Northeastern University
College of Engineering

2019 | 2020

SCHOLARSHIP REPORT
CHEMICAL ENGINEERING

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

DEAR COLLEAGUES, FRIENDS, AND STUDENTS,

We face significant challenges in our society that will shape our future. Innovations are required to reduce the impact of environmental disasters and climate change, increase healthcare equity through scale and cost control, and use of predictive technology for safety and health monitoring. Northeastern's Department of Chemical Engineering trains our students to be active participants in engineering for society and leaders for our evolving world.

Our department scholarship is focused in advanced materials and biological engineering. These broad areas provide a wealth of opportunity for students to have an impact on the environment, healthcare, and technology. Additionally, our highly accomplished, diverse faculty are recognized for their research and educational impact through Young Investigator and Trailblazer awards, American Society for Engineering Education awards, and National Science Foundation CAREER awards. Several are also Fellows of a variety of professional societies.

Northeastern's top-rated (and one of the nation's largest) cooperative education (co-op) program plays an important role in our success. Chemical engineering co-op positions span the areas of consumer products, plastics, biotechnology, nanotechnology, alternative energy, and petrochemicals, with students placed in positions both domestically and internationally. Through a combination of rigorous academics, research excellence, and professional experience, recent graduate students have taken industry and research positions at leading organizations such as Pfizer, Harvard University, Takeda, Sanofi, Lockheed Martin, and Intel, to name a few.

I invite you to explore highlights of the many aspects of our Department of Chemical Engineering and research of our faculty through this Scholarship Report.

FOR THE LATEST HIGHLIGHTS,
PLEASE VISIT US AT CHE.NORTHEASTERN.EDU.

Sincerely,

Rebecca Kuntz Willits, PhD
Professor and
Department Chair
Chemical Engineering
r.willits@northeastern.edu

QUICK FACTS CHEMICAL ENGINEERING

629
Students

45% Students are Women

76%
Increase in graduate students
(2014-2019)

RECENT HIRES


Sara Hashmi
PhD, Yale University


Andrew Jones
PhD, MIT


Benjamin Woolston
PhD, MIT

70%
Increase in research expenditures
since 2017

20 Young Investigator Awards, including **8** National Science Foundation CAREER Awards

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

17
Professional
Society Fellowships

54
Visiting Scholars
(2017-2020)

National Academy Member
Arthur Coury, University Distinguished Professor

COLLEGE OF ENGINEERING

With **189** tenured/tenure-track faculty and **18** 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.

5 **Engineering Departments**

95 **YOUNG INVESTIGATOR** Awards

Including **50** NSF CAREER Awards, and **18** DOD Young Investigator Awards

1038 **Graduate Students**
Placed on Co-op
(2019-20)

TOTAL ENROLLMENT (2019)
8460
53% Graduate
47% Undergraduate

Enrollment Growth
(2014 to 2019)

115% MS
36% PhD
24% BS

FACULTY BY RESEARCH AREAS

Advanced Materials Research

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

Biological Engineering

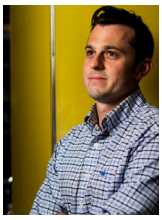
Mansoor Amiji
Anand Asthagiri
Debra Auguste
Sidi A. Bencherif
Rebecca L. Carrier
Heather Clark
Arthur Coury
Eno Ebong
Adam Ekenseair
Hicham Fenniri
Edgar Goluch
Sara Hashmi
Andrew Jones
Abigail Koppes
Ryan Koppes
Carolyn Lee-Parsons
Shashi Murthy
Mrityunjay Singh
Srinivas Sridhar
Ming Su
Thomas Webster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

Faculty Honors and Awards

Selected Highlights

Research of Assistant Professor **Sidi A. Bencherif**, chemical engineering, on "Injectable Cryogels for Biomedical Applications" was featured on the front cover of the April issue of ***Trends in Biotechnology***. Also, his research on "Effect of Polymer Concentration on Autoclaved Cryogel Properties" was featured on the back cover page of ***Macromolecular Materials and Engineering***.

Associate Professor **Richard West**, chemical engineering, is the Northeastern University lead of a **$2.5 million multi-university National Science Foundation grant** to further develop and support the successful and popular open-source modeling software Cantera.



Associate Professor Guohao Dai, bioengineering, and Assistant Professors **Ryan Koppes** and **Abigail Koppes**, chemical engineering, were awarded $200K from the **American Heart Association (AHA) Innovative Project Award** for "Bioengineer an Autonomic Neurovascular System to Explore the Innervation of Arterial Grafts."

Professor **Debra Auguste**, chemical engineering, was selected as an American Institute for Medical and Biological Engineering **(AIMBE) Fellow** in recognition of "her distinguished and continuing achievements in medical and biological engineering."

Chemical Engineering Assistant Professors **Abigail Koppes** and **Ryan Koppes**' research on "Cryopreservation and Functional Analysis of Cardiac Autonomic Neurons" was published in the ***Journal of Neuroscience Methods***. Also, their research on "Cholinergic Activation of Primary Human Derived Intestinal Epithelium Does Not Ameliorate TNF-α Induced Injury" was published in ***Cellular and Molecular Bioengineering***.

Rebecca Kuntz Willits, professor and Chair of the Department of Chemical Engineering, has been elected a **Fellow of the Biomedical Engineering Society**. Fellows demonstrate exceptional achievements and make significant contributions within the biomedical engineering field. They also have extensive leadership within the field but also have served within the Society.

