135(3), 2013
- C. Bellini, E.S. Di Martino, S. Federico
 Mechanical Behavior of the Human Atria, *Annals of Biomedical Engineering*, 41(7), 2013, 1478-1490
- C. Bellini, E.S. Di Martino
 A Mechanical Characterization of the Porcine Atria at the Healthy Stage and After Ventricular Tachypacing, *Journal of Biomechanical Engineering*, 134(2), 2012
- E.S. Di Martino, C. Bellini, D. Schwartzman
 In Vivo Porcine Left Atrial Wall Stress: Effect of Ventricular Tachypacing on Spatial and Temporal Stress Distribution, *Journal of Biomechanics*, 44(16), 2011, 2755-2760
- E.S. Di Martino, C. Bellini, D. Schwartzman
 In Vivo Porcine Left Atrial Wall Stress: Computational Model, *Journal of Biomechanics*, 44(15), 2011, 2589-2594

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

- 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
- 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 appointment in: Bioengineering, Electrical and Computer Engineering

PhD, Oklahoma State University, 1983
mie.neu.edu/people/busnaina-ahmed

Scholarship focus: nano engineering, nano and micro-contamination control, particulate and chemical contamination and defects, high rate nanomanufacturing, MEMS and NEMS devices with micro and nano-scale channels, nanomaterials

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

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

A. Malima, S. Siavoshi, T. Musacchio, J. Upponi, C. Yilmaz, S. Somu, W. Hartner, V. Torchilin, A. Busnaina
Highly Sensitive Microscale in Vivo Sensor Enabled by Electrophoretic Assembly of Nanoparticles for Multiple Biomarker Detection, *Lab on a Chip*, 12, 2012, 4748-4754

A. Busnaina
Nanomanufacturing Handbook, Taylor and Francis Group, CRC Press, 2007

SELECTED RESEARCH PROJECTS

Collaborative Research in Nanomanufacturing
Principal Investigator, Massachusetts Technology Collaborative
Novel Nanoprinting for Oral Delivery of Poorly Soluble Drugs
Co-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

Y. Cheng, J.A. Lopez, O. Camps, M. Sznaier
A Convex Optimization Approach to Robust Fundamental Matrix
Estimation, Proceedings of the IEEE Conference on Computer
Vision and Pattern Recognition, 2015, 2170-2178

S. Markovic, L. Siyuan, M. Sznaier, O. Camps, M. Niedre
Computer Vision in Vivo Flow Cytometry of Low-abundance
Circulating Cells, Bio-Optics: Design and Application
Conference, 2015

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

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

F. Xiong, Y. Cheng, O. Camps, M. Sznaier, C. Lagoa
Hankel Based Maximum Margin Classifiers: A Connection
Between Machine Learning and Wiener Systems Identification,
Proceedings 52 IEEE Conference Dec. Control, 2013, 6005-6010

SELECTED RESEARCH PROJECTS

Robust Identification of a Class of Structured Systems with High
Dimensional Outputs and Applications
Co-Principal Investigator, National Science Foundation

REBECCA L. CARRIER



Associate Professor, Chemical Engineering;
Associate Chair of Research

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

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

F. Buyukozturk, S. Di Maio, D.E. Budil, R.L. Carrier
Effect of Ingested Lipids on Drug Dissolution and Release with
Concurrent Digestion: A Modeling Approach, *Pharmaceutical
Research*, 30(12), 2013, 3131-3144

C.A. Pfluger, B.J. McMahon, R.L. Carrier, D.D. Burkey
Precise, Biomimetic Replication of the Multiscale Structure
of Intestinal Basement Membrane using Chemical Vapor
Deposition, *Tissue Engineering*, 19(5-6), 2013, 649-656

SELECTED RESEARCH PROJECTS

Impact of Lipids on Compound Absorption: Mechanistic Studies
and Modeling

Principal Investigator, National Institutes of Health
Intestinal Mucus Barrier: Role in Necrotizing Enterocolitis (NEC) and
Prophylactic "Mucus-strengthening" Treatment to Prevent NEC
Principal Investigator, March of Dimes

PAUL CHAMPION



Professor and Chair, 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

- Y. Sun, A. Benabbas, W. Zeng, S. Muralidharan, E.M. Boon, P.M. Champion
 Kinetic Control of O₂ 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
- 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
- M.M. Warren, M. Kaucikas, A. Fitzpatrick, P.M. Champion, J. Timothy Sage, J.J. van Thor
 Ground State Proton Transfer in the Photoswitching Reactions of the Fluorescent Protein Dronpa, *Nature Communications*, 2013

SELECTED RESEARCH PROJECTS

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

HEATHER CLARK



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

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

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

- 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



Associate 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

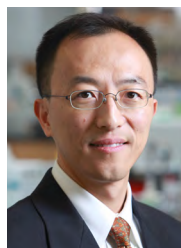
SELECTED PUBLICATIONS

- A.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
- J.D. Weaver, S. Goklany, N.F. 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
- 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. Zheng, Y. Sun, X. Yu, Y. Shao, P. Zhang, G. Dai, J. Fu
 Angiogenesis in Liquid Tumors: An In Vitro Assay for Leukemic Cell Induced Bone Marrow Angiogenesis, *Advanced Healthcare Materials*, 5(9), 2016, 1014-1024
- X. Cui, Y.W. Lu, V. Lee, D. Kim, T. Dorsey, Q. Wang, Y. Lee, P. Vincent, J. Schwarz, G. Dai
 Venous Endothelial Marker COUP-TFII Regulates the Distinct Pathologic Potentials of Adult Arteries and Veins, (*Nature*) *Scientific Reports*, 2015
- G. Gao, A.F. Schilling, K. Hubbell, T. Yonezawa, D. Truong, Y. Hong, G. Dai, X. Cui
 Improved Properties of Bone And Cartilage Tissue from 3D Inkjet-bioprinted Human Mesenchymal Stem Cells by Simultaneous Deposition and Photocrosslinking in PEG-GelMA, *Biotechnology Letters*, 37(11), 2015, 2349-2355
- G. Gao, T. Yonezawa, K. Hubbell, G. Dai, X. Cui
 Inkjet-bioprinted Acrylated Peptides and PEG Hydrogel with Human Mesenchymal Stem Cells Promote Robust Bone and Cartilage Formation with Minimal Printhead Clogging, *Biotechnology Journal*, 10(10), 2015, 1568-1577
- G. Gao, A.F. Schilling, T. Yonezawa, J. Wang, G. Dai, X. Cui
 Bioactive Nanoparticles Stimulate Bone Tissue Formation in Bioprinted Three-dimensional Scaffold And Human Mesenchymal Stem Cells, *Biotechnology Journal*, 9(10), 2014, 1304-1311

