Northeastern University
College of Engineering

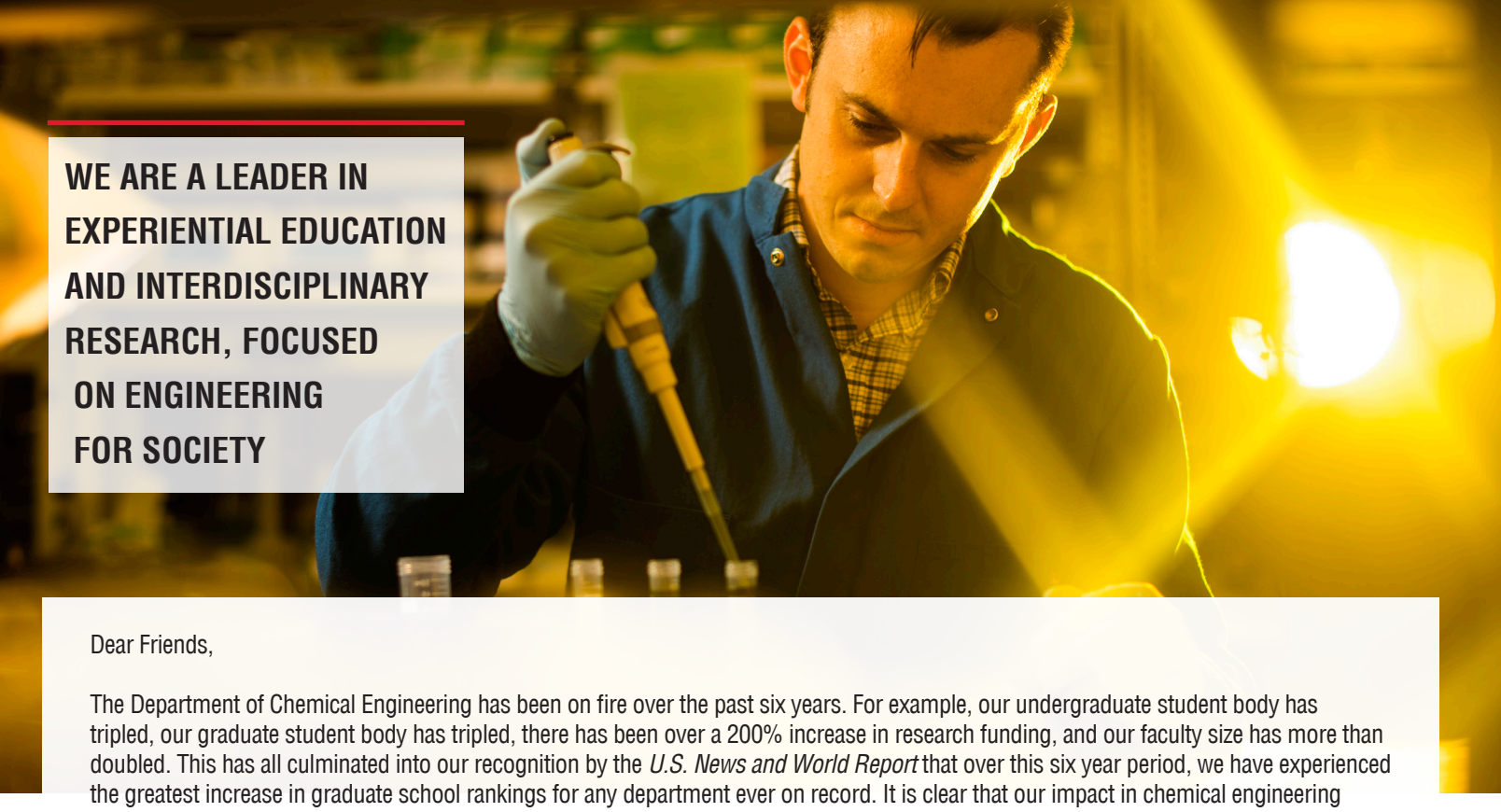
Engineering for Society

Boldly innovating to better our world

2017 | 2018

SCHOLARSHIP REPORT

Chemical Engineering



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

Dear Friends,

The Department of Chemical Engineering has been on fire over the past six years. For example, our undergraduate student body has tripled, our graduate student body has tripled, there has been over a 200% increase in research funding, and our faculty size has more than doubled. This has all culminated into our recognition by the *U.S. News and World Report* that over this six year period, we have experienced the greatest increase in graduate school rankings for any department ever on record. It is clear that our impact in chemical engineering education and research is at a record level and is poised for continual unprecedented growth in the years ahead.

We offer degrees at all levels (Bachelor of Science, Master of Science and Doctor of Philosophy) and are internationally renowned for high quality classroom-based education in conjunction with industrial work experience. Our top-rated (and one of the nation's largest) Cooperative (Co-op) Education program was one of the first in the country and the Chemical Engineering Co-op placed students in 179 companies in 2017; spanning the areas of consumer products, plastics, biotechnology, nanotechnology, alternative energy, and petrochemicals, to name a few. We even placed students in international co-op locations in Germany, Chile, France, Singapore, China, United Arab Emirates, Madagascar, India, Italy, Costa Rica, Spain, and Belgium in this year alone. In addition, our Graduate Co-op program has grown tremendously. We have placed students in top companies such as Glaxosmithkline, CONTINUUS Pharmaceuticals, Kaleido Biosciences, Inc., and NBD Nanotechnologies. It is not hard to see why we have been ranked five times as the Best School for Internships by the *Princeton Review*.

Our undergraduate program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ensuring that our program meets the quality standards established by the profession of Chemical Engineering. Our award-winning undergraduate student chapter of the American Institute of Chemical Engineers (AIChE) is very active in many outreach programs, such as the ChemE Car competition and hosting regional AIChE annual conferences. Our graduate program is very interdisciplinary and offers students opportunities to work with outstanding faculty to attain research experience and achieve their career goals in a variety of subfields of chemical engineering. In 2017 alone, our faculty gave a total number of 322 presentations (including invited talks at conferences, professional societies, workshops, and more) and we now have international research centers in China, Columbia, and other countries around the world, demonstrating our leadership across the chemical engineering community.

I invite you to explore our Department of Chemical Engineering through this Scholarship Report and find out why we have been listed among the most innovative and best-valued schools by the *U.S. News & World Report*.

Sincerely,
Thomas J. Webster, Art Zafiropoulo Chair, and Professor and Department Chair
Chemical Engineering
th.webster@northeastern.edu

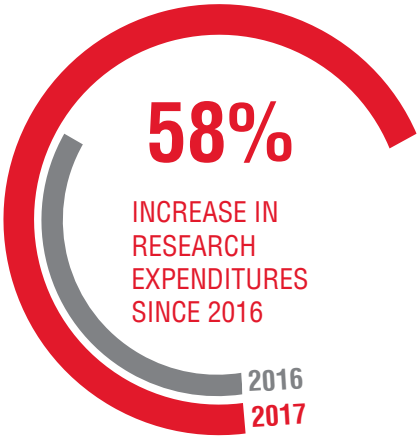
QUICK FACTS — Chemical Engineering

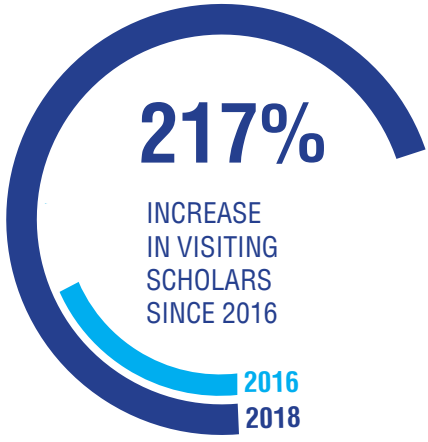
GRADUATE students

FACULTY

34

Countries represented across both undergraduate and graduate levels





QUICK FACTS — College of Engineering

13 STATE-OF-THE-ART RESEARCH CENTERS funding by eight federal agencies

DOE · DHS · EPA · HHS · NIH · NSA · NIST · NSF

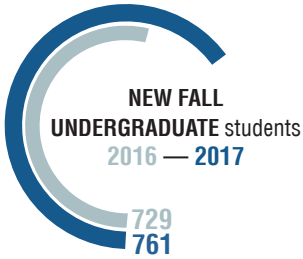
TENURED/ TENURE-TRACK Faculty

NSF CAREER Awards

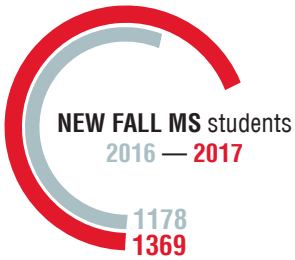
5 ENGINEERING DEPARTMENTS

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

3819 **UNDERGRADUATE** students



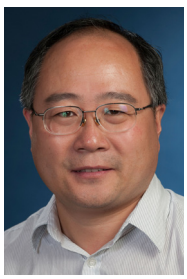
3717 **GRADUATE** students



YOUNG INVESTIGATOR Awards

FACULTY HONORS AND AWARDS

Chair and Professor **Thomas Webster** was named a fellow of the National Academy of Inventors, the highest professional distinction for academic inventors whose work has made contributions to tangibly impacting society. Also, Webster's nano spinal implant, which was commercialized by Nanovis, LLC, just received FDA approval for implantation. The design includes the first nanostructured surface features in which studies have demonstrated increased bone growth and decrease bacteria functions, all without using drugs.



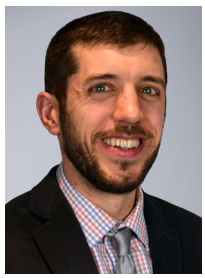
Professor **Ming Su's** article on "Three Dimensional Microtissues as an In Vitro Model for Personalized Radiation Therapy" was selected to be featured on the cover of the *Analyst journal*.

Assistant Professors **Abigail Koppes** and **Ryan Koppes** were awarded a $632K NIH grant to develop a microfluidic model of the "brain-in-the-gut." The grant is a three-year Trailblazer New/Early Career Investigator R21 award with the NIH National Institute of Biomedical Imaging and Bioengineering.

Assistant Professor **Adam Ekenseair** was one of 21 winners of the American Chemistry Society's Polymer Science and Engineering Young Investigator Award. Recipients of the award are recognized as emerging leaders in the fields of synthesis, processing, characterization, and physics of soft materials and their applications. He also received the 2018 Nano Research Young Innovator Award (NR45) in nanobiotech.

Associate Professor **Richard West** was awarded a CAREER Award from the National Science Foundation for "Predictive Kinetic Modeling of Halogenated Hydrocarbon Combustion." HHCs are important flame suppressants and refrigerants, but the chemical kinetic models for describing their combustion are highly complex. To effectively build these models, the project will use machine learning to predict the properties of HHC molecules and their reactions. This breakthrough will enable the development of an automated reaction mechanism generation tool to create detailed kinetic models for combustion of novel HHCs.

Cabot and University Distinguished Professor **Laura Lewis** has received a Fulbright U.S. Scholar Program grant for a research project in Spain where she will conduct research at the Instituto de Ciencia de Materiales de Madrid as part of a project to tailor magnetic microwires for advanced applications. Lewis was appointed to the rank of University Distinguished Professor in 2018, which is the highest honor the university can bestow upon a faculty member.