Abigail Koppes, assistant professor of chemical engineering, has received the **Rita Schaffer Young Investigator Award from Biomedical Engineering Society** for 2020. The award is offered each year to stimulate research careers in biomedical engineering. The recipient presents the 20-minute Rita Schaffer Young Investigator Lecture and publishes the text of the lecture in the Annals of Biomedical Engineering. The award recipient must be within seven years of receiving his/her highest degree at the time of award nomination submission.

COVID-19 Research Highlights

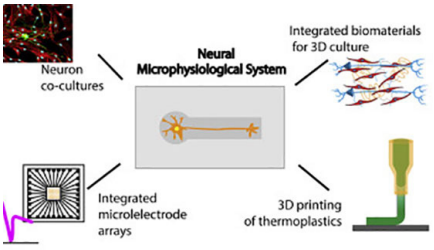
Distinguished University and Cabot Professor **Laura Lewis**, chemical engineering, jointly appointed in mechanical and industrial engineering, was awarded a $200K **National Science Foundation RAPID grant** for "Lattice-Defective Copper Oxides as a Biocidal Tool for COVID-19 and Beyond." The research addresses a need for new types of surface treatments that exhibit antipathogenic "contact-kill" capabilities to protect public health and welfare.

Chemical Engineering Associate Professor **Steve Lustig** and Professor **Ming Su's** research on "Effectiveness of Common Fabrics to Block Aqueous Aerosols of Virus-like Nanoparticles" was published in the American Chemical Society journal, ***Nano***. It was also featured articles in ***U.S. Army Defense One*** and ***Science News Service***. The research was published to address the shortage of certified PHPE for health care workers and the public who need to wear masks to protect against COVID infections.

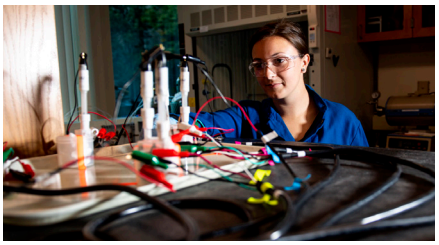
Student Honors and Awards

PhD student **Katie Hoyt**, chemical engineering, won the prestigious national **Ford Foundation Fellowship** to support her doctoral research. Working in Assistant Professor Benjamin Woolston's lab, her research focuses on using metabolically engineered acetogenic microbes to convert renewable single-carbon feedstocks into chemicals and fuels.

Chemical Engineering student **Myra Afzal**, BS/MS'20, was awarded a one-year research grant by the German Academic Exchange Service (DAAD). She will be working at the Helmholtz Centre for Environmental Research on bioreactor engineering for sustainable chemical production and organic waste reutilization using microorganisms.



Assistant Professors of Chemical Engineering Abigail Koppes and Ryan Koppes, and PhD student **Kyla Nichols**' research on "Recent Advancements in Microphysiological Systems for Neural Development and Disease" was published in the "Current Opinion" in ***Biomedical Engineering***.



Sofia Catalina, E'20, chemical engineering, was awarded the **GEM Fellowship** for her research in renewable energy which will fund her doctoral studies.

Zach Rogers, a chemical engineering PhD student in Assistant Professor Sidi A. Bencherif's lab, was selected to join the Northeastern node of the **National Science Foundation's I-Corps** program for his novel proposal "Hypoxia-inducing cryogels as a fast and inexpensive technology for hypoxic cell culture conditions."

View all department news.

PhD Student Spotlight

Jonathan Soucy, PhD'20

Advised by Assistant Professor Ryan Koppes, Chemical Engineering

After receiving his bachelor's degree in chemical engineering from Rensselaer Polytechnic Institute in 2015, Jonathan Soucy joined Northeastern University pursuing a PhD in chemical engineering. His research has focused on neurochemistry, specifically on the sympathetic and parasympathetic nerve systems—the mechanisms by which the brain controls the speed and function of the heart directly and indirectly via the adrenal gland, the "fight or flight" response. Using in vitro models of an organ-on-a-chip platform to mimic neural systems, Soucy has studied the nervous system's responses to a wide variety of stimuli, ranging from drug compounds to electric shocks. His research has led to some breakthroughs as well—a biomaterial he developed to encourage regrowth of heart cells was found to work far better with neurons, as well as having strong adhesive properties, effectively acting as nerve superglue in lieu of sutures for repairing nerves and more. His publication on this is one of the most highly cited manuscripts in *Tissue Engineering A*. Overall, Soucy has published seven manuscripts, three as first author, and a couple currently in submission. He also contributed to two filed patents, received Northeastern's Outstanding Graduate Research Award, and an American Heart Association Predoctoral Fellowship. Upon graduation, Soucy joined Harvard Medical School as a postdoctoral fellow, and his career ambition is to become a professor.

SEE RECENT PHD GRADUATE DISSERTATION SUMMARIES ON PAGE 23.

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

J. Bae, N. Parayath, W. Ma, M. Amiji, N. Munshi, K. Anderson
BCMA Peptide Engineered Nanoparticles Enhance Induction and Function of Antigen Specific Cd8+ Cytotoxic T Lymphocytes Against Multiple Myeloma, Nature – Leukemia, 34, 2020, 210–223

N.N. Parayath, S. Padmakumar, M.M. Amiji
Extracellular Vesicle-Mediated Nucleic Acid Transfer and Reprogramming in the Tumor Microenvironment, Cancer Letters, 482(10), 2020, 33-43

G. Ahmad, G. Mackenzie, J. Egan, M. Amiji
Dha-Sbt-1214 Taxoid Nanoemulsion and Anti-Pd-L1 Antibody Combination Therapy Enhances Antitumor Efficacy in a Syngeneic Pancreatic Adenocarcinoma Model, Molecular Cancer Therapeutics, 18(11), 2019, 961-1972