SELECTED RESEARCH PROJECTS

- Transcriptional Regulation of Arterial Venous Differentiation
 Principal Investigator, American Heart Association
- Integrated Platform to Construct and Image 3-D Perfused Vascular Network Within Thick Matrix
 Principal Investigator, National Science Foundation
- 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

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

- 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
- M.B. Trudeau, D.S. Asakawa, D.L. Jindrich, J.T. Dennerlein
 Two-handed Grip on a Mobile Phone Affords Greater Thumb Motor Performance, Decreased Variability, and a More Extended Thumb Posture Than a One-handed Grip, *Applied Ergonomics*, 52, 2015, 24-28
- S.S. Kim, C. Okechukwu, L. Boden, J.T. Dennerlein, et al.
 Association Between Work-family Conflict and Musculoskeletal Pain Among Hospital Patient Care Workers, *American Journal of Industrial Medicine*, 56(4), 2013, 488-495
- P. Morency, L. Miranda-Moreno, W. Willett, J.T. Dennerlein, et al.
 Bicycle Guidelines and Crash Rates on Cycle Tracks in the United States, *American Journal of Public Health*, 103(7), 2013, 1240-1248
- J.G. Young, M.B. Trudeau, D. Odell, K. Marinelli, J.T. Dennerlein
 Wrist and Shoulder Posture and Muscle Activity During Touch-screen Tablet use: Effects of Usage Configuration, Tablet Type, and Interacting Hand, *Work: A Journal of Prevention, Assessment and Rehabilitation*, 45(1), 2013, 59-71

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
- Modifying the Workplace to Decrease Sedentary Behaviour and Improve Health
 Co-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

SELECTED PUBLICATIONS

- 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
- Y. Zeng, E. Ebong, B. Fu, J. Tarbell
The Structural Stability of the Endothelial Glycocalyx after Enzymatic Removal of Glycosaminoglycans, PLoS ONE, 7(8), 2012, e43168
- E. Ebong, F. Macaluso, D. Spray, J. Tarbell
Imaging the Endothelial Glycocalyx In Vitro by Rapid Freezing/Freeze Substitution Transmission Electron Microscopy, Arteriosclerosis Thrombosis and Vascular Biology, 31(8), 2011, 1908-1915

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
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, N.A. Peppas
Network Structure and Methanol Transport Dynamics in Poly(methyl methacrylate), *AIChE Journal*, 58(5), 2012, 1600-1609
- 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
BrainComputer Interface with Language Model/EEG 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 Single-trial 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

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. 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*
 H.J. Sismaet, T.A. Webster, E.D. Goluch

Up-regulating Pyocyanin Production by Amino Acid Addition for Early Identification of *Pseudomonas aeruginosa*, *Analyst*, 139, 2014, 4241-4246, *featured as a hot article in the *Analyst*

SELECTED RESEARCH PROJECTS

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 appointment in: 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



Associate Professor, Civil and Environmental Engineering, Director of Graduate Studies; affiliated faculty, Bioengineering

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

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

Honors and awards: 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 β -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

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
 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

J.-U. Kreft, C. Plugge, V. Grimm, F. Hellweger, et al.
 Mighty Small: Observing and Modeling Individual Microbes Becomes Big Science, *PNAS*, 110(45), 2013, 18027-18028

N. Fredrick, J.A. Berges, B. Twining, D. Nuñez-Milland, F.L. Hellweger
 Exploring Mechanisms of Intracellular P Heterogeneity in Cultured Phytoplankton Using Agent Based Modeling, *Applied and Environmental Microbiology*, 79(14), 2013

F.L. Hellweger
 Escherichia Coli Adapts to Tetracycline Resistance Plasmid (pBR322) by Mutating Endogenous Potassium Transport: in Silico Hypothesis Testing, *FEMS Microbiology Ecology*, 83(3), 2013, 622-631

SELECTED RESEARCH PROJECTS

Dimensions: Collaborative Research: Anthropogenic Nutrient Input Drives Genetic, Functional and Taxonomic Biodiversity in Hypereutrophic Lake Taihu, China

Principal Investigator, National Science Foundation

Collaborative Research: Causes and Mechanisms of Cell Death in Freshwater Phytoplankton

Principal Investigator, National Science Foundation

Consortium for Ocean Sensing In the Nearshore Environment (COSINE)

Principal Investigator, National Oceanic and Atmospheric Administration

NADER JALILI



Professor and Associate Chair for Graduate Studies and Research, Mechanical and Industrial Engineering; affiliated faculty appointment in 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 KAEI



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

S. Mukherjee, Y. Sun, P. Blinzer, A. K. Ziabari, D. Kaeli

A Comprehensive Performance Analysis of HSA and OpenCL 2.0, *Proceedings of the IEEE International Symposium on Performance Analysis of Systems and Software*, 2016, 183-192

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

A.K. Ziabari, J.L. Abellan, R. Ubal, C. Chen, A. Joshi, D. Kaeli

Leveraging Silicon-photonics NOC for Designing Scalable GPUs, *Proceedings of the 29th ACM International Conference on Supercomputing*, 2015, 273-282

D. Kaeli, P. Mistry, D. Schaa, D. Zhang

Heterogeneous Computing with OpenCL 2.0, Morgan Kaufmann Publishing, 2015

SELECTED RESEARCH PROJECTS

Development of a Testbed for Side-channel Analysis and Security Evaluation

Co-Principal Investigator, National Science Foundation

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. 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
- R.M. Gathungu, J.T. Oldham, S.S. Bird, C.W.T. Lee-Parsons, P. Vouros, R. Kautz
 Application of an Integrated LC-UV-MS-NMR Platform to the Identification of Secondary Metabolites from Cell Cultures: Benzophenanthridine Alkaloids from Elicited *Eschscholzia californica* (California poppy) Cell Cultures, *Analytical Methods*, 4, 2012, 1315-1325