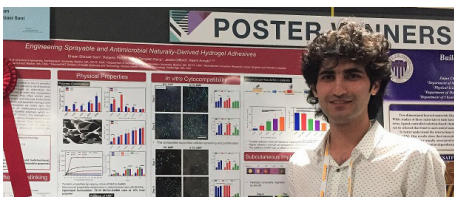


Associate Teaching Professor **Lucas Landherr** was awarded the AIChE Education Division's Award for Innovation in Chemical Engineering Education, which recognizes an individual who has implemented a pedagogical innovation into a class or course that has made a significant and documented positive impact on teaching effectiveness and has enhanced student learning.

ABio-Techne will acquire Quad Technologies, which is a spinout company from Professor **Shashi Murthy's** lab and was co-founded by him and **Sean Kevlahan,** PhD'13, the late **Adam Hatch**, PhD'14, and **Brian Plouffe,** PhD'11. Quad Technologies developed QuickGel™ microparticles that are easily modifiable with antibodies and can serve as the substrate for traditional "bead-based" separation and cell activation with the added benefit of being able to quickly dissolve them after use.

Professor **Debra Auguste** was selected as a fellow of the Biomedical Engineering Society (BMES) for her exceptional achievements and significant contributions within the biomedical engineering field.

PhD candidate **Brian Lejeune**, chemical engineering, has been awarded a Science Graduate Research Fellowship award through the Department of Energy. Lejeune is advised by University Distinguished Professor Laura Lewis. The Fellowship will enable him to continue his research on crystal growth of magnetic materials for six months at the AMES National Laboratory in Iowa.



PhD student **Ehsan Shirzaei Sani** received Best Poster Award at the 2017 Materials Research Society (MRS) Fall Meeting and Exhibit earlier in Boston. He presented a project entitled, "Engineering sprayable and antimicrobial naturally-derived hydrogel adhesives."

FACULTY BY RESEARCH AREAS

19
Faculty

ADVANCED MATERIALS RESEARCH

Debra Auguste
Sidi A. Bencherif
Sunho Choi
Arthur Coury
Matthew Eckelman
Adam Ekenseair
Hicham Fenniri
Joshua Gallaway
Andrew Gouldstone
Vincent G. Harris
Francisco Hung
Laura H. Lewis
Steve Lustig
Mrityunjay Singh
Ming Su
Thomas Webster
Richard West
Ronald Willey
Katherine Ziemer

20
Faculty

BIOLOGICAL ENGINEERING

Mansoor Amiji
Anand Asthagiri
Debra Auguste
Sidi A. Bencherif
Rebecca L. Carrier
Heather Clark
Arthur Coury
Eno Ebong
Adam Ekenseair
Hicham Fenniri
Edgar Goluch
Abigail Koppes
Ryan Koppes
Carolyn Lee-Parsons
Shashi Murthy
Mrityunjay Singh
Nikolai Slavov
Srinivas Sridhar
Ming Su
Thomas Webster

MANSOOR AMIJI

University Distinguished Professor, Professor of Pharmaceutical Sciences and Professor of Chemical Engineering, and affiliate faculty in Biomedical Engineering

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 (AAPS); Meritorious Manuscript Award, AAPS; Fellow, Controlled Release Society; Tsuneji Nagai Award, Controlled Release Society

SELECTED PUBLICATIONS

M.M. Amiji, R. Ramesh
Exosomes in Cancer: Diagnostics, Pharmaceutical, and Therapeutic Applications, Elsevier Publishing Company, 2018

A. Singh, M.M. Amiji
Stimuli-Responsive Drug Delivery Systems, Royal Society of Chemistry Biomaterial Series Publication, Royal Society of Chemistry, 2018

G. Ahmad, M. Amiji
Use of CRISPR/Cas9 Gene Editing Tools for Developing Models in Drug Discovery, Drug Discovery Today, 23(3), 2018, 519-533

G. Ahmad, R. El-Sadda, G. Botchkina, I. Ojima, J. Egan, M. Amiji
Nanoemulsion Formulation of a Novel Taxoid Prodrug SBT-1214 Conjugated with Omega-3 Fatty Acid Inhibits Prostate Cancer Stem Cell-Induced Tumor Growth, Cancer Letters, 406, 2017, 71-80

S. Padmakumar, N. Parayath, F. Leslie, S.V. Nair, D. Menon, and M. Amiji
Intraperitoneal Chemotherapy for Ovarian Cancer Using Sustained-Release Implantable Devices, Expert Opinion on Drug Delivery, 15(5), 2018, 481-494

D. Chen, S. Ganesh, W. Wang, M. Amiji
Plasma Protein Adsorption and Biological Identity of Systemically-Administered Nanoparticles, Nanomedicine (London), 12(17), 2017, 2113-2135

SELECTED RESEARCH PROJECTS

Nanoemulsion Formulation and IND Enabling Studies of a Novel Cancer Stem Cell Cytotoxic Agent
Principal Investigator, Targagenix, Inc., Sub-Contract of NCI SBIR Contract

Oral Gene Delivery to Improve Iron Overload Disorders
Principal Investigator, National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health

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

ANAND ASTHAGIRI

Associate Professor, Bioengineering; affiliated faculty, Chemical Engineering

PhD, Massachusetts Institute of Technology, 2000
bioe.neu.edu/people/asthagiri-anand

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

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

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

DEBRA AUGUSTE

Professor, Chemical Engineering

PhD, Princeton University, 2005
che.neu.edu/people/auguste-debra

Scholarship focus: bioresponsive drug delivery; cell and tissue engineering; tissue architecture; targeted therapeutics

Honors and awards: National Science Foundation CAREER Award; NIH Director's New Innovator Award; Presidential Early Career Award in Science; Fellow, Biomedical Engineering Society

SELECTED PUBLICATIONS

P. Guo, J. Yang, D. Jia, M.A. Moses, D.T. Auguste
ICAM-1-Targeted, Lcn2 siRNA-Encapsulated Liposomes are Potent Anti-Angiogenic Agents for Triple Negative Breast Cancer, Theranostics, 6, 2016, 1-13

D. Liu, D.T. Auguste
Cancer Targeted Therapeutics: From Molecules to Drug Delivery Vehicles, Journal of Controlled Release, 219, 2015, 632-643

B. Wang, P. Guo, D.T. Auguste
Mapping the CXCR4 Receptor on Breast Cancer Cells, Biomaterials, 57, 2015, 161-8

T.T. Ho, J.O. You, D.T. Auguste
siRNA Delivery Impedes the Temporal Expression of Cytokine-Activated VCAM1 on Endothelial Cells, Annals of Biomedical Engineering, 2015, 1-8

J.O. You, M. Rafat, D. Almeda, N. Maldonado, P. Guo, C.S. Nabzdyk, M. Chun, F.W. LoGerfo, J.W. Hutchinson, L.K. Pradhan-Nabsdyk, D.T. Auguste
pH-Responsive Scaffolds Generate a Pro-Healing Response, Biomaterials, 57, 2015, 22-32

D. Almeda, B. Wang, D.T. Auguste
Minimizing Antibody Surface Density on Lipsomes While Sustaining Cytokine-Activated EC Targeting, Biomaterials, 47, 2015, 37-44

P. Guo, J. Huang, L. Wang, D. Jia, J. Yang, D.A. Dillon, D. Zurakowski, H. Mao, M.A. Moses, D.T. Auguste
ICAM-1 as a Molecular Target for Triple Negative Breast Cancer, Proceedings of the National Academy of Science, 111(41), 2014, 14710-14715

P. Guo, J.O. You, J. Yang, D. Jia, M.A. Moses, D.T. Auguste
Inhibiting Metstatic Breast Cancer Cell Migration Via the Synergy of Targeted, pH-Triggered siRNA Delivery and Chemokine Axis Blockade, Molecular Pharmaceutics, 11(3), 2014, 755-765

J. You, P. Guo, D.T. Auguste
A Multi-Targeted Drug Delivery Vehicle Approach that Targets, Triggers, and Thermally Ablates HER2+ Breast Cancer Cells, Angewandte Chemie, 52(15), 2013, 4141-4146

SIDI A. BENCHERIF

Assistant Professor, Chemical Engineering; affiliated faculty, Bioengineering

PhD, Carnegie Mellon University, 2009
che.neu.edu/people/bencherif-sidi

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

Honors and awards: Acta Biomaterialia Outstanding Reviewer Award, FACE Foundation Award to Strengthen French-American Collaborative Research Activities, Burroughs-Wellcome Fund Collaborative Research Travel Award

SELECTED PUBLICATIONS

O. Gsib, C. Egles, S.A. Bencherif
Fibrin: An Underrated Biopolymer for Skin Tissue Engineering, Journal of Molecular Biology and Biotechnology, 2(1), 2017

O. Chaudhuri, L. Gu, D. Klumpers, M. Darnell, S.A. Bencherif, J.C. Weaver, N. Huebsch, H. Lee, E. Lippens, G.N. Duda, D.J Mooney
Hydrogels with Tunable Stress Relaxation Regulate Stem Cell Fate and Activity, Nature Materials, 15, 2016, 326-334

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

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

S.A. Bencherif, W.R. Sands, D. Bhatta, P. Arany, C. Verbeke, D.A. Edwards, D.J. Mooney
Injectable Preformed Scaffolds with Shape-Memory Properties, PNAS, PNA, 109(48), 2012, 19590-19595

N. Korin, M. Kanapathipillai, B.D. Matthews, M. Crescente, T. Mammoto, K. Ghosh, S. Jurek, S.A. Bencherif, D. Bhatta, A.U. Coskun, C.L. Feldman, D.D. Wagner, D.E. Ingber
Shear-activated Platelet Mimetics for Drug Targeting to Obstructed Blood Vessels, Science, 337, 2012, 738-742

SELECTED RESEARCH PROJECTS

Unlocking the Full Potential of Cryogel-based Cancer Vaccines
Principal Investigator, Northeastern University

Cryogel-Integrated Biochips for Ex-vivo Hepatotoxicity and Anti-Cancer Drug Screening of 3D Biomimetic Liver Microtissues
Principal Investigator, Thomas Jefferson Fund/FACE Foundation

Cryogel-supported Liver-on-a-chip for Ex-vivo Hepatotoxicity and Anticancer Drug Screening
Principal Investigator, Burroughs-Wellcome Fund

REBECCA L. CARRIER

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

PhD, MIT, 2000
che.neu.edu/people/carrier-rebecca

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

Honors and awards: College of Engineering Soren Buus Outstanding Research Award; Society for Biomaterials Member-At-Large; College of Engineering Faculty Fellow; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

SUNHO CHOI

Assistant Professor, Chemical Engineering

PhD, University of Minnesota, 2008
che.neu.edu/people/choi-sunho

Scholarship focus: demonstrating innovative processing strategies for nanostructured materials and functional hybrids engineered for challenging applications in clean and renewable energy

SELECTED PUBLICATIONS

D. Andirova, C.F. Cogswell, Y. Lei, S. Choi
Effect of the Structural Constituents of Metal Organic Frameworks on Carbon Dioxide Capture, Microporous and Mesoporous Materials, 219, 2016, 276-305

D. Andirova, Y. Lei, X. Zhao, S. Choi
Functionalization of Metal-organic Frameworks for Enhanced Stability under Humid Carbon Dioxide Capture Conditions, ChemSusChem, 8, 2015, 3405

S.A. Didas, S. Choi, W. Chaikittisilp, C.W. Jones
Amine–Oxide Hybrid Materials for CO2 Capture from Ambient Air, Accounts of Chemical Research, 48, 2015, 2680-2687

C.F. Cogswell, H. Jiang, J. Ramberger, D. Accetta, R.J. Willey, S. Choi
Effect of Pore Structure on CO2 Adsorption Characteristics of Aminopolymer Impregnated MCM-36, Langmuir, 31, 2015, 4534-4541

S. Choi, T. Watanabe, T-H. Bae, D.S. Sholl, C.W. Jones
Modification of Mg/DOBDC with Amines to Enhance CO2 Adsorption from Ultradilute Gases, Journal of Physical Chemistry Letters, 3, 2012, 1136-1141

S. Choi, M. L. Gray, C.W. Jones
Amine-tethered Solid Adsorbents Coupling High Adsorption Capacity and Regenerability for CO_2 Capture Applications Including the Air Capture, ChemSusChem, 4(5), 2011, 628-635

S. Choi, J. Drese, M. Gray, R.R. Chance, P. Eisenberger, C. Jones
Application of Amine-Tethered Solid Sorbents for Direct CO_2 Capture from the Ambient Air, Environmental Science and Technology, 45(6), 2011, 2420-2427

W. Kim, S. Choi, S. Nair
Swelling, Functionalization, and Structural Changes of the Nanoporous Layered Silicates AMH-3 and MCM-22, Langmuir, 27(12), 2011, 7892-7901

SELECTED RESEARCH PROJECTS

Amino-Pillared Nanosheet (APN) Adsorbents for High Performance CO_2 capture
Principal Investigator, Northeastern University

HEATHER CLARK

Professor, Bioengineering; joint appointment in College of Science; affiliated faculty, Chemical Engineering

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

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

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

E.H. Kim, G. Chin, G. Rong, K.E. Poskanzer, H.A. Clark
Optical probes for neurobiological sensing and imaging, Accounts of Chemical Research: Special Issue- The Interface of Biology with Nanoscience and Electronics, 51(5), 2018, 1023–1032

G. Rong, E.H. Kim, K.E. Poskanzer, H.A. Clark
A Method for Estimating Intracellular Ion Concentration Using Optical Nanosensors and Ratiometric Imaging, Nature Scientific Reports, 7, 2017, 10819

SELECTED RESEARCH PROJECTS

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

AChMRNS: Nanosensors for Chemical Imaging of Acetylcholine Using MRI
Principal Investigator, NIH/NINDS BRAIN initiative

Circulating Red Blood Cell Based Nanosensors for Continuous, Real-Time Drug Monitoring
Principal Investigator, NIH/NIBIB

Optical Nanosensors Detect Neurotransmitter Release in the Peripheral Nervous System
Principal Investigator, NIH/NCATS

Implanted Nanosensors for Physiological Monitoring
Principal Investigator, Tufts CTSI

Sprayable Biocidal Coatings for Tactical Shelters
Co-Principal Investigator, Army Research Labs

ARTHUR COURY

University Distinguished Professor, Chemical Engineering

PhD, University of Minnesota, 1965
che.neu.edu/people/coury-arthur

Scholarship focus: polymeric biomaterials for medical products such as implantable electronic devices, hydrogel-based devices and drug delivery systems

Honors and awards: Fellow, American Chemical Society; Fellow, American Institute for Medical and Biological Engineering; Fellow, Biomaterials Science and Engineering; Member, National Academy of Engineering

SELECTED PUBLICATIONS

A. Coury
Forces and Imperatives in Translating Medical Concepts to the Marketplace, BE 502 "From Lab Bench to Marketplace" Department of Bioengineering, University of Pennsylvania, 2013

A. Coury
Issues in Translation of Advanced Composites from the Bench to the Medical Marketplace, MRS Conference, Boston, MA, 2013

A. Coury
Progress in the Prevention of Tissue Adhesions, Tenth International Symposium on Frontiers in Biomedical Polymers, Vancouver, British Columbia, Canada, 2013

A. Coury
Organic Chemistry: Passport to a "Hybrid" Career, Presentation to Department of Chemistry, University of Minnesota, upon Receipt of Distinguished Alumni Award, 2013

A. Coury
Technology, Service and Bucking Convention: A Prescription for a Rewarding Biomaterials Career, Transactions of Society for Biomaterials, 2(3), 101S-110S, in conjunction with receipt of 2013 C. William Hall Award, Boston, MA, 2013

A. Coury, P. Jarrett
Tissue Adhesives and Sealants for Surgical Applications, in Joining and Assembly of Medical Materials and Devices, Edited by Y.N. Zhou and M.D. Breyen (Woodhead Publishing Limited), 2013, 449-490

A. Coury
Tissue Engineering: Scope, Products, and Commercialization Strategies, Chapter 17, Scaffolds for Tissue Engineering: Biological Design, Materials, and Fabrication, Edited by Claudio Migliaresi and Antonella Motta, CRC Press (Taylor & Francis), 2014, 614-625

ENO EBONG

Assistant Professor, Chemical Engineering
affiliated faculty, Bioengineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

MATTHEW ECKELMAN

Associate Professor, Civil and Environmental Engineering; affiliated faculty, Chemical Engineering, Marine and Environmental Sciences, Public Policy and Urban Affairs

PhD, Yale University, 2009
civ.neu.edu/people/eckelman-matthew

Scholarship focus: environmental engineering and sustainability; life cycle assessment; energy efficiency and emissions modeling; environmental assessment of bio and nanomaterials; material and energy use in urban buildings and infrastructure

Honors and awards: National Science Foundation CAREER Award; International Laudise Prize in Industrial Ecology

SELECTED PUBLICATIONS

R. Phillips, L. Troup, D.J. Fannon, M.J. Eckelman
Do Resilient and Sustainable Design Strategies Conflict in Commercial Buildings?, Building and Environment, 146, 2017, 295-311

Q. Tu, M.J. Eckelman, J.B. Zimmerman
Meta-analysis and Harmonization of Life Cycle Assessment (LCA) Studies for Algae Biofuels, Environmental Science & Technology 51(17), 2017, 9419-9432

L. Pourzahedi M. Vance, M.J. Eckelman
Life Cycle Assessment and Release Studies for 15 Nanosilver-Enabled Consumer Products: Investigating Hotspots and Patterns of Contribution, Environmental Science & Technology 51(12), 2017, 7148-7158

M. Saha, M.J. Eckelman
A Geospatial Assessment of Ground Level and Rooftop Urban Agriculture Potential in Boston, USA, Landscape and Urban Planning 165, 2017, 130-141

M.J. Eckelman, J.S. Sherman
Environmental Impacts of the US Healthcare System and Effects on Public Health, PLoS ONE, 11(6), 2016, e0157014

SELECTED RESEARCH PROJECTS

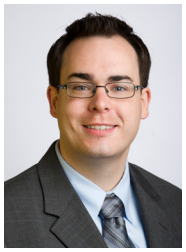
Air Climate and Energy Center—SEARCH: Solutions for Energy AiR Climate and Health
Senior Personnel, Environmental Protection Agency

CAREER: Building Chemical Synthesis Networks for Life Cycle Hazard Modeling
Principal Investigator, National Science Foundation

Ethics Education in Life Cycle Design, Engineering, and Management
Principal Investigator, National Science Foundation

RSB: A Decision and Design Framework for Multi-Hazard Resilient and Sustainable Buildings
Co-Principal Investigator, National Science Foundation

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

Honors and awards: ACS PMSE Young Investigator Award, Nano Research Young Innovator Award, Early Career Alumni Award

SELECTED PUBLICATIONS

S. Emam, A. Adedoyin, X. Geng, M. Zaeimbashi, J. Adams, A.K. Ekenseair, E. Podlaha-Murphy, N.X. Sun
A Molecularly- Imprinted Electrochemical Gas Sensor to Sense Butylated Hydroxytoluene in Air, Journal of Sensors, 2018, 2018, 9 pages

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

D.M. Schwartz, M.O. Pehlivaner Kara, A.M. Goldstein, H.C. Ott, A.K. Ekenseair
Spray Delivery of Intestinal Organoids to Reconstitute Epithelium on Decellularized Native Extracellular Matrix, Tissue Engineering Part C: Methods, 23, 2017, 565-573

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

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

SELECTED RESEARCH PROJECTS

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

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

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

HICHAM FENNIRI

Professor, Chemical Engineering

PhD, Université Louis Pasteur, 1994
che.neu.edu/people/fenniri-hicham

Scholarship focus: nanomaterials science and engineering, supramolecular chemistry, theranostics, targeted drug delivery, sensors

Honors and awards: National Science Foundation CAREER Award, Cottrell Teacher-Scholar Award, Canada Foundation for Innovation Leaders Award, Xerox UAC Award, 3M Young Investigator Award, Visiting Professor at: College de France, Université de Strasbourg, Regensburg University, Taiwan National Normal University, and University of Colorado

SELECTED PUBLICATIONS

L.M. Puzan, B. Legesse, R.A. Koppes, H. Fenniri, A.N. Koppes
Bioactive Organic Rosette Nanotubes Support Sensory Neurite Outgrowth, ACS Biomat. Sci. Eng., 4, 2018, 1630-1640

A.R. Spencer, A. Primbetova, A.N. Koppesa, R.A. Koppes, h. Fenniri, N. Annabi
Electroconductive Gelatin Methacryloyl-PEDOT:PSS Composite Hydrogels: Design, Synthesis, and Properties, ACS Biomat. Sci. Eng.,4, 2018, 1558-1567

E. Keyvani-Someh, Z. Hennighausen, W. Lee, R.C.K. Igwe, M.E. Kramdi, S. Kar, H. Fenniri
Organic Photovoltaics with Stacked Graphene Anodes, ACS Appl. Energy Mater. 1, 2018, 17-21

J.E. Fitzgerald, H. Fenniri
Cutting Edge Methods for Non-Invasive Disease Diagnosis Using E-Tongue and E-Nose Devices, Biosensors, 7(59), 2017, 1-39

H. Fenniri, K.W. Temburnikar, R.S. Johnson
Rosettes: Self-Assembled Supermacrocycles, In: Atwood, J. L. (ed.) Comprehensive Supramolecular Chemistry II, 6, 2017, 83-114

J.E. Fitzgerald, T.H.E. Bui, N.M. Simon, H. Fenniri
Artificial Nose Tehcnology: Status and Prospects in Diagnostics, Trends in Biotechnology, 35, 2016, 33-42

J.E. Fitzgerald, H. Fenniri
Biomimetic Cross-Reactive Sensor Arrays: Prospects in Diagnostics, RSC Advances, 6, 2016, 80468-80484

J.E. Fitzgerald, J. Zhu, J.-P. Bravo-Vasquez, H. Fenniri
Cross-Reactive, Self-Encoded Polymer Film Arrays for Sensor Applications, RSC Advances, 6, 2016, 82616-82624

SELECTED RESEARCH PROJECTS

RNA Nanoparticles as Carriers of Therapeutic miRNAs for the Treatment of Inflammation and Atherosclerotic Plaques
Principal Investigator, Kostas

JOSHUA GALLAWAY

DiPietro Assistant Professor, Chemical Engineering

PhD, Columbia University, 2007
che.neu.edu/people/gallaway-joshua

Scholarship focus: electrochemical engineering, batteries and energy storage, energy sustainability

SELECTED PUBLICATIONS

G.G. Yadav, J.W. Gallaway, D.E. Turney, M. Nyce, J. Huang, X. Wei, S. Banerjee
Regenerable Cu-Intercalated MnO_2 Layered Cathode for Highly Cyclable Energy Dense Batteries, Nature Communications, 8, 2017, 14424

J.W. Gallaway, B.J. Hertzberg, Z. Zhong, M. Croft, D.E. Turney, G.G. Yadav, D.A. Steingart, C.K. Erdonmez, S. Banerjee
Operando Identification of the Point of $[Mn_2]O_4$ Spinel Formation During γ-MnO_2 Discharge Within Batteries, Journal of Power Sources, 321, 2016, 135-142

J.W. Gallaway, M. Menard, B. Hertzberg, Z. Zhong, M. Croft, L.A. Sviridov, D.E. Turney, S. Banerjee, D.A. Steingart, C.K. Erdonmez
Hetaerolite Profiles in Alkaline Batteries Measured by High Energy EDXRD, Journal of the Electrochemical Society, 162(1), 2015, A162-A168

N.D. Ingale, J.W. Gallaway, M. Nyce, A. Couzis, S. Banerjee
Rechargeability and Economic Aspects of Alkaline Zinc-Manganese Dioxide Cells for Electrical Storage and Load Leveling, Journal of Power Sources, 276, 2015, 7-18

J.W. Gallaway, A.M. Gaikwad, B. Hertzberg, C.K. Erdonmez, Y.K. Chen-Wiegart, L.A. Sviridov, K. Evans-Lutterodt, J. Wang, S. Banerjee, D.A. Steingart
An In Situ Synchrotron Study of Zinc Anode Planarization by a Bismuth Additive, Journal of the Electrochemical Society, 161(3), 2014, A275-A284

D.E. Turney, M. Shmukler, K. Galloway, M. Klein, Y. Ito, T.Z. Sholklapper, J.W. Gallaway, M. Nyce, S. Banerjee
Development and Testing of an Economic Grid-Scale Flow-Assisted Zinc/Nickel-Hydroxide Alkaline Battery, Journal of Power Sources, 264, 2014, 49-58

J.W. Gallaway, C.K. Erdonmez, Z. Zhong, M. Croft, L.A. Sviridov, T.Z. Sholklapper, D.E. Turney, S. Banerjee, D.A. Steingart
Real-time Materials Evolution Visualized Within Intact Cycling Alkaline Batteries, Journal of Materials Chemistry A, 2(8), 2014, 2757-2764

EDGAR GOLUCH

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

PhD, University of Illinois, 2007
che.neu.edu/people/goluch-edgar

Scholarship focus: detection of biomolecules at the nanoscale, specifically inside micro and nanofluidic channels. This is applied to a broad range of scientific fields including: biophysics, micro and systems biology, ecology, environmental sensing, and analytical instrumentation

SELECTED PUBLICATIONS

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

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

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

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

E.D. Goluch
Microbial Identification Using Electrochemical Detection of Metabolites, Trends in Biotechnology, 35(12), 2017, 1125-1128

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

Device and Method for High Throughput Bacterial Isolation

N. Tandogan, P.N. Abadian, B. Huo, E.D. Goluch
Characterization of Bacterial Adhesion and Biofilm Formation, Antimicrobial Coatings and Modifications on Medical Devices, 2017, 67-95

SELECTED RESEARCH PROJECTS

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

ANDREW GOULDSTONE

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

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

Scholarship focus: biomechanics; material science; engineering mechanics

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

SELECTED PUBLICATIONS

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

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

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

B. Choi, Y. Wu, S. Sampath, A. Gouldstone
Modified Indentation Techniques to Probe Inelasticity in Ni-5%Al Coatings from Different Processes, Journal of Thermal Spray Technology, 18(1), 2009, 65-74

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

SELECTED RESEARCH PROJECTS

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

VINCENT G. HARRIS

University Distinguished Professor, William Lincoln Smith Professor, Electrical and Computer Engineering; affiliated faculty, Chemical Engineering

PhD, Northeastern University, 1990
ece.neu.edu/people/harris-vincent

Scholarship focus: Design and processing of advanced materials with emphasis on high frequency device applications for radar, communication, and sensing

Honors and awards: Fellow of Fulbright, American Association for the Advancement of Science, Institute of Electrical and Electronics Engineers, American Physical Society, and Institute of Engineering and Technology (UK); The Materials, Minerals, and Metals Society 2016 Distinguished Scientist Award; Chinese Academy of Sciences' Lee Hsun Lecture Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

P. Andalib, Y. Chen, V.G. Harris
Concurrent Core Loss Suppression and High Permeability by Introduction of Highly Insulating Intergranular Magnetic Inclusions to MnZn Ferrite, IEEE Magnetics Letters, 9, 2018

V.G. Harris, V. Šepelák
Mechanochemically Processed Zinc Ferrite Nanoparticles: Evolution of Structure and Impact of Induced Cation Inversion, Journal of Magnetism and Magnetic Materials, 465, 2018, 603-610

Z. Zheng, Q. Feng, Y. Chen, V.G. Harris
High-Frequency Magnetic Properties of Ca-Substituted Co 2 Z and Co 2 W Barium Hexaferrite Composites, IEEE Transactions on Magnetics, 54 (6), 2018, 1-6

G. Li, Y. Chen, V.G. Harris
Particle-Size Distribution Modified Effective Medium Theory and Validation by Magneto-Dielectric Co-Ti Substituted BaM Ferrite Composites, Journal of Magnetism and Magnetic Materials, 453, 2018, 44-47

J. Liu, Q. Jin, S. Wang, P. Yu, C. Zhang, C. Luckhardt, Z. Su, R. Barua, V.G. Harris
An Insight into Formation Mechanism of Rapid Chemical Co-Precipitation for Synthesizing Yttrium Iron Garnet Nano Powders, Materials Chemistry and Physics, 208, 2018, 169-176

SELECTED RESEARCH PROJECTS

MAgnetics on GaN for Next GEneration T/R Systems (MAGNETS)
Principal Investigator, DARPA, Subaward from Qorvo

Accelerated Development of Magnetodielectrics Having Equivalent Permeability and Permittivity for RF Applications
Principal Investigator, Rogers Corp

Magnetodielectric Heterostructures and Composites
Principal Investigator, Rogers Corp

Nonlinear Properties of Ferrite Materials
Principal Investigator, Raytheon

FRANCISCO HUNG

Associate Professor, Chemical Engineering

PhD, North Carolina State University, 2005
che.neu.edu/people/hung-francisco

Scholarship focus: molecular modeling and theory of mixtures and interfacial systems relevant to nano/bio-materials, separations, energy and the environment

Honors and awards: NSF CAREER Award; ORAU Ralph E. Powe Award; R. H. Sioui Award for Excellence in Teaching

SELECTED PUBLICATIONS

Y. Shen, F. R. Hung
A Molecular Simulation Study of Carbon Dioxide Uptake by a Deep Eutectic Solvent Confined in Slit Nanopores, Journal of Physical Chemistry C, 121(44), 2017, 24562-24575

R. Abedin, S. Heidarian, J. C. Flake, F. R. Hung
Computational Evaluation of Mixtures of Hydrofluorocarbons and Deep Eutectic Solvents for Absorption Refrigeration Systems, Langmuir, 33(42), 2017, 11611-11625

Z. Zhang, P. Avij, M. J. Perkins, T. P. Liyana-Arachchi, J. A. Field, K. T. Valsaraj, F. R. Hung
Combined Experimental and Molecular Simulation Investigation of the Individual Effects of Corexit Surfactants on the Aerosolization of Oil Spill Matter, Journal of Physical Chemistry A, 120(30), 2016, 6048-6058

X. He, Y. Shen, F. R. Hung, E. E. Santiso
Heterogeneous Nucleation from a Supercooled Ionic Liquid on a Carbon Surface, Journal of Chemical Physics, 145(21), 2016, 211919

X. He, Y. Shen, F. R. Hung, E. E. Santiso
Molecular Simulation of Homogeneous Nucleation of Crystals of an Ionic Liquid from the Melt, Journal of Chemical Physics, 143(12), 2015, 124506

Y. Shen, X. He, F. R. Hung
Structural and Dynamical Properties of a Deep Eutectic Solvent Confined Inside a Slit Pore, Journal of Physical Chemistry C, 119(43), 2015, 24489-24500

N. N. Rajput, J. Monk, F. R. Hung
Ionic Liquids Confined in a Realistic Activated Carbon Model: A Molecular Simulation Study, Journal of Physical Chemistry C, 118(3), 2014, 1540-1553

SELECTED RESEARCH PROJECTS

Understanding Novel Shale Hydration Inhibitors for Water-Based Drilling Fluids Using Molecular Simulation
Principal Investigator, American Chemical Society Petroleum Research Fund

CAREER: Molecular Modeling of Solidification of Nanoconfined Ionic Liquids
Principal Investigator, National Science Foundation

ABIGAIL KOPPES

Assistant Professor, Chemical Engineering, Affiliated Faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2013
che.neu.edu/people/koppes-abigail

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

A.N. Koppes, K.W. Keating, A.L. McGregor, R.A. Koppes, et al.
Robust Neurite Extension Following Exogenous Electrical Stimulation within Single Walled Carbon Nanotube-Composite Hydrogels, Acta Biomaterialia, 39, 2016, 34-43

SELECTED RESEARCH PROJECTS

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

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

Engineering a Humanized Gut-Enteric-Axis
Principal Investigator, National Institute of Health

RYAN KOPPES

Assistant Professor, Chemical Engineering

PhD, Rensselaer Polytechnic Institute, 2013
che.neu.edu/people/koppes-ryan

Scholarship focus: neural interface technology; tissue engineering; musculoskeletal biomechanics

SELECTED PUBLICATIONS

K. Mubyana, R.A. Koppes, K.L. Lee, J.A. Cooper, D.T. Corr
The Influence of Specimen Thickness and Alignment on the Material and Failure Properties of Electrospun Polycaprolactone Nanofiber Mats, J. Biomedical Materials Research A, 107(11), 2016, 2794-2800

A.N. Koppes, K.W. Keating, A.L. McGregor, R.A. Koppes, K.R. Kearns, A.M. Ziemba, C.A. McKay, J.M. Zuidema, C.J. Rivet, R.J. Gilbert, D.M. Thompson
Robust Neurite Extension Following Exogenous Electrical Stimulation Within Single Walled Carbon Nanotube-Composite Hydrogels, Acta Biomaterialia, 39, 2016, 34-43

R.A. Koppes, S. Park, T. Hood, X. Jia, N. Abdolrahim Poorheravi, A.H. Achyuta, Y. Fink, P. Anikeeva
Thermally Drawn Fibers as Nerve Guidance Scaffolds, Biomaterials, 81, 2016, 27-35

A. Canales, X. Jia, U.P. Froriep, R.A. Koppes, C.M. Tringides, J. Selvidge, C. Lu, C. Hou, L. Wei, Y. Fink, P. Anikeeva
Multimodality Fibers for In-Vivo Simultaneous Optical, Electrical and Chemical Communications with Neural Circuits, Nature Biotechnology, 33(3), 2015, 277-284

R.A. Koppes, D.M. Swank, D.T. Corr
A New Experimental Model for Force Enhancement: Steady-State and Transient Observations in the *Drosophila* Jump Muscle, AJP-Cell Physiology, 2015

S. Park, R.A. Koppes, U.P. Froriep, X. Jia, A. Harapanahalli, B. McLaughlin, P. Anikeeva
Optogenetic Control of Nerve Growth, Scientific Reports, 5(9669), 2015

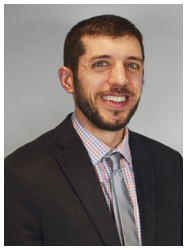
P. Anikeeva, R.A. Koppes
Restoring the Sense of Touch, Science, 350(6258), 2015, 274-275

R. Koppes, D. Swank, et al.
A New Experimental Model to Study Force Depression: The Drosophila Jump Muscle, Journal of Applied Physiology, 166(12), 2014, 1543-1550

C. Lu, U.P. Froriep, R. Koppes, et al.
Polymer Fiber Probes Enable Optical Control of Spinal Cord and Muscle Function in Vivo, Advanced Functional Materials, 24(42), 2014, 6594-6600 *Cover Art

N. Schiele, R. Koppes, D. Chrisey, D.T. Corr
Engineering Cellular Fibers for Musculoskeletal Soft Tissues Using Directed Self-Assembly, Tissue Engineering: Part A, 19(9-10), 2013, 1223-1232

LUCAS LANDHERR



Associate Teaching Professor, Chemical Engineering

PhD, Cornell University, 2010
che.neu.edu/people/landherr-lucas

Scholarship focus: development of comics, visualization, and modules for novel STEM teaching tools for K-12, undergraduate, and adult education

Honors and awards: AIChE 35 Under 35 Award; Fostering Engineering Innovation in Education Award; ASEE Northeast Section 2016 Outstanding Teacher Award; Omega Chi Epsilon Faculty Member of the Year Award ('15, '16, '18)

SELECTED PUBLICATIONS

L. Landherr
Crash Course: Engineering, Serving as Engineering Consultant / Curriculum Writer, Youtube Series in Affiliation with PBS Digital, 2018

L. Landherr, M. Lubchansky
Drawn to Engineering: Answering Questions, Chemical Engineering Education, 52(1), 2018, 31-32

L. Landherr, M. Keszler
Drawn to Engineering: Diversity Statement, Chemical Engineering Education, 52(2), 2018, 115-116

L. Landherr, M. Keszler
Drawn to Engineering: Skeleton Notes, Chemical Engineering Education, 52(3), 2018, 221-222

L. Landherr, M. Keszler
Drawn to Engineering: Presenting Audiences, Chemical Engineering Education, 51(4), 2017, 163-164

L. Landherr, M. Keszler
Drawn to Engineering: Humor in Exams, Chemical Engineering Education, 51(3), 2017, 126-127

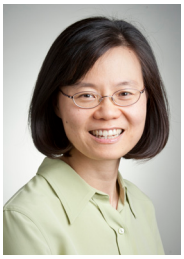
L. Landherr, M. Lubchansky
Drawn to Engineering: Problem-Solvers, Chemical Engineering Education, 51(2), 2017, 62-63

L. Landherr, C. Pfluger, R.A. Koppes
The River Project: an Open-Ended Engineering Design Challenge from Bench-Scale to Pilot-Scale, Proceedings of the ASEE Annual Conference, 2018

M. Vigeant, D.L. Silverstein, K.D. Dahm, L.P. Ford, J. Cole, L. Landherr
How We Teach: Unit Operations Laboratory, Proceedings of the ASEE Annual Conference, 2018

L. Landherr
The Production of Science Comics To Improve Undergraduate Engineering, Proceedings of the ASEE Northeast Section Conference, 2016

CAROLYN LEE-PARSONS



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

PhD, Cornell University, 1995
che.neu.edu/people/lee-parsons-carolyn

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

Honors and awards: National Science Foundation CAREER Award; College of Engineering Outstanding Teaching Award

SELECTED PUBLICATIONS

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

LAURA H. LEWIS

Distinguished University and Cabot Professor of Chemical Engineering; jointly appointed, Mechanical and Industrial Engineering; George J. Kostas Research Institute for Homeland Security

PhD, University of Texas, 1993
che.neu.edu/people/lewis-laura

Scholarship focus: structure-property relationships in magnetofunctional materials for energy transformations including advanced permanent magnet materials and magnetocaloric materials; strategic materials for technological application

Honors and awards: Fulbright Scholar (2018, 2019); Fellow, American Physical Society; Northeastern University Excellence in Research and Creative Activity Award; Chair, Technical Committee of the IEEE Magnetics Society; Conference Editor, IEEE Transactions on Magnetics, NATO Technical Team Member of AVT-231 on "Scarcity of Rare Earth Materials for Electrical Power Systems," appointed by U.S. National Coordinator

SELECTED PUBLICATIONS

B.D. Plouffe, S.K. Murthy, L.H. Lewis
Fundamentals and Application of Magnetic Particles in Cell Isolation and Enrichment: A Review, Reports on Progress in Physics, 78(1), 2015, 016601

L.H. Lewis, F.E. Pinkerton, et al.
De Magnete et Meteorite: Cosmically-Motivated Materials, IEEE Magnetics Letters, 5, 2014

R. McCallum, L.H. Lewis, R. Skomski, M.J. Kramer, I.E. Anderson
Practical Aspects of Modern and Future Permanent Magnets, Annual Review of Materials Research, 44(1), 2014, 451-477

L.H. Lewis, F. Jiménez-Villacorta
Perspectives on Permanent Magnetic Materials for Energy Conversion and Power Generation, Metallurgical and Materials Transactions A, 44(1), 2013, 2-20

G. Srajer, L.H. Lewis, S.D. Bader, et al.
Advances in Nanomagnetism via X-Ray Techniques, Review Article, Journal of Magnetism and Magnetic Materials, 307(1), 2006, 1-31

SELECTED RESEARCH PROJECTS

Promotion and Control of $L1_0$ FeNi Phase Formation for Permanent Magnet Applications
Principal Investigator, Rogers Corporation

Program in Engineered Mat'ls and Materials Design of Engineered Mat'ls
Co-Principal Investigator, Army Research Office

Sustainable Permanent Magnets For Advanced Applications
Principal Investigator, National Science Foundation

Rapid Assessment oF AlT_2X_2 (T = Fe, Co, Ni, X = B, C) Layered Materials for Sustainable Magnetocaloric Applications
Principal Investigator, Department of Energy

STEVE LUSTIG

Associate Professor, Chemical Engineering

PhD, Purdue University, 1989
che.neu.edu/people/lustig-steve

Scholarship focus: design and manipulation of molecular/materials chemistry and structure for new property discovery, new functionality and technology development by combining theoretical and experimental methods; high performance computing, quantum chemistry, statistical mechanics, polymer physics, materials and biomolecular engineering

Honors and awards: American Institute of Chemical Engineers Industrial Research and Development Institute Award; DuPont Central Research & Development Accomplishment Award (9 awards); DuPont TechCon Award; DuPont Materials Science and Engineering Accomplishment Award (3 awards); Phi Lambda Upsilon; Sigma Xi; Plastics Institute of America National Fellowship; Purdue University Fellowship

SELECTED PUBLICATIONS

M.B. Shiflett, B.A. Elliott, S.R. Lustig, S. Sabesan, M.S. Kelkar, A. Yokozeki
Phase Behavior of CO2 in Room-Temperature Ionic Liquid 1-Ethyl-3-Ethylimidazolium Acetate, Chem Phys Chem, 13, 2012, 1806-1817

R.H. French, V.A. Parsegian, R. Podgornik, R.F. Rajter, A. Jagota, J. Luo, D. Asthagiri, M.K. Chaudhury, Y.M. Chiang, S. Granick, S. Kalinin, M. Kardar, R. Kjellander, D.C. Langreth, J. Lewis, S. Lustig, et al.
Long Range Interactions in Nanoscale Science, Reviews of Modern Physics, 82(2), 2010

J.S. Meth, S.R. Lustig
Polymer Interphase Structure Near Nanoscale Inclusions: Comparison Between Random Walk Theory and Experiment, Polymer, 51, 2010, 4259-4266

C. Gu, S. Lustig, C. Jackson, B.L. Trout
Design of Surface Active Soluble Peptide Molecules at the Air/Water Interface, Journal of Physical Chemistry B, 112, 2008, 2970-2980

S.R. Lustig, A. Jagota, C. Khripin, M. Zheng
Theory of Structure-Based Carbon Nanotube Separations by Ion-Exchange Chromatography of DNA/CNT Hybrids, Journal of Physical Chemistry B, 109, 2005, 2559-2566

S.R. Lustig, E.D. Boyes, R.H. French, T.D. Gierke, et al.
Lithographically Cut Single-Walled Carbon Nanotubes: Controlling Length Distribution and Introducing End-group Functionality, Nano Letters, 3, 2003, 1007-1012

S. Wang, E.S. Humphreys, S.Y. Chung, D.F. Delduco, S.R. Lustig, H. Wang, K.N. Parker, N.W. Rizzo, S. Subramoney, Y.M. Chiang
Peptides with Selective Affinity for Carbon Nanotubes, Nature Materials, 2, 2003, 196-200

GREGORY MILLER

Associate Professor, Center for Drug Discovery; Associate Professor, Pharmaceutical Sciences; affiliated faculty, Chemical Engineering

PhD, Mount Sinai School of Medicine, New York, 1986
che.neu.edu/people/miller-gregory

Scholarship focus: addiction sciences, neuropsychiatric disorders

SELECTED PUBLICATIONS

D.K. Grandy, G.M. Miller, J.X. Li,
"TAARgeting Addiction" - The Alamo Bears Witness to Another Revolution: An Overview of the Plenary Symposium of the 2015 Behavior, Biology and Chemistry Conference, Drug and Alchohol Dependence, 159, 2016, 9-16

L.J. Lynch, K.A. Sullivan, E.J. Vallender, J.K. Rowlett, D.M. Platt, G.M Miller
Trace Aamine Associated Receptor 1 Modulates Behavioral Effects of Ethanol, Substance Abuse: Research and Treatment, 7, 2013, 117-126

M.W. Panas, Z. Xie, H.N. Panas, M.C. Hoener, E.J. Vallender, G.M. Miller
Trace Amine Associated Receptor 1 Signaling in Activated Lymphocytes, Journal of Neuroimmune Pharmacology, 7(4), 2012, 866-876

Z. Xie, G.M. Miller
A Receptor Mechanism for Methamphetamine Action in Dopamine Transporter Regulation in Brain, Journal of Pharmacology and Experimental Therapeutics, 330(1), 2009, 316-325

Z. Xie, G.M. Miller
Beta-phenylethylamine Alters Monoamine Transporter Function via Trace Amine Associated Receptor 1: Implication for Modulatory Roles of Trace Amines in Brain, Jounral of Pharmacology and Experimental Therapeutics, 325(2), 2008, 617-628

SANJEEV MUKERJEE

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

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

Scholarship focus: physical/materials chemistry

SELECTED PUBLICATIONS

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

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

SHASHI MURTHY

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

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

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

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

SELECTED PUBLICATIONS

A. Kozbial, L. Bhandary, B.B. Collier, C.S. Eickhoff, D.F. Hoft, S.K. Murthy
Automated Generation of Immature Dendritic Cells in a Single Use System, Journal of Immunological Methods 2018, 457, 53-65

H. Sallmon, A. Hatch, S.K. Murthy, B.D. Plouffe, G. Hansmann
Circulating Endothelial Cell Quantification by Microfluidics Chip in Pulmonary Arterial Hypertension, American Journal of Respiratory Cell and Molecular Biology 2017, 56, 680-682

T. Narahari, D. Dendukuri, and S.K. Murthy
Electrically-Actuated Valves for Woven Fabric Lateral Flow Devices, Analytical Chemistry 2017, 89, 4671-4679

D.I. Walsh, D.S. Kong, S.K. Murthy, P.A. Carr
Enabling Microfluidics: From Clean Rooms to Makerspaces," Trends in Biotechnology 2017, 35, 383-392.