D. Chen, N. Parayath, S. Ganesh, W. Wang, M. Amiji
Role of Apolipoprotein-and Vitronectin-Enriched Protein Corona on Lipid Nanoparticles for in Vivo Targeted Delivery and Transfection of Oligonucleotides in Murine Tumor Models, Nanoscale, 11, 2019, 18806–18824

SELECTED RESEARCH PROJECTS

Development and Validation of a Novel Cas13a and Nanoparticle Guide-RNA Delivery System that Allows Precise Ablation of Host Macrophage Populations in a Humanized Mouse Model
Principal Investigator, Jackson Laboratories on a National Institutes of Health

Direct CNS Delivery System for BDNF AntagoNATs using Heterotopic Mucosal Grafting for the Treatment of Parkinson's Disease
Principal Investigator, 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 and engineering; biomaterials; biomedical engineering; drug delivery; tissue engineering; regenerative medicine; immunotherapy; immunoengineering; vaccines

Honors and awards: National Science Foundation CAREER Award, Thomas Jefferson Award, Burroughs-Wellcome Fund Travel Award, DFCI/Northeastern University Joint Program Award, GapFund360 Award, MTTC Acorn Award, Acta Biomaterialia Outstanding Reviewer Award, AAI Early Career Faculty Travel Award, Carl Storm Underrepresented Minority Fellowship

SELECTED PUBLICATIONS

L.J. Eggermont, T. Colombani, Z.J. Rogers, A. Memic, S.A. Bencherif
Injectable Cryogels for Biomedical Applications, Trends in Biotechnology, 38, 2020, 418–431

P. Villard, M. Rezaeeyazdi, T. Colombani, K. Joshi Navare, D. Rana, A. Memic, S.A. Bencherif
Autoclavable and Injectable Cryogels for Biomedical Applications, Advanced Healthcare Materials, 8, 2019, 1900679

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

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

SELECTED RESEARCH PROJECTS

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

Hypoxia-Inducing Cryogels: A Hassle-Free and Low-Cost Hypoxic Cell Culture Solution
Principal Investigator, Center for Research Innovation, Northeastern University

Hypoxia-Inducing Cryogels As a Fast and Inexpensive Technology for Hypoxic Cell Culture Conditions
Principal Investigator, Massachusetts Technology Transfer Center (MTTC)

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

Rebecca L. Carrier

Professor, 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

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

H. Seo, H.A. Clark
Gadolinium-Based MRI Contrast Agent for the Detection of Tyrosinase, Analyst, 145, 2020, 1169-1173

W. Di, H.A. Clark
Optical Nanosensors for in Vivo Physiological Chloride Monitoring for Cystic Fibrosis, Analytical Methods, 12 (11), 2020, 1441-1448

W. Di, X. Tan, I.A.C. Calderon, A.E. Neal Reilly, M. Niedre, H.A. Clark
Real-Time Particle-by-Particle Detection of Erythrocyte Camouflaged Microsensor with Extended Circulation Time in the Bloodstream, Proceedings of the National Academy of Sciences of the United States of America, 117(7), 2020, 3509-3517

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

C. Anderson, M. Johansen, B. Erokwu, H. Hu, Y. Gu, Y. Zhang, H.A. Clark, et al.
Simultaneous Concentration Mapping of Multiple MRI Contrast Agents with Dual Contrast - Magnetic Resonance Fingerprinting, Nature Scientific Reports, 9(1), 2019, 1-11

SELECTED RESEARCH PROJECTS

AChMRNS: 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

Associate Professor and Associate Chair for Graduate Studies, Chemical Engineering; Associate Professor, Bioengineering; affiliated faculty, Biology

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

S.A. Mensah, A.A. Nersesyan, I.C. Harding, C.I. Lee, X. Tan, S. Banerjee, M. Niedre, V.P. Torchilin, E.E. Ebong
Flow-Regulated Endothelial Glycocalyx Determines Metastatic Cancer Cell Activity, The FASEB Journal, 34(5), 2020, 6166-6184

X. Cai, J. Qiao, P. Kulkarni, I.C. Harding, E. Ebong, C.F. Ferris
Imaging The Effect of the Circadian Light-Dark Cycle on the Glymphatic System in Awake Rats, Proceedings of the National Academy of Sciences of the United States of America, 117(1), 2020, 668-676

M.J. Cheng, R. Mitra, C.C. Okorafor, A.A. Nersesyan, I.C. Harding, N.N. Bal, R. Kumar, H. Jo, S. Sridhar, E.E. Ebong
Targeted Intravenous Nanoparticle Delivery: Role of Flow and Endothelial Glycocalyx Integrity, Annals of Biomedical Engineering, 2020

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

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, 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; National Academy of Engineering Exemplar in Engineering Ethics Education; Clemens Herschel Award for Civil Engineering Research, Boston Society of Civil Engineering Section (BSCES)

SELECTED PUBLICATIONS

A.G. Parvatker, M.J. Eckelman
Simulation-Based Estimates of Life Cycle Inventory Gate-To-Gate Process Energy use for 151 Organic Chemical Syntheses, ACS Sustainable Chemistry & Engineering 8(23), 2020, 8519-8536

L.N. Troup, M.J. Eckelman, D.F. Fannon
Simulating Future Energy Consumption in Office Buildings using an Ensemble of Morphed Climate Data, Applied Energy, 255, 2019, 113821

N. Watts, M.J. Eckelman, J. Chambers
The 2019 Report of the Lancet Countdown on Health and Climate Change: Ensuring that the Health of a Child Born Today is not Defined by a Changing Climate, The Lancet, 394(10211), 2019, 1836-1878