SELECTED RESEARCH PROJECTS

- Transcriptional Control of Alkaloid Biosynthesis in *Catharanthus roseus* Cultures
 Principal Investigator, National Science Foundation
 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 Data with 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, 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
- J. Janssen, O. Verschuren, D. Levac, J. Ermers, M. Ketelaar
Structured Game-related Group Therapy for an Adolescent with Acquired Brain Injury: A Case Report, *Journal of Pediatric Rehabilitation Medicine*, 5(2), 2012, 125-132
- D. Levac, L. Rivard, C. Missiuna
Describing the Active Ingredients of Interactive Computer Play Interventions for Children with Neuromotor Impairments: A Scoping Review, *Research in Developmental Disabilities*, 33, 2012, 214-223
- D. Levac, P. Miller, C. Missiuna
Usual and Virtual Reality Video Game-based Physiotherapy Interventions for Children and Youth with Acquired Brain Injuries, *Physical and Occupational Therapy in Pediatrics*, 32(3), 2012, 180-195

SELECTED RESEARCH PROJECTS

- Usability Evaluation of the FITBoard: A Motivating, Movement-based Rehabilitation Tool for Children with Disabilities
Principal Investigator, Deborah C. Noonan Memorial Research Fund
- Does Narrative Feedback Enhance Motor Learning of a Virtual Balance Task for Children with Cerebral Palsy?
Co-Principal Investigator, Northeastern University

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 appointment in: 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 appointment in: 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 MEMS-enabled cell assembly and origami folding, carbon nanotube-based energy storage

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

SELECTED PUBLICATIONS

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

A.S. Dighe, C. Livermore
Single-use MEMS Sealing Valve with Integrated Actuation for Ultra Low-leak Vacuum Applications, *Journal of Micromechanics and Microengineering*, 24(10), 2014, 105011

G. Agarwal, A. Servi, C. Livermore
Size-selective, Biocompatible, Manufacturable Platform for Structuring Deformable Microsystems, *Lab on a Chip*, 14(17), 2014, 3385-3393

F.A. Hill, T. Havel, D. Lashmore, M. Schauer, C. Livermore
Storing Energy and Powering Small Systems with Mechanical Springs Made of Carbon Nanotube Yarn, *Energy*, 76, 2014, 318-325

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

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, *9, Biotechnology for Biofuels*, 2016, 126-143

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

J. Viell, H. Inouye, N.K. Szekely, H. Frielinghaus, Y. Wang, N. Anders, A.C. Spiess, L. Makowski
 Mechanisms of Wood Disintegration and Pretreatment with 1-ethyl-3-methylimidazolium Acetate/Water Mixtures, *Biotechnology for Biofuels*, 2016

H. Zhou, S. Li, L. Makowski
 Visualizing Global Properties of a Molecular Dynamics Trajectory, *Proteins: Structure Function and Bioinformatics*, *84*, 2016, 82-91

H. Zhou, S. Li, J. Badger, E. Nalivaika, Y. Cai, J. Foulkes-Murzycki, C. Schiffer, L. Makowski
 Modulation of HIV Protease Flexibility by the T80N Mutation, *Proteins: Structure Function and Bioinformatics*, *83*, 2015, 1929-1939

A.E. Onuk, M. Akcakaya, J. 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*, 2015, 5383-5394

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.

Precise Characterization of Conformational Ensembles
 Principal Investigator, National Science Foundation

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

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

E.A. Marengo, P. Berestesky
 Cramer-rao Bound Study of Multiple Scattering Effects in Target Separation Estimation, *International Journal of Antennas and Propagation*, *572923*, 2013, 1-10

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
 Multipole Theory and Algorithms for Target Support Estimation, *International Journal of Antennas and Propagation*, *515240*, 2013, 1-15

E.A. Marengo, F.K. Gruber
 Optical-theorem-based Coherent Scatterer Detection in Complex Environments, *International Journal of Antennas and Propagation*, *231729*, 2013, 1-12

SELECTED RESEARCH PROJECTS

Wave-based Algorithms and Bounds for Target Support Estimation
 Principal Investigator, Air Force Office of Scientific Research

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; 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

- L. Hayward, S. Ventura, M. Mahanna, and 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
- S. Guler, M. Dannhauer, B. Erem, R. Macleod, D. Tucker, S. Turovets P. Luu, W. Meleis, D. Brooks
Optimizing Stimulus Patterns for Dense Array TDCS with Fewer Sources than Electrodes Using a Branch and Bound Algorithm, *International Symposium on Biomedical Imaging (ISBI'16)*, Prague, Czech Republic, 2016
- D. Lazer, W. Meleis, B. Foucault Wells, C. Riedl, et al.
Performing Massively Open Online Social Experiments with Volunteer Science, *Workshop on Crowdsourcing and Online Behavioral Experiments (COBE) at the ACM Conference on Economics and Computation*, 2015
- 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
- W. Meleis, et al.
Volunteer Science as a Platform for Studying Team Processes and Performance, *Cooperative Team Networks Workshop at the International School and Conference on Network Science (NetSci)*, 2014
- D. Brooks, S. Muftu, W. Meleis, R. Moore, K.-T. Wan, et al.
Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, *Experimental Mechanics*, 54,(6), 2014, 935-942
- C. Karbeyaz, B. Foucault Welles, J. Hoye, W. Meleis, D. Lazer, et al.
Information Navigation and Hidden Profile Experiments on the Volunteer Science Web Laboratory, *International Sunbelt Social Network Conference (Sunbelt XXXIV)*, Florida, US, 2014

HOSSEIN MOSALLAEI



Associate 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. Valleau, S.K. Saikin, M. Rostami, H. Mosallaei, et al.
Electromagnetic Study of the Chlorosome Antenna Complex of Chlorobium-*tepidum*, ACS Nano, 8(4), 2014, 3884-3894

J. Cheng, H. Mosallaei
Optical Metasurfaces for Beam Scanning in Space, Optics Letters, 39(9), 2014, 2719-2722

M. Farmahini-Farahani, J. Cheng, H. Mosallaei
Metasurfaces Nanoantennas for Light Processing, Journal of the Optical Society of America B, 30(9), 2013, 2365-2370

B. Memarzadeh, H. Mosallaei
Multimaterial Loops as the Building Block for a Functional Metasurface, Journal of the Optical Society of America B, 30(7), 2013, 1827-1834

E. Chernobrovkina, S.K. Saikin, S. Valleau, H. Mosallaei, et al.
Parametric Hierarchical Matrix Approach for the Wideband Optical Response of Large-scale Molecular Aggregates, Journal of Applied Physics, 114, 2013, e164315