B.D. Plouffe and S.K. Murthy
Fluorescence-Based Lateral Flow Assays for Rapid Oral Fluid Roadside Detection of Cannabis Use, Electrophoresis 2017, 38, 501-5016

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

SELECTED RESEARCH PROJECTS

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

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

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

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

COURTNEY PFLUGER

Assistant Teaching Professor, Chemical Engineering

PhD, Northeastern University, 2011
che.neu.edu/people/pfluger-courtney

Scholarship focus: engineering education, globalization in the classroom and international educational experiences, sustainable energy and clean water technologies

SELECTED PUBLICATIONS

C. Pfluger, R. Koppes, L. Landherr
The River Project: an Open-Ended Engineering Design Challenge from Bench-Scale to Pilot-Scale, American Society for Engineering Education Annual Meeting, 2017

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

S. Freeman, D. Goldthwaite, J. Hertz, B.K. Jaeger-Helton, J. Love, B. Maheswaran, C. Pfluger, K. Schulte-Graham, M. Sivak, C. Variawa, R. Whalen
Cranking Up Cornerstone: Lesson Learned from Implementing a Pilot with First-Year Engineering Students, American Society for Engineering Education Annual Meeting, New Orleans, LA, 2016

C. Pfluger
Maximizing the Global Experience: Lessons Learned from Running a Month Long Faculty-Led Program to Brazil, American Society for Engineering Education Annual Meeting, Seattle, WA, 2015

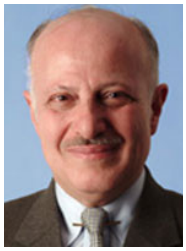
S. Freeman, D. Goldthwaite, B.K. Jaeger-Helton, C. Pfluger, K. Schulte-Graham, R. Whalen
First-Year Student Assumptions on Diversity in Engineering Education, American Society for Engineering Education Annual Meeting, Seattle, WA, 2015

C. Pfluger, K. Schulte-Graham
Introducing Sustainability into Engineering Design: A First-Year Course, American Society for Engineering Education Annual Meeting, Indianapolis, IN, 2014

B. McMahon, C.A. Pfluger, B. Sun, K. Ziemer, D. Burkey, R. Carrier
Photoinitiated Chemical Vapor Deposition Of Cytocompatible Poly(2-Hydroxyethyl Methacrylate) Films, Journal of Biomedical Materials Research Part A, 201(7), 2014

C.A. Pfluger, D.D. Burkey, L. Wang, B. Sun, K. Ziemer, R. Carrier
Biocompatibility of Plasma Enhanced Chemical Vapor Deposited Poly(2-hydroxyethyl methacrylate) Films for Biomimetic Replication of the Intestinal Basement Membrane, Biomacromolecules, 11(6), 2010, 1579-1584

BEHROOZ SATVAT



Associate Teaching Professor, Chemical Engineering

ScD, MIT 1980
che.neu.edu/people/satvat-behrooz

Scholarship focus: engineering education, development of new applied mathematics courses for chemical engineering students. Mentors graduate and undergraduate students. Research in the field of separation technologies, thermodynamics and reaction engineering.

Honors and awards: Dr. Behrooz (Barry) Satvat has over forty years of academic and industrial experience. In 2007, he developed and launched the Graduate Co-op Program in the College of Engineering and served as the Director of Graduate Cooperative Education for the College of Engineering. Previously, Dr. Satvat served as the Director of Undergraduate Cooperative Education for the College of Engineering and the Bouvé College of Health Sciences and was responsible for managing all activities of the Cooperative Education Engineering and Bouvé Groups. He also held an appointment as a Senior Lecturer in Northeastern's Department of Chemical Engineering, where he taught undergraduate-level and graduate-level courses. Dr. Satvat is the recipient of several Outstanding Teaching and Co-op Awards at Northeastern University.

Dr. Satvat joined Northeastern University as a Cooperative Education Faculty and a Senior Lecturer of Chemical Engineering in January of 1996. Prior to joining Northeastern University, he was a senior technical manager at Millipore Corporation, spearheading multi-million-dollar projects in the private sector. In the late 1980s, Dr. Satvat served as a Professor of Chemical Engineering at the Cooper Union for the Advancement of Science and Art in New York City. He has previously held senior positions in research, engineering, and management both at W.R. Grace and Company in Massachusetts and at Union Camp Corporation in New Jersey. Dr. Satvat has designed numerous processes from conception to completion and has developed many products that yielded increased market share and achieved market leadership for various companies.

While working in industry, Dr. Satvat also served as an adjunct professor at various academic institutions and as an independent consultant across several different branches of chemical engineering. Dr. Satvat's research interests include separation technology, transport processes, chemical reaction engineering, thermodynamics, biomedical engineering, and process engineering design. He is a licensed professional engineer and a member of the National Society of Professional Engineers

MRITYUNJAY SINGH

Affiliated faculty, Chemical Engineering

PhD, Indian Institute of Technology, 1983
che.neu.edu/people/singh-mrityunjay

Scholarship focus: aerospace materials, alternative and renewable energy materials and systems, energy storage and thermal management, bioinspired materials, additive manufacturing, advanced ceramics and composites

Honors and awards: Fellow, American Ceramic Society; Fellow, ASM International; Fellow, American Association for Advancement of Science; Fellow, National Academy of Inventors; Honorary Fellow, European Ceramic Society; W.D. Kingery Award, American Ceramic Society; Honorary Doctorate, Slovak Academy of Sciences; ACerS Global Ambassador Award; JFCA 30th Anniversary Special Award; International Keramos Award

SELECTED PUBLICATIONS

Meng Wang, Yakup Gönüllü, M. Pyeon, Zhidan Diao, Lisa Czympiel, M. Singh
Trace Amount of Platinum Supported on Carbonized Biomorphic Wood for Efficient Electrochemical Hydrogen Evolution in Alkaline Condition, Chemistry Select, 3(7), 2018, 2140-2143

J.R. Rico, J.M. Fernandez, and M. Singh
Biomorphic Ceramics from Wood Derived Precursors, International Materials Review, 62, 2017, 465-485

M.C. Vera, J. Martínez-Fernandez, M. Singh, J. Ramírez-Rico
High Temperature Compressive Strength and Creep Behavior of Si-TI-C-O Fiber-Bonded Ceramics, Journal of the European Ceramic Society, 37, 2017, 4442- 4448

M. Singh, J. Ramírez-Rico, J. Martínez-Fernandez, D. Zhu
Thermal Conductivity of Environmentally Conscious Biomorphic Silicon Carbide Ceramics by the Laser Steady-State Heat Flux Technique, Journal of Material Science, 52(17), 2017, 10038-10046

J. Martínez-Fernandez, R. Asthana, M. Singh, F.M. Varela
Active Metal Brazing of Silicon nitride Ceramics Using a Cu-Based Alloy and Refractory Metal Interlayers, Ceramics International, 42(4), 2016, 5447-5454

T. Kim, D. Singh, M. Singh
Enhancement of Oxidation Resistance of Graphite Foams by PDC-SiC Coating for Concentrated Solar Power Applications, Energy Procedia, 69, 2015, 900-906

M.C. Vera, J. Ramírez-Rico, J. Martinez-Fernandez, M. Singh
Slidng Wear Resistance of Biomorphic SiC Ceramics, International Journal of Refractory Metals and Hard Materials, 49, 2015, 327-333

M.C. Vera, J. Ramírez-Rico, J. Martinez-Fernandez, M. Singh
Sliding Wear Resistance of Sintered SiC-fiber Bonded Ceramics, International Journal of Refractory Metals and Hard Materials, 49, 2015, 232-239

SRINIVAS SRIDHAR

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

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

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

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

SELECTED PUBLICATIONS

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

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

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

SELECTED RESEARCH PROJECTS

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

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

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

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

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

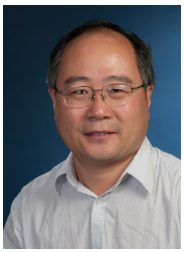
Quantitative Non-Invasive Brain Imaging using Magnetic Nanoparticles
Principal Investigator, National Institutes of Health

Drug-eluting Brachytherapy Implants for Chemo-radiation Therapy
Principal Investigator, National Institutes of Health

Targeted Nanodelivery of PARP Inhibitors for Lung Cancer Therapy
Principal Investigator, American Lung Association

Quantitative Neurovascular Imaging for Drug Abuse Research
Principal Investigator, National Institutes of Health

MING SU



Professor & Associate Chair of International Collaborations, Chemical Engineering

PhD, Northwestern University, 2004
che.neu.edu/people/su-ming

Scholarship focus: phase change nanoparticles, nanomedicines, biomarker detections, nanoparticle-enhanced radiation therapy, heat transfer, covert barcodes, nano enhanced process

Honors and awards: National Science Foundation CAREER Award; National Institute of Health Director's New Innovator Award

SELECTED PUBLICATIONS

S. Hou, W. Zheng, B. Duong, M. Su
All-Optical Decoder for Rapid and Noncontact Readout of Thermal Barcodes, Journal of Physical Chemistry C, 120, 2016, 22110

D. Ning, B. Duong, G. Thomas, Y. Qiao, L. Ma, Q. Wen, M. Su
Mechanical and Morphological Analysis of Cancer Cells on Nanostructured Substrates, Langmuir, 32, 2016, 2718

L. Ma, Y. Qiao, R. Jones, N. Singh, M. Su
Single Cell HaloChip Assay on Paper for Personalized Medicine, Analytical Bioanalytical Chemistry, 408 2016, 7753

C. Wang, A. Sun, Y. Qiao, P. Zhang, L. Ma, M. Su
Cationic Surface Modification of Gold Nanoparticles for Enhanced Cell Uptake and Radio-Sensitization, Journal of Materials Chemistry B, 3, 2015, 7372

M. Wang, B. Duong, H. Fenniri, M. Su
Nanoparticle-Based Barcodes, Nanoscale, 7, 2015, 11240

P. Zhang, Y. Qiao, C. Wang, L. Ma, M. Su
Enhanced Radiation Therapy with Internalized Gold Nanoparticles, Nanoscale, 6, 2014, 10095

Y. Qiao, P. Zhang, C. Wang, L. Ma, M. Su
Reducing X-Ray Induced Oxidative Damages in Fibroblasts with Graphene Oxide, Nanomaterials, 4, 2014, 522

B. Duong, H. Liu, L. Ma, M. Su
Covert Thermal Barcodes Based on Phase Change Nanoparticles, Nature Scientific Reports, 4, 2014, 5170

SELECTED RESEARCH PROJECTS

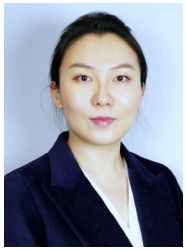
Adsorption Cooling With Nanoporous Monolithic Adsorbents
Principal Investigator, National Science Foundation

CAREER: Biosensing in Thermal Space
Principal Investigator, National Science Foundation

Enhanced Radiation Therap with Nanoscale Frequency Modulator
Principal Investigator, National Institutes of Health

Phase Change Nanoparticles as Thermally Readable Taggants
Principal Investigator, National Institute of Justice

LINLIN SUN



Research Assistant Professor, Chemical Engineering

PhD, Northeastern University, 2014
che.neu.edu/people/sun-linlin

Scholarship focus: self-assembling nanomaterials in the field of tissue engineering, drug delivery and anti-bacterial therapy for bone, cartilage, skin, and eye applications

