

DEPARTMENT OF BIOENGINEERING

Dear Friends,

The Bioengineering Department is the newest Department at Northeastern University. Building on the success of its PhD Program, Bioengineering has added BS and MS degree programs to begin in the 2015-2016 academic year. We are entering 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. This interdisciplinary community of faculty spans the entire University. With over 75 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 of the field 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@neu.edu

QUICK FACTS

50

**GRADUATE
STUDENTS**

75

**FACULTY
MEMBERS**

RECENT HIRES:

QIANQIAN FANG

who joins the college from Harvard Medical School

NIKOLAI SLAVOV

who joins the college from Harvard University

DEPARTMENT OF BIOENGINEERING

212A Lake Hall
Northeastern University
360 Huntington Avenue
Boston, MA 02115

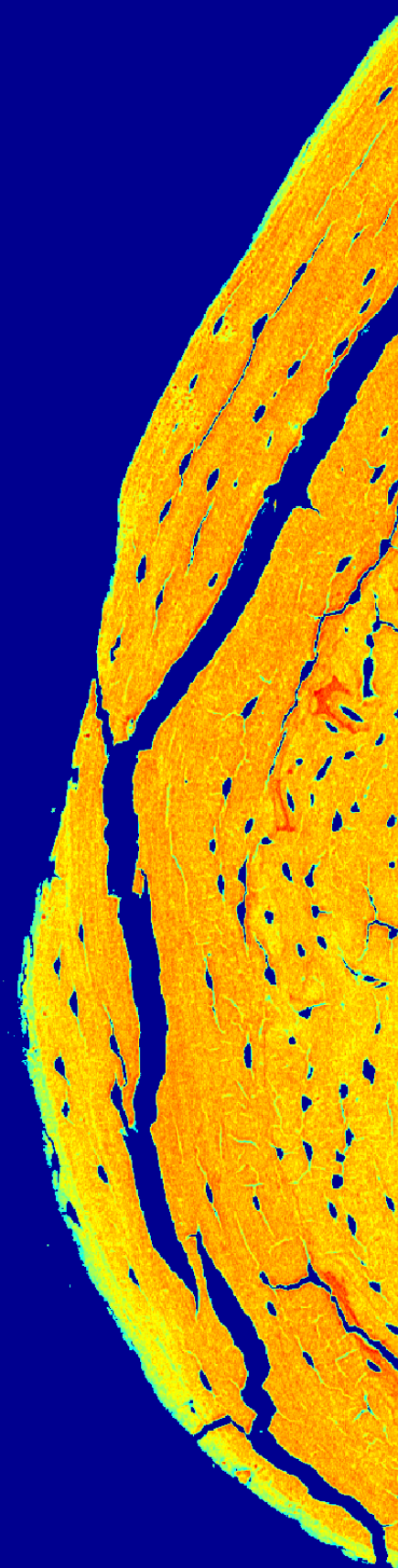
P 617.373.7805

bioe.neu.edu
coe.neu.edu

COVER IMAGE

This image is a transverse cross section of the mouse tibia at mid-diafysis of the bone, obtained by quantitative backscattered scanning electron microscopy (qBSEM). The bone belongs to an IDUA mouse which is a model of the MPS diseases, an example of an MPS disease in humans is Hurler syndrome. In an electron microscope intensity of backscattered signal emitted from the sample is proportional to the atomic number of the elements and therefore, areas which contain heavier elements appear lighter in the image. Calcium is the primary source of mineral in bone and the color representation of a graylevel qBSEM image could be used to quantify the distribution of the mineral (calcium) density and porosity in bone. This image is part of the project exploring the multiscale characteristics of bone toughness at Prof. Sandra Shefelbine's Bone Biomechanics Lab at Northeastern University.

Learn more at shefelbine.org





Northeastern University
College of Engineering

BIOENGINEERING

2014 | 2015

SCHOLARSHIP REPORT

QUICK FACTS

DEPARTMENT OF BIOENGINEERING

75
FACULTY
MEMBERS

RECENT HIRES:



QIANQIAN FANG who joins the college from Harvard Medical School as Assistant Professor of Bioengineering. Dr. Fang received his PhD from Dartmouth College in 2005. His research interests include medical imaging and biomedical optics.

» See page 15



NIKOLAI SLAVOV who joins the college from Harvard University as Assistant Professor of Bioengineering. Dr. Slavov received his PhD from Princeton University in 2010. His research interests include ribosome-mediated translational regulation, cell growth and differentiation, statistical inference, mass-spectrometry; quantitative systems biology; bioinformatics.

» See page 32

50
GRADUATE
STUDENTS

QUICK FACTS

COLLEGE OF ENGINEERING

12 Federally Funded Multi-Institutional Research Centers

151
TENURED/
TENURE-TRACK
FACULTY

Including
69 Fellows
of national
professional
societies

50
YOUNG
INVESTIGATOR
AWARDS

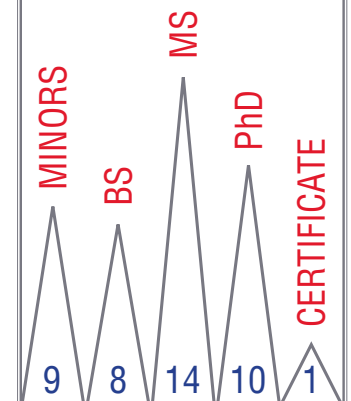
5 DEPARTMENTS

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

36
NEW HIRES
SINCE 2013



42
PROGRAMS



HONORS

ACHIEVEMENTS

IN THE NEWS

Bioengineering **Associate Professor Anand Asthagiri** and PhD Student Mark Lalli published an article in the Journal Cellular and Molecular Bionegineering entitled, "Collective Migration Exhibits Greater Sensitivity But Slower Dynamics of Alignment to Applied Electric Fields."

Bioengineering **Professor Jeffrey Ruberti** was awarded a patent for "Developing Methods and Compositions for Organizing Collagen into Fibrillar Networks."

Bioengineering affiliated **Professor Dagmar Sternad**, received the Best Paper award at the International Conference for Virtual Rehabilitation 2015 during RehabWeek held in Valencia, Spain. The paper was entitled "From Theoretical Analysis to Clinical Assessment and Intervention: Three Interactive Motor Skills in a Virtual Environment."

Bioengineering affiliated **Associate Professor Rebecca Carrier** was selected as 2015 recipient for the Dove Press International Journal of Nanomedicine Outstanding Researcher Award.

Bioengineering affiliated **Professor Shashi Murthy**, Founding Director of the Michael J. and Ann Sherman Center for Engineering Entrepreneurship Education, has been awarded a 4-year, **\$1.4M grant** from the National Institutes of Health.

Akram Alshawabkeh, George A. Snell Professor of Engineering and bioengineering affiliated faculty, received a five-year **\$13.5M** award to renew the Puerto Rico Testsite for Exploring Contamination Threats Center from the National Institute of Environmental Health Sciences within the National Institutes of Health.

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
Rupal Patel
Carey Rappaport
Purnima Ratilal-Makris
Bahram Shafai
Milica Stojanovic
Gilead Tadmor
Vladimir 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 Sznaiier
Gilead Tadmor

BIOMECHANICS AND MECHANOBIOLOGY

Anand Asthagiri
Eno Ebong
Andrew Gouldstone
Yingzi Lin
Sinan Müftü
Uichiro Narusawa
Hamid Nayeb-Hashemi
Jeffrey Ruberti
Carmen Sceppa
Sandra Shefelbine
Ashkan Vaziri
Kai-Tak Wan

BIOCHEMICAL AND BIOENVIRONMENTAL ENGINEERING

Akram N. Alshawabkeh
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
Andrew Gouldstone
Carol Livermore
Donald O'Malley
Jeffrey Ruberti
Nikolai Slavov
Kai-Tak Wan