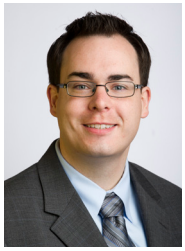
S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu
Comparative Life Cycle Assessment of Advanced Wastewater Treatment Processes for Removal of Chemicals of Emerging Concern, Environmental Science and Technology, 52, 2018, 11346-11358

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

Adam Ekenseair



Associate Teaching 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: Fellow of the American Institute for Medical and Biological Engineering; 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: Collège de France, University of Strasbourg, Regensburg University, Taiwan National Normal University, and University of Colorado

SELECTED PUBLICATIONS

P. Tripathi, H. Joshi, H. Yamazaki, W. Fowle, A. Aksimentiev, H. Fenniri, M. Wanunu
Rosette Nanotube Porins as Ion Selective Transporters and Single Molecules Sensors, Journal of the American Chemical Society, 142, 2020, 1680-1685

Y. Fan, A.C. Pauer, A.A. Gonzales, H. Fenniri
Enhanced Antibiotic Activity of Ampicillin Conjugated to Gold Nanoparticles on Pegylated Rosette Nanotubes, International Journal of Nanomedicine, 14, 2019, 7281-7289

J.E. Fitzgerald, S. Shen, H. Fenniri
Barcoded Polymer-Based Cross-Reactive Spectroscopic Sensor Array for Organic Volatiles, Sensors, 19(17), 2019, 3683

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

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

A.M. Bruck, M.A. Kim, L. Ma, S.N. Ehrlich, J.S. Okasinski, J.W. Gallaway
Bismuth Enables the Formation of Disordered Birnessite in Rechargeable Alkaline Batteries, Journal of the Electrochemical Society, 2020

A. Marschilok, A. Bruck, A. Abraham, C. Stackhouse, K. Takeuchi, E. Takeuchi, M. Croft, J.W. Gallaway
Energy Dispersive X-Ray Diffraction (Edxrd) for Operando Materials Characterization within Batteries, Physical Chemistry Chemical Physics, 2020

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

SELECTED RESEARCH PROJECTS

Engineering the Metal Sulfide Interface in All Solid State Batteries through Operando Study
Co-Principal Investigator, National Science Foundation

Solid Polymer Electrolytes for High Energy Density Li-ion Batteries
Principal Investigator, Department of Defense

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 in micro and nanofluidic channels; biophysics; micro and systems biology; environmental sensing; 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 and Associate Chair for Experiential Innovation, Mechanical and Industrial Engineering; affiliated faculty, Chemical Engineering; Director, Michael J and Ann Sherman Center for Engineering Entrepreneurship Education

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

A. Gouldstone, B.M. Smyser
Comparing Patterns of Quantitative Literacy in Mechanical and Industrial Engineering Capstone Teams, The International Journal of Engineering Education, 35(6), 2019, 1918-1925

C.D. Smallwood, P. Boloori-Zadeh, M.R. Silva, A. Gouldstone
High Oxygen Concentrations Adversely Affect the Performance of Pulmonary Surfactant, Respiratory Care, 62(8), 2017, 1085-1090

N. Zhi, B.K. Jaeger, A. Gouldstone, R. Sipahi, S. Frank
Toward Monitoring Parkinson's Through Analysis of Static Handwriting Samples: A Quantitative Analytical Framework, IEEE Journal Of Biomedical and Health Informatics 21(2), 2016, 488-495

G. Dwivedi, K. Flynn, M. Resnick, S. Sampath, A. Gouldstone
Bioinspired Hybrid Materials from Spray-Formed Ceramic Templates, Advanced Materials, 27(19), 2015, 3073-3078

M. Qu, A. Gouldstone
On The Role of Bubbles In Metallic Splat Nanopores and Adhesion, Journal of Thermal Spray Technology, 17(4), 2008, 486-494

SELECTED RESEARCH PROJECTS

Fundamentals of Bonding in Kinetic Consolidation Processes
Co-Principal Investigator, National Science Foundation

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

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: functional materials used in high frequency applications such as sensors, radar and communication platforms, and nanotechnology, power electronics, and medical diagnostics and therapeutics

Honors and awards: Jefferson Science Fellow; Fellow, American Association for the Advancement of Science; Fellow, Institute of Electrical and Electronics Engineers; Fellow, American Physical Society; Fellow, Institute of Physics; Lee Hsun Award, Chinese Academy of Sciences, Institute of Metal Research; Fulbright Fellow; TMS, Functional Materials Division, Distinguished Scientist Award; Søren Buus Outstanding Research Award, College of Engineering; Outstanding Translational Research Award, College of Engineering; 47th Robert D. Klein Lecturer, Northeastern University

SELECTED PUBLICATIONS

P. Kulik, G. Winter, A. Sokolov, K. Murphy, C. Yu, K. Qian, O. Fitchorova, V. Harris, et al.
Broadband Free Space Impedance in Hexaferrites by Substitution of Quadrivalent Heavy Transition Metal Ions for Miniaturized RF Devices, Applied Physics Letters, 116(20), 2020, 202404

P. Andalib, V. Harris
Grain Boundary Engineering of Power Inductor Cores for Mhz Applications, Journal of Alloys and Compounds, 832, 2020, 153131 (60th Jubilee Edition)

Q. Li, Y. Chen, V.G. Harris
Clustering Effect on Permeability Spectra of Magneto-Dielectric Composites with Conductive Magnetic Inclusions, Journal of Applied Physics, 125(18), 2019, 185107

N. Jia, H. Zhang, V.G. Harris
Iron-Depleted Bi-Yig Having Enhanced Gyromagnetic Properties Suitable for Ltcc Processing, Journal of the American Ceramic Society, 102(3), 2019, 1180-1191

SELECTED RESEARCH PROJECTS

Development of Low Loss Inductor Cores and Deconvolution of Power Loss Contributions
Principal Investigator, Raytheon Corp.