SELECTED PUBLICATIONS

F. Chai, L. Sun, Y. Ding, X.Liu, Y. Zhang, T.J. Webster, C. Zheng
A Solid Self-Nanoemulsifying System of the BCS Class IIb Drug Dabigatran Etexilate to Improve Oral Bioavailability, Nanomedicine,11(14), 2016, 1801-1816

L. Sun, C. Zheng, T.J. Webster
Self-Assembled Peptide Nanomaterials for Biomedical Applications: Promises and Pitfalls, International Journal of Nanomedicine, 2017(12), 2016, 73-86

R. Chang, L. Sun, T.J. Webster
Selective Inhibition of MG-63 Osteosarcoma Cell Proliferation Induced by Curcumin-Loaded Self-Assembled Arginine-Rich-RGD Nanospheres, International Journal of Nanomedicine, 10, 2015, 3351-3365

L. Sun, S. Ni, T.J. Webster
Nanoscale Technologies for Bone Grafting, Bone Graft Substitutes, 2nd edition, Edited by Cato Laurencin, Tao Jiang, ASTM International, 2014 (Book Chapter)

L. Sun, L. Zhang, U.D. Hemraz, H. Fenniri, T.J. Webster
Bioactive Rosette Nanotube–Hydroxyapatite Nanocomposites Improve Osteoblast Functions, Tissue Engineering Part A, 18(17-18), 2012, 1741-1750

VLADIMIR TORCHILIN

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

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

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

Honors and awards: Fellow, AIMBE; Fellow, AAPS; Fellow, Controlled Release Society; Member, European Academy of Sciences; Highly Cited Researcher from Thomson Reuters; 2012 Alec Bangham Life Achievement Award; 2013 Journal of Drug Targeting Life Time Achievement Award; 2013 Blaise Pascal Medal in Biomedicine from the European Academy of Sciences

SELECTED PUBLICATIONS

J.R. Upponi, K. Jerajani, D.K. Nagesha, P. Kulkarni, S. Sridhar, C. Ferris, V.P. Torchilin
Polymeric micelles: Theranostic Co-Delivery System for Poorly-Soluble Drugs and Contrast Agents, Biomaterials, 170, 2018, 26-36

A.Jhaveri, P.Deshpande, B.Pattni, V.P. Torchilin
Transferrin-Targeted, Resveratrol-Loaded Liposomes for the Treatment of Glioblastoma, Journal of Controlled Release 277, 2018, 89-101

B.S. Pattni, A. Jhaveri, I. Dutta, J.D. Baleja, A. Degterev, V.P. Torchilin
Targeting Energy Metabolism of Cancer Cells: Combined Administration of NCL-240 and 2-DG, Int J. Pharm., 532, 2017, 149-156

G. Salzano, D.F. Costa, C. Sarisozen, E. Luther, G. Mattheolabakis, P.P. Dhargalkar, V.P. Torchilin
Combination Therapy Targeting Both Cancer Stem-Like Cells and Bulk Tumor Cells for Imporved Efficacy of Breast Cancer Treatment, Cancer Biology Therapy, 17(6), 2016, 698-707

J.R. Upponi, K. Jerajani, D.K. Nagesha, P. Kulkarni, S. Sridhar, T. Wang, B. Narayanaswamy, H. Ren, V.P. Torchilin
Mixed Nanosized Polymeric Micelles as Promoter of Doxorubicin and miRNA-34a Co-Delivery Triggered by Dual Stimuli in Tumor Tissue, Small, 12(35), 2016, 4837-4848

SELECTED RESEARCH PROJECTS

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

Dendrimer-Based Nanomedicines
Principal Investigator, National Institutes of Health

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

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, National Academy of Inventors; 4 FDA approved products; 11 start-up companies; Fellow, Biomaterials Science and Engineering; Fellow, American Institute for Medical and Biological Engineers; Fellow, American Society for Nanomedicine; Fellow, Biomedical Engineering Society; Fellow, Ernst Strungmann Foundation; Wenzhou 580 Elite Scientist Award, China; Zhejiang Province Talent Program; Acta Biomaterialia Silver (under 45) Award; Hsu Chinese Academy of Sciences OuTwi tstanding Lecture Award

SELECTED PUBLICATIONS

J.S. Medeiros, A.M.Oliveira, J.O. de Carvalho, T.J. Webster
Nanohydroxyapatite/Graphene Nanoribbons Nanocomposites Induce in Vitro Osteogenesis and Promote in Vivo Bone Neoformation, ACS Biomaterials Science and Engineering, 4(5), 2018, 1580-1590

Q. Wang, G. Mi, D. Hickey, T.J. Webster
Azithromycin-Loaded Respirable Microparticles for Targeted Pulmonary Delivery for the Treatment of Pneumonia Biomaterials, 160, 2018, 107-123

G. Mi, D. Shi, W. Herchek, T.J. Webster
Self-assembled Arginine-Rich Peptides as Effective Antimicrobial Agents, Journal of Biomedical Materials Research Part A, 105(4), 2017, 1046-1054

B.M. Geilich, I. Gelfat, S. Sridhar, T.J. Webster
Superparamagnetic Iron Oxide-Encapsulating Polymersome Nanocarriers for Biofilm Eradication, Biomaterials, 119, 2017, 78-85

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

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.

RICHARD WEST

Associate Professor and Associate Chair of Graduate Studies, Chemical Engineering

PhD, University of Cambridge, 2009
che.neu.edu/people/west-richard

Scholarship focus: development of detailed microkinetic models for complex reacting systems; automating the discovery and calculation of reaction pathways; heterogeneous catalysis

Honors and awards: National Science Foundation CAREER Award; Dick Sioui Teaching Award; American Chemical Society Doctoral New Investigator

SELECTED PUBLICATIONS

R.H. West, C.F. Goldsmith
The Impact of Roaming Radical Reactions on Combustion Properties of Transportation Fuels, Combustion and Flame, 194, 2018, 387-395

S.K. Sirumalla, M.A. Mayer, K.E. Niemeyer, R.H. West
Assessing Impacts of Discrepancies in Model Parameters on Autoignition Model Performance: A Case Study Using Butanol, Combustion and Flame, 190, 2018, 284-292

P.L. Bhoorasingh, B.L. Slakman, F. Seyedzadeh Khanshan, J. Cain, R.H. West
Automated Transition State Theory Calculations for High-Throughput Kinetics, The Journal of Physical Chemistry A, 121, 2017, 6896-6904

C.F. Goldsmith, R.H. West
Automatic Generation of Microkinetic Mechanisms for Heterogeneous Catalysis, The Journal of Physical Chemistry C, 121(18), 2017, 9970-9981

K. Han, W.H. Green, R.H. West
On-the-fly Pruning for Rate-Based Reaction Mechanism Generation, Computers & Chemical Engineering, 100, 2017, 1-8

F. Seyedzadeh Khanshan, R.H. West
Developing Detailed Kinetic Models of Syngas Production from Bio-Oil Gasification Using Reaction Mechanism Generator (RMG), Fuel, 163, 2016, 25-33

B.L. Slakman, H. Simka, H. Reddy, R.H. West
Extending Reaction Mechanism Generator to Silicon Hydride Chemistry, Industrial & Engineering Chemistry Research, 55(49), 2016, 12507-12515

SELECTED RESEARCH PROJECTS

CAREER: Predictive kinetic modeling of halogenated hydrocarbon combustion.
Principal Investigator, National Science Foundation

Exascale-enabled computational tools for complex chemical systems.
Co-investigator, Department of Energy

Resolving Discrepancies in Detailed Kinetic Models of Combustion via Automated Transition State Theory Calculations
Principal Investigator, National Science Foundation

RONALD WILLEY

Professor and Vice Chair, Chemical Engineering

PhD, University of Massachusetts, Amherst, 1984
che.neu.edu/people/willey-ronald

Scholarship focus: process safety and catalysis (industrial)

Honors and awards: Fellow, American Institute of Chemical Engineers; Norton H. Walton/Russell L. Miller Award in Safety/Loss Prevention, American Institute of Chemical Engineers

SELECTED PUBLICATIONS

R.J. Willey
West Fertilizer Company Fire and Explosion: A Summary of the U.S. Chemical Safety and Hazard Investigation Board Report, Journal of Loss Prevention in the Process Industries, 49, 2017, 132-138

P.R. Amyotte, S. Berger, D.W. Edwards, J.P. Gupta, D.C. Hendershot, F.I. Khan, M.S. Mannan, R.J. Willey
Why Major Accidents are Still Occurring, Current Opinion in Chemical Engineering, 14, 2016, 1-8

J. Murphy, D. Hendershot, S. Berger, A.E. Summers, R.J. Willey
Bhopal Revisited, Process Safety Progress, 33(4), 2014, 310-313

R.J. Willey
Consider the Role of Safety Layers in the Bhopal Disaster, Chemical Engineering Progress, 110(12), 2014, 22-27

R. J. Willey
Layer of Protection Analysis, Procedia Engineering, 84, 2014, 12–22

R. J. Willey
Novel ways to Present Process Safety Concepts, Process Safety Progress, 33(3), 2014, 207-207

R. Willey, J. H.-C. Hsiao, R. E. Sanders, A. Kossoy, C.-M. Shu
A Focus on Fire Fundamentals Including Emergency Response Training at the National Fire Agency in Taiwan, Process Safety Progress, 32(1), 2013, 2-7

R. Willey, J. Murphy
Process Safety Progress, American Institute of Chemical Engineers, 32(3), 2013, 229-229

T.O. Spicer, R. J. Willey, D.A. Crowl, W. Smades
The Safety and Chemical Engineering Education Committee—Broadening the Reach of Chemical Engineering Process Safety Education, Process Safety Progress, 32(2), 2013, 113-118

XINGDONG ZHANG

University Distinguished Professor, Chemical Engineering

BS, Sichuan University, 1960
che.neu.edu/people/zhang-xingdong

Scholarship focus: biomaterials and medical implants for musculoskeletal systems, innovative biomaterials for regeneration medicine, tissue engineering

Honors and awards: President of the International Union of Societies for Biomaterials Science and Engineering (IUSBSE); Honorary President of the Chinese Society for Biomaterials (CSBM); Fellow of the IUSBSE and the American Institute of Medical and Biological Engineering; winner of National Natural Science Award of China; National Science and Technology Progress Award of China; Outstanding Contribution Award of Science and Technology of Sichuan Province; Sharma Award from the Society for Biomaterials and Artificial Organs (India); Hashiguchi Lungi Fund Award (Japan); Outstanding Contribution Award (CSBM); Clemson Award for Applied Research (USA)

SELECTED PUBLICATIONS

Y. Sun, W. Zou, S.Q. Bian, Y.H. Huang, Y.F. Tan, J. Liang, Y.J. Fan, X.D. Zhang
Bioreducible PAA-g-PEG Graft Micelles with High Doxorubicin Loading for Targeted Antitumor Effect Against Mouse Breast Carcinoma, IBiomaterials, 34(28), 2013, 6818-6828

C.F. Tan, Z.H. Sun, Y.L. Hong, Y.Y. Li, X.S. Chen, X.D. Zhang
Reverse-Biomineralization Assembly of Acid-Sensitive Biomimetic Fibers for Hard Tissue Engineering and Drug Delivery, Journal of Materials Chemistry B, 1(30), 2013, 3694-3704

Y. Sun, Y.H. Huan, S.Q. Bian, J. Liang, Y.J. Fan, X.D. Zhang
Reduction-degradable 13 PEG-b-PAA-b-PEG Triblock Copolymer Micelles Incorporated with MTX for Cancer Chemotherapy, Colloids and Surfaces B: Biointerfaces, 112, 2013, 197-203