BIOCOMPUTING

Stefano Basagni
David Kaeli
Miriam Leeser
Waleed Meleis

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

- N. Gou, S. Yuan, J. Lan, C. Gao, A.N. Alshawabkeh, A.Z. Gu
 A Quantitative Toxicogenomics Assay Reveals the Evolution and Nature of Toxicity During the Transformation of Environmental Pollutants, *Environmental Science and Technology*, 48(15), 2014, 8855-8863
- D. Meric, A.N. Alshawabkeh, J.P. Shine, T.C. Sheahan
 Bioavailability of Hydrophobic Organic Compounds in Thin-layered Capped Sediments, *Chemosphere*, 103, 2014, 281-289
- D. Meric, S. Barbuto, T.C. Sheahan, J.P. Shine, A.N. Alshawabkeh
 Benchscale Assessment of the Efficacy of a Reactive Core Mat to Isolate PAH-spiked Aquatic Sediments, *Soil Sediment Contamination*, 23(1), 2014, 1-23
- D. Tang, N. Yang, Y. Yang, X. Zhang, W. Xiao, ...A.N. Alshawabkeh
 Enhanced Adsorption of Aqueous Perchlorate on Quaternary Ammonium Chloride Surfactant-modified Activated Carbon Fibers, *Desalination and Water Treatment*, 55(2), 2014, 484-495
- L. Rajic, N. Fallahpour, S. Yuan, A.N. Alshawabkeh
 Electrochemical Transformation of Trichloroethylene in Aqueous Solution by Electrode Polarity Reversal, *Water Research*, 67, 2014, 267-275
- M. Tong, S. Yuan, P. Zhang, P. Liao, A.N. Alshawabkeh, X. Xie, Y. Wang
 Electrochemically Induced Oxidative Precipitation of Fe(II) for As(III) Oxidation and Removal in Synthetic Groundwater, *Environmental Science and Technology*, 48(9), 2014, 5145-5153
- S. Yuan S, Liao P, A.N. Alshawabkeh
 Electrolytic Manipulation of Persulfate Reactivity by Iron Electrodes for TCE Degradation in Groundwater, *Environmental Science and Technology*, 48(1), 2014, 656-663

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

MANSOOR AMIJI



Distinguished Professor and Chair, 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, Q. Ouyang, M. Goldberg, M.M. Amiji
 Co-silencing of PKM-2 and MDR-1 Sensitizes Multidrug Resistant Ovarian Cancer Cells to Paclitaxel in a Murine Model of Ovarian Cancer, *Molecular Cancer Therapeutics*, 14(7), 2015, 1521-1531
- A. Singh, M. Talekar, A. Raikar, M.M. Amiji
 Macrophage-targeted Delivery Systems for Nucleic Acid Therapy in Inflammatory Diseases, *Journal of Controlled Release*, 190, 2014, 515-530
- S. Ganta, A. Singh, T.P. Coleman, D. Williams, M. Amiji
 Pharmaceutical Nanotechnology: Overcoming Drug Delivery Challenges in Contemporary Medicine, *Nanomedicine: Principles and Perspectives*, Published by Springer Publishing, New York, NY, Chapter 10, 2014, 191-236
- M.M. Amiji
 Nanotechnology for Cancer Therapy, Published by CRC Press, LLC, Boca Raton, FL, 2007
- M.M. Amiji
 Polymeric Gene Delivery: Principles and Applications, Published by CRC Press, LLC, Boca Raton, FL, 2004

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; jointly appointed, 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 at Berkeley, 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

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

J. Ayers, et al.
 Special Issue on the 2013 International SoC Design Conference, *Journal of Semiconductor Technology and Science*, 14(4), 2014, 1-2

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

W. Westphal, D. Blustein, J. Ayers
 A Biomimetic Neuronal Network-based Controller for Guided Helicopter Flight, *Biomimetic and Biohybrid*, Springer, 2013, 299-310

D. Blustein, N. Rosenthal, J. Ayers
 Designing and Implementing Nervous System Simulations on LEGO Robots, *Journal of Visualized Experiment*, 75, 2013

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

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; protocol design and testing

SELECTED PUBLICATIONS

- 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
- S. Basagni, C. Petrioli, R. Petroccia, D. Spaccini
CARP: A Channel-aware Routing Protocol for Underwater Acoustic Wireless Networks, Ad Hoc Networks, Available online, August 2014
- M.Y. Naderi, K.R. Chowdhury, S. Basagni, W. Heinzelman, et al.
Experimental Study of Concurrent Data and Wireless Energy Transfer for Sensor Networks, Proceedings of IEEE Globecom 2014, Austin, TX, December 8-12, 2014, 2543-2549
- S. Basagni, L. Boloni, C. Petrioli, C.A. Phillips, D. Turgut
Maximizing the Value of Sensed Information in Underwater Wireless Sensor Networks via an Autonomous Underwater Vehicle, in Proceedings of IEEE Infocom 2014, Toronto, Canada, April 27- May 2, 2014, 988-996
- L. Chen, S. Cool, H. Ba, W. Heinzelman, S. Basagni, et al.
Range Extension of Passive Wake-up Radio Systems through Energy Harvesting, Proceedings of IEEE ICC 2013, Ad Hoc and Sensor Networking Symposium, Budapest, Hungary, June 9-13, 2013, 1549-1554, Best Paper Award

SELECTED RESEARCH PROJECTS

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

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: National Science Foundation CAREER Award; Cottrell Scholar Award; American Cancer Society Research Scholar Award

SELECTED PUBLICATIONS

- 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.N. Ollivierre, J.L. Sikora, P.J. Beuning
Dimer Exchange and Cleavage Specificity of the DNA Damage Response Protein UmuD, Biochimica et Biophysica Acta-Proteins and Proteomics, 1834, 2013, 611-620
- 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

Chemical Signatures for the Discovery of Protein Function
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; optimization

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

SELECTED PUBLICATIONS

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

J. Sourati, D. Erdogmus, J.G. Dy, D.H. Brooks
Accelerated Learning-based Interactive Image Segmentation using Pairwise Constraints, *IEEE Transactions on Image Processing*, 23(7), 2014, 3057-3070

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

S. Eichelbaum, M. Dannhauer, M. Hlawitschkae, D. Brooks, T.R. Knosche, G. Scheuermann

Visualizing Simulated Electrical Fields from Electroencephalography and Transcranial Electric Brain Stimulation: A Comparative Evaluation, *NeuroImage*, 2014, 513-530

SELECTED RESEARCH PROJECTS

Center for Integrative Biomedical Computing
Co-Investigator, National Institutes of Health

Precise Characterization of Conformational Ensembles
Co-Investigator, National Science Foundation

Automated Image Guidance for Diagnosing Skin Cancer with Confocal Microscopy

Co-Investigator, National Institutes of Health

AHMED BUSNAINA



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

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

Scholarship focus: 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; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

S. Siavoshi, C. Yilmaz, S. Somu, T. Musacchio, A. Busnaina, et al.
Size-selective Template-assisted Electrophoretic Assembly of Nanoparticles for Biosensing Applications, *Journal of ACS, Langmuir*, 27, 2011, 7301-7303

Y.L. Kim, B. Li, X. An, M.G. Hahm, A. Busnaina, et al.
Highly Aligned Scalable Platinum-decorated Single-wall Carbon Nanotube Arrays for Nanoscale Electrical Interconnects, *ACS Nano*, 3, 2009, 2818-2826

Y. Jung, X. Xiong, L. Jaberansari, M. Hahm, A. Busnaina
Building Highly Organized Single-walled Carbon Nanotube Networks Using Template Guided Fluidic Assembly, *Small*, 3(12), 2007, 2006-2010

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

P. Makaram, S. Selvarasah, X. Xiong, C. Chen, A. Busnaina, et al.
Three-dimensional Assembly of Single-walled Carbon Nanotube Interconnects using Dielectrophoresis, *Nanotechnology*, 18(39), 2007, 395204, *journal cover

SELECTED RESEARCH PROJECTS

Collaborative Research in Nanomanufacturing
Principal Investigator, Massachusetts Technology Collaborative
Designing & Integrating LCA Methods for Nanomanufacturing Scale-up
Co-Principal Investigator, National Science Foundation

Electrostatic Deposition of a Seed Layer on Ceramic Substrates using Nanoparticles that Enables Electroplating
Principal Investigator, Rogers Corp.

Fabrication and Characterization of Nanoscale films
Principal Investigator, HC Starck, Inc.

LED manufacturing using Directed Assembly of Nanoparticles
Principal Investigator, Rogers Corp.