Revealing the Nature and Role of Interfaces in Hexaferrite – Wide Bandgap Heterostructures for Rf Electronics
Principal Investigator, Army Research Office

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

S.M. Hashmi*, I. Zucker*, J. Yang, Y. He, L.D. Pfefferle, M. Elimelech
Shape-Dependent Interactions of Manganese Oxide Nanomaterials with Lipid Bilayer Vesicles, Langmuir 35(43), 2019, 13958-13966

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

R. Abedin, Y. Shen, J.C. Flake, F.R. Hung
Deep Eutectic Solvents Mixed with Fluorinated Refrigerants for Absorption Refrigeration: A Molecular Simulation Study, Journal of Physical Chemistry B, 124(22), 2020, 4536-4550

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

SELECTED RESEARCH PROJECTS

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: Editorial Board Member, Scientific Reports; 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

SELECTED RESEARCH PROJECTS

Enabling a Lab-On-A-Faucet
Principal Investigator, Sloan Scholars Mentoring Network

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

Honors and awards: 2020 Young Innovator of Cellular and Molecular Bioengineering (BMES Society)

SELECTED PUBLICATIONS

S. Hosic, W. Lake, E. Stas, R. Koppes, D. Breault, S. Murthy, A. Koppes
Cholinergic Activation of Primary Human Derived Intestinal Epithelium does not Ameliorate TNF-α Induced Injury, Cellular and Molecular Bioengineering (Journal of BMES), CMBE 2020 Young Innovator Issue, 2020

S. Hosic, M. Puzan, F. Zhou, R. Koppes, D. Breault, S. Murthy, A. Koppes
Rapid Prototyping of a Multilayer Microphysiological System for Primary Human Intestinal Epithelial Culture, ACS Biomaterials Science & Engineering, 2020

K. Nichols, R. Koppes, A. Koppes
Recent Advancements in Microphysiological Systems for Neural Development and Disease, Invited Review; Current Opinion in Biomedical Engineering, 2020

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

SELECTED RESEARCH PROJECTS

Bioengineer Autonomic Neurovascular System to Explore the Innervation of Vascular Grafts
Co-Investigator, American Heart Association

GUMI: New in Vitro Platforms to Parse the Human Gut Epithelial-Microbiome-Immune Axis
Co-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

Honors and awards: Gilda Barbino Excellence in Mentoring Award

SELECTED PUBLICATIONS

S. Hosic, W. Lake, E. Stas, R.A. Koppes, D.T. Breault, S.K. Murthy, A.N. Koppes
Cholinergic Activation of Primary Human Derived Intestinal Epithelium does not Ameliorate TNF-α Induced Injury, Cellular and Molecular Bioengineering, 2020

T. Torregrosa, S. Webster, C. Aghaizu, J. Soucy, C. Bertucci, L. Plant, A.N. Koppes, R.A. Koppes
Cryopreservation and Functional Analysis of Cardiac Autonomic Neurons, Journal of Neuroscience Methods, 341, 2020, 108724

J. Snyder, C. Wang, A.Q. Zhang, Y. Li, J. Luchan, S. Hosic, R. Koppes, R.L. Carrier, A. Koppes
Materials and Microenvironments for Engineering the Intestinal Epithelium, Annals of Biomedical Engineering, 48, 2020, 1916–1940

S. Hosic, A. Bindas, M. Puzan, W. Lake, J. Soucy, F. Zhou, R.A. Koppes, D. Breault, S. Murthy, A.N. Koppes
Rapid Prototyping of Multilayer Micro Physiological Systems, ACS Biomaterials Science & Engineering, 2020

K. Nichols, R. Koppes, A. Koppes
Recent Advancements in Micro Physiological Systems for Neural Development and Disease, Current Opinion in Biomedical Engineering, 14, 2020, 42-51

A.R. Spencer, E.S. Sani, J.R. Soucy, C.C. Corbet, A. Primebetova, R.A. Koppes, N. Annabi
Bioprinting of a Cell-Laden Conductive Hydrogel Composite, ACS Applied Material Interfaces, 11(34), 2019, 30518-30533

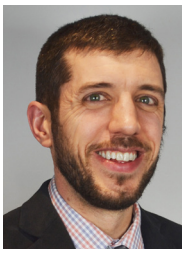
J.R. Soucy, A.J. Bindas, A.N. Koppes, R.A. Koppes
Instrumented Micro Physiological Systems for Real-Time Measurement and Manipulation of Cellular Electrochemical Processes, iScience, 21, 2019, 521-548

SELECTED RESEARCH PROJECTS

Bioengineer Autonomic Neurovascular System to Explore the Innervation of Vascular Grafts
Principal Investigator, American Heart Association

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

Lucas Landherr



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; 5-time Omega Chi Epsilon Faculty Member of the Year Award

SELECTED PUBLICATIONS

L. Landherr
By Students for Students: Using Course Projects to Create Learning Materials for Future Classes, Proceedings of the ASEE Annual Conference, 2020

L. Landherr, D. Nguyen
Drawn to Engineering: Mentoring: In Honor of Phil Wankat, Chemical Engineering Education, 54(1), 2020, 43-44

L. Landherr, D. Nguyen
Drawn to Engineering: The Show Must Go on, Chemical Engineering Education, 54(2), 2020, 107-108

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

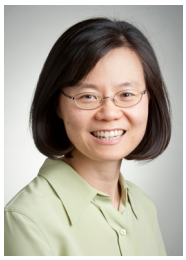
L. Landherr, M. Keszler
Drawn to Engineering: Idea Theft, Chemical Engineering Education, 53(1), 2019, 63-64

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

Carolyn Lee-Parsons



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, University Excellence in Teaching Award

SELECTED PUBLICATIONS

R. Grützner, P. Martin, C. Horn, S. Mortensen, E.J. Cram, C.W.T. Lee-Parsons, J. Stuttmann, S. Marillonnet
Addition of Multiple Introns to a Cas9 Gene Results in Dramatic Improvement in Efficiency for Generation of Gene Knockouts in Plants, BioRxIV, 2020

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 Sciences, 2019

S. Mortensen, J. Weaver, S. Sathitloetsakun, L.F. Cole, N.F. Rizvi, E.J. Cram, C.W.T. Lee-Parsons
The Regulation of Zct1, a Transcriptional Repressor of Monoterpenoid Indole Alkaloid Biosynthetic Genes in *Catharanthus roseus*, Plant Direct, 3, 2019, 1-13

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

SELECTED RESEARCH PROJECTS

Production of Chemotherapeutic Drugs from the Periwinkle Plant
Principal Investigator, Massachusetts Technology Transfer Center

Production of Chemotherapeutic Drugs from the Periwinkle Plant
Principal Investigator, GapFund360

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 and supply chains 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 (2017-2019); Conference Editor, IEEE Transactions on Magnetics (2008-2018), NATO Technical Team Member of AVT-231 on "Scarcity of Rare Earth Materials for Electrical Power Systems;" U.S. Technical Advisory Group to ISO TC298, Rare Earth; International Advisory Committee of the Joint European Magnetics Symposia (JEMS)

SELECTED PUBLICATIONS

X. Zhang, B.T. Lejeune, R. Barua, R.W. McCallum, L.H. Lewis
Estimating the In-Operando Stabilities of $AlFe_2b_2$-Based Compounds for Magnetic Refrigeration, Journal of Alloys and Compounds, 2020, 153693

A. Adib, K.K. Afridi, M. Amirabadi, F. Fateh, M. Ferdowsi, B. Lehman, L.H. Lewis, B. Mirafzal, M. Saeedifard, M.B. Shadmand, P. Shamsi
E-Mobility–Advancements and Challenges, IEEE Access, 7, 2019, 165226-165240

B.T. Lejeune, X. Du, R. Barua, J.C. Zhao, L.H. Lewis
Anisotropic Thermal Conductivity of Magnetocaloric $AlFe_2B_2$, Materialia, 1, 2018, 150-154

SELECTED RESEARCH PROJECTS

Lattice-Defective Copper Oxides as a Biocidal Tool for COVID-19 and Beyond
Principal Investigator, National Science Foundation RAPID

Sprayable Biocidal Coatings for Tactical Shelters
Co-Principal Investigator, Department of the Army

Thermal Management Investigations Into Device-Level Thermal Management with PCMs
Co-Principal Investigator, Raytheon Corporation and ONR

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

SELECTED PUBLICATIONS

S.R. Lustig, et al.
Effectiveness of Common Fabrics to Block Aqueous Aerosols of Virus-like Nanoparticles, ACS Nano, 14, 2020, 7651-7658

T.A. Stockdale, D.P. Cole, J.M. Staniszewski, M.R. Roenbeck, D. Papkov, S.R. Lustig, et al.
Hierarchical Mechanisms of Lateral Interactions in High-Performance Fibers, ACS Appl. Mater. Interfaces, 12, 2020, 22256-22267

S.R. Lustig
Speciation in Electrolytes Using the COSMO-RS Solution Model, Fluid Phase Equilibrium, 2020, 112717

M.R. Roenbeck, J. Cline, V. Wu, M. Afshari, S. Kellner, P. Martin, J.D. Londono, L.E. Clinger, D. Reichert, S.R. Lustig, et al.
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, et al.
Probing the Internal Structures of Kevlar® Fibers and Their Impacts on Mechanical Performance, Polymer, 128, 2017, 200-210

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

Honors and awards: Klein Lectureship, 2007, Northeastern University; Excellence in Research and Creative Activity Award, 2009, Northeastern University; Awarded URP (University Research Professorship), 2010, Ford Motor Company; Fellow of the Electrochemical Society, 2013; Distinguished College Professor, 2015, Northeastern University; Fellow of the International Society of Electrochemistry, 2019

SELECTED PUBLICATIONS

N. Ramaswamy, S. Mukerjee
Alkaline Anion Exchange Membrane Fuel Cells: Challenges in Electrocatalysis and Interfacial Charge Transfer, Chemical Reviews, 119(23), 2019, 11945

W. Wang, Q. Jia, S. Mukerjee, S. Chen
Recent Insights into the Oxygen Reduction Electrocatalysis of Fe/N/C Materials, ACS Catalysis, 9, 2019, 10126

E. Liu, J. Li, L. Jiao, H. Thi Thanh Doan, Z. Liu, Z. Zhao, Y. Huang, K.M. Abraham, S. Mukerjee, Q. Jia
Unifying the Hydrogen Evolution and Oxidation Reactions Kinetics in Base by Identifying the Catalytic Roles of Hydroxyl-Water-Cation, Journal of the American Chemical Society, 141(7), 2019, 3232-3239

Q. Jia, E. Liu, J. Li, S. Pann, S. Mukerjee
X-Ray Absorption Spectroscopy Characterizations on PGM-Free Electrocatalysts: Justification, Advantages, and Limitations, Advanced Materials, 31(31), 2019, 1805157