J. Cheng, W.L. Wang, H. Mosallaei, E. Kaxiras
Surface Plasmon Engineering in Graphene Functionalized with Organic Molecules: A multi-scale Theoretical Investigation, Nano Letters, 14(1), 2013, 50-56

SELECTED RESEARCH PROJECTS

Computationally-designed Materials for Wave Synthesis
Principal Investigator, Defense Advanced Research Projects Agency

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

SINAN 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

Q. Sheng, A.J. White, S. Müftü
An Experimental Study of Friction and Durability of a Thin PTFE-film on Rough Aluminum Substrates, Tribology Transactions, 2016

Q. Sheng, A.J. White, S. Müftü
Interfacial Delamination of Thin-film PTFE (Polytetrafluoroethylene) Coatings, The Journal of Adhesion, 2016

H. Yang, J.B.C. Engelen, A. Pantazi, W. Häberle, M.A. Lantz, S. Müftü
Mechanics of Lateral Positioning of a Translating Tape due to Tilted Rollers: Theory and Experiments, International Journal of Solids and Structures, 66, 2015, 88-97

H.Y. Chou, D. Satpute, A. Müftü, S. Mukundan, S. Müftü
Influence of Mastication and Edentulism on Mandibular Bone Density, Computer Methods in Biomechanics and Biomedical Engineering, 18(3), 2015, 269-281

Yildirim, H. Fukunuma, T. Ando, A. Gouldstone, S. Müftü
A Numerical Investigation into Cold Spray Bonding Processes, Journal of Tribology, 137(1), 2015, 935-942

H. Yang, J. B. C. Engelen, A. Pantazi, S. Müftü, et al.
Mechanics of Lateral Positioning of a Translating Tape due to Tilted Rollers: Theory and Experiments, International Journal of Solids and Structures, 66, 2015, 88-97

T. Kasikci, S. Müftü
Wrap Pressure between a Flexible Web and a Circumferentially Grooved Cylindrical Guide, Journal of Tribology, Trans ASME, 138(3), 2015

SELECTED RESEARCH PROJECTS

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

ARL Cold Spray Modeling Program
Technical Point of Contact, Army Research Laboratory

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

SANJEEV MUKERJEE



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

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 CH₂P 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 Transcriptomics-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 appointment in: 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 appointment in: 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, Electrical and Computer Engineering; jointly appointed, 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

- 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. Sznajder, 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: computational fluid dynamics, biological flows, multi-phase flows, multi-scale modeling, pulmonary physiology, aerosols, parameter estimation, magnetic resonance imaging, flow visualization, particle image velocimetry, numerical methods

SELECTED PUBLICATIONS

- 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. Tchanchou, 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
- J.M. Oakes, S. Day, S.J. Weinstein, R.J. Robinson
 Flow Field Analysis in Expanding Healthy and Emphysematous Alveolar Models Using Particle Image Velocimetry, *Journal of Biomechanical Engineering*, 132(2), 2010, 021008

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

- 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. Brodtkin, 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
- R. Thomas, J. Lee, V. Chevalier, S. Sadler, K. Selesniemi, S. Hatfield, M. Sitkovsky, M.J. Ondrechen, G.B. Jones
 Design and Evaluation of Xanthine Based Adenosine Receptor Antagonists: Potential Hypoxia Targeted Immunotherapies, *Bioorganic and Medicinal Chemistry*, 21, 2013, 7453-7464
- Z. Wang, P. Yin, J.S. Lee, R. Parasuram, S. Somarowthu, M.J. Ondrechen
 Protein Function Annotation with Structurally Aligned Local Sites of Activity (SALSAs), *BMC Bioinformatics*, 14(Suppl 3), 2013

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

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. Sato, E.B. Suki, H. Parameswaran, H. Hamakawa, B. Suki
 Scale Dependence of Structure-Function Relationship in the Emphysematous Mouse Lung, *Frontiers in Physiology*, 6(146), 2015

M.V. Szabari, J. Tolnai, B.A. Maár, H. Parameswaran, E. Bartolák-Suki, B. Suki, Z. Hanto
 Lung Structure and Function in Elastase-treated Rats: A Follow-up Study, *Respiratory Physiology and Neurobiology*, 215, 2015, 13-19

B. Harvey, H. Parameswaran, K.R. Lutchen
 Can Breathing-like Pressure Oscillations Reverse or Prevent Narrowing of Small Intact Airways?, *Journal of Applied Physiology*, 119(1), 2015, 47-54

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

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

A. Takahashi, A. Majumdar, H. Parameswaran, E.B. Suki, B. Suki
 Proteoglycans Maintain Lung Stability in an Elastase-treated Mouse Model of Emphysema, *American Journal of Respiratory Cell and Molecular Biology*, 51(1), 2014, 26-33

SELECTED RESEARCH PROJECTS

Advanced Image-based Approach to Assess How Fibrillar Collagen Modulates Airway Reactivity
 Principal Investigator, National Institutes of Health/National Heart, Lung, and Blood Institute (NHI/NHLBI)

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

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, Institute of Electrical and Electronics Engineers; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

- 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
- M. Tajdini, B. Gonzalez-Valdes, J.A. Martinez-Lorenzo, A. Morgenthaler, C. Rappaport
Efficient 3D Forward Modeling of GPR Scattering from Rough Ground, *IEEE International Symposium on Antennas and Propagation*, Vancouver, Canada, 2015, 1686-1687
- B. Gonzalez-Valdez, Y. Alvarez Lopez, J.A. Martinez Lorenzo, F. Las-Heras Andres, C. Rappaport
A Hybrid SAR – Model Based Method for High Resolution Imaging, *IEEE International Symposium on Antennas and Propagation*, Memphis, TN, 2014, 653-654
- Y. Álvarez, F. Las-Heras, B. Gonzalez-Valdes, J.A. Martínez-Lorenzo, C. Rappaport
Accurate Profile Reconstruction Using An Improved SAR Based Technique, *Proceedings of the IEEE International Antennas and Propagation Symposium (IAPS)*, 2013, 818-819
- B. Gonzalez-Valdes, J.A. Martinez-Lorenzo, C. Rappaport
Dual Band SAR Processing for Low Dielectric Contrast Buried IED Detection, *Proceedings of the IEEE IAPS*, 2013, 1080-1081

SELECTED RESEARCH PROJECTS

- Awareness and Localization of Explosive-Related Threats (ALERT)
Co-Principal Investigator, Department of Homeland Security
Concept Development And Modeling For Communicating With Oil Drilling Heads Using Low Frequency Electromagnetic Waves
Principal Investigator, Draper Laboratory Incorporated
- Multi-Modality Electromagnetic Detection and Localization of Implanted Explosives Using Ultra Low Field MRI and Nuclear Quadrupole Resonance
Principal Investigator, Defense Advanced Research Projects Agency

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



Assistant 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

- 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
- Z. Qian, Y. Hui, F. Liu, S. Kar, M. Rinaldi
 Graphene-aluminum NEMS Resonant Infrared Detector, *Microsystems and Nanoengineering*, 2, 2016, 16026
- 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-β3 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 Chair, 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

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

N. Brooks, S.M. Cadena, G. Cloutier, C. Castaneda-Sceppa, et al.

Influence of Exercise on the Metabolic Profile Caused by 28 days of Bed Rest with Energy Deficit and Amino Acid Supplementation in Healthy Men, *International Journal of Medical Sciences*, 11(12), 2014, 1248-1257

C. Castaneda-Sceppa, J.A. Hoffman, J. Thomas, M. DuBois, et al.

Family Gym: A Model to Promote Physical Activity for Families with Young Children, *Journal of Health Care for the Poor and Underserved*, 25(3), 2014, 1101-1107

G. Cloutier, K. Khrapko, C. Castaneda-Sceppa, et al.

Bedrest Increases Burden of Mitochondrial DNA Deletions in Human Muscle, *FASEB Journal*, 27, 2014, 956.1

C. Castaneda-Sceppa, K.O. O'Brien, S.A. Abrams SA, et al.

Calcium Kinetics During Bed Rest with Artificial Gravity and Exercise Countermeasures, *Osteoporosis International*, 25, 2014, 2237-2244

SELECTED RESEARCH PROJECTS

Boston Area Roybal Center

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-Principal 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 faculty 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
- P.L. Salmon, C. Ohlsson, S.J. Shefelbine, M. Doube
Structure Model Index Does Not Measure Rods and Plates in Trabecular Bone, *Frontiers in Endocrinology*, 6, 2015, 162

SELECTED RESEARCH PROJECTS

- Heterogeneity 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 appointment in: 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: Young Investigator Award, American Society of Mechanical Engineers; College of Engineering Faculty Fellow; Defense Advanced Research Projects Agency Young Faculty Award; Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

- W. Qiao, R. Sipahi
Consensus Control under Communication Delay: Experiments on a Three-robot System, *IEEE Control Systems Technology*, 24(2), 2016, 687-694
- A. Ramirez, S. Mondie, R. Garrido, R. Sipahi
Design of Proportional Integral Retarded Controllers, *IEEE Transactions on Automatic Control*, 61(6), 2016, 1688-1693
- M. Ulusoy, R. Sipahi
Experimental Evaluation of a Braille-reading-inspired Finger Motion Adaptive Algorithm, *PLoS One*, 0148356, 2016, 1-23
- N. Zhi, A. Gouldstone, B.K. Jaeger, R. Sipahi, S. Frank
Toward Monitoring Parkinson's through Analysis of Static Handwriting Samples: A Quantitative Analytical Framework, available online, *IEEE Journal of Biomedical and Health Informatics*, 2016
- R. Sipahi
Delay-margin Design for the General Class of Single-delay Retarded-type LTI Systems, *International Journal of Dynamics and Control*, 2(2), 2014, 198-209

SELECTED RESEARCH PROJECTS

- A Three-dimensional Model of Spinal Cord Growth and Repair in a Regeneration-competent Organism
Co-Principal Investigator, National Science Foundation
- Graph-based Control Design for Network Dynamics with Time Delays
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, cell growth and differentiation, statistical inference, mass-spectrometry; quantitative systems biology; bioinformatics

Honors and awards: Broad Institute SPARC; IRCSET Postgraduate Research Fellowship; Eureka Fellowship for Academic Excellence

SELECTED PUBLICATIONS

- N. Slavov, S. Semrau, E. Airoidi, 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. Airoidi, 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
- N. Slavov, D. Botstein
 Coupling Among Growth Rate Response, Metabolic Cycle, and Cell Division Cycle in Yeast, *Molecular Biology of the Cell*, 22(12), 2011, 1997-2009
- N. Slavov, J. Macinskas, A. Caudy, D. Botstein
 Metabolic Cycling Without Cell Division Cycling in Respiring Yeast, *Proceedings of the National Academy of Sciences of the United States of America*, 108(47), 2011, 19090-19095

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

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

- J. Schuemann, R. Berbeco, D.B. Chithrani, S. Hyun Cho, R. Kumar, S.J. McMahon, S. Sridhar, S. Krishnan
 Roadmap to Clinical Use of Gold Nanoparticles for Radiation Sensitization, *International Journal of Radiation Oncology Biology Physics*, 94(1), 2016, 189-205
- B.M. Geilich, A.L. van de Ven, G.L. Singleton, L.J. Sepulveda, S. Sridhar, T.J. Webster
 Silver Nanoparticle-embedded Polymersome Nanocarriers for the Treatment of Antibiotic-resistant Infections, *Nanoscale*, 7(8), 2015, 3511-3519
- S. Kunjachan, A. Detappe, R. Kumar, T. Ireland, L. Cameron, D.E. Biancur, V. Motto-Ros, L. Sancey, S. Sridhar, G.M. Makrigiorgos, R.I. Berbeco
 Nanoparticle Mediated Tumor Vascular Disruption: A Novel Strategy in Radiation Therapy, *Nano Letters*, 15(11), 2015, 7488-7496
- S. Kumar, J. Belz, S. Markovic, T. Jadhav, S. Sridhar, et al.
 Nanoparticle-based Brachytherapy Spacers for Delivery of Localized Combined Chemoradiation Therapy, *International Journal of Radiation Oncology*, 91(2), 2015, 393-400
- R. Tangutoori, P. Baldwin, S. Sridhar
 Parp Inhibitors: A New Era of Targeted Therapy, *Maturitas*, 81(1), 2015, 5-9