NSF Nanoscale Science and Engineering Center for High-Rate Nanomanufacturing
Principal Investigator and Director, National Science Foundation

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 CARRIER



Associate Professor, Chemical Engineering; Associate Chair of Research; affiliated faculty, Bioengineering

PhD, Massachusetts Institute of Technology, 2000
che.neu.edu/people/carrier-rebecca

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

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

SELECTED PUBLICATIONS

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

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

S. diMaio, R.L. Carrier
Gastrointestinal Contents Post-lipid Ingestion: In vivo Measurements and in Vitro Models for Studying Oral Drug Delivery, Journal of Controlled Release, 151(2), 2011, 110-122

SELECTED RESEARCH PROJECTS

Combinatorial-designed Nano-platforms to Overcome Tumor Drug Resistance

Co-Principal Investigator, National Institutes of Health

Impact of Lipids on Compound Absorption: Mechanistic Studies and Modeling

Principal Investigator, National Institutes of Health

Impact of Lipids on Intestinal Mucus Transport and Structural Properties

Principal Investigator, National Institutes of Health

Interphotoreceptor Matrix Based Cell Delivery Vehicle for Retinal Regeneration

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

HEATHER CLARK



Associate 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

Honors and awards: Young Faculty Award, Defense Advanced Research Projects Agency

SELECTED PUBLICATIONS

- K.J. Cash, C. Li, L.V. Wang, H.A. Clark
 Photoacoustic Imaging of Nanosensors for Therapeutic Drugs, *In Vivo*, 9(2), 2015, 1692-1698
- M.K. Balaconis, H.A. Clark
 Gel Encapsulation of Glucose Nanosensors for Prolonged in Vivo Lifetime, *Journal of Diabetes Science and Technology*, 7(1), 2013, 53-61
- T.T. Ruckh, A.A. Mehta, J.M. Dubach, H.A. Clark
 Polymer-Free Optode Nanosensors for Dynamic, Reversible, and Ratiometric Sodium Imaging in the Physiological Range, *Scientific Reports*, 3(3366), 2013
- K.J. Cash, H.A. Clark
 Phosphorescent Nanosensors for in Vivo Tracking of Histamine Levels, *Analytical Chemistry*, 85(13), 2013, 6312-6318
- T.T. Ruckh, H.A. Clark
 Implantable Nanosensors: Toward Continuous Physiologic Monitoring, *Analytical Chemistry*, 86(3), 2013, 1314-1323
- K.J. Cash, H.A. Clark
 In Vivo Histamine Optical Nanosensors, *Sensors*, 12(9), 2012, 11922-11932

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

- 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*, *G3: Genetics, Genes, and Genomes*, 4(8), 2014, 1555-1564
- 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
- S. Goklany, N.F. Rizvi, R. Loring, E.J. Cram, C. W.T. Lee-Parsons
 Jasmonate Dependent Alkaloid Biosynthesis in *Catharanthus roseus* Hairy Root Cultures is Correlated with the Relative Expression of Orca and Zct Transcription Factors, *Biotechnology Progress*, 29(6), 2013, 1367-1376
- J. 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), 2013, 89-97
- I. Kovacevic, R. Ho, E.J. Cram
 CCDC-55 is Required for Larval Development and Distal Tip Cell Migration in *Caenorhabditis elegans*, *Mechanisms of Development*, 128(11), 2012, 548-559

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

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, and multi-model imaging. 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

SELECTED PUBLICATIONS

- 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
- E. Ebong, F. Macaluso, D. Spray, J. Tarbell
Life-like Preservation and TEM Visualization of the Glycocalyx Reveals that it is Substantial in Vitro, Proceedings of the 2011 IEEE 37th Annual Northeast Bioengineering Conference, 2011, 1-2

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

applications

SELECTED PUBLICATIONS

- 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
- A.K. Ekenseair, K.W.M. Boere, S.N. Tzouanas, T.N. Vo, F.K. Kasper, A.G. Mikos
Synthesis and Characterization of Thermally and Chemically Gelling Injectable Hydrogels for Tissue Engineering, *Biomacromolecules*, 13, 2012, 1908-1915
- A.K. Ekenseair, R.N. Seidel, N.A. Peppas
Tuning the Transport Dynamics of Small Penetrant Molecules in Glassy Polymers, *Polymer*, 53(18), 2012, 4010-4017

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, 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 Locked-in 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 EEG-based 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 Project-based 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)
Principal Investigator, Intelligence Advanced Research Projects Activity
- The Rehabilitation Engineering Center Research Center on Augmentative and Alternative Communication
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

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

Q. Fang, D. Boas
Monte Carlo Simulation of Photon Migration in 3D Turbid Media Accelerated by Graphics Processing Units, *Optics Express*, 17(22), 2009, 20178-20190 *featured article

SELECTED RESEARCH PROJECTS

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

Combined Optical and Mammographic Imaging of Breast Function and Structure for Early Cancer Detection

Principal Investigator, Massachusetts Life Sciences Center

EDGAR GOLUCH



Di Pietro Assistant 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

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*

P.N. Abadian, C.P. Kelley, E.D. Goluch
Cellular Analysis and Detection using Surface Plasmon Resonance (SPR) Techniques, *Analytical Chemistry*, 86, 2014, 2799-2812

T.A. Webster, H.J. Sismaet, J.L. Conte, I.J. Chan, E.D. Goluch
Detection of *Pseudomonas aeruginosa* in Human Samples via Pyocyanin, *Biosensors and Bioelectronics*, 60, 2014, 265-270

N. Tandogan, P.N. Abadian, S. Epstein, Y. Aoi, E.D. Goluch
Isolation of Microorganisms using Sub-micrometer Constrictions, *PLoS ONE*, 9(6), 2014, e101429

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 hotarticle in the *Analyst*

P.N. Abadian, N. Tandogan, J.J. Jamieson, E.D. Goluch
Using Surface Plasmon Resonance Imaging (SPRi) to Study Bacterial Biofilms, *Biomicrofluidics*, 8(2), 2014, 021804

SELECTED RESEARCH PROJECTS

Breath and Saliva Based Nano-bio Sensing System for Disease Diagnosis and Monitoring

Co-Investigator, Northeastern University

IDBR: TYPE A Nano-constriction Devices for Isolation and Cultivation of Environmental Microbes

Principal Investigator, National Science Foundation

ANDREW GOULDSTONE



Associate Professor, Associate Department Chair and Program Director of Mechanical Engineering; affiliated faculty, Bioengineering, Chemical Engineering

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

Scholarship focus: biomechanics; material science; engineering mechanics

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

SELECTED PUBLICATIONS

- T. Hu, S. Zhalehpour, A. Gouldstone, et al.
A Method for the Estimation of the Interface Temperature in Ultrasonic Joining, *Metallurgical And Materials Transactions A-Physical Metallurgy And Materials Science*, 45A(5), 2014, 2545-2552
- C.T. Nguyen, H.M. Gonnermann, Y. Chen, A. Gouldstone
Film Drainage and the Lifetime of Bubbles, *Geochemistry Geophysics Geosystems*, 14(9), 2013, 3616-3631
- J.H. Kim, A. Gouldstone, C.S. Korach
Analysis of Spherical Indentation of an Elastic Bilayer Using a Modified Perturbation Approach, *MEMS and Nanotechnology*, 4, 2011, 53-57
- B. Choi, Y. Wu, S. Sampath, A. Gouldstone
Modified Indentation Techniques to Probe Inelasticity in Ni5%Al Coatings from Different Processes, *Journal of Thermal Spray Technology*, 18(1), 2009, 65-74
- L.H. Weng, A. Gouldstone, Y.H. Wu, W.L. Chen
Mechanically Strong Double Network Photocrosslinked Hydrogels from N,N-Dimethylacrylamide and Glycidyl Methacrylated Hyaluronan, *Biomaterials*, 29(14), 2008, 2153-2163

SELECTED RESEARCH PROJECTS

- Fundamentals of Bonding in Kinetic Consolidation Processes
Co-Principal Investigator, National Science Foundation
- Garde: An Interdisciplinary Approach to Accommodate Fine Motor Control Disorders
Co-Principal Investigator, National Science Foundation
- IDR/Collaborative Research: Activities in Thermal Spray Processing and Volcanology
Principal Investigator, National Science Foundation

APRIL GU



Associate Professor, Civil and Environmental Engineering; 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