SELECTED RESEARCH PROJECTS

Developing Novel Platinum Group Metal-Free Catalysts for Alkaline Hydrogen and Oxygen Evolution Reactions
Principal Investigator, Office of Energy Efficiency and Renewable Energy

Harvesting Localized Plasmons on Noble Metal Nanostructures for Efficient Electrochemical and Photochemical Reactions
Principal Investigator, Army Research Office

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 Distinguished Life Membership (DLM) Award, ACerS Edward Orton, Jr. Memorial Lecture Awaard, ASM Edward DeMille Campbell Memorial Lectureship Award, William B. Johnson Founders Award from Engineers Council, R&D 100 Award 2019, 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; ACerS W.D. Kingery Award, Honorary Doctorate, Slovak Academy of Sciences; Honorary Doctorate, Nagaoka University of Technology, Japan

SELECTED PUBLICATIONS

M. Singh, C.E. Smith, R. Asthana, A.L. Gyekenyesi
Active Metal Brazing of Graphite Foam-to-Titanium Joints Made with SiC Coated Foam, Journal of the European Ceramic Society, 40, 2020, 2533-2541

W. Du, M. Singh, D. Singh
Binder Jetting Additive Manufacturing of Silicon Carbide Ceramics: Development of Bimodal Powder Feedstocks by Modeling and Experimental Methods, Ceramics International, 46(12), 2020, 19701-19707

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

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 2016

SELECTED PUBLICATIONS

D. Zhang, P. Baldwin, A.S. Leal, S. Carapellucci, S. Sridhar, K.T. Liby
A Nano-Liposome Formulation of the Parp Inhibitor Talazoparib Enhances Treatment Efficacy and Modulates Immune Cell Populations in Mammary Tumors of BRCA-Deficient Mice, Theranostics, 9(21), 2019, 6224-6238

J. Qiao, X. Cai, Q. Xiao, Z. Chen, P. Kulkarni, C. Ferris, S. Kamarthi, S. Sridhar
Data on MRI brain Lesion Segmentation using K-means and Gaussian Mixture Model-Expectation Maximization, Data Brief, 27, 2019, 104628

P. Baldwin, A.W. Ohman, J.E. Medina, E.T. McCarthy, D.M. Dinulescu, S. Sridhar
Nanoformulation of Talazoparib Delays Tumor Progression and Ascites Formation in a Late Stage Cancer Model, Frontiers in Oncology, 9(353), 2019

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

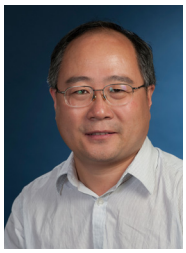
Nanomedicine Academy of Minority Serving Institutions
Principal Investigator, National Science Foundation Development

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

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

Quantitative Non-Invasive Brain Imaging using Magnetic Nanoparticles
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

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; 23 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; SCOPUS Highly Cited Researcher (Top 1% Materials Science)

SELECTED PUBLICATIONS

M.M. Machado-Paula, M.A.F Corat, M. Lancellotti, G. Mi, T.J. Webster, et al.
A Comparison Between Electrospinning and Rotary-Jet Spinning to Produce Pcl Fibers with Low Bacteria Colonization, Materials Science & Engineering C-Materials For Biological Applications, 111, 2020, 110706

L.S. Moura, G.D. Vittoria, A.H.G Gabriel, T.J. Webster, et al.
A Highly Accurate Methodology for the Prediction and Correlation of Mechanical Properties Based on the Slimness Ratio of Additively Manufactured Tensile Test Specimens, Journal Of Materials Science, 55(22), 2020, 9578-9596

A. Shaheen, A. Taj, P.A. Lieberzeit, A. Mujahid, T.J. Webster, et al.
Design of Heterostructured Hybrids Comprising Ultrathin 2D Bismuth Tungstate Nanosheets Reinforced by Chloramphenicol Imprinted Polymers Used as Biomimetic Interfaces for Mass-Sensitive Detection, Colloids and Surfaces B-Biointerfaces, 188, 2020, 110775

SELECTED RESEARCH PROJECTS

Center for Disruptive Musculoskeletal Innovations
Co-Principal Investigator, National Science Foundation

Next Generation Dermal Fillers
Principal Investigator, Arctic Fox

Optimizing Surface Energy, Menor
Principal Investigator, Johnson and Johnson

Richard West

Associate Professor, 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

K. Blondal, J. Jelic, E. Mazeau, F. Studt, R.H. West, C.F. Goldsmith
Computer-Generated Kinetics for Coupled Heterogeneous/Homogeneous Systems: A Case Study in Catalytic Combustion of Methane on Platinum, Industrial & Engineering Chemistry Research 58 (38), 2019, 17682-17691

B.L. Slakman, R.H. West
Kinetic Solvent Effects in Organic Reactions, Journal of Physical Organic Chemistry, 32, 2019, e3904

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

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

Frameworks: Collaborative Research: Extensible and Community-Driven Thermodynamics, Transport, and Chemical Kinetics Modeling with Cantera: Expanding to Diverse Scientific Domains
Principal Investigator, National Science Foundation

Ronald Willey

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, P.E.
History Repeats Itself, Process Safety Progress, 39(1), 2020, e12138

R.J. Willey, P.E., T. Carter, J. Price, B. Zhang
Instruction of Hazard Analysis of Methods for Chemical Process Safety at the University Level, Journal of Loss Prevention in the Process Industries, 63, 2020, 103961

R.J. Willey, P.E.
Process Safety and a Virus, Process Safety Progress, 39(2), 2020, e12156