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

- W.T.V. Chu, S.W. Park, T.D. Sanger, D. Sternad
 Dystonic Children Can Learn a Novel Motor Skill: Strategies That are Tolerant to High Variability, *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 2016
- C.J. Hasson, Z. Zhang, M.O. Abe, D. Sternad
 Neuromotor Noise is Malleable by Amplification of Perceived Error, *PLoS Computational Biology*, 2016
- J. Ahn, Z. Zhang, D. Sternad
 Noise Induces Biased Estimation of the Correction Gain, *PLoS ONE*, 11(7), 2016, e0158466, 2016
- M.E. Huber, D. Sternad
 Implicit Guidance to Stable Performance in a Rhythmic Perceptual-motor Skill, *Experimental Brain Research*, 233(6), 2015, 1783-1799
- S.-W. Park, D. Sternad
 Robust Retention of Individual Sensorimotor Skill After Self-Guided Practice, *Journal of Neurophysiology*, 2015
- M.E. Huber, A.E. Seitchik, A. Brown, D. Sternad, S.G. Harkins
 The Effect of Stereotype Threat on Performance of a Rhythmic Motor Skill, *Journal of Experimental Psychology: Human Perception and Performance*, 41(2), 2015, 525-541
- D. Sternad, M.E. Huber, N. Kuznetsov
 Acquisition of Novel and Complex Motor Skills: Stable Solutions Where Intrinsic Noise Matters Less, *Advances in Experimental Medicine and Biology*, 826, 2014, 101-124

SELECTED RESEARCH PROJECTS

- Challenging the Cognitive-control Divide
 Principal Investigator, National Science Foundation
- Multi-center Trial of Augmented Sensory Feedback in Children with Dyskinetic CP
 Co-Principal Investigator, National Institutes of Health
- 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

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

- 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
- E. Zorita, M. Stojanovic
 Space-frequency Block Coding for Underwater Acoustic Communications, *IEEE Journal of Oceanic Engineering*, 40(2), 2015, 303-314
- 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/sznaiier-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. Sznaiier
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. Sznaiier, O. Camps
Finding Causal Interactions in Video Sequences, IEEE International Conference on Computer Vision, Sydney, 2013
- C. Dicle, O. Camps, M. Sznaiier
The Way They Move: Tracking Multiple Targets with Similar Appearance, IEEE International Conference on Computer Vision, Sydney, Australia, 2013
- K. Bekiroglu, M. Sznaiier, 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. Sznaiier
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

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

Scholarship focus: chemistry; biochemistry; bioorganic chemistry; physiologically active compounds; experimental pharmacology

Honors and awards: Elected as a Member of European Academy of Sciences; Fellow, AAPS; Fellow, Controlled Release Society; Fellow, American Institute of Medical and Biological Engineering; 2013 Blaise Pascal Medal in Biomedicine from the European Academy of Sciences

SELECTED PUBLICATIONS

- 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
- B.S. Pattni, V.V. Chupin, V.P. Torchilin
 New Developments in Liposomal Drug Delivery, *Chemical Reviews*, 115(9), 2015, 10938-10966
- S. Essex, G. Navarro, P. Sabhachandani, A. Chordia, M. Trivedi, S. Movassaghian, V.P. Torchilin
 Phospholipid-modified PEI-based Nanocarriers for in vivo siRNA Therapeutics Against Multidrug-resistant Tumors, *Gene Therapy*, 22, 2015, 41-50
- E.Y. Lukianova-Hleb, X. Ren, R.R. Sawant, X. Wu, V.P. Torchilin, D.O. Lapotko
 On-demand Intracellular Amplification of Chemoradiation with Cancer-specific Plasmonic Nanobubbles, *Nature Medicine*, 20, 2014, 778-784
- G. Salzano, R. Riehle, G. Navarro, F. Perche, G. De Rosa, V.P. Torchilin
 Polymeric Micelles Containing Reversibly Phospholipid-modified Anti-survivin siRNA: A Promising Strategy to Overcome Drug Resistance in Cancer, *Cancer Letters*, 343(2), 2014, 224-231

SELECTED RESEARCH PROJECTS

- Center for Cancer Nanotechnology Excellence
 Principal Investigator, National Institutes of Health
- Immix-production of PEG-PE-based Polymeric Micelles Co-loaded with Curcumin and Doxorubicin
 Principal Investigator, Immix Biopharma, LLC
- Microbiotix - Pharmacokinetic and Biodistribution of Liposomal Phenoxyacetamide in Vivo Using Mouse Model
 Principal Investigator, Microbiotix, Inc
- Multifunctional Matrix Metalloprotease-2-Sensitive Anti-cancer Nanopreparations
 Principal Investigator, National Institutes of Health
- Pharmacokinetic and Biodistribution of SBC-105
 Principal Investigator, Synageva BioPharma

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 E 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 appointment in: 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 appointment in: 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

M. Robitaille, N. Belisle, S. Dang, E. Faigle, C. Morck, P. Uth, K.-T. Wan
An Optical Topographic Technique to Map the 3-D Deformed Profile of a Convex Lens under External Loading, *Experimental Mechanics*, 55, 2015, 641-646

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

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

G. Li, K.-T. Wan
Adhesion Map for Thin Membranes, *Journal of Applied Mechanics* 81(12), 2013, 021018

G. Li, C. Yilmaz, X. An, S. Somu, S. Kar, Y. Jung, A. Busnaina, K.-T. Wan
Adhesion of Graphene Sheet on Nano-patterned Substrates with Nano-pillar Array, *Journal of Applied Physics*, 113, 2013, 244303

M. Robitaille, J. Shi, S. McBride, K.-T. Wan
Mechanical Performance of Hydrogel Contact Lenses with a Range of Power Under Parallel Plate Compression and Central Load, *Journal of the Mechanical Behavior of Biomedical Materials*, 22, 2013, 59-64

SELECTED RESEARCH PROJECTS

A Novel Biomechanical Model of Bacterial Adhesion and Aggregation

Principal Investigator, National Science Foundation

Mechano-lipidomics and Mechano-cytosis of Drug Delivery Liposomes

Principal Investigator, National Science Foundation

Mechanical Integrity and Long Term Reliability of Photovoltaic Panels

Principal Investigator, National Institute of Standards and Technology

MENI WANUNU



Assistant Professor, Physics; affiliated faculty, Bioengineering

PhD, Weizmann Institute, 2005
bioe.neu.edu/people/wanunu-meni

Scholarship focus: experimental biological physics

SELECTED PUBLICATIONS

G-M. Mustata, Y.H. Kim, J. Zhang, W.F. DeGrado, G. Grigoryan, M. Wanunu

Graphene Symmetry Amplified by Designed Peptide Self-assembly, *Biophysical Journal*, 110(11), 2016, 2507-2516