- D. Bello, J. Lan, A.Z. Gu, P. Demokritou P. Gaines, et al.
Evaluation of Cytotoxic Genotoxic and Inflammatory Responses of Nanoparticles from Photocopiers in Three Human Cell Lines, *Particle and Fibre Toxicology*, 10(42), 2014, 1743-8977
- S.T. O'Connor, J. Lan, M. North, A. Loguinov, L. Zhang, M. T. Smith, A.Z. Gu, C. Vulpe
Genome-wide Functional and Stress Response Profiling Reveals Toxic Mechanism and Genes Required for Tolerance to Benzo[a]pyrene in *S. cerevisiae*, *Frontiers in Genetics*, 3(316), 2013
- N. Gou, A. Onnis-Hayden, A.Z. Gu
Mechanistic Toxicity Assessment of Nanomaterials by Whole-Cell-Array Stress Genes Expression Analysis, *Environmental Science and Technology*, 2010, 44(15), 5964-5970
- Yildirim N, Long F, Gao C, He M, Shi HC and Gu AZ
Aptamer-based Optical Biosensor for Rapid and Sensitive Detection of 17-Estradiol in Water Samples, *Environmental Science & Technology*, 2010, 46(6), 3288-3294
- A. Onnis-Hayden, H. Weng, M. He, S. Hansen, V. Ilyin, K. Lewis, A. Gu
Prokaryotic Real-time Gene Expression Profiling for Toxicity Assessment, *Environmental Science & Technology*, 2009, 43(12), 4574-4581

SELECTED RESEARCH PROJECTS

- Assessment of Potential Ecological and Health Impact of Coal Ash Spill in Dan River North Carolina
Principal Investigator, National Science Foundation
- CAREER: Mechanistic Toxicity Assessment Of Emerging Contaminants for Water Quality Monitoring
Principal Investigator, National Science Foundation
- Novel S2EBPR Process for Sustainable Phosphorus Removal in Wastewater
Principal Investigator, Water Environment Research Foundation
- 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-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, 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
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 Ultrasensitive Biological Species Detection, *Journal of Micromechanics and Microengineering*, 23, 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

- Design and Development of Nanoscale Package-embedded Vibration Sensing and Active Isolation – Phases I-IV
Principal Investigator, Raytheon
- 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; heterogeneous computing; performance analysis; embedded systems; security and information assurance; back-end compilers; profile-guided optimization; hardware reliability and recovery; image databases; software engineering; workload characterization; GPGPU

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

SELECTED PUBLICATIONS

- A.K. Ziabari, J.L. Abellan, R. Ubal, C. Chen, A. Joshi, D. Kaeli
Leveraging Silicon-photonic 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
- Y. Ukidave, F.N. Paravecino, L. Yu, C. Kalra, D. Kaeli, et al.
NUPAR: Benchmark Suite for Modern GPU Architectures, *Proceedings of the 6th ACM/SPEC International Conference on Performance Engineering*, 2015, 253-264
- M. Wilkening, V. Sridharan, S. Li, F. Previlon, D. Kaeli, et al.
Calculating Architectural Vulnerability Factors for Spatial Multi-bit Transient Faults, *Proceedings of the 47th Annual IEEE/ACM International Symposium on Microarchitecture*, 2014, 293-305
- B. Jang, D. Schaa, P. Mistry, D. Kaeli
Exploiting Memory Access Patterns to Improve Memory Performance in Data Parallel Architectures, *IEEE Transactions on Parallel and Distributed Computing*, 22(1), 2011, 105-118

SELECTED RESEARCH PROJECTS

- Collaborative Research: Leveraging Intra-chip/Inter-chip Silicon Photonic Networks for Designing Next-generation Accelerators
Principal Investigator, National Science Foundation
- BIGDATA: IA: Exploring Analysis of Environment and Health Through Multiple Alternative Clustering
Co-Principal Investigator, National Science Foundation
- Engineering Strong, Highly Conductive Nanotube Fibers Via Fusion
Co-Principal Investigator, National Science Foundation
- MRI: Development of a Testbed for Side-channel Analysis and Security Evaluation (TeSCASE)
Co-Principal Investigator, National Science Foundation
- Multi-disciplinary Preparation of Next Generation Information Assurance Practitioners
Co-Principal Investigator, National Science Foundation
- Puerto Rico Testsite for Exploring Environmental Contamination Threats (PROTECT)
Co-Principal Investigator, National Institutes of Health

BARRY L. KARGER



Professor and James L. Waters Chair in Analytical Chemistry; affiliated faculty, Bioengineering, Chemical Engineering

PhD, Cornell University, 1963
bioe.neu.edu/people/karger-barry

Scholarship focus: analytical chemistry, bioanalysis, proteomics

Honors and awards: Arnold O. Beckman Medal; Csaba Horváth Memorial Award; Heyrovsky Medal (Czech Republic); Michael Widmer Award of the New Swiss Chemical Society; 3 American Chemical Society Awards

SELECTED PUBLICATIONS

- Z. Liu, S. Dai, B.L. Karger, J.J. Li, et al.
 A Quantitative Proteomic Analysis of Cellular Responses to High Glucose Media in Chinese Hamster Ovary Cells, *Biotechnology Progress*, 31(4), 2015, 1026-1038
- S. Li, B.D. Plouffe, B.L. Karger, A.R. Ivanov, et al.
 An Integrated Platform for Isolation, Processing and Mass Spectrometry-based Proteomic Profiling of Rare Cells in Whole Blood, *Molecular and Cellular Proteomics*, 14(6), 2015, 1672-1683
- H. Arthanari, Y. Gao, S.-L. Wu, B.L. Karger, et al.
 Constitutively Oxidized CXXC Motifs within the CD3 Heterodimeric Ectodomains of the T Cell Receptor Complex Enforce the Conformation of Juxtaposed Segments, *Journal of Biological Chemistry*, 290(1), 2015, 18880-18892
- S. Li, T. Nakayama, A. Akinc, S.-L. Wu, B.L. Karger
 Development of LC-MS Methods for Quantitation Of Hepcidin And Demonstration of siRNA-Mediated Hepcidin Suppression in Serum, *Journal of Pharmacological and Toxicological Methods*, 71, 2015, 110-119
- S. Rodig, J.L. Kutok, E.K. Jackson, B.L. Karger, et al.
 Immunological Mechanisms of the Antitumor Effects of Supplemental Oxygenation, *Science Translational Medicine*, 7(277), 2015, 277

SELECTED RESEARCH PROJECTS

- Development of an Analytical Platform for Comprehensive Characterization of Biotherapeutic Proteins Top down, middle down and bottom up LC and CE-MS of Biopharmaceuticals
 Principal Investigator, Biogen Idec
- Proteomic Analysis of Cell Lines, Drug Target Identification and Host Cell Impurity
 Principal Investigator, Industrial Collaborations

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

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

M. Shulman, M. Cohen, A. Soto-Gutierrez, H. Yagi, H. Wang, J. Goldwasser, C.W.T. Lee-Parsons, O. Benny-Ratsaby, M.L. Yarmush, Y. Nahmias
Enhancement of Naringenin Bioavailability by Complexation with Hydroxypropyl- β -cyclodextrin, *PLoS ONE*, 6(4), 2011, e18033

SELECTED RESEARCH PROJECTS

Transcriptional Control of Alkaloid Biosynthesis in *Catharanthus roseus* Cultures

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

Principal Investigator, National Science Foundation

MIRIAM LEESER



Professor, 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

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

N. Moore, M. Leeser, L. Smith King
Kernel Specialization for Improved Adaptability and Performance on Graphics Processing Units (GPUs), 27th IEEE International Parallel and Distributed Processing Symposium (IPDPS), May 2013

M. Leeser, D. Yablonski, D. Brooks, L. Smith King
The Challenges of Writing Portable, Correct and High Performance Libraries for GPUs, *ACM SIGARCH Computer Architecture News*, 39(4), 2011, 2-7

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

N. Moore, A. Conti, M. Leeser, L. Smith King
Vforce: An Extensible Framework for Reconfigurable Supercomputing, *Computer*, Published by the IEEE, 2007, 39-49

SELECTED RESEARCH PROJECTS

MRI: Development of a Testbed for Side Channel Analysis and Security Evaluation

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

Co-Principal Investigator, National Science Foundation

KIM LEWIS



Distinguished Professor, 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

- N. Balaban, K. Gerdes, K. Lewis, J. McKinney
 A Problem of Persistence: Still More Questions than Answers?,
Nature Reviews Microbiology, 11(8), 2013, 587-591
- B. Conlon, E. Nakayasu, L. Fleck, M. LaFleur, V. Isabella, K. Coleman, S. Leonard, R. Smith, J. Adkins, K. Lewis
 Activated ClpP Kills Persisters and Eradicates a Chronic Biofilm Infection, *Nature*, 503, 2013, 365-370
- 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
 Platforms for Antibiotic Discovery, *National Reviews Drug Discovery*, 12, 2013, 371-387
- M. LaFleur, L. Sun, I. Liste, J. Keating, A. Nantel, L. Long, M. Ghannoum, J. North, R. Lee, K. Coleman, T. Dahl, K. Lewis
 Potentiation of Azole Antifungals by 2-Adamantanamine, *Antimicrob, Agents Chemother*, 2013, 3585-3592

SELECTED RESEARCH PROJECTS

- Developing Therapeutics to Treat Chronic Infections
 Co-Principal Investigator, National Institutes of Health
- Formation of Persisters in *B. Burgdorferi* and their Elimination
 Principal Investigator, Lyme Research Alliance

YINGZI LIN



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

PhD, University of Saskatchewan, 2004
mie.neu.edu/people/lin-yingzi

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

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

- M. Yu, Y. Lin, X. Wang, D. Schmidt, Y. Wang
 Human-robot Interaction Based on Gaze Gesture for the Drone Teleoperation, *Journal of Eye Movement Research*, 7(4), 2014, 1-14
- S. Radhakrishnan, Y. Lin, A. Zeid, S. Kamarthi
 Design, Evaluation and Implementation of Gesture Based Functions for CAD Modeling System Using the Multitouch Interface, *International Journal of Human-computer Studies*, 71(3), 2013, 261-275
- H. Cai, Y. Lin
 Coordinating Cognitive Assistances with Cognitive Engagement Control Approaches in Human-machine Interactions, *IEEE Transactions on Systems, Man and Cybernetics Part A: Humans and Systems*, 42(2), 2012, 286-294
- Y. Lin
 A Natural Contact Sensor Paradigm for Non-intrusive and Real-time Sensing of Bio-signals in Human-machine Interactions, *IEEE Sensors Journal, Special Issue on Cognitive Sensor Networks*, 11(3), 2011, 522-529
- G. Yang, Y. Lin, P. Bhattacharya
 A Driver Fatigue Recognition Model Based on Information Fusion and Dynamic Bayesian Network, *Information Sciences*, 180, 2010, 1942-1954

SELECTED RESEARCH PROJECTS

- CAREER: Bridging Cognitive Science and Sensor Technology: Nonintrusive and Multimodality Sensing in Human Machine Interactions
 Principal Investigator, National Science Foundation
- Integrated Individualized Modeling towards Cognitive Control of Human-machine Systems
 Principal Investigator, National Science Foundation

CAROL LIVERMORE



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

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

Scholarship focus: MEMS-enabled systems for assistive technologies, energy harvesting, and microscale vacuum systems, tissue engineering via MEMS-enabled cell assembly and origami folding, carbon nanotube-based energy storage

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

- 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
- F.A. Hill, T. Havel, A. John Hart, C. Livermore
Enhancing the Tensile Properties of Continuous Millimeter-scale Carbon Nanotube Fibers by Densification, *ACS Applied Materials and Interfaces*, 5(15), 2013, 7198-7207

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
- Tiny, Robust Tactile Elements for Scalable, High Resolution Tactile Displays (Phase I)
Principal Investigator, Samsung

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

- L. Makowski, et al.
Large-scale Inter-laboratory Study to Develop, Analytically Validate and Apply Highly Multiplexed, Quantitative Peptide Assays to Measure Cancer-relevant Proteins in Plasma, *Molecular and Cellular Proteomics*, 14(4), 2015, 2357-2374
- Y. Wang, E. Onuk, L. Makowski
The Mechanism of Population Shifting Among Transition States of Adenylate Kinase, *Biophysical Journal*, 108(2), 2015, 59a
- B. Donohoe, J. Matthews, M.E. Himmel, L. Makowski, et al.
Multiscale Deconstruction of Molecular Architecture in Corn Stover, *Scientific Reports*, 4(3756), 2014
- L. Makowski, H.R. Kim, P. Ciesielski, J. Badger, et al.
The Structure of the Catalytic Domain of a Plant Cellulose Synthase and its Assembly into Dimers, *The Plant Cell*, 26(7), 2014, 2996-3009
- R.E. Iacob, G.M. Bou-Assaf, L. Makowski, J.R. Engen, et al.
Investigating Monoclonal Antibody Aggregation Using a Combination of H/DX-MS and Other Biophysical Measurements, *Journal of Pharmaceutical Sciences*, 102(12), 2013, 4315-4329

SELECTED RESEARCH PROJECTS

- Center for Direct Catalytic Conversion of Biomass to BioFuels (C3Bio)
Co-Investigator, Basic Energy Sciences
- Identification of Small Molecules that Stabilize PARKIN in an Active Conformation
Principal Investigator, Zenobia Therapeutics, Inc.
- Precise Characterization of Conformational Ensembles
Principal Investigator, National Science Foundation
- Small Angle X-Ray Scattering (SAXS) as a Tool for Characterizing the Biophysical Properties of Biopharmaceutical Proteins in Solution
Principal Investigator, Biogen Idec

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, 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: 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

- 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
- J. Tai, J. Zhang, J. Li, W. Meleis, N. Mi,
 ArA: Adaptive Resource Allocation for Clouds under Burst Workloads, Proceedings of the IEEE International Performance Computing and Communications Conference (IPCCC), Orlando, Florida, 2011, 1-8
- K. Chowdhury, R. Doost-Mohammady, W. Meleis, et al.
 Cooperation and Communication in Cognitive Radio Networks based on TV Spectrum Experiments, Proceedings of IEEE International Symposium on a World of Wireless Mobile and Multimedia Networks (WoWMoM), Lucca, Italy, 2011, 1-9

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. Valteau, 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. Valteau, 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, Office of Naval Research
- Designer Solids Nanoantennas and Material
 Principal Investigator, Army Research Laboratory
- Large-area, 3D Optical Metaminerals with Tunability and Low Loss
 Co-Principal Investigator, Office of Naval Research
- Multiscale Mathematical Modeling and Design Realization of Novel 2D Functional Materials
 Co-Principal Investigator, Office of Naval Research
- 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

- 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
- S. Müftü, W. Meleis, R.H. Moore, D. Kopans, K.T. Wan, et al.
Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, *Experimental Mechanics*, 54(6), 2014, 935-942
- T. Hu, S. Zhalehpour, A. Gouldstone, S. Müftü, T. Ando,
A Method for the Estimation of Interface Temperature in Ultrasonic Joining, *Metallurgical and Materials Transactions A*, 45(5), 2014, 2545-2552
- K. Michalakakis, P. Calvani, S. Müftü, A. Pissiotis, H. Hirayama
The Effect of Different Implant-abutment Connection on Screw Joint Stability, *Journal of Oral Implantology*, 40(2), 2014, 146-152
- J. Aguirrebeitia, S. Müftü, M. Abasolo, J. Vallejo
Experimental Study of the Removal Force in Conical Implant-abutment Interfaces, *Journal of Prosthetic Dentistry*, 111(4), 2014, 293-300
- J. Shi, S. Müftü, A.Z. Gu, K.T. Wan
Adhesion of a Cylindrical Shell in the Presence of DLVO Surface Potential, *Journal of Applied Mechanics*, 80(6), 2013, e061007
- B. Yildirim, S. Müftü
Impact of High Velocity Particles onto a Rough Surface, *International Journal of Solids and Structures*, 49(11-12), 2012, 1375-1386

SELECTED RESEARCH PROJECTS

- A Novel Biomechanical Model of Bacterial Adhesion and Aggregation
Co-Principal Investigator, National Science Foundation
- Collaborative Research: Mechano-Lipidomics and Mechano-Cytosis of Drug Delivery Liposomes
Co-Principal Investigator, National Science Foundation
- Fundamentals of Bonding and Kinetic Consolidation Processes,
Co-Principal Investigator, National Science Foundation
- Improving Theoretical Models of Advanced Tape Transport Systems
Principal Investigator, Oracle Corporation

SHASHI MURTHY



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

SELECTED PUBLICATIONS

- D.A.L. Vickers, E. Chory, S.K. Murthy
Separation of Two Phenotypically Similar Cell Types via a Single Common Marker in Microfluidic Channels, *Lab on a Chip*, 12, 2012, 3399-3407
- D.A.L. Vickers, S.K. Murthy
Receptor Expression Changes as a Basis for Endothelial Cell Identification Using Microfluidic Channels, *Lab on a Chip*, 10, 2010, 2380-2386
- B.D. Plouffe, T. Kniazeva, J.E. Mayer, S.K. Murthy, V.L. Sales
Development of Microfluidics as Endothelial Progenitor Cell Capture Technology for Cardiovascular Tissue Engineering and Diagnostic Medicine, *FASEB Journal*, 23, 2009, 3309-3314
- J.V. Green, S.K. Murthy
Microfluidic Enrichment of a Target Cell Type from a Heterogeneous Suspension by Adhesion-Based Negative Selection, *Lab on a Chip*, 9, 2009, 2245-2248
- B.D. Plouffe, D.N. Njoka, J. Harris, J. Liao, S.K. Murthy, et al.
Peptide-Mediated Selective Adhesion of Smooth Muscle and Endothelial Cells in Microfluidic Shear Flow, *Langmuir*, 23, 2007, 5050-5055

SELECTED RESEARCH PROJECTS

- CAREER: Understanding the Role of Cell Surface Markers in Microfluidic Cell Separation- An Integrated Research and Education Program
Principal Investigator, National Science Foundation
- Cleavable Surface Coatings for Microfluidic Devices
Principal Investigator, US-Israel Binational Science Foundation
- Identification and Measurement of Biomarkers to Predict and Prevent Behavioral Mental Illness
Co-Principal Investigator, Northeastern University
- Microfluidic Cell Separation for Tissue Engineering and Regenerative Medicine
Principal Investigator, National Institutes of Health

UICHIRO NARUSAWA



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

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

Scholarship focus: biomechanics on respiratory systems; turbine blade cooling

SELECTED PUBLICATIONS

- F. Forghan, O. Askari, U. Narusawa, H. Metghalchi
Computational Design of Turbine Blade Film Cooling with Expanded Exit Holes, Proceedings of ASME Turbo Expo, 2015
- M. Nabian, U. Narusawa
Ventilator Optimization from P-V (Pressure-Volume) Curve Analyses of Animal Models for Lung Injury, International Mechanical Engineering Congress & Exposition (IMECE), 2015, 52472
- F. Forghan, O. Askari, U. Narusawa, H. Metghalchi
Film Cooling of Turbine Blade Surface with Extended Exit Holes, Proceedings of the ASME 2014 8th International Conference on Energy Sustainability and 12th Fuel Cell Sci. Eng. Tech. Conf., ES-FuelCell, 2014, 1-7
- F. Forghan, U. Narusawa, H. Metghalchi
Discharge Coefficient of an Expanded Exit Hole for Film Cooling of Turbine Blades, American Institute of Aeronautics and Astronautics Journal of Propulsion Power, 26, 2010, 1322-1325
- H. Liu, P.R. Patil, U. Narusawa
On Darcy-brinkman Equation: Viscous Flow Between Plates Packed with Regular Square Arrays of Cylinders, Entropy, 9, 2007, 118-131
- R. Amini, K. Creeden, U. Narusawa
A Mechanistic Model for Quasi-static Pulmonary Pressure-Volume Curves for Inflation, Journal of Biomechanical Engineering, 127, 2005, 619-629
- H. Liu, U. Narusawa
Flow-induced Endothelial Surface Reorganization and Minimization of Entropy Generation Rate, ASME Journal of Biomechanical Engineering, 126, 2004, 346-350

HAMID NAYEB-HASHEMI



Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering

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

Scholarship focus: biomechanics and mechanics

Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

- 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
- P. Bloori-Zadeh, S.C. Corbett, H. Nayeb-Hashemi
In-Vitro Calcification Study of Polyurethane Heart Valves, Material Science and Engineering C, 35, 2014, 335-340
- J. Papadopoulos, A. Hamouda, H. Nayeb-Hashemi, A. Vaziri, et al.
Mechanics of Anisotropic Hierarchical Honeycombs, International Journal of Mechanical Sciences, 81, 2014, 126-136
- H. Abdi, H. Nayeb-Hashemi, A. Hammuda, A. Vaziri, et al.
Torsional Dynamic Response of Shaft with Longitudinal and Circumferential Cracks, Journal of Vibration and Acoustics, ASME, 136(6), 2014, 1-8

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. Leiser, 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
- Detecting Blood Flow Changes in Bone
Principal Investigator, Northeastern University
- Detecting, Counting and Tracking Rare Circulating Cells in Vivo
Principal Investigator, Northeastern University

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

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

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

C. Rappaport, B. Gonzalez-Valdes, G. Allan, et al.
 Optimizing Element Positioning in Sparse Arrays for Nearfield Mm-Wave Imaging, Proceedings of the IEEE Phased Array Conference, 13, 2013, 333-335

Y. Álvarez, F. Las-Heras, B. Gonzalez-Valdes, J.A. Martínez-Lorenzo, C. Rappaport
 Material Characterization Using A Millimeter Wave Portal-Based Imaging System for Security Screening, Proceedings of the IEEE Homeland Security Technology Conference, 2013, 511-516

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: National Science Foundation CAREER Award; Defense Advanced Research Projects Agency Young Faculty Award

SELECTED PUBLICATIONS

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

Y. Hui, T. Nan, N.X. Sun, M. Rinaldi

High Resolution Magnetometer based on a High Frequency Magnetolectric MEMS-CMOS Oscillator, *IEEE/ASME Journal of Microelectromechanical Systems*, 24(1), 2015, 134-143

G. Hummel and M. Rinaldi

Switchable 2-Port Aluminum Nitride MEMS Resonator Using Monolithically Integrated 3.6THz Cut-Off Frequency Phase-Change Switches, *Proceedings of the 2015 Joint Conference of the IEEE International Frequency Control Symposium & European Frequency and Time Forum*, Denver, 2015, 706-708

Y. Hui, Z. Qian, G. Hummel and M. Rinaldi

Pico-watts Range Uncooled Infrared Detector Based on a Freestanding Piezoelectric Resonant Microplate with Nanoscale Metal Anchors, *Proceedings of the 2014 Solid-state Sensors, Actuators and Microsystems Workshop*, Hilton Head Island, 2014, 387-390

SELECTED RESEARCH PROJECTS

Plasmonic Microelectromechanical Infrared Digitizer (PLASMID)

Principal Investigator, DARPA MTO N-Zero program

Zero Power Sensors (ZePS)

Principal Investigator, DARPA MTO N-Zero program

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

Nanofabricated Neural Probes with Ultra-sensitive Integrated Compact RF NEMS Magnetolectric Sensors for Electro-Magneto-Brain Activity Mapping

Co-Principal Investigator, Keck Foundation

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

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

SELECTED PUBLICATIONS

J. Ruberti, C. Watson, Q. Dang, et al.

Assessing the Impact of Engineered Nanoparticles on Wound Healing Using a Novel in Vitro Bioassay, *Nanomedicine*, 9(18), 2014, 2803-2815

H.K. Kao, Q. Li, B. Flynn, X. Qiao, J.W. Ruberti, G. Murphy, L. Guo
 Collagen Synthesis Modulated in Wounds Treated by Pulsed Radiofrequency Energy, *Plastic and Reconstructive Surgery*, 131(4), 2013, 490e-498e

J. Paten, G. Tilburey, E. Molloy, R. Zareian, C. Trainor, J. Ruberti
 Utility of an Optically-based Micromechanical System for Printing and Testing Collagen Fibers, *Biomaterials*, April, 34(11), 2013, 2577-2587

B.P. Flynn, G. Tilburey, J.W. Ruberti

Single Fibril Force/Enzyme Degradation Assay Reveals Highly-sensitive Mechanochemical Switch in Native Collagen, *Biomechanics and Modeling in Mechanobiology*, 12(2), 2013, 291-300

C.B. Rich, R. Zareian, A.E.K. Hutcheon, J.W. Ruberti, et al.

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

Multiscale Investigation of Collagen Mechanochemistry

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 and exercise, healthy eating and nutrition science

SELECTED PUBLICATIONS

- G. Cloutier, A. Morton, D. Arguello, C. Castaneda-Sceppa, et al.
Effects of a 12-week Health and Fitness Program on the Health Status of University Police Officers, *FASEB Journal*, 29(1), 2015
- M.S. El-Nasr, S. Durga, M.P. Shiyko, C. Castaneda-Sceppa
Data-driven Retrospective Interviewing (DDRI): A Proposed Methodology for Formative Evaluation of Pervasive Games, *Entertainment Computing*, 11, 2015, 1-19
- 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, 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; jointly appointed, 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

- A. Carriero, E.A. Zimmermann, S.J. Shefelbine, R.O. Ritchie
A Methodology for the Investigation of Toughness and Crack Propagation in a Mouse Bone, *Journal of the Mechanical Behavior of Biomedical Materials*, 39, 2014, 38-47
- N. Rodriguez-Florez, M.L. Oyen, S.J. Shefelbine
Age Related Changes in Mouse Bone Permeability, *Journal of Biomechanics*, 47(5), 2014, 1110-1116
- A. Levchuk, P. Schneider, R. Müller, S.J. Shefelbine, et al.
Altered Lacunar and Vascular Porosity in Osteogenesis Imperfecta Mouse Bone as Revealed by Synchrotron Tomography Contributes to Bone Fragility, *Bone*, 61, 2014, 116-124 (cover picture)
- A. Carriero, L. Abela, A.A. Pitsillides, S.J. Shefelbine
Ex Vivo Determination of Bone Tissue Strains for an in Vivo Mouse Tibial Loading Model, *Journal of Biomechanics*, 47(10), 2014, 2490-2497
- A. Carriero, E.A. Zimmermann, R.O. Ritchie, S.J. Shefelbine, et al.
How Tough is Brittle Bone? Investigating Osteogenesis Imperfecta in Mouse Bone, *Journal of Bone and Mineral Research*, 29(6), 2014, 1392-401 (cover picture)
- 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*, 2014
- M. Giorgi, A. Carriero, S.J. Shefelbine, N. C. Nowlan
Mechanobiological Simulations of Prenatal Joint Morphogenesis, *Journal of Biomechanics*, 47(5), 2014, 989-995
- S.J. Shefelbine, N. J. Horwood, M. Marenzana, P. De Coppi, et al.
Potential of Human Fetal Chorionic Stem Cell for the Treatment of Osteogenesis Imperfecta, *Stem Cells and Development*, 23(3), 2014, 262-276
- J. Bruse, K. Oldknow, C. Farquharson, S.J. Shefelbine, et al.
Reference Point Indentation is not Indicative of Whole Mouse Bone Measures of Stress Intensity Fracture Toughness, *Bone*, 69, 2014, 174-179

SELECTED RESEARCH PROJECTS

- Heterogeneity and Anisotropy in Tough Materials
Principal Investigator, National Science Foundation
- Multi-scale Characteristics of Bone Toughness
Principal Investigator, National Science Foundation

RIFAT SIPAHI



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

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

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

Honors and awards: 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
Delay-dependent Coupling for a Multi-agent LTI Consensus System with Inter-agent Delays, *Physica D: Nonlinear Phenomena*, 267, 2014, 112-122
- 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
- R. Sipahi, I.I. Delice
On Some Features of Core Hypersurfaces Related to Stability Switching of LTI Systems with Multiple Time Delays, *IMA Mathematical Control and Information*, 31(2), 2014, 257-272
- W. Qiao, R. Sipahi
A Linear Time-invariant Consensus Dynamics with Homogeneous Delays: Analytical Study and Synthesis of Rightmost Eigenvalues, *SIAM Journal on Control and Optimization*, 51(5), 2013, 3971-3992
- I.I. Delice, R. Sipahi
Delay-independent Stability Test for Systems with Multiple Time-Delays, *IEEE Transactions on Automatic Control*, 57(4), 2012, 963-972
- R. Sipahi, S.-I. Niculescu, C.T. Abdallah, W. Michiels, K. Gu
Stability and Stabilization of Systems with Time Delay, Limitations and Opportunities, invited, *IEEE Control Systems Magazine*, 31(1), 2011, 38-65

SELECTED RESEARCH PROJECTS

- GARDE: An Interdisciplinary Approach to Accommodate Fine Motor Control Disorders
Principal Investigator, National Science Foundation
- Model-free Algorithms to Assist and Control Human-Task Missions against Dynamic Environments
Principal Investigator, Defense Advanced Research Projects Agency

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, 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 Ca²⁺ 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
- N. Slavov
 Inference of Sparse Networks with Unobserved Variables, Application to Gene Regulatory Networks, *Journal of Machine Learning Research, W&CP*, 9(1), 2010, 757-764

SELECTED RESEARCH PROJECTS

Broad Institute SPARC
 Co-Principal Investigator, Broad Institute

SRINIVAS SRIDHAR



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

PhD, California Institute of Technology, 1984
che.neu.edu/people/sridhar-srinivas

Scholarship focus: nanomedicine; neurotechnology; nanophotonics

SELECTED PUBLICATIONS

- 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
- B.M. Geilich, A.L. van de Ven, G.L. Singleton, L.J. Sepúlveda, S. Sridhar, T.J. Webster
 Silver Nanoparticle-embedded Polymersome Nanocarriers for the Treatment of Antibiotic-resistant Infections, *Nanoscale*, 7(8), 2015, 3511-3519
- A. van de Ven, M. Shann, S. Sridhar
 Essential Components of a Successful Doctoral Program in Nanomedicine, *International Journal of Nanomedicine*, 10, 2014, 23-30
- C.A. Gharagouzloo, P.N. McMahon, S. Sridhar
 Quantitative Contrast-enhanced MRI with Superparamagnetic Nanoparticles using Ultrashort Time-to-Echo Pulse Sequences, *Magnetic Resonance in Medicine*, 74(2), 2014, 431-441
- Y. Petrov, J. Nador, C. Hughes, S. Tran, O.Yavuzcetin, S. Sridhar
 Ultra-dense EEG Sampling Shows Two-fold Increase of Functional Brain Information, *NeuroImage*, 90, 2014, 140-145

SELECTED RESEARCH PROJECTS

- CaNCURE: Cancer Nanomedicine Co-ops for Undergraduate Research Experiences
 Principal Investigator, National Institutes of Health
- Integrative Graduate Education and Research Training
 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

- D. Sternad, K.P. Kording
 Carrot or Stick in Motor Learning, *Nature Neuroscience*, 18(4), 2015, 480-481
- M.E. Huber, D. Sternad
 Implicit Guidance to Stable Performance in a Rhythmic Perceptual-motor Skill, *Experimental Brain Research*, 233(6), 2015, 1783-1799
- 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, *American Psychological Association*, 41(2), 2015, 525-541
- S.-W. Park, D. Sternad
 Robust Retention of Individual Sensorimotor Skill After Self-Guided Practice, *Journal of Neurophysiology*, 2015
- 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
- B. Nasserolelami, C.J. Hasson, D. Sternad
 Rhythmic Manipulation of Objects with Complex Dynamics: Predictability Over Chaos, *PLoS Computational Biology*, 10(10), 2014, e1003900
- M.O. Abe, D. Sternad
 Directionality in Distribution and Temporal Structure of Variability in Skill Acquisition, *Frontiers in Human Neuroscience*, 7(225), 2013
- SELECTED RESEARCH PROJECTS**
- EAGER: Challenging the Cognitive-control Divide
 Co-Principal Investigator, National Science Foundation
- Clinical Studies on the Control of Movements in Infants and Adults
 Principal Investigator, National Institutes of Health
- Multi-center Trial of Augmented Sensory Feedback in Children with Dyskinetic CP
 Co-Principal Investigator, National Institutes of Health
- Variability and Stability of Skill Acquisition
 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: Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

- Y. Aval, M. Stojanovic
 Differentially Coherent Multichannel Detection of Acoustic OFDM Signals, *IEEE Journal of Oceanic Engineering*, 40(2), 2015, 251-268
- P. Qarabaqi, M. Stojanovic
 Statistical Characterization and Computationally Efficient Modeling of a Class of Underwater Acoustic Channels, *IEEE Journal of Oceanic Engineering, Special Issue on Underwater Communications*, 38(4), 2013, 701-717
- S. Yerramalli, M. Stojanovic, U. Mitra
 Partial FFT Demodulation: A Detection Method for Doppler Distorted OFDM Systems, *IEEE Transactions on Signal Processing*, 60(11), 2012, 5906-5918
- J. Heidemann, M. Stojanovic, M. Zorzi
 Underwater Sensor Networks: Applications, Advances, and Challenges, *Philosophical Transactions of the Royal Society A*, 2012, 158-175
- A. Radošević, D. Fertonani, T. Duman, J. Proakis, M. Stojanovic
 Bounds on the Information Rate for Sparse Channels with Large Memory and I.U.D. Inputs, *IEEE Transactions on Communications*, 59(12), 2011, 3343-3352

SELECTED RESEARCH PROJECTS

- NeTS: Large: Collaborative Research: Exploration and Exploitation in Actuated Communication Networks
 Principal Investigator, National Science Foundation
- Intelligent Coordination and Adaptive Classification for Naval Autonomous Systems
 Principal Investigator, Office of Naval Research
- MRI: Development of the Northeastern University Marine Observatory NETWORK (NU MONET)
 Co-Principal Investigator, National Science Foundation

NIAN SUN



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

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

Scholarship focus: magnetic, ferroelectric and magnetoelectric materials; RF/microwave magnetic and magnetoelectric devices design, fabrication and testing; materials properties

at RF/microwave frequency; range self-assembly of magnetic nanostructures

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

SELECTED PUBLICATIONS

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

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

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

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

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

MARIO SZNAIER



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

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

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

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: applications of dynamics in imaging, robust and nonlinear control, reduced order models, fluid flow control

SELECTED PUBLICATIONS

- 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

VLADMIR TORCHILIN



University Distinguished Professor,

Pharmaceutical Sciences; affiliated faculty, Bioengineering

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

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

Honors and awards: Fellow of American Institute of Medical and Biological Engineering; Elected as a Member of European Academy of Sciences

SELECTED PUBLICATIONS

- G. Salzano, G. Navarro, M.S. Trivedi, G. De Rosa, V.P. Torchilin
Multifunctional Polymeric Micelles Co-loaded with Anti-survivin siRNA and Paclitaxel Overcome Drug Resistance in an Animal Model of Ovarian Cancer, *Molecular Cancer Therapeutics*, 14(4), 2015, 1075-1084
- S. Essex, G. Navarro, P. Sabhachandani, V.P. Torchilin, et al.
Phospholipid-modified PEI-based Nanocarriers for in Vivo siRNA Therapeutics Against Multidrug-resistant Tumors, *Gene Therapy*, 22, 2015, 41-50
- A. Apte, E. Koren, A. Koshkaryev, V.P. Torchilin
Doxorubicin in TAT Peptide-modified Multifunctional Immunoliposomes Demonstrates Increased Activity Against both Drug-sensitive and Drug-resistant Ovarian Cancer Models, *Cancer Biology and Therapy*, 15, 2014, 69-80
- F. Perche, S. Biswas, T. Wang, L. Zhu, V.P. Torchilin
Hypoxia-targeted siRNA Delivery, *Angew Chemie*, 53, 2014, 3363-3366
- S. Biswas, V.P. Torchilin
Nanopreparations for Organelle-specific Delivery in Cancer, *Advanced Drug Delivery Reviews*, 66, 2014, 26-41
- V.P. Torchilin
Multifunctional, Stimuli-sensitive Nanoparticulate Systems for Drug Delivery, *Nature Reviews Drug Discovery*, 13, 2014, 813-827

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

ASHKAN VAZIRI



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

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

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

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

SELECTED PUBLICATIONS

- J Xiong, R. Ghosh, L. Ma., H. Ebrahimi, A. Vaziri, L. Wu, et al. Bending Behavior of Lightweight Sandwich-walled Shells with Pyramidal Truss Cores, *Composite Structures*, 116, 2014, 793-804
- B. Haghpanah, H. Nayeb-Hashemi, A. Vaziri, et al. Buckling of Regular, Chiral, and Hierarchical Honeycombs Under a General Macroscopic Stress State, *Proceedings of the Royal Society A*, 470(2167), 2014, 20130856
- R. Ghosh, H. Ebrahimi, A. Vaziri Contact Kinematics of Biomimetic Scales, *Applied Physics Letters*, 2014, 105.23, 233701
- R. Ghosh, A. Ajdari, H. Nayeb-Hashemi, A. Vaziri, et al. Impact Resistance and Energy Absorption of Regular and Functionally Graded Hexagonal Honeycombs with Cell Wall Material Strain Hardening, *International Journal of Mechanical Sciences*, 89, 2014, 413-422
- R. Oftadeh, B. Haghpanah, D. Vella, A. Boudaoud, A. Vaziri Optimal Fractal-like Hierarchical Honeycombs, *Physical Review Letters*, 113, 2014, 104301
- H. Abdi, H. Nayeb-Hashemi, A. M. S. Hamouda, A. Vaziri Torsional Dynamic Response of a Shaft with Longitudinal and Circumferential Cracks, *Journal of Vibration and Acoustics*, 136, 2014, 61011-61018
- R. Ghosh, A. Kumar, A. Vaziri Type-IV Pilus Deformation Can Explain Retraction Behavior, *PLOS ONE*, 2014, 9, 114613

SELECTED RESEARCH PROJECTS

- Development of Novel High Friction, low Adhesion Materials
Co-Principal Investigator, Brooks Automation
- Mechanics of Carbon Nanotube Surface Decontamination
Principal Investigator, FM Global
- Multifunctional Cellular Structures for Energy Harvesting and Energy Management Applications
Principal Investigator, Qatar Foundation

KAI-TAK WAN



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

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

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

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

SELECTED PUBLICATIONS

- 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

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

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. Moralez, H. Fenniri, T.J. Webster

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

T.J. Webster, J.U. Ejiogor

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
bioe.neu.edu/people/williams-mark

Scholarship focus: biophysics of DNA-protein interactions

SELECTED PUBLICATIONS

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 a 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

Adedayo E. Catlett

PhD 2015, Bioengineering; Advisor, Shashi Murthy

INDUCED DIFFERENTIATION OF ADULT MESENCHYMAL STEM CELLS VIA FLUID SHEAR STIMULATION

In this dissertation, the differentiation of hMSCs via shear stimulation through biocompatible plastic tubing in a suspended flow was examined.

The in vitro investigation of mechanically and chemically stimulated hMSCs in a suspension was performed by: (1) Determining the length of plastic tubing which induced a differentiation response of the hMSCs. (2) Examining intracellular receptors using fluorescent markers to resolve differentiation toward the adipogenic lineage. (3) Incubating the hMSCs with fluorescently tagged antibodies corresponding to differentiation along the adipogenic and chondrogenic lineages. (4) Analyzing the genetic fold changes related to the shear stimulation of hMSCs.

See full dissertation at coe.neu.edu/iris/BioAdedayoCatlett

Amir Farjadian Bejestan

PhD 2014, Bioengineering; Advisor, Constantinos Mavroidis

MECHANICAL DESIGN AND CONTROL SYSTEM DEVELOPMENT OF NOVEL 2 DEGREE-OF-FREEDOM ANKLE AND BALANCE REHABILITATION ROBOTIC SYSTEM

In this work, we present the Virtually-Interfaced Robotic Ankle and Balance Trainer (vi-RABT), a low-cost platform-based robotic system that is designed to improve overall ankle/balance strength, mobility and control. The system is equipped with two degrees-of-freedom (DOF) controlled actuation along with complete means of accurate force and angular measurements. Effective control techniques and virtual reality games were developed and interfaced into the system hardware. Under IRB approved protocol, the system was used to assess ankle force, mobility and motor control in a pool of healthy human subjects, while playing interactive virtual reality games on a large screen. In the next phase, an anisotropic assistive/resistive control paradigm has been implemented into practice, with realistic functionality consistent with the expectations of a Physical Therapy expert. A pilot experiment was conducted to investigate the feasibility of assistive control using vi-RABT.

See full dissertation at coe.neu.edu/iris/AmirFarjadian

Masoud Khabiry

PhD 2015, Bioengineering; Advisor, Nader Jalili

AN INTEGRATED MICROFLUIDIC PLATFORM FOR CHEMICAL AND BIOLOGICAL SENSING EMPLOYING POLYMER-COATED PIEZOELECTRIC MICROCANTILEVERS

In this work, an integrated microfluidic system with shear-protective regions that enables cell and particle immobilization, sensor integration, and nanoparticle synthesis is presented. Thus, a novel and simple microfluidic device for capturing small volume of cells by using sidewall microgroove containing channels and microposts is developed. The developed microfluidic system enabled the control of fluid flow and shear stress profiles. Furthermore, the shear stress variation and cell positioning in the sidewall microgrooves were investigated. Moreover, the histograms of cell locations in the microgrooves were provided and the most probable destination of the cells was presented. In the microfluidic device, further investigation on extracting cell information from image data was carried out. Hence, a cell segmentation technique was developed for cell counting and extracting the cell information from the microfluidic device.

See full dissertation at coe.neu.edu/iris/MasoudKhabiry

This page intentionally left blank

This page intentionally left blank