R.J. Willy, P.E.
We Must Not be Complacent, Process Safety Progress, 38(2), 2020, e12056

Rebecca Kuntz Willits

Professor and Chair, Chemical Engineering; affiliated faculty, Bioengineering

PhD, Cornell University, 1999
coe.northeastern.edu/people/willits-rebecca

Scholarship focus: neural regenerative strategies, neural mechanosensing, diversity and inclusion in engineering

Honors and awards: Council for Advancement and Support of Education (CASE) Missouri Professor of the Year; AIMBE Fellow

SELECTED PUBLICATIONS

C.M.M. Motta, K.J. Endres, C. Wesdemiotis, R.K. Willits, M.L. Becker
Enhancing Schwann Cell Migration Using Concentration Gradients of Laminin Derived-Peptides, Biomaterials, 218, 2019, 119335

E.A. Silantyeva, R.K. Willits, M.L. Becker
Postfabrication Tethering of Molecular Gradients on Aligned Nanofibers of Functional Poly(Îµ-caprolactone)s, Biomacromolecules, 20(12), 2019, 4494-4501

D.L. Philip, E.A. Silantyeva, M.L. Becker, R.K. Willits
RGD-Functionalized Nanofibers Increase Early GFAP Expression during Neural Differentiation of Mouse Embryonic Stem Cells, Biomacromolecules, 20(3), 2019, 1443-1454

M. Cavanaugh, E. Silantyeva, G. Pylypiv Koh, E. Malekzadeh, W. Lanzinger, R. Willits, M. Becker
Rgd-Modified Nanofibers Enhance Functional Outcomes in Rats after Sciatic Nerve Injury, Biomimetic Materials for Regenerative Medicine; Journal of Functional Materials, 10(2), 2019, 24

SELECTED RESEARCH PROJECTS

Toward a Mechanotransduction Mimic of the Neural Stem Cell Niche
Principal Investigator, National Science Foundation

Collaborative Research: Professional Preparation of Underrepresented Minority PhD's and Post-Docs for a Career in Engineering Academia
Co-Principal Investigator, National Science Foundation

Benjamin Woolston

Assistant Professor, Chemical Engineering

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

Selected PhD Theses

Martin Kimani

PhD 2019, Chemical Engineering; Advisor, Edgar Goluch

Development Of Forward Osmotic Sample Concentration And Electrophoretic Microfluidics For Pathogen Diagnostics

The global healthcare impact of bacterial infections has been on the rise with current indication that pathogen associated illnesses are one of the top 3 leading causes of mortality particularly in remote regions. This work presents an overall aim to develop low cost, portable and rapid systems for detecting pathogens in clinical and environmental settings. The first part of the dissertation outlines the fabrication and characterization of an osmotic driven microfluidic system that improves sensitivity of existing low cost pathogen detection platforms by quantitatively performing sample enrichment. In the second part of the dissertation, a thread based electrophoretic microfluidic system is introduced and characterized for use in electrophoretic and chromatographic isolation of pathogen biomarkers with inline detection. Three research aims were defined as summarized below for the evaluation of the two microfluidic systems. In the first objective, cellulose ester membranes were employed to determine their feasibility for inducing an osmotic gradient that can be used for electrical-less concentration of micro-scale volumes. High solute concentrations of sucrose, salt and polyethylene glycol placed on the permeate side of the membrane were evaluated as osmotic gradients for sample enrichment. This system offers low cost and low energy alternatives to existing use of centrifugal, ultrafiltration, and evaporative pre-concentration methods where quantitative inline sample monitoring is not feasible.

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

Ehsan Keyvani-Someh

PhD 2019, Chemical Engineering; Advisor, Hicham Fenniri

Organic Photovoltaics Based On Self-assembled Rosette Nanotubes And Stacked Graphene

To overcome the drawbacks of inorganic solar cells, organic photovoltaics (OPVs) was introduced as a viable energy source with advantages such as cost-effectiveness, lightweight, and flexibility. However, low power conversion efficiency (PCE) is still limiting them from moving beyond the laboratory. This work focuses on developing a simple fabrication and characterization process for OPV manufacturing and addressing common issues with OPV devices. The second part of this thesis focuses on fabricating more affordable solar cells by finding alternatives for expensive indium-tin-oxide (ITO) electrode for optoelectronic applications. Herein, we employed chemical vapor deposition (CVD) to grow graphene in an inexpensive way by stacking several layers on top of each other to improve the performance of the electrode. Stacked graphene was characterized by Raman and UV-Vis spectroscopy and conductivity measurements. Solar cells fabricated with stacked graphene anode showed an enhancement of PCE as a function of the number of stacked layers. The highest efficiency was measured for the double-transferred graphene anode because of improved conductance an optimal transmittance. This work establishes that layered graphene is a viable substitute for ITO. The third part of this work is dedicated to improving the low PCE of OPVs to overcome the low PCE values. Poor PCE performance is a result of ill-defined morphology.

See full dissertation at
coe.northeastern.edu/19/EhsanKeyvani-Someh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Northeastern University
College of Engineering

DEPARTMENT OF CHEMICAL ENGINEERING

Northeastern University
201 Cullinane
360 Huntington Avenue
Boston, MA 02115

P 617.373.2989

che.northeastern.edu
coe.northeastern.edu

COVER IMAGE

Assistant Professor Abigail Koppes, chemical engineering, is developing “organs on a chip” technology to understand the complexity of how brain and gut cells communicate. Each person’s unique diet and microbiome set the stage differently. By isolating individual types of cells on handheld chips, Koppes’s technology could clarify both what these cells are supposed to do and how they might do it in a different environment.