X.Q. Yang, L.Q. Guo,Y.J Fan, X.D. Zhang
Preparation and Characterization of Macromolecule Cross Linked Collagen Hydrogels for Chondrocyte Delivery, International Journal of Biological Macromolecules, 61, 2013 487-493

J. Wang, H.J Zhang, X.D. Zhu, H.S. Fan, Y.J. Fan, X.D. Zhang
Dynamic Competitive Adsorption of Bone Related Proteins on Calcium Phosphate Ceramic Particles with Different Phase Composition and Microstructure, Journal of Biomedical Materials Research Part B: Applied Biomaterials, 101(6) 2013, 1069-1077

KATHERINE ZIEMER

Professor, Chemical Engineering; Vice Provost for Curriculum

PhD, West Virginia University, 2001
che.neu.edu/people/ziemer-katherine

Scholarship focus: engineering surfaces in order to integrate wide bandgap semiconductors with functional and multi-functional oxides, organic molecules, and/or biomaterials

Honors and awards: Fellow, American Institute of Chemical Engineers; Fellow, College of Engineering Faculty

SELECTED PUBLICATIONS

G.M. Uddin, G. Moeen, K.S. Ziemer, A. Zeid, S. Kamarthi
Process Model-Based Analysis of Highly Crystalline and Chemically Pure Molecular Beam Epitaxy of MgO (111) Nano-Thin Films on 6H-SiC (0001) Substrates, International Journal of Nanomanufacturing, 11(1-2), 2015, 25-45

E. Alpaslan, H. Yazici, N. Golshan, K.S. Ziemer, T.J. Webster
Dextran Coated Cerium Oxide Nanoparticles for Inhibiting Bone Cancer Cell Functions, Biomaterials Science: Processing, Properties and Applications V, Ceramic Transactions, 254, 2015, 187

S. Ni, L. Sun, B. Ercan, L. Lui, K.S. Ziemer, T.J. Webster
A Mechanism for the Enhanced Attachment and Proliferation of Fibroblasts on Anodized 316L Stainless Steel with Nano-Pit Arrays, Journal of Biomedical Materials Research Part B: Applied Biomaterials, 102(6), 2014, 1297-1303

B. Hu, Y. Chen, Z. Su, S. Bennett, L. Burns, G. Uddin, K.S. Ziemer, V.G. Harris
Magnetocrystalline Anisotropy and FMR Linewidth of Zr and Zn-Doped Ba-Hexaferrite Films Grown on MgO (111), IEEE Transactions on Magnetics, 49(7), 2013, 4234-4237

G.M. Uddin, K.S. Ziemer, B. Sun, A. Zeid, S. Kamarthi
Monte Carlo Study of the High Temperature Hydrogen Cleaning Process of 6H-Silicon Carbide for Subsequent Growth of Nano Scale Metal Oxide Films, International Journal of Nanomanufacturing, 9(5-6), 2013, 407-430

V.K. Lazarov, Z. Cai, K. Yoshida, K.H. Zhang, M. Weinert, K.S. Ziemer, P.J. Hasnip
Dynamically Stabilized Growth of Polar Oxides: The Case of MgO (111), Physical Review Letters , 107(5), 2011, 056101

Adedokun Adediji Adedoyin

PhD 2017, Chemical Engineering; Advisor, Adam Ekenseair

DEVELOPMENT OF INJECTABLE, STIMULI-RESPONSIVE BIOMATERIALS AS ACTIVE SCAFFOLDS FOR APPLICATIONS IN ADVANCED DRUG DELIVERY AND OSTEOCHONDRAL TISSUE REGENERATION

Stimuli-responsive hydrogels, capable of exhibiting dramatic changes in swelling behavior, network structure, permeability and mechanical strength in response to changes in their local environment, have emerged as potential candidates as active scaffolds for several tissue engineering applications. Magneto-responsive biomaterials have become a subject of interest in the field of tissue engineering as their physical and structural properties could be manipulated spatiotemporally by varying the magnetic field strength, making them useful for applications in advanced drug delivery and osteochondral tissue regeneration. Thus, the goal of this thesis was to investigate the feasibility of developing an injectable, magneto-responsive hydrogel scaffold capable of delivering viable stem cell populations to a cartilage defect, and to spatiotemporally control the regeneration of the cartilage tissue in vivo.

See full dissertation at **coe.neu.edu/18/AdedokunAdedijiAdedoyin**

Xiaohua Geng

PhD 2017, Chemical Engineering; Advisor, Elizabeth Podlaha

ELECTRODEPOSITION OF FE-NI-CO, AND CU THIN FILMS, NANOWIRES, AND SCULPTING NANOSCALED FEATURES

Nanogap electrodes are elements of nanoscale microfluidic devices and sensors, and have been prepared by different techniques. The presented idea is to build a pair of nanogap electrodes using novel nanowire-electrodeposition approaches. The nanogap electrodes, or the precursor nanowires are to be aligned with a nanogap size of < 10 nm, required for molecular sensing, and exhibit high electronic conductivity, corrosion resistance, thermal stability, scalable productivity, and most important be economically viable.

See full dissertation at **coe.neu.edu/18/XiaohuaGeng**

Negar Hamedani Golshan

PhD 2017, Chemical Engineering; Advisor, Katherine Ziemer

UNDERSTANDING ELECTRICALLY ACTIVE INTERFACE FORMATION ON WIDE BANDGAP SEMICONDUCTORS THROUGH MOLECULAR BEAM EPITAXY USING FE5O4 FOR SPINTRONICS AS A BASE CASE

Nanoelectronics, complex heterostructures, and engineered 3D matrix materials are quickly advancing from research possibilities to manufacturing challenges for applications ranging from high-power devices to solar cells to any number of novel multifunctional sensors and controllers. Formation of an abrupt and effective interface is one of the basic requirements for integration of functional materials on different types of semiconductors (from silicon to the wide bandgaps) which can significantly impact the functionality of nanoscale electronic devices. To realize the potential of next-generation electronics, the understanding and control of those initial stages of film layer formation must be understood and translated to a process that can control the initial stages of film deposition.

See full dissertation at **coe.neu.edu/18/NegarHamedaniGolshan**

Luting Liu

PhD 2017, Chemical Engineering; Advisor, Thomas Webster

FABRICATION OF NANOSTRUCTURES ON IMPLANTABLE BIOMATERIALS FOR BIOCOMPATIBILITY ENHANCEMENT AND INFECTION RESISTANCE

In this study, we sought to employ various nanofabrication techniques for tailoring implant surfaces to minimize bacteria and promote mammalian cell functions without using drugs.

Titanium (Ti) and polyetheretherketone (PEEK) are commonly used biomaterials in orthopedic implants. Further surface modification is needed to support osseointegration while inhibiting bacteria attachment. Herein, temperature controlled atomic layer deposition (ALD) was utilized to provide unique nanostructured TiO2 coatings on commercial Ti. In vitro bacteria experiments revealed that the nano-TiO2 coatings showed promising antimicrobial efficacy towards Gram-positive bacteria (S. aureus), Gram-negative bacteria (E. coli) and antibiotic-resistant bacteria (MRSA). Impressively, cell results indicated that this nano-TiO2 coating stimulated osteoblast (or bone forming cell) adhesion and proliferation while suppressing undesirable fibroblast functions.

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

SELECTED PhD THESES

Hunter James Sismaet

PhD 2017, Chemical Engineering; Advisor, Edgar Goluch

DEVELOPMENT AND OPTIMIZATION OF ELECTROCHEMICAL SENSORS TO DETECT BACTERIAL PATHOGENS FOR POINT-OF-CARE APPLICATIONS

This dissertation focuses on the development and optimization of electrochemical sensors to detect bacterial pathogens for point-of-care applications. Recent spikes in hospital-acquired infections have resurfaced fears of antibiotic-resistant bacteria and their adverse effects on human health. Presenting new challenges in pathogenesis and resistance, infections caused by these microorganisms are becoming increasingly difficult to treat, with prompt administration of targeted therapies providing the best chances for patient recovery. To address this emerging threat, this dissertation aims to develop and improve biosensors that will allow for early and rapid detection of these bacterial pathogens.

See full dissertation at **coe.neu.edu18/HunterJamesSismaet**

Miao Wang

PhD 2018, Chemical Engineering; Advisor, Ming Su

HIGH-THROUGHPUT SCREENING OF COKE RESISTANT CATALYST WITH THERMAL BARCODE

The main objective of my research was to establish a high-throughput catalyst evaluation system based on thermal barcodes, in which a selected panel of phase change nanoparticles (PCM) was embedded into catalyst pellets. Owing to sharp melting peak of phase change nanoparticles and large temperature range of thermal analysis, the labeling capacity of thermal barcodes was greatly increased to over millions, sufficiently to evaluate a large number of catalysts in one batch of reaction. The thermal barcodes have been used to test coke formation for catalyst evaluation. After reaction, coke formation was tested by thermo-gravimetric analysis and the thermal barcode was decoded with a differential scanning calorimeter (DSC). Items like heat transfer, interaction among catalyst and PCM particles, and gas diffusion have been studied to exam the feasibility of the high-throughput screening method.

See full dissertation at **coe.neu.edu/18/MiaoWang**

Belinda Leigh Slakman

PhD 2017, Chemical Engineering; Advisor, Richard West

NEW DOMAINS IN AUTOMATIC MECHANISM GENERATION

Deeper understanding of complex chemical systems can be aided by detailed kinetic modeling, in which processes are broken down into their individual elementary reactions. An important industrial goal is to move from postdictive to predictive modeling, where new chemical vapor deposition (CVD) precursors, for example, can be tested for efficiency without performing tedious and expensive experiments. Some of these microkinetic models may contain hundreds of reacting chemical species, and thousands of reactions; thus, it is desirable to build the models automatically with a computer to speed up model generation and reduce errors. Automatic mechanism generation is now commonly used for applications such as combustion, but extension to other systems presents challenges. This dissertation describes the extension of the Reaction Mechanism Generator (RMG) software to two less-studied chemical systems: the oxidation of liquid fuels and the gas-phase decomposition of silicon hydrides.

See full dissertation at **coe.neu.edu/18/BelindaLeighSlakman**

Haotian Zhang

PhD 2018, Chemical Engineering; Advisor, Ming Su

BATTERY THERMAL MANAGEMENT WITH PHASE CHANGE MATERIALS (PCMS)

As people demand more and more strong lightweight electro devices, electric vehicles and battery driven tools, an advisab and increasing need appears for battery systems to availably these essential energy density and power density demands w operating. Due to their high voltage, high energy density, hig power density and insignificant fade in power and capacity at cycles, lithium-ion batteries become the prevalent choice util in extensive applications, significantly in the use of electric vehicle. Nevertheless, operating in a high output power and manufacturing the lithium-ion battery packs with greater cap density result in elevated operating temperatures, which brin about swift fade of capacity after continuous charge/discharg cycles and fade in total output power as well. The battery the management system relates deeply to the operating and safe issues of the battery. According to the difference of the heat transfer medium, the lithium-ion battery thermal managemer can be divided into three types: air cooling, liquid cooling and phase change material cooling. Among them, first two types are the active thermal management and the third one is passi thermal management.

See full dissertation at **coe.neu.edu/18/HaotianZhang**

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COVER IMAGE

Marissa Puzan, PhD'19, earning her doctorate in chemical engineering, conducts research in the Mugar Life Sciences Building at Northeastern University.