Northeastern University
College of Engineering

2018 | 2019

SCHOLARSHIP REPORT
CHEMICAL ENGINEERING

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

Dear Colleagues and Students,

The Department of Chemical Engineering continues to innovate and grow. Since 2012, our graduate student enrollment rose 143% and undergraduate student enrollment increased 58%. We have also hired highly accomplished tenured/tenure-track faculty, several who have been recently recognized with Young Investigator Awards and National Science Foundation CAREER Awards, as well as selected as fellows of their professional societies. Additionally, our department has received $20 million in research funding since 2016, while research expenditures increased 90%.

The U.S. News and World Report has recognized our success; since 2012, our graduate rankings experienced an unprecedented and significant increase. It is clear that our impact in chemical engineering education and research is poised for continual 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 professional work experience. Northeastern's top-rated (and one of the nation's largest) cooperative education (co-op) program was one of the first in the country; Chemical Engineering placed students in co-op positions in 180 companies in 2018, spanning the areas of consumer products, plastics, biotechnology, nanotechnology, alternative energy, and petrochemicals, to name a few. Our students have also been placed in international co-op locations in Germany, Chile, France, Singapore, China, United Arab Emirates, Madagascar, India, Italy, Costa Rica, Spain, and Belgium. Additionally, our graduate students have been placed in top companies such as Glaxosmithkline, CONTINUUS Pharmaceuticals, Kaleido Biosciences, Inc., and NBD Nanotechnologies.

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 2018 alone, our faculty gave over 300 presentations (including invited talks at conferences, professional societies, workshops, and more) and we now have international research centers in China and other countries around the world, demonstrating our leadership across the chemical engineering community.

I invite you to explore all of the many aspects of our Department of Chemical Engineering through this Scholarship Report, and visit or contact us for more information.

Sincerely,

Ronald J. Willey, Ph.D. P.E.,
Professor and Interim
Department Chair
Chemical Engineering
r.willey@northeastern edu

QUICK FACTS

Chemical Engineering

145 **Graduate Students** enrolled

36 **Visiting Scholars** (2017-2019)

17 **Professional** Society Fellows

21 Young Investigator Awards, including **10** National Science Foundation CAREER Awards

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

90% **Increase in research expenditures** since 2016

RECENT HIRES

Sara Hashmi
PhD, Yale University

Andrew Jones
PhD, MIT

Benjamin Woolston
PhD, MIT

National Academy of Engineering Member, Arthur Coury, University Distinguished Professor

College of Engineering

With **185** tenured/tenure-track faculty and **16** multidisciplinary research centers and institutes with funding by eight federal agencies, the College of Engineering is a leader in experiential education and interdisciplinary research, with a focus on discovering solutions to global challenges to benefit society.

48 **NSF CAREER** Awards

5 **Engineering Departments**

90 **YOUNG INVESTIGATOR** Awards

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

STUDENTS ENROLLED

8080

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

FACULTY BY RESEARCH AREAS

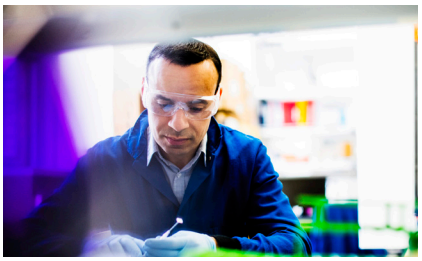
ADVANCED MATERIALS RESEARCH

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

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
Sara Hashmi
Andrew Jones
Abigail Koppes
Ryan Koppes
Carolyn Lee-Parsons
Shashi Murthy
Mrityunjay Singh
Srinivas Sridhar
Ming Su
Thomas Webster
Benjamin Woolston

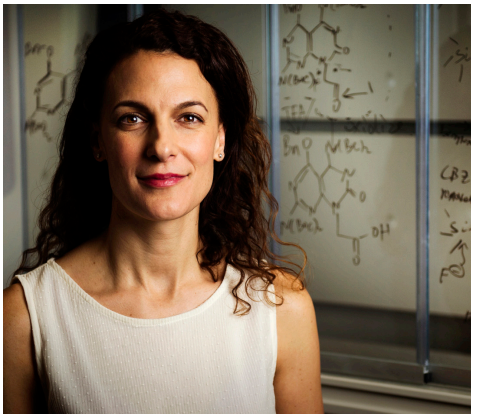
FACULTY HONORS AND AWARDS



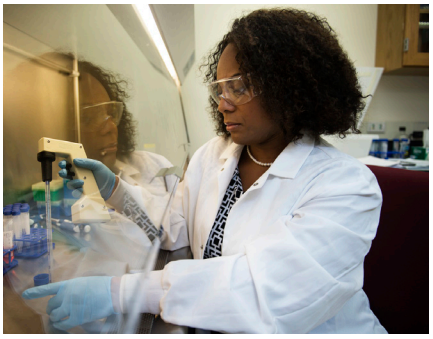
Assistant Professor **Sidi Bencherif** received a National Science Foundation CAREER Award for "Modulating Local Tumor Hypoxia using Cryogel Scaffolds to Regulate Dendritic Cell Function and Activity." Bencherif also received a King Abdulaziz City of Science and Technology Award for his project, entitled "Biomaterials for Wound Healing and Diabetic Ulcer Treatment."

Professor and Art Zafiropoulo Chair **Thomas Webster** was elected as an Overseas Fellow to the Royal Society of Medicine (RSM) of the United Kingdom.

Professor and Associate Chair of Research **Rebecca Carrier** was awarded a four-year $1.57M renewal National Institutes of Health grant for "Impact of Lipids and Food on Oral Compound Absorption: Mechanistic Studies and Modeling." She was also elected a Fellow of the American Institute of Medical and Biological Engineering (AIMBE) for her exceptional achievements and significant contributions within the medical and biological engineering fields.



Associate Professor **Eno Ebong** received a National Science Foundation CAREER Award for "EMBRACE STEM (Endothelial MechanoBiology Research And multiCultural Education in STEM)."

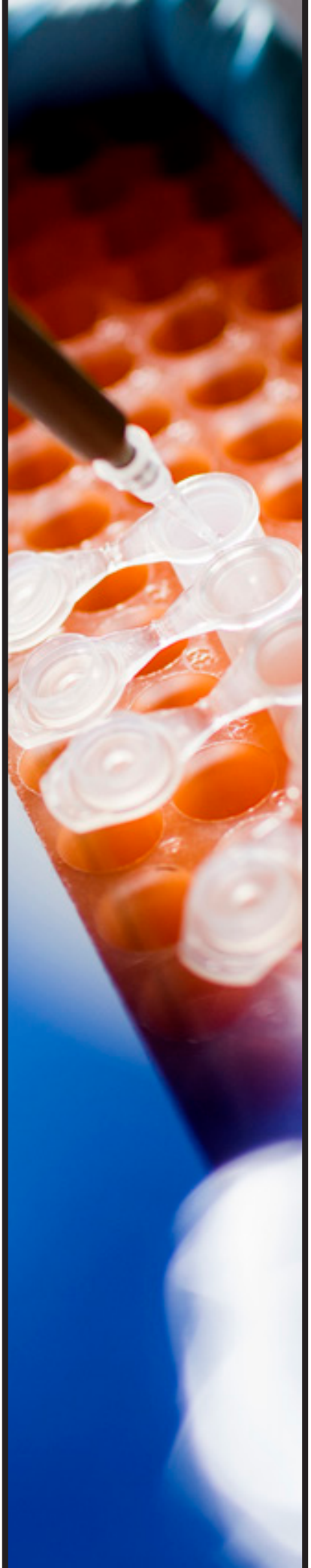


Professor **Mansoor Amiji**, jointly appointed in pharmaceutical sciences and chemical engineering, received the 2019 Distinguished Alumni Award from Purdue University's College of Pharmacy.

Teaching Professor **Lucas Landherr** was recently awarded the Ray W. Fahien Award by the American Society for Engineering Education (ASEE) Chemical Engineering Division. The award is given annually to an educator who has shown evidence of vision and contribution to chemical engineering education.

The article "Kinetic solvent effects in organic reactions" by Associate Professor and Associate Chair of Graduate Studies **Richard West**'s research group made the cover of the March 2019 Issue of the *Journal of Physical Organic Chemistry*.

Professor **Hicham Fenniri** has been elected as a Fellow of the American Institute of Medical and Biological Engineering (AIMBE) for his exceptional achievements and significant contributions within the medical and biological engineering fields.



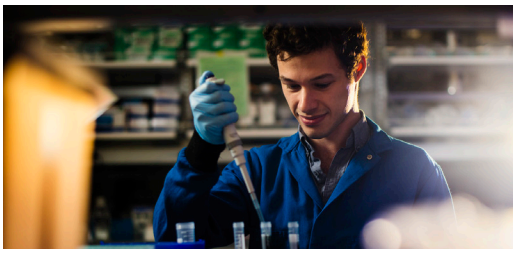
STUDENT HONORS AND AWARDS

PhD student **Ada Vernet** received an award for the Best Oral Presentation at the 3rd Baltic Conference Series: International Conference on Nanomaterials & Nanotechnology (ICNANO) 2018 for her research on "Synthesis and characterization of tellurium nanowire using both chemical and green routes and their comparison in terms of biocompatibility and anticancer properties."

Vidhan Bhaiya, E'21, chemical engineering, and Danny Jooyoung Kim, PharmD'21, won the Global Impact Award at the Schulze Entrepreneurship Challenge. Their business submission was Dr. Brinsely, a footwear manufacturer for diabetics that combines medical performance with chic style.

PhD student **Pranali Buch**, advised by Professor **Edgar Goluch**, had her review paper, titled "Treating Polymicrobial Infections in Chronic Diabetic Wounds" featured on the front page of the Clinical Microbiology Reviews journal website. CMR is ranked second out of 126 microbiology journals with an Impact Factor of 20.642.

PhD student **Jon Soucy** won an American Heart Association Fellowship. This competitive fellowship supports doctoral students with career aspirations to make an impact on global cardiovascular health; Soucy is working to develop an innervated heart on a chip.



Evelyn Soon, BS/MS'19, chemical engineering and engineering management, won the prestigious General Schriever Leadership Award, which honors excellence in military space operations and acquisition.

MANSOOR AMIJI

University Distinguished Professor, Professor of Pharmaceutical Sciences, Chemical Engineering; affiliate faculty, Bioengineering

PhD, Purdue University, 1992
coe.northeastern.edu/people/amiji-mansoor

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

Honors and awards: Fellow, American Association of Pharmaceutical Scientists (AAPS); Fellow, Controlled Release Society; Charivate Analytics Highly Cited Author (top 1%); Purdue University School of Pharmacy Distinguished Alumni Award

SELECTED PUBLICATIONS

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

ANAND ASTHAGIRI

Associate Professor, Bioengineering; affiliated faculty, Chemical Engineering

PhD, Massachusetts Institute of Technology, 2000
coe.northeastern.edu/people/asthagiri-anand

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

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

DEBRA AUGUSTE

Professor, Chemical Engineering

PhD, Princeton University, 2005
coe.northeastern.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. Liu, L. Huang, G. Fell, J. Huang, M.A. Moses, D.T. Auguste
Dual Complementary Liposomes Inhibit Triple-Negative Breast Tumor Progression and Metastasis, Science Advances, 5(3), 2019, eaav5010

D.E. Large, J.R. Soucy, J. Hebert, D.T. Auguste
Advances in Receptor-Mediated, Tumor-Targeted Drug Delivery, Advanced Therapeutics, 2018

P. Guo, D. Liu, K. Subramanyam, B. Wang, J. Yang, J. Huang D.T. Auguste, M.A. Moses
Nanoparticle Elasticity Directs Tumor Uptake, Nature Communications, 9(130), 2018

D. Liu, D.T. Auguste
Peptide Density Targets and Impedes Triple Negative Breast Cancer Metastasis, Nature Communications, 9, 2018, 2612

P. Guo, B. Wang, D. Liu, J. Yang, K. Subramanyam, C. McCarthy, J. Hebert, M. Moses, D.T. Auguste
Using Atomic Force Microscopy to Predict Tumor Specificity of ICAM1 Antibody-Directed Nanomedicines, Nano Letters, 18, 2018, 2254-2262

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

SIDI A. BENCHERIF

Assistant Professor, Chemical Engineering; affiliated faculty, Bioengineering

PhD, Carnegie Mellon University, 2009
coe.northeastern.edu/people/bencherif-sidi

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

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

SELECTED PUBLICATIONS

A. Memic, T. Colombani, M. Rezaeeyazdi, L. Eggermont, J. Steingold, Z. Rogers, K.J. Navare, H.S. Mohammed, M. Sitkovsky, S.A. Bencherif
Latest Advances in Cryogel Technology for Biomedical Applications, Advanced Therapeutics, 2019, 1800114

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

Modulating Local Tumor Hypoxia using Cryogel Scaffolds to Regulate Dendritic Cell Function and Activity
Principal Investigator, National Science Foundation

REBECCA L. CARRIER

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

PhD, Massachusetts Institute of Technology, 2000
coe.northeastern.edu/people/carrier-rebecca

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

Honors and awards: Fellow, American Institute for Medical and Biological Engineering; College of Engineering Soren Buus Outstanding Research Award; Society for Biomaterials Member-At-Large (2018-2019); College of Engineering Faculty Fellow; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

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

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

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

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

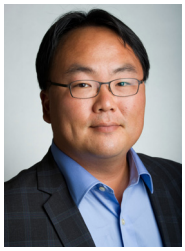
A.N. Koppes, M. Kamath, C.A. Pfluger, D.D. Burkey, M. Dokmeci, L. Wang, R.L. Carrier
Complex, Multi-Scale Small Intestinal Topography Replicated in Cellular Growth Substrates Fabricated via Chemical Vapor Deposition of Parylene C, Biofabrication, 8(3), 2016, 035011O

SELECTED RESEARCH PROJECTS

Impact of Lipids and Food on Oral Compound Absorption: Mechanistic Studies and Modeling
Principal Investigator, National Institutes of Health

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

SUNHO CHOI



Assistant Professor, Chemical Engineering

PhD, University of Minnesota, 2008
coe.northeastern.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

C.F. Cogswell, T.P. Nigl, A. Stavola, A. Wolek, Y.C. Wang, J. Zummo, Y. Lin, L. Dukaye, R. Chinn, S. Choi
Generation and Use of a Pure Titanium Pillared MCM-36 Structure as a High Efficiency Carbon Dioxide Capture Platform and Amine Loaded Solid Adsorbent, Microporous And Mesoporous Materials, 280, 2019, 151-156

C.F. Cogswell, Z. Xie, A. Wolek, Y. Wang, A. Stavola, M. Finkenaur, E. Gilmore, M. Lanzillotti, S. Choi
Pore Structure–CO^2 Adsorption Property Relations of Supported Amine Materials with Multi-Pore Networks, Journal of Materials Chemistry A, 5, 2017, 8526–8536

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

S.A. Didas, S. Choi, W. Chaikittisilp, C.W. Jones
Amine–Oxide Hybrid Materials for CO^2 Capture from Ambient Air, Accounts of Chemical Research, 48, 2015, 2680-2687

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

C.F. Cogswell, H. Jiang, J. Ramberger, D. Accetta, R.J. Willey, S. Choi
Effect of Pore Structure on CO^2 Adsorption Characteristics of Aminopolymer Impregnated MCM-36, Langmuir, 31, 2015, 4534-4541

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; director, Institute for Chemical Analysis of Living Systems (CILS)

PhD, University of Michigan, 1999
coe.northeastern.edu/people/clark-heather

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

J. Morales, R.H. Pawle, N. Akkilic, Y. Luo, M. Xavierselvan, R. Albokhari
DNA-Based Photoacoustic Nanosensor for Interferon Gamma Detection, ACS sensors 4 (5), 2019, 1313-1322

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

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

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

SELECTED RESEARCH PROJECTS

Nanosensors for Chemical Imaging of Acetylcholine Using MRI
Principal Investigator, National Institutes of Health

Circulating Red Blood Cell Based Nanosensors for Continuous, Real-Time Drug Monitoring
Principal Investigator, National Institutes of Health

Optical Nanosensors Detect Neurotransmitter Release in the Peripheral Nervous System
Principal Investigator, National Institutes of Health

ARTHUR COURY

University Distinguished Professor, Chemical Engineering

PhD, University of Minnesota, 1965
coe.northeastern.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
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

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, in conjunction with receipt of C. William Hall Award, Boston, MA, 2(3), 101S-110S, 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

ENO EBONG

Assistant Professor, Chemical Engineering
affiliated faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2006
coe.northeastern.edu/people/ebong-eno

Scholarship focus: studying the means by which endothelial cell mechanotransduction occurs in order to prevent or promote diseases related to blood vessel dysfunction

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

SELECTED PUBLICATIONS

J. Nagatomi, E.E. Ebong (co-editors)
2nd Edition Mechanobiology Handbook, CRC, Taylor and Francis Group, Boca Raton, 2019

I.C. Harding, R. Mitra, S.A. Mensah, A. Nersesyan, N.N. Bal, E.E. Ebong
Endothelial Barrier Reinforcement Relies on Flow-Regulated Glycocalyx, a Potential Therapeutic Target, Biorheology, 2019, 1-19

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

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

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

SELECTED RESEARCH PROJECTS

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

EMBRACE STEM (Endothelial MechanoBiology Research And multiCultural Education in STEM)
Principal Investigator, National Science Foundation

MATTHEW ECKELMAN

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

PhD, Yale University, 2009
coe.northeastern.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

A.G. Parvatker, M.J. Eckelman
Comparative Evaluation of Chemical Life Cycle Inventory Generation Methods and Implications for Life Cycle Assessment Results, ACS Sustainable Chemistry & Engineering, 7(1), 2018, 350-367

S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu
Comparative Life Cycle Assessment of Advanced Wastewater Treatment Processes for Removal of Chemicals of Emerging Concern, Environmental Science and Technology, 52, 2018, 11346-11358

M. Montazeri, M.J. Eckelman
Life Cycle Assessment of UV-Curable Biobased Wood Flooring Coatings, Journal of Cleaner Production 192, 2018, 932-939

M. Montazeri, G.G. Zaimes, V. Khanna, M.J. Eckelman
Meta-Analysis of Life Cycle Energy and Greenhouse Gas Emissions for Priority Bio-Based Chemicals, ACS Sustainable Chemistry & Engineering, 4(12), 2016, 6443-645

L. Soh, M.J. Eckelman
Green Solvents in Biomass Processing, ACS Sustainable Chemistry & Engineering, 4(11), 2016, 5821-5837

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

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

ADAM EKENSEAIR

Assistant Professor, Chemical Engineering

PhD, University of Texas at Austin, 2010
coe.northeastern.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, 9

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, University of Strasbourg, 1994
coe.northeastern.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 Biomaterials Science and Engineering, 4, 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 and Engineering, 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 Applied Energy Materials, 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

SELECTED RESEARCH PROJECTS

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

JOSHUA GALLAWAY

DiPietro Assistant Professor, Chemical Engineering

PhD, Columbia University, 2007
coe.northeastern.edu/people/gallaway-joshua

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

SELECTED PUBLICATIONS

J.W. Gallaway, G.G. Yadav, D.E. Turney, M. Nyce, J. Huang, Y.-C.K. Chen-Wiegart, G. Williams, J. Thieme, J.S. Okasinski, X. Wei
An Operando Study of the Initial Discharge of Bi and Bi/Cu Modified MnO2, Journal of the Electrochemical Society, 165 (13), 2018, A2935-A2947

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

SELECTED RESEARCH PROJECTS

Understanding Phase Change Processes of Energy Storage Materials
Principal Investigator, Department of Energy

EDGAR GOLUCH

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

PhD, University of Illinois, 2007
coe.northeastern.edu/people/goluch-edgar

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

SELECTED PUBLICATIONS

M.K. Kimani, J. Mwagi, E.D. Goluch
Bacterial Sample Concentration and Culture Monitoring using a PEG-Based Osmotic System with Inline Impedance and Voltammetry Measurements, Journal of Analysis and Testing, 3(2), 2019, 166-174

M.K. Kimani, R. Loo, E.D. Goluch
Biosample Concentration Using Microscale Forward Osmosis with Electrochemical Monitoring, Analytical Chemistry, 91, 2019, 7487-7494

P.J. Buch, Y. Chai, E.D. Goluch
Treating Polymicrobial Infections in Chronic Diabetic Wounds, Clinical Microbiology Reviews, 32(2), 2019, e00091-18

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

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

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

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

SELECTED RESEARCH PROJECTS

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

ANDREW GOULDSTONE

Professor, Mechanical and Industrial Engineering; affiliated faculty, Chemical Engineering; Director, Michael J. and Ann Sherman Center for Engineering

PhD, Massachusetts Institute of Technology, 2001
coe.northeastern.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
coe.northeastern.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, Fulbright; Fellow, American Association for the Advancement of Science, Distinguished Scientist Award, The Materials, Minerals, and Metals Society; Fellow, Institute of Electrical and Electronics Engineers; Fellow, American Physical Society; Fellow, Institute of Physics; Fellow, Institute of Engineering and Technology; Institute of Metal Research's Lee Hsun Lecture Award; Fulbright Senior Fellow; 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

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

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

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

SELECTED RESEARCH PROJECTS

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

Magnetodielectric Heterostructures and Composites
Principal Investigator, Rogers Corporation

MAgnetics on GaN for Next GEneration T/R Systems
Principal Investigator, Defense Advanced Research Projects Agency

Nonlinear Properties of Ferrite Materials
Principal Investigator, Raytheon

SARA M. HASHMI

Assistant Professor, Chemical Engineering

PhD, Yale University, 2008
coe.northeastern.edu/people/hashmi-sara

Scholarship focus: complex fluids, biomaterials & soft materials: manipulation of nanoscale and single-particle properties to control macroscale transport & assembly; microfluidics for biomedical, pharmaceutical & energy applications

SELECTED PUBLICATIONS

A.N. Quay, T. Tong, S.M. Hashmi, Y. Zhou, S. Zhao, M. Elimelech
Combined Organic Fouling and Inorganic Scaling in Reverse Osmosis: Role of Protein-Silica Interactions, Environmental Science & Technology, 52, 2018, 9145-9153

S.M. Hashmi, A. Firoozabadi
Efficient Removal of Asphaltene Deposition in Pipes, Journal of the Society of Petroleum Engineering, 21, 2016, 1747

N. Quennouz, S.M. Hashmi, H.S. Choi, J.W. Kim, C.O. Osuji
Rheology of Cellulose Nanofibrils in the Presence of Surfactants, Soft Matter, 12, 2016, 157-164

S.M. Hashmi, S. Senthilnathan, A. Firoozabadi
Thermodiffusion of Polycyclic Aromatic Hydrocarbons in Binary Mixtures, Journal of Chemical Physics, 145, 2016, 184503

S.M. Hashmi, M. Loewenberg, A. Firoozabadi
Colloidal Asphaltene Deposition in Metal Pipes: Flow Rate and Parametric Effects, Physics of Fluids, 27, 2015, 083302

M. Xie, E. Bar-Zeev, S.M. Hashmi, L.D. Nghiem, M. Elimelech
Role of Reverse Divalent Cation Diffusion in Forward Osmosis Biofouling, Environmental Science & Technology, 49, 2015, 13222

J.M. Thomsen, S.W. Sheehan, S.M. Hashmi, J. Campos, U. Hintermair, R.H. Crabtree, G.W. Brudvig
Electrochemical Activation of CP*Iridium Complexes for Electrode-Driven Water-Oxidation Catalysis, Journal of the American Chemical Society, 136, 2104, 13826

S.M. Hashmi, A. Firoozabadi
Self-Assembly of Resins and Asphaltenes Facilitates Asphaltene Dissolution by an Organic Acid, Journal of Colloid & Interface Science, 394, 2013, 115

FRANCISCO HUNG

Associate Professor, Chemical Engineering

PhD, North Carolina State University, 2005
coe.northeastern.edu/people/hung-francisco

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

Honors and awards: National Science Foundation CAREER Award; Oak Ridge Associated Universities Ralph E. Powe Award; R.H. Sioui Award for Excellence in Teaching

SELECTED PUBLICATIONS

X. Zhang, B. Blalock, W. Huberty, Y. Chen, F. Hung, P.S. Russo
Microbubbles and Oil Droplets Stabilized by a Class II Hydrophobin in Marinelike Environments, Langmuir, 35(12), 2019, 4380-4386

Y. Shen, R. Abedin, F.R. Hung
On the Performance of Confined Deep Eutectic Solvents and Ionic Liquids for Separations of Carbon Dioxide from Methane: Molecular Dynamics Simulations, Langmuir, 35(10), 2019, 3658-3671

X. Zhang, S.M. Kirby, Y. Chen, S.L. Anna, L.M. Walker, F.R. Hung, P.S. Russo
Formation and Elasticity of Membranes of the Class II Hydrophobin Cerato-Ulmin at Oil-Water Interfaces, Colloids and Surfaces B: Biointerfaces, 164, 2018, 98–106

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

SELECTED RESEARCH PROJECTS

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

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

ANDREW JONES

Assistant Professor, Chemical Engineering

PhD, Massachusetts Institute of Technology, 2018
coe.northeastern.edu/people/jones-andrew

Scholarship focus: systems engineering approaches to understand the impact of engineered and environmental stresses on bacteria life cycles with applications in health, ecology, water and wastewater treatment

Honors and awards: Gordon Research Conference Board of Trustees Carl Storm Underrepresented Minority Fellowship, 5th Stevens Conference on Bacteria-Material Interactions Young Scientist Travel Award, Montana State University Center for Biofilm Engineering Young Investigator Award

SELECTED PUBLICATIONS

A.-A.D. Jones III, G. Mi, T.J. Webster
A Status Report on FDA Approval of Medical Devices Containing Nanostructured Materials, Trends in Biotechnology, 37(2), 2019, 117-120

A.-A.D. Jones III, C.R. Buie
Continuous Shear Stress Alters Metabolism, Mass-Transport, and Growth in Electroactive Biofilms Independent of Surface substrate Transport, Scientific Reports, 9(1), 2019, 2602

Q. Wang, A.-A. Jones III, J. Garlnick, L. Lin, C.R. Buie
Microfluidic Dielectrophoresis Illuminates the Relationship Between Microbial Cell Envelope Polarizability and Electrochemical Activity, Science Advances, 5(1), 2019, eaat5664

A.-A.D. Jones III, Z. Xie, T.J. Webster
Multiscale Synthetic Approaches to Improve Cell-Biomaterial Interaction for Translational Medicine, Current Opinions in Biomedical Engineering, 10, 2019, 89-96

A.-A.D. Jones III, A.D. Jones Jr.
Numerical Simulation of a Single-Wafer Atomic Layer Deposition Process, Materials Science and Semiconductor Processing, 21, 2014, 82-90

ABIGAIL KOPPES

Assistant Professor, Chemical Engineering, Affiliated Faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2013
coe.northeastern.edu/people/koppes-abigail

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

SELECTED PUBLICATIONS

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

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

RYAN KOPPES

Assistant Professor, Chemical Engineering

PhD, Rensselaer Polytechnic Institute, 2013
coe.northeastern.edu/people/koppes-ryan

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

SELECTED PUBLICATIONS

A. Ziemba, A. D'Amato, T. MacEwen, D. Puhl, A.N. Koppes, R.A. Koppes, M. Lennartz, R. Gilbert
Stabilized Interleukin-4-Loaded Poly(Lactic-Co-Glycolic) Acid Films Shift Pro-Inflammatory Macrophages Towards A Regenerative Phenotype in Vitro, ACS Applied Bio Materials, 2(4), 2019, 1498-1508

M.L. Puzan, B. Legesse, R.A. Koppes, H. Fenniri, A.N. Koppes
Bio-active 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

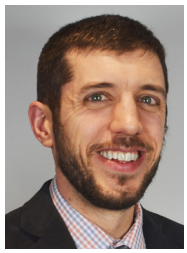
J.R. Soucy, E.S. Sani, R.P. Lara, D. Diaz, F. Dias, A.S. Weiss, A.N. Koppes, R.A. Koppes, N. Annabi
Photocrosslinkable Gelatin/Tropoelastin Hydrogel Adhesives for Peripheral Nerve Repair, Tissue Engineering Part A, 24 (17-18), 2018, 1393-1405

T. Torregrosa, R.A. Koppes
Neural Interface Technology for By-Passing and Treatment of Spinal Cord Injury, Cells, Tissues, and Organs, 202(1-2), 2016, 6-22

SELECTED RESEARCH PROJECTS

Engineering A Humanized Gut-Enteric-Axis
Principal Investigator, National Institutes of Health

LUCAS LANDHERR



Associate Teaching Professor, Chemical Engineering

PhD, Cornell University, 2010
coe.northeastern.edu/people/landherr-lucas

Scholarship focus: development of comics, visualization, and modules for novel STEM teaching tools for all-ages education

Honors and awards: ASEE Ray W. Fahien Award; AIChE Award for Innovation in Chemical Engineering Education; AIChE 35 Under 35 Award; Omega Chi Epsilon Faculty Member of the Year Award

SELECTED PUBLICATIONS

L. Landherr, M. Keszler
'Applied' Sensory Evaluation, Matter, 2019, 1, 14

L. Landherr, M. Keszler
Drawn to Engineering: Evolving Your Teaching, Chemical Engineering Education, 53(2), 2019, 67-68

L. Landherr, M. Keszler
Drawn to Engineering: Exams Are Alive With The Sound Of ... Music?, Chemical Engineering Education, 52(4), 2018, 294-295

L. Landherr, M. Keszler
Drawn to Engineering: Idea Theft, Chemical Engineering Education, 53(1), 2019, 63-64

L. Landherr, M. Keszler
Drawn to Engineering: Illumination, Chemical Engineering Education, 53(3), 2019, 145-146

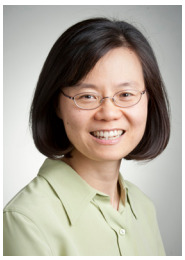
M. Vigeant, J. Cole, K. Dahm, L. Ford, L. Landherr, D. Silverstein, C. West
How We Teach: Thermodynamics, Proceedings of the ASEE Annual Conference, 2019

L. Landherr
Integrating Comics Into Engineering Education To Promote Student Interest, Confidence, and Understanding, Proceedings of the ASEE Annual Conference, 2019

L. Landherr
Crash Course: Engineering, Engineering Consultant/ Curriculum Writer, Youtube Series in Affiliation with PBS Digital, 2018-2019

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

CAROLYN LEE-PASONS



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

PhD, Cornell University, 1995
coe.northeastern.edu/people/lee-parsons-carolyn

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

Honors and awards: National Science Foundation CAREER Award; College of Engineering Outstanding Teaching Award 2013 & 2018, University Excellence in Teaching Award 2019

SELECTED PUBLICATIONS

S. Mortensen, D. Bernal-Franco, L.F. Cole, S. Sathitloetsakun, E.J. Cram, C.W.T Lee-Parsons
EASI transformation: An Efficient Transient Expression Method for Analyzing Gene Function in Catharanthus Roseus Seedlings, Frontiers in Plant Science, 2019

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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
coe.northeastern.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

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

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

STEVE LUSTIG

Associate Professor, Chemical Engineering

PhD, Purdue University, 1989
coe.northeastern.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.R. Roenbeck, J. Cline, V. Wu, M. Afshari, S. Kellner, P. Martin, J.D. Londono, L.E. Clinger, D. Reichert, S.R. Lustig, K. Strawhecker
Structure–Property Relationships of Aramid Fibers Via X-ray Scattering and Atomic Force Microscopy, Journal of Materials Science, 54, 2019, 6668–6683 (2019 Cahn Prize April finalist)

M.R. Roenbeck, E.J. Sandoz-Rosado, J. Cline, V. Wu, P. Moy, M. Afshari, D. Reichert, S.R. Lustig, K.E. Strawhecker
Probing the Internal Structures of Kevlar® Fibers and Their Impacts on Mechanical Performance, Polymer, 128, 2017, 200-210

M.B. Shiflett, B.A. Elliott, S.R. Lustig, S. Sabesan, M.S. Kelkar, A. Yokozeki
Phase Behavior of CO_2 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

SANJEEV MUKERJEE

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

PhD, Texas A&M University, 1994
coe.northeastern.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

SELECTED RESEARCH PROJECTS

Innovative Non-PGM Catalysts for CH P Relevant Proton Conducting Membranes
Principal Investigator, U.S. Department of 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
coe.northeastern.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, 457, 2018, 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, 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, S.K. Murthy
Fluorescence-Based Lateral Flow Assays for Rapid Oral Fluid Roadside Detection of Cannabis Use, Electrophoresis, 2017, 38, 501-5016

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

MRITYUNJAY SINGH

Affiliated faculty, Chemical Engineering

PhD, Indian Institute of Technology, 1983
coe.northeastern.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: ACerS Samuel Geijsbeek PACRIM International Award; Fellow, Indian Institute of Metals, India; 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; Honorary Doctorate, Nagaoka University of Technology, Japan; International Keramos Award

SELECTED PUBLICATIONS

M. Wang, Y. Gönüllü, M. Pyeon, Z. Diao, L. 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, 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

SRINIVAS SRIDHAR

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

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

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

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

SELECTED PUBLICATIONS

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

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

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

SELECTED RESEARCH PROJECTS

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

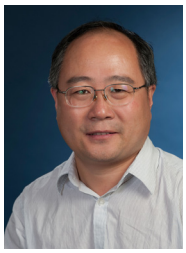
Nanoformulations and Sustained Delivery of PARP Inhibitors for Breast Cancer
Principal Investigator, Department of Defense

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

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

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

MING SU



Professor & Associate Chair of International Collaborations, Chemical Engineering

PhD, Northwestern University, 2004
coe.northeastern.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, 22110-22114

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, 2718-2723

L. Ma, Y. Qiao, R. Jones, N. Singh, M. Su
Single Cell HaloChip Assay on Paper for Personalized Medicine, Analytical Bioanalytical Chemistry, 408, 2016, 7753-7759

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, 7372-7376

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

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

VLADIMIR TORCHILIN

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

PhD, Moscow State University, 1971
DSc, Moscow State University, 1980
coe.northeastern.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

C. Sarisozen, Y. Tan, J. Liu, C. Bilir, L. Shen, N. Filipczak, T.M. Porter, V.P. Torchilin
MDM2 Antagonist-Loaded Targeted Micelles in Combination with Doxorubicin: Effective Synergism against Human Glioblastoma Via p53 Re-Activation, Journal of Drug Targeting, 27(5-6), 2019, 624-633

J. Pan, L.P. Mendes, M. Yao, N. Filipczak, S. Garai, G.A. Thakur, C. Sarisozen, V.P. Torchilin
Polyamidoamine Dendrimers-Based Nanomedicine for Combination Therapy with siRNA and Chemotherapeutics to Overcome Multidrug Resistance, European Journal of Pharmaceutical Sciences, 136, 2019, 18-28

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, International Journal of Pharmaceutics, 532, 2017, 149-156

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

THOMAS WEBSTER

Professor, Chemical Engineering; Art Zafiropoulo Chair in Engineering

PhD, Rensselaer Polytechnic Institute, 2000
coe.northeastern.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: International Fellow Royal Society of Medicine: Fellow, International Journal of Nanomedicine; Fellow, National Academy of Inventors; 5 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 Outstanding Lecture Award

SELECTED PUBLICATIONS

H.T. Cui, S.D. Miao, T. Esworthy, S.J. Lee, X. Zhou, S.Y. Hann, T.J. Webster
A Novel Near-Infrared Light Responsive 4D Printed Nanoarchitecture with Dynamically and Remotely Controllable Transformation, Nano Research, 12(6), 2019, 1381-1388

D.M. Cruz, W.T. Street, B. Zhang, X. Huang, T.J. Webster, et al.
Citric Juice-Mediated Synthesis of Tellurium Nanoparticles with Antimicrobial and Anticancer Properties, Green Chemistry, 21, 2019, 1982-1998

S.M.N. Gallón, E. Alpaslan, M. Wang, P. Larese-Casanova, T.J. Webster
Characterization and Study of the Antibacterial Mechanisms of Silver Nanoparticles Prepared with Microalgal Exopolysaccharides, Materials Science and Engineering: C, 99, 2019, 685-695

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

RICHARD WEST

Associate Professor and Associate Chair of Graduate Studies, Chemical Engineering

PhD, University of Cambridge, 2009
coe.northeastern.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

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

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

B.L. Slakman, R.H. West
Kinetic Solvent Effects in Organic Reactions, Journal of Physical Organic Chemistry, 32, 2018, e3904

SELECTED RESEARCH PROJECTS

CAREER: Predictive Kinetic Modeling of Halogenated Hydrocarbon Combustion
Principal Investigator, National Science Foundation

Collaborative Research: Autonomous Systems for Experimental and Computational Data Generation and Data-Driven Modeling of Combustion Kinetics
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

BENJAMIN WOOLSTON

Assistant Professor, Chemical Engineering (Joining Janurary 2020)

PhD, Massachusetts Institute of Technology, 2017
coe.northeastern.edu/people/woolston-benjamin

Scholarship focus: Metabolic engineering and synthetic biology for sustainable biochemical production and human health

SELECTED PUBLICATIONS

D.F. Emerson, B.M. Woolston, N. Liu, M. Donnelly, D.H. Currie, G. Stephanopoulos
Enhancing Hydrogen-Dependent Growth of and Carbon Dioxide Fixation by Clostridium Ljungdahlii Through Nitrate Supplementation, Biotechnology and Bioengineering, 116(2), 2019, 294-306

T.B. Roth, B.M. Woolston, G. Stephanopoulos, D.R. Liu
Phage-Assisted Evolution of Bacillus methanolicus Methanol Dehydrogenase 2, ACS Synthetic Biology, 8(4), 2019, 796-806

B.M. Woolston, T. Roth, I. Kohale, D.R. Liu, G. Stephanopoulos
Development of a Formaldehyde Biosensor with Application to Synthetic Methylotrophy, Biotechnology and Bioengineering, 2018

B.M. Woolston, J.R. King, M. Reiter, B. Van Hove, G. Stephanopoulos
Improving Formaldehyde Consumption Drives Methanol Assimilation in Engineered E. Coli, Nature Communications, 9(1), 2018, 2387

B.M. Woolston, D.F. Emerson, D.H. Currie, G. Stephanopoulos
Rediverting Carbon Flux in Clostridium Ljungdahlii Using CRISPR Interference (CRISPRi), Metabolic Engineering, 48, 2018, 243-253

RONALD WILLEY

Interim Chair and Professor, Chemical Engineering; Assistant Vice President, Northeast Zone of the NCEES

PhD, University of Massachusetts, Amherst, 1984
coe.northeastern.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
Contribution to Process Safety Section: Case Histories, Perry's Chemical Engineers' Handbook, D.W. Green and M.Z. Southard, Eds, McGraw Hill, New York, 23, 5-6, 2018

R.J. Willey
Mists: Hidden Hazards, Process Safety Progress, 37(1), 2018, 3-3

R.J. Willey
Process Safety Begins with Land Use Planning, Process Safety Progress, Vol 37(2), 2018, 123-123

J.F. Murphy, R.J. Willey, T. Carter
Women in Process Safety, Process Safety Progress, 37(3), 2018, 328-339

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

KATHERINE ZIEMER

Professor, Chemical Engineering; Vice Chancellor

PhD, West Virginia University, 2001
coe.northeastern.edu/people/ziemer-katherine

Scholarship focus: education; 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

M. Stolzoff, J.E. Burns, A. Aslani, E.J. Tobin, C. Nguyen, N. De La Torre, N.H. Golshan, K.S. Ziemer, T.J. Webster
Decreased Bacterial Growth on Titanium Nanoscale Topographies Created by Ion Beam Assisted Evaporation, International Journal of Nanomedicine, 12, 2017, 1161–1169

G.M. Uddin, K.S. Ziemer, A. Zeid, Y.T. Lee, S. Kamarthi
Process Control Model for Growth Rate of Molecular Beam Epitaxy of MgO (111) Nanoscale Thin Films on 6H-SiC (0001) Substrates, The International Journal of Advanced Manufacturing Technology, 2016, 1-10

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

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

Tracy L. Carter

PhD 2019, Chemical Engineering; Advisor, Ronald Willey

Incorporating Chemical Process Safety Education Into a Chemical Engineering Curriculum Using the Four Categories of Change Strategies Model

Process safety education and training at US colleges and universities is currently insufficient to meet industry needs. Failure to prepare students with essential process safety training can and does lead to catastrophic and financially devastating events. Academia needs to recognize the importance of chemical process safety education, and to emphasize this need, the college accreditation board, ABET, requires evidence that students understand the hazards associated with these processes as part of chemical engineering program accreditation.

The goal of this dissertation is to integrate process safety across the Northeastern University (NEU) Chemical Engineering (ChmE) curriculum to address these needs and minimize these risks. Failing to include mandated process safety in the curriculum can influence an ABET accreditation for a university program. At a minimum, a program will have to prepare a report addressing a weakness within 3 years and submit an Interim Report (IR), or at the extreme, Not to Accredit (NA).2 This would cause a loss of competitiveness and will result in fewer enrollees in the university. For Northeastern University, this is equivalent to an income stream of $27 million per year. It can cascade over to closer assessments by potential students in other engineering programs as well.

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

Sue-Jonnathane Celestin

PhD 2018, Chemical Engineering; Advisor, Katherine Ziemer

Understanding Thin Film Formation Through Molecular Beam Epitaxy Studies of Atomic-Level Interactions in Order to Link Deposition Process Conditions to Device Performance in 2 Materials: MgO and Cs3Sb

The understanding and control of initial states of film formation acquired by building correlations between deposition parameters (e.g. substrate temperature, relative fluxes) and film metrics (e.g. chemistry, structure, quantum efficiency) can open up new possibilities in the development of engineered thin film materials that can meet the evolving and necessary performance requirements of next-generation two-dimensional electronic materials. Robust correlations between deposition parameters and film metrics are also necessary to engineer scalable manufacturing processes that produce consistent material quality results. The work of this dissertation builds the case for dynamic, real time characterization of film formation and explores next generation X-ray light source materials needed to achieve this probing of bond formation.

See full dissertation at
coe.northeastern.edu/18/Sue-JonnathaneCelestin

SELECTED PhD THESES

Sanjin Hosic

PhD 2019, Chemical Engineering; Advisor, Abigail Koppes

Harnessing Patient-Derived Organoids And Microfluidics To Investigate Cholinergic Regulation Of The Epithelial Barrier

Two decades ago, it was demonstrated that electrical vagal nerve stimulation (VNS) inhibits gastrointestinal (GI) inflammation. In-vivo studies concluded that VNS inhibits GI inflammation by releasing neurotransmitter acetylcholine (ACh) from efferent vagus nerve fibers which binds intestinal macrophage nicotinic acetylcholine receptors (nAChRs), inhibiting pro-inflammatory cytokine tumor necrosis factor alpha (TNF-α) production. The next decade of research demonstrated that ACh activated intestinal epithelial cell (IEC) muscarinic acetylcholine receptors (mAChRs) to ameliorate epithelial barrier integrity. However, several contradictory studies were published. One plausible explanation for the discrepancies is differential mAChR expression and/or biological function between GI cell lines. Evidently, our cellular understanding of cholinergic regulation of the intestinal epithelium is in its infancy. Nevertheless, bioelectric medicine may potentially augment inflammatory bowel disease (IBD) treatment, warranting further investigation of cholinergic regulation of the intestinal epithelium. This research leveraged primary human organoids and microfluidics to develop physiologically relevant models for studying cholinergic regulation of intestinal epithelial barrier integrity. Primary human intestinal organoids were dissociated and seeded on Transwell inserts.

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

Sichao Hou

PhD 2019, Chemical Engineering; Advisor, Ming Su

Photo-thermally enhanced temperature gradient gel electrophoresis for DNA Separation

A great challenge of genomics and proteomics is the repeatable and reproducible separation of DNA and proteins with high resolution. Gel electrophoresis is irreplaceably applied for separation and isolation of macromolecules, including DNA, RNA and protein, by providing diffusion resistance to molecules of different size and shape. The separation capability of gel electrophoresis is relatively low for long DNA segment limited by the modest voltage employed for the separation, even for high voltage capillary electrophoresis system. On the other hand, temperature that can affect all physicochemical properties of solution, gel and macromolecules, plays a significant role in gel electrophoresis. Although uncontrolled temperature variation in electrophoresis is considered pestiferous to separation, leading to low reproducibility of separation and thermal degradation of sensitive analytes, a controlled variation in temperature can be beneficial to separation. Temperature has a strong influence on the diffusion coefficient, which determines migration rate in gel electrophoresis. Temperature, at the meantime, affects the structural and mechanical properties of gel such as pore size, gelation rate and elastic modulus, among which the pore size has a significant impact on diffusion.

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

Bumjun Kim

PhD 2018, Chemical Engineering; Advisor, Debra Auguste

Engineering Lipid Nanoparticles To Deliver Drug Combinations To Improve Therapeutic Efficacy In Triple Negative Breast Cancer

Triple negative breast cancers (TNBCs) represent a heterogenous disease with high patient mortality relative to other breast cancers. Conventional chemotherapy, such as Doxorubicin (DOX), is widely used for TNBC treatment. However, it often accompanies severe side effects that limit the effective therapeutic dose for cancer treatment. The plasticity of cancer epigenetics makes them plausible candidates for therapeutic intervention. DNA methyltransferases (DNMTs) and histone deacetyltransferases (HDACs) are two of most well studied enzymes that regulate transcription and chromatin compaction. Aberrant expressions of DNMTs and HDACs have been implicated in a variety of cancers. A few DNMT inhibitors (DNMTi) and HDAC inhibitors (HDACi) have been approved for treating T-cell lymphoma, multiple myeloma, and myelodysplastic syndromes. For instance, DNMTi Decitabine (DAC) and HDACi Panobinostat (PAN) were shown to reverse abnormal methylation of DNA and altered chromatin structure, respectively, leading to increased expression of tumor suppressor genes (TSGs) and decreased expression of oncogenes (OGs). However, epigenetic agents as a monotherapy did not show a therapeutic benefit against solid tumors. A targeted drug delivery vehicle may improve efficacy of epigenetic drugs.

See full dissertation at
coe.northeastern.edu/18/BumjunKim

Brian Lejeune

PhD 2019, Chemical Engineering; Advisor, Laura Lewis

Composition-lattice Interactions in Ternary Transition-metal Boride Ferromagnetic Systems

Successful development of novel magnetic materials leverages understanding the materials intrinsic magnetic behavior and underlying structural-magnetic property correlations. Of particular interest are materials that undergo coupled magnetic phase transitions sensitive to changes in crystal structure (magnetostructural phase transitions). Magnetostructural phase transformations may be induced by applying multiple stimuli (temperature, pressure, magnetic field) and are often easily tuned by chemical substitution. Composition induced structure changes provide a method for studying the sensitivity of a materials magnetic response to specific bond alterations and changes in the electronic environment. This research aims to quantify the impact of detailed chemistry on the magnetic phase transitions in layered systems where structure and magnetism are strongly coupled. The focus of this Dissertation is to understand structure-composition-property correlations in AlFe2B2 and Fe5SiB2 based technologically relevant new magnetic material systems. Both magnetic systems have layered crystal structures that contribute to their large magnetocrystalline anisotropy, or preference for a material to magnetize along a particular crystallographic direction.

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

SELECTED PhD THESES

Deyang Li

PhD 2019, Chemical Engineering; Advisor, Elizabeth Podlaha

Fabrication of Fe-Ni-Co Nanowires by Electrodeposition Coupled with Hydrogen Evolution Reaction and Electrochemical Detection of Pyocyanin

Fe-Ni-Co nanowires are of interest for their excellent magnetic and thermal properties. Template-assisted electrodeposition of Fe-Ni-Co nanowires has been extensively investigated due to its low cost, easy implementation, and dimension control at the nanoscale. Additionally, the electrochemical codeposition behavior of iron-group elements (i.e. Fe, Ni, and Co) exhibits an anomalous codeposition, where less noble elements are preferentially deposited. It has been well known that the hydrogen evolution reaction plays an important role in determining the resulting alloy composition and morphology of deposits when electroplating iron-group metals from an aqueous solution. Although the effect of the hydrogen evolution reaction has been intensively investigated on planar electrodes, there is a lack of studies on nanoporous electrodes.

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

Meryem Oznur Pehlivaner

PhD 2019, Chemical Engineering; Advisor, Adam Ekenseair

Sprayable Thermoresponsive Hydrogels for Minimally Invasive Treatment of Bowel Diseases

Inflammatory bowel diseases, most notably Crohn's disease and ulcerative colitis, currently affect millions of patients worldwide and lead to prolonged inflammation of the digestive tract. Current treatment plans focus on systemic delivery of drugs; however these drugs frequently fail or are inadequate to prevent or reverse the damage. The purpose of this study is to develop a new class of colonoscope-based treatment options that specifically target the diseased area and locally deliver drugs and stem cells through sprayable application of a regenerative hydrogel during diagnostic procedures. Thermoresponsive hydrogel solutions can facilitate on-demand delivery of drugs and viable cell populations through instant solidification on intestinal tissue. Ultimately, the regeneration of diseased or damaged sections of the intestinal tract could maintain deep remission, increase intestinal function, reduce symptoms, and provide a higher quality of life for patients.

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

Di Shi

PhD 2018, Chemical Engineering; Advisor, Thomas Webster

Multi-functionalized Liposome for Brain Drug Delivery to Treat Glioblastoma

To date, delivery of therapeutic agents into the brain to target malignant brain tumors such as glioblastoma multiforme (GBM) remains a significant challenge due to the existence of the blood-brain barrier (BBB). A multitude of delivery systems, such as hydrogels, micelles, liposomes, or polymeric nanoparticles have been proposed as carriers for brain drug delivery and for GBM targeting. However, many of them exhibited limited tumor-specific inhibition effects. Herein, a drug-encapsulated dual-functionalized thermosensitive liposomal system was developed for targeted delivery across the BBB. Specifically, a GBM-specific cell-penetrating peptide and an anti-GBM antibody were conjugated onto the liposome surface. In addition, superparamagnetic iron oxide nanoparticles (SPIONs) and Doxorubicin (DOX) were co-loaded inside the synthesized dual-functionalized liposomes (DOX@P1NS/TNC-FeLP) in order to achieve thermo-triggered drug release by converting electromagnetic energy to heat using an alternating magnetic field (AMF).

See full dissertation at
coe.northeastern.edu/18/DiShi

Junyan Zhang

PhD 2019, Chemical Engineering; Advisor, Thomas Webster

Biomedical Applications of Gold and Silver Nanoparticles

Noble nanoparticles have attracted a large amount of attention among researchers due to their brilliant colors, which results from their unique optical properties from the localized surface plasmon resonance (LSPR) effect. Among different kinds of noble nanoparticles, gold and silver nanoparticles have been studied the most because of their superior properties.

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

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

Northeastern University

College of Engineering

DEPARTMENT OF CHEMICAL ENGINEERING

Northeastern University
313 Snell Engineering Center
360 Huntington Avenue
Boston, MA 02115

P 617.373.2989

che.northeastern.edu
coe.northeastern.edu

COVER IMAGE

Chemical Engineering Professor Debra Auguste conducts research in her lab in the Interdisciplinary Science and Engineering Complex. Auguste has designed a drug delivery system that more effectively targets a particularly difficult-to-treat form of breast cancer and keeps it from metastasizing.