R.Y. Henley, B.A. Ashcroft, I. Farrell, B.S. Cooperman, S. Lindsay, M. Wanunu

Electrophoretic Deformation of Individual Transfer RNA Molecules Reveals Their Identity, *Nano Letters*, 16(1), 2016, 138-144

K.M. Goodfellow, C. Chakraborty, K. Sowers, P. Waduge, M. Wanunu, T. Krauss, K. Driscoll, A.N. Vamivakas

Distance-dependent Energy Transfer Between CdSe/CdS Quantum Dots and a Two-dimensional Semiconductor, *Applied Physics Letters*, 108, 2016, 021101

R.Y. Henley, A.G. Vazques-Pagan, M. Johnson, A. Kanavarioti, M. Wanunu

Osmium-based Pyrimidine Contrast Tags for Enhanced Nanopore-based DNA Base Discrimination, *PLoS One*, 108, 2015, 0142155

S. Carson, S.T. Wick, P.A. Carr, M. Wanunu, C.A. Aguilar
Osmium-based Pyrimidine Contrast Tags for Enhanced Nanopore-based DNA Base Discrimination, *ACS Nano*, 9(12), 2015, 12417-12424

S. Carson, J. Wilson, A. Aksimentiev, P. Weigele, M. Wanunu
Hydroxymethyluracil Modifications Enhance the Flexibility and Hydrophilicity of Double-stranded DNA, *Nucleic Acids Research*, 2015

E. Angeli, A. Volpe, P. Fanzio, L. Repetto, G. Firpo, P. Guida, R. Lo Savio, M. Wanunu, U. Valbusa

Simultaneous Electro-optical Tracking for Nanoparticle Recognition and Counting, *Nano Letters*, 15, 2015, 5696-5701

P. Waduge, I. Bilgin, J. Larkin, R.Y. Henley, K. Goodfellow, A.C. Graham, D.C. Bell, N. Vamivakas, S. Kar, M. Wanunu

Direct and Scalable Deposition of Atomically Thin Low-noise MoS₂ Membranes on Apertures, *ACS Nano*, 9, 2015, 7352-7359

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

SELECTED PUBLICATIONS

P. Tran, L. Sarin, R. Hurt, T.J. Webster

Titanium Surfaces with Adherent Selenium Nanoclusters as a Novel Anti-cancer Orthopedic Material, *Journal of Biomedical Materials Research*, 93(4), 2014, 1417-1428

P. Tran, L. Sarin, R. Hurt, T.J. Webster

Opportunities for Nanotechnology-enabled Bioactive Bone Implants, *Journal of Materials Chemistry*, 19, 2009, 2653-2659

E.M. Christenson, K. Anseth, T.J. Webster, A.G. Mikos, et al.
Nanobiomaterial applications in orthopaedics, *Journal of Orthopaedic Research* 25, 2007, 11-22

G. Balasundaram, T.J. Webster

A Perspective on Nanophase Materials for Orthopedic Implant Applications, *Journal of Materials Chemistry*, 16, 2006, 3737-3745

A. Chun, J. G. Morales, H. Fenniri, T.J. Webster

Helical Rosette Nanotubes: A More Effective Orthopaedic Implant Material, *Nanotechnology*, 15, 2004, 234-239

T.J. Webster, J.U. Ejirofor

Increased Osteoblast Adhesion on Nanophase Metals, *Biomaterials*, 25, 2004, 4731-4739

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

A.A. Almaqwashi, T. Paramanathan, I. Rouzina, M.C. Williams
Mechanisms of Small Molecule–DNA Interactions Probed by Single-molecule Force Spectroscopy, *Nucleic Acids Research*, 44(9), 2016, 3971-3988

A.A. Almaqwashi, J. Andersson, P. Lincoln, I. Rouzina, F. Westerlund, M.C. Williams

Dissecting the Dynamic Pathways of Stereoselective DNA Threading Intercalation, *Biophysical Journal*, 110(6), 2016, 1255-1263

M.J. McCauley, I. Rouzina, K.A. Manthei, R.J. Gorelick, K. Musier-Forsyth, M.C. Williams

Targeted Binding of Nucleocapsid Protein Transforms the Folding Landscape of HIV-1 TAR RNA, *Proceedings of the National Academy of Sciences*, 112(44), 2015, 13555-13560

K.R. Chaurasiya, M.J. McCauley, M.C. Williams, et al.

Oligomerization Transforms Human APOBEC3G from an Efficient Enzyme to a Slowly Dissociating Nucleic Acid-binding Protein, *Nature Chemistry*, 6, 2014, 28-33

H. Wu, M. Mitra, K. Musier-Forsyth, M.C. Williams, et al.

Aromatic Residue Mutations Reveal Direct Correlation Between HIV-1 Nucleocapsid Protein's Nucleic Acid Chaperone Activity and Retroviral Replication, *Virus Research*, 171, 2013, 263-277

K.R. Chaurasiya, C. Ruslie, M.C. Williams, et al.

Polymerase Manager Protein UmuD Directly Regulates E. coli DNA Polymerase III alpha Binding to ssDNA, *Nucleic Acids Research*, 41, 2013, 8959-8968

M.J. McCauley, E. Rueter, I. Rouzina, L.J. Maher III, M.C. Williams
Single Molecule Kinetics Reveal Microscopic Mechanism by which HMGB Proteins Alter DNA Flexibility, *Nucleic Acids Research*, 41, 2013, 167-181

SELECTED RESEARCH PROJECTS

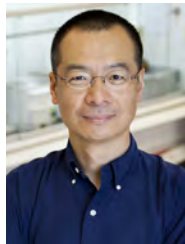
Single Molecule HIV-1 Replication Interactions

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
bioe.neu.edu/people/zhou-sunny

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
Capturing Unknown Substrates via in Situ Formation of Tightly Bound Bisubstrate Adducts: S-Adenosyl-Vinithionine as a Functional Probe for AdoMet-dependent Methyltransferases, *Journal of the American Chemical Society*, 138(9), 2016, 2877-2880
- S. Liu, K.R. Moulton, J.R. Auclair, Z.S. Zhou
Mildly Acidic Conditions Eliminate Deamidation Artifact During Proteolysis: Digestion with Endoprotease Glu-C at pH 4.5, *Amino Acids*, 48(4), 2016, 1059-67
- C. Chumsae, P. Hossler, H. Raharimampionona, Y. Zhou, S. McDermott, C. Racicot, C. Radziejewski, Z.S. Zhou
When Good Intentions Go Awry: Modification of a Recombinant Monoclonal Antibody in Chemically Defined Cell Culture by Xylosone, an Oxidative Product of Ascorbic Acid, *Analytical Chemistry*, 87(15), 2015, 7529-7534
- R.I. Duclos Jr, D.C. Cleary, K.C. Catcott, Z.S. Zhou
Synthesis and Characterization of Se-adenosyl-L-selenohomocysteine Selenoxide, *Journal of Sulfur Chemistry*, 36(2), 2015, 135-144
- C. Chumsae, L.L. Zhou, Y. Shen, J. Wohlgemuth, E. Fung, R. Burton, C.H. Radziejewski, Z.S. Zhou
Discovery of a Chemical Modification by Citric Acid in a Recombinant Monoclonal Antibody, *Analytical Chemistry* 86(18), 2014, 8932-8936
- J.J. Klaene, W. Ni, J.F. Alfaro, Z.S. Zhou
Detection and Quantitation of Succinimide in Intact Protein via Hydrazine Trapping and Chemical Derivatization, *Journal of Pharmaceutical Sciences*, 103(10), 2014, 3033-3042
- M. Liu, Z. Zhang, J. Cheetham, D. Ren, Z.S. Zhou
Discovery and Characterization of a Novel Photo-oxidative Histidine-histidine Crosslink in IgG1 Antibody Utilizing ¹⁸O-labeling and Mass Spectrometry, *Analytical Chemistry*, 86(10), 2014, 4940-4948
- 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

Asieh Ahani

PhD 2016, Bioengineering; Advisor, Deniz Erdogmus

ICON-BASED COMMUNICATION THROUGH A BRAIN COMPUTER INTERFACE

In this dissertation, we have designed a system called “RSVP IconMessenger” that combines P300 signal detection with the icon-based semantic message construction system of RSVP-iconCHAT. The results of this study conducted with 10 healthy participants suggest that the system has potential as an AAC system in real-time typing applications. Furthermore we designed and implemented “IconMessenger” as an icon-based BCI-AAC system that combines ERP signal detection with a unified framework for different presentation paradigms including RSVP, matrix Row&Column Presentation (RCP) and matrix Single Character Presentation (SCP). IconMessenger also takes advantage of a unique semantic gram language model, incorporated tightly in the inference engine. In this study, we assess the ERP shape, classification accuracy and typing performance of different presentation paradigms on 10 healthy participants.

See full dissertation at coe.neu.edu/AsiehAhani

Ce Gao

PhD 2016, Bioengineering; Advisor, April Z. Gu

UNSUPERVISED DATA MINING APPLICATIONS ON HIGH DIMENSIONAL GENE EXPRESSION TIME SERIES IN TOXICOGENOMICS

This thesis aims to develop and demonstrate new or improved methodology that better address the challenges and limitations in high dimensional time series toxicogenomics data analysis for critical bioinformatics application such as toxicity mechanism identification, toxicants classification, and for predictive toxicology knowledge discovery. In this study, we develop new or improve bioinformatics data analysis algorithms so that they are capable of processing high dimensional time series toxicogenomics data, therefore better capture and reflect the dynamics of cellular response to toxicants. We also prove the potential and validity of the incorporation of various molecular disturbance/effect quantifiers into various functional toxicogenomics bioinformatics to provide quantitative insights into the toxicant-induced cellular molecular responses at individual gene, specific pathway and system levels. In addition, we demonstrate the effectiveness of unsupervised bioinformatics tools for mining new, more in depth, much-detailed and fundamental knowledge and understanding of toxicological information at molecular level.

See full dissertation at coe.neu.edu/CeGao

Alexander Dickerson Orsi

PhD 2016, Bioengineering; Advisor, Hamid Nayeb-Hashemi

DEVELOPING SUBJECT SPECIFIC METHODS FOR KNEE JOIN INJURY DETECTION USING FINITE ELEMENT ANALYSIS

The goal of this work is to better understand injury mechanisms to improve medical procedures, and reduce rehabilitation costs. Anterior cruciate ligament (ACL) tear occurs upwards of 400,000 times annually in the U.S. Reconstructive surgery and rehabilitation combine to create an annual \$1 Billion expense. Associated cartilage damage leads to degenerative osteoarthritis. Injury mechanism theories include risk factors such as specific motion combinations, unbalanced musculature, intercondylar notch impingement, and gender. Despite ongoing research into injury prevention, injury rates have not improved.

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David Ignatius Walsh

PhD 2016, Bioengineering; Advisor, Shashi K. Murthy

SCALABLE MANUFACTURING METHODS FOR BIOMEDICAL MICROFLUIDICS

This dissertation contributes to the development of scalable rapid prototyping techniques to better translate microfluidic systems from the lab bench to the clinic. Chronic and idiopathic eye diseases are one facet of healthcare that could greatly benefit from microfluidic point-of-care diagnostic platforms to better preserve vision, reduce surgeries needed for large volume biopsies and personalize disease treatment. Three different scalable platforms have been developed to address this clinical need utilizing innovative microfluidic techniques such as centrifugal and paper-based flow control. These systems contribute to the field by: 1) providing a framework for scalable rapid prototyping of microfluidic devices using commercialization-friendly manufacturing methods and materials, 2) enabling the study of molecular diagnostic analysis and complicated cell functions such as chemotaxis at very small time frames (<20 minutes), and 3) integrating diagnostic capabilities with necessary sample preparation techniques such as preconcentration using an innovative open-platform system.

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Naiqian Zhi

PhD 2016, Bioengineering; Advisor, Rifat Sipahi

QUANTITATIVE ASSESSMENT OF MICROGRAPHIA AND TREMOR IN STATIC HANDWRITING SAMPLES: ANALYSIS, DIAGNOSTIC TOOLS AND ACCOMMODATION

In this work innovative computerized metrics are presented, by which static handwriting samples can be analyzed to decide whether studied conditions affect the samples. Specifically, these metrics are tested and validated in their ability to measure (a) micrographia effects by comparing normal writing samples with symptomatic ones collected from PD patients, and (b) tremors by comparing unaffected writing samples with those affected by artificially induced tremor on healthy subjects. Results suggest that both sets of metrics are sensitive enough to detect and discern changes with specificity. A two-week self-administrated handwriting therapeutic exercise has been performed by PD subjects with micrographia, to investigate influence of this exercise on handwriting samples by means of developed quantitative metrics.

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