Northeastern University
College of Engineering

Engineering for Society

Boldly innovating to better our world

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2016 | 2017
SCHOLARSHIP REPORT
Chemical Engineering

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

Dear Friends,

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

We offer degrees at all levels (Bachelor of Science, Master of Science and Doctor of Philosophy) and are internationally renowned for high quality classroom-based education in conjunction with industrial work experience. Our top-rated (and one of the nation's largest) Cooperative (Co-op) Education program was one of the first in the country and the Chemical Engineering Co-op program currently places students in over 55 companies spanning the areas of consumer products, plastics, biotechnology, nanotechnology, alternative energy, and petrochemicals, to name a few. We even place students in international co-op locations in the UK, France, Switzerland, China, and Vietnam. It is not hard to see why we have been ranked four times as the Best Internship/Career Service University by the *Princeton Review*.

Our undergraduate program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc. ensuring that our program meets the quality standards established by the profession of Chemical Engineering. Our award-winning undergraduate student chapter of the American Institute of Chemical Engineers (AIChE) is very active in many outreach programs, such as the ChemE Car competition and hosting regional AIChE annual conferences. Our graduate program is very interdisciplinary and offers students opportunities to work with outstanding faculty to attain research experience and achieve their career goals in a variety of sub-fields of chemical engineering. Collectively, our graduate students and faculty have organized over 24 conferences in the past five years demonstrating our leadership across chemical engineering.

I invite you to explore our Department of Chemical Engineering through this Scholarship Report and find out why we have been listed among the top "up-and-coming national universities" by the *U.S. News and World Report.*

Sincerely,

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

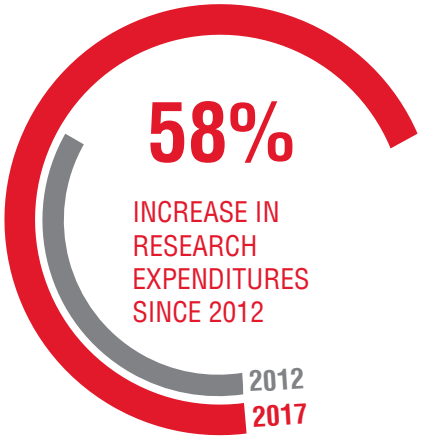
QUICK FACTS — Chemical Engineering

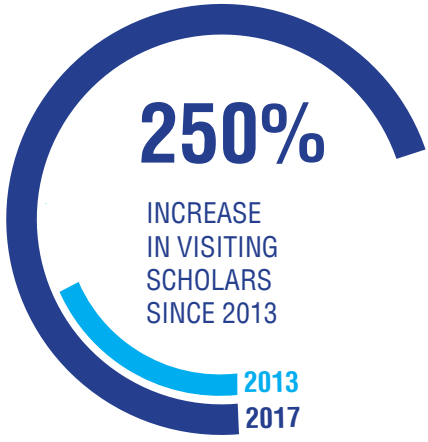
GRADUATE students

TENURED/ TENURE-TRACK Faculty

32

Countries represented across both undergraduate and graduate levels





QUICK FACTS — College of Engineering

13 MULTI-INSTITUTIONAL RESEARCH CENTERS funding by eight federal agencies

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

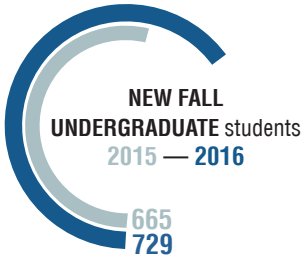
TENURED/ TENURE-TRACK Faculty

NSF CAREER Awards

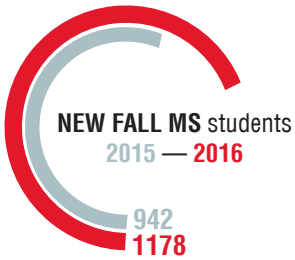
5 ENGINEERING DEPARTMENTS

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

3566 **UNDERGRADUATE** students



3177 **GRADUATE** students



YOUNG INVESTIGATOR Awards

FACULTY HONORS AND AWARDS

Professor **Laura Lewis**, jointly appointed in mechanical and industrial engineering, won a Fulbright U.S. Scholar Program grant for a research project in Spain to advance her research in magnetic materials. Dr. Lewis was also selected as an American Physical Society fellow for for investigations of fundamental structure-property relationships in functional magnetic materials from a unified perspective, specifically for "advancing permanent magnet, magnetic cooling, and biomedical applications."

Professor **Shashi Murthy** was awarded a $300K NSF grant to create a "Bioreactor System for Autologous T-Cell Stimulation." The cell type that is most commonly used to target cancers is the T cell, a type of white blood cell. The project addresses the manufacturing challenge associated with T cell stimulation with an interdisciplinary approach to design disposable stimulation systems that can accept dendritic cell and T cell samples, accomplish the desired stimulation in a timely and efficient manner, and generate enough T cells for a therapeutic dose.

Associate Teaching Professor **Lucas Landherr** recently won the 2016 Outstanding Teacher Award from the Northeast section of American Society for Engineering Education (ASEE). This award is given by each ASEE section, with support, where possible, from local industry. The award, which focuses on outstanding classroom performance, recognizes teachers of engineering and engineering technology students and serves as an incentive to make further significant contributions to teaching.

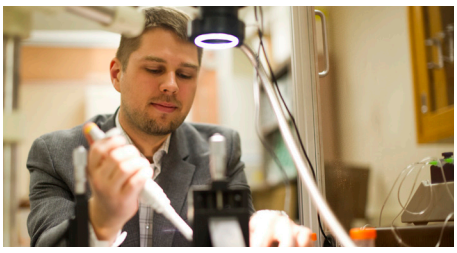
Chair and Professor of Chemical Engineering and Art Zafiropoulo Chair in Engineering **Thomas Webster** was awarded a patent for "System and Method for Attaching Soft Tissue to an Implant Comprising a Nanotextured Surface." Dr. Webster also received the International Society for Ceramics in Medicine Excellence Award for outstanding service in the field of biomaterials.

Assistant Professor **Nasim Annabi's** research to solve the problem of chronic non-healing wounds has led to the development of the first elastic and adhesive wound dressing with adhesive, antimicrobial, and regenerative properties. The research findings were published in the *Journal of Biomaterials*.

Vincent Harris, University Distinguished Professor and William Lincoln Smith Chair Professor, electrical and computer engineering, received in collaboration with Quorvo an $8M grant (2017-2019) from the Defense Advanced Research Projects Agency for a project, "MAgnetics on GaN for Next GEneration T/R Systems (MAGNETS)," which involves the Integration of active and passive elements in GaN-based Transmit and receive modules.

Associate Professor **Ming Su** received a $300K grant from the National Institute of Justice to work on new nanoparticle barcodes, which would have an astronomically large coding space as compared to those of printed barcodes, but completely invisible to the naked eye. Additionally, Su's research on cancer biomarker detection using phase change nanoparticles was highlighted in the recent annual report of Lung Cancer Research Program of Congressionally Directed Medical Research Program of the Department of Defense.

Professor **Rebecca Carrier** (PI) and Assistant Professor **Abigail Koppes** (Co-I) were awarded a $5M National Institutes of Health Bioengineering Research Partnership grant to develop an in vitro model of the human gut that can be utilized for laboratory study. This is a collaborative project between Northeastern University, MIT, and Boston Children's Hospital.



QSM Diagnostics, founded by Associate Professor **Edgar Goluch**, was awarded an "In-Kind Silver Winner" prize at the 2016 MassChallenge. QSM Diagnostics uses a proprietary instrument sensor to identify common infectious bacteria in bodily fluids within one minute at the point-of-care.

Chair and Professor of Chemical Engineering and Art Zafiropoulo Chair in Engineering **Thomas Webster** developed a novel self-assembling nanomolecule that is being exclusively licensed by Audax Medical, Inc. for use in tissue regeneration. Additionally, at the 13th IASTED International Conference on Biomedical Engineering in Innsbruck, Austria, Webster was awarded the Plenary Award for his lab's contributions to commercializing nanomedicine.

FACULTY BY RESEARCH AREAS

21
Faculty

ADVANCED MATERIALS RESEARCH

Nasim Annabi
Debra Auguste
Sidi Bencherif
Sunho Choi
Arthur Coury
Matthew Eckelman
Adam Ekenseair
Hicham Fenniri
Joshua Gallaway
Andrew Gouldstone
Vincent Harris
Francisco Hung
Barry Karger
Lucas Landherr
Laura Lewis
Courtney Pfluger
Ming Su
Thomas Webster
Richard West
Ronald Willey
Katherine Ziemer

21
Faculty

BIOLOGICAL ENGINEERING

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

MANSOOR AMIJI

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

PhD, Purdue University, 1992
che.neu.edu/people/amiji-mansoor

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

Honors and awards: Fellow, American Association of Pharmaceutical Scientists; Fellow, Controlled Release Society; T. Nagai Award, Controlled Release Society

SELECTED PUBLICATIONS

M. Talekar, M. Trivedi, P. Shah, Q. Ouyang, A. Oka, S.K. Gandham, M.M. Amiji
Combination wt-p53 and MicroRNA-125b Transfection in a Genetically Engineered Lung Cancer Model Using Dual EGFR/CD44 Targeted Nanoparticles, Molecular Therapy, 24(4), 2016, 759-769

A. Singh, J. Xu, G. Mattheolabakis, M.M. Amiji
EGFR-Targeted Gelatin Nanoparticles for Systemic Administration of Gemcitabine in an Orthotopic Pancreatic Cancer Model, Nanomedicine: Nanotechnology, Biology, and Medicine, 12(3), 2016, 589-600

S. Yadav, S.K. Gandham, R. Panicucci, M.M. Amiji
Intranasal Brain Delivery of Cationic Nanoemulsion-Encapsulated TNF siRNA for Prevention of Experimental Neuroinflammation, Nanomedicine: Nanotechnology, Biology, and Medicine, 12(4), 2016, 987-1002

D. Deshpande, S. Kethireddy, D.R. Janero, M.M. Amiji
Therapeutic Efficacy of an w-3-Fatty Acid-Containing Estradiol Nano-Delivery System Against Experimental Atherosclerosis, PLoS ONE, 11(2), 2016

SELECTED RESEARCH PROJECTS

Combinatorial-Designed Nano-Platforms to Overcome Tumor Drug Resistance
Principal Investigator, National Institutes of Health

Multi-Modal Gene Therapy for Pancreatic Cancer with Targeted Nanovectors
Principal Investigator, National Institutes of Health

IGERT: Nanomedical Science and Technology
Co-Investigator, National Science Foundation

Integrated Image-Guided Targeted Therapy for Refractory Ovarian Cancer
Principal Investigator, Nemucore Medical Innovations, Inc.

Impact of Lipids on Compound Absorption: Mechanistic Studies and Modeling
Co-Investigator, National Institutes of Health

Hepatic Insulin Resistance and Metabolic Disease
Principal Investigator, National Institutes of Health

Targeted Platinates/siRNA Combination Therapy for Resistant Lung Cancer
Principal Investigator, National Institutes of Health

NASIM ANNABI

Assistant Professor, Chemical Engineering

PhD, University of Sydney, Australia, 2010
che.neu.edu/people/annabi-nasim

Scholarship focus: advanced biomaterials; soft tissue engineering; 3D microfabrication; vascularized 3D tissues; nanocomposite hydrogels

SELECTED PUBLICATIONS

N. Annabi, S.R. Shin, A. Tamayol, M. Miscuglio, M. Bakooshli, A. Assman, P. Mostrafalu, J.-Y. Sun, S.M. Mithieux, L. Cheung, X. Tang, A.S. Weiss, A. Khademhosseini
Highly Elastic and Conductive Human-Based Protein Hybrid Hydrogels, Advanced Materials, 28(1), 2016, 40-49

Y. Zhang, R. Avery, Q. Vallmajó Martín, A. Assmann, A. Vegh, A. Memic, B.D. Olsen, N. Annabi, A. Khademhosseini
A Highly Elastic and Rapid Crosslinkable Elastin-Like Polypeptide-Based Gels for Biomedical Applications, Advanced Functional Materials, 25 (30), 2015, 4814-4826

N. Annabi, A. Tamayol, J. Alfredo Uquillas, M. Akbari, L. Bertassoni, C. Cha, G. Camci-Unal, M. Dokmeci, N.A. Peppas, A. Khademhosseini
25th Anniversary Article: Rational Design and Applications of Hydrogels in Regenerative Medicine, Advanced Materials, 26(1), 2014, 85-124

N. Annabi, A. Tamayol, S. Shin, A.M. Ghaemmaghami, N.A. Peppas, A. Khademhosseini
Surgical Materials: Current Challenges and Nano-Enabled Solutions, Nano Today, 9(5), 2014, 574-589

N. Annabi, K. Tsang, S.M. Mithieux, M. Nikkhah, A. Ameri, A. Khademhosseini, A.S. Weiss
Highly Elastic Micropatterned Hydrogels for Engineering Functional Cardiac Tissues, Advanced Functional Materials, 23(39), 2013, 4950-4959

SELECTED RESEARCH PROJECTS

Engineering a Sprayable Multifunctional Wound Dressing
Principal Investigator, Northeastern University

Engineering Bioprintable Cardiac Tissues
Principal Investigator, American Heart Association

Smart Wound Dressing for Treating Chronic Diabetic Ulcers
Co-Investigator, National Institutes of Health

ANAND ASTHAGIRI

Associate Professor, Bioengineering; affiliated faculty, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

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

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

DEBRA AUGUSTE

Professor, Chemical Engineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

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

SIDI A. BENCHERIF

Assistant Professor, Chemical Engineering

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

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

Honors and awards: FACE Foundation Award to Strengthen French-American Collaborative Research Activities

SELECTED PUBLICATIONS

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

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

S.A. Bencherif, R.W. Sands, O. Ali, S.A. Lewin, A. Li, T. Braschler, T. Shih, D. Bhatta, G. Dranoff, D.J. Mooney
Injectable Scaffold-Based Whole Tumor Cell Vaccines, Nature Communications, 6, 2015, 7556 *Selected as research highlight by Harvard University, Biomedical Picture of the Day, and several online news articles

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

S.A. Bencherif, W.R. Sands, D. Bhatta, P. Arany, C. Verbeke, D.A. Edwards, D.J. Mooney
Injectable Preformed Scaffolds with Shape-Memory Properties, PNAS, 109(48), 2012, 19590-19595 **Selected as research highlight by Nature, Imperial College of London, Harvard University, Materials360, Biomedical Picture of the Day, Sciences & Avenir magazine, Cell Therapy News, and several online news articles

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

SELECTED RESEARCH PROJECTS

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

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

REBECCA L. CARRIER

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

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

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

Honors and awards: College of Engineering Faculty Fellow; National Academy of Engineering Frontiers of Engineering and Frontiers of Engineering Education, Selected Attendee; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

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

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

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

H.M. Yildiz, L. Speciner, C. Ozdemir, D.E. Cohen, R.L. Carrier
Food-Associated Stimuli Enhance Barrier Properties of Gastrointestinal Mucus, Biomaterials, 54, 2015, 1-8

H.M. Yildiz, T.L. Carlson, A.M. Goldstein, R.L. Carrier
Mucus Barriers to Microparticles and Microbes are Altered in Hirschsprung's Disease, Macromol Biosci, 5(5), 2015, 712-718

J.R. Thiagarajah, H. Yildiz, T. Carlson, A.R. Thomas, C. Steiger, A. Pieretti, L.R. Zuckerberg, R.L. Carrier, A.M. Goldstein
Altered Goblet Cell Differentiation and Surface Mucus Properties in Hirschsprung Disease, PLoS ONE, 9(6), 2014, e99944

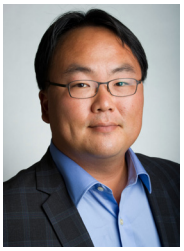
P. Baranov, A. Michaelson, J. Kundu, R.L. Carrier, M. Young
Interphotoreceptor Matrix-poly(caprolactone) Composite Scaffolds for Human Photoreceptor Differentiation, Journal of Tissue Engineering, 5, 2014

SELECTED RESEARCH PROJECTS

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

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

SUNHO CHOI



Assistant Professor, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

HEATHER CLARK

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

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

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

G. Rong, S. Corrie, H.A. Clark
In Vivo Biosensing: Progress and Perspectives, ACS Sensors, 2(3), 2017, 327-338

T.T. Ruckh, C.G. Skipwith, W. Chang, A.W. Senko, V. Bulovic, P. Anikeeva, H.A. Clark
Ion-Switchable FRET Rates in Ratiometric Nanocrystal Potassium Sensors, ACS Nano, 10(4), 2016, 4020-4030

W. Di, R.S. Czarny, N.A. Fletcher, M.D. Krebs, H.A. Clark
Comparative Study of Poly(epsilon-caprolactone) and Poly(Lactic-co-Glycolic Acid)-Based Nanofiber Scaffolds for pH-Sensing, Pharmaceutical Research, 2016

A. Sahari, T.T. Ruckh, R. Hutchings, H.A. Clark
Development of an Ultra-Selective Optical Nanosensor for Potassium Imaging, Analytical Chemistry, 87(21), 2015, 10684-10687

R.P. Walsh, J. Morales, C.G. Skipwith, T.T. Ruckh, H.A. Clark
Enzyme Linked DNA Dendrimers for the Detection of Acetylcholine, Nature Scientific Reports, 2015

J.M. Morales, C.G. Skipwith, H.A. Clark
Quadruplex Integrated DNA (QuID) Nanosensors for Monitoring Dopamine, Sensors, 15(8), 2015, 19912-19924

K.J. Cash, C. Li, L.V. Wang, H.A. Clark
Photoacoustic Imaging of Nanosensors for Therapeutic Drugs, In Vivo, ACS Nano, 9(2), 2015, 1692-1698

M.K. Balaconis, Y. Luo, H.A. Clark
Glucose-Sensitive Nanofiber Scaffolds Prevent Sensor Diffusion, In Vivo, Analyst, 140, 2015, 716-723 *selected as a HOT article

SELECTED RESEARCH PROJECTS

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

ARTHUR COURY

University Distinguished Professor,
Chemical Engineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

ENO EBONG

Assistant Professor, Chemical Engineering
affiliated faculty, Bioengineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

MATTHEW ECKELMAN

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

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

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

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

SELECTED PUBLICATIONS

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

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

S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu
Life-Cycle Assessment of Advanced Nutrient Removal Technologies for Wastewater Treatment, Environmental Science and Technology, 50(6), 2016, 3020-3030

M.J. Eckelman
Life-Cycle Inherent Toxicity: A Novel LCA-Based Algorithm for Evaluating Chemical Synthesis Pathways, Green Chemistry, 18(11), 2016, 3257-3264

M. Montazeri, L. Soh, P. Pérez-López, J.B. Zimmerman, M.J. Eckelman
Time-Dependent Life Cycle Assessment of Microalgal Biorefinery Co-Products, Biofuels, Bioproducts, and Biorefining, 2016

M. Saha, M.J. Eckelman
Geospatial Assessment of Potential Bioenergy Crop Production on Urban Marginal Land, Applied Energy, 159, 2015, 540-547

SELECTED RESEARCH PROJECTS

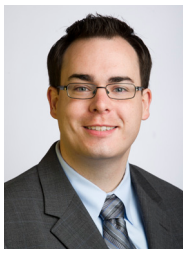
Air Climate and Energy Center—SEARCH: Solutions for Energy AiR Climate and Health
Senior Personnel, Environmental Protection Agency

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

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

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

ADAM EKENSEAIR



Assistant Professor, Chemical Engineering; affiliated faculty, Bioengineering

PhD, University of Texas at Austin, 2010
che.neu.edu/people/ekenseair-adam

Scholarship focus: synthesis and application of novel polymeric biomaterials for tissue engineering and regenerative medicine

SELECTED PUBLICATIONS

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

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

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

S.N. Tzouanas, A.K. Ekenseair, F.K. Kasper, A.G. Mikos
Mesenchymal Stem Cell and Gelatin Microparticle Encapsulation in Thermally and Chemically Gelling Injectable Hydrogels for Tissue Engineering, Journal of Biomedical Materials Research, Part A, 102(5), 2014, 1222-1230

A.K. Ekenseair, F.K. Kasper, A.G. Mikos
Perspectives on the Interface of Drug Delivery and Tissue Engineering, Advanced Drug Delivery Reviews, 65, 2013, 89-92

A.K. Ekenseair, K.W.M. Boere, S.N. Tzouanas, T.N. Vo, F.K. Kasper, A.G. Mikos
Structure-Property Evaluation of Thermally and Chemically Gelling Injectable Hydrogels for Tissue Engineering, Biomacromolecules, 13, 2012, 2821-2830

SELECTED RESEARCH PROJECTS

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

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

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

HICHAM FENNIRI

Professor, Chemical Engineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

R.L. Beingessner, Y. Fan, H, Fenniri
Molecular and Supramolecular Chemistry of Rosette Nanotubes, RSC Advances, 6, 2016, 75820-75838

H. Fenniri, G.A. Tikhomirov, D.H. Brouwer, S. Bouatra, et al.
High Field Solid-State NMR Spectroscopy Investigation of 15N-Labeled Rosette Nanotubes: Hydrogen Bond Network and Channel-Bound Water, Journal of the American Chemical Society, 138, 2016, 6115-6118

SELECTED RESEARCH PROJECTS

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

JOSHUA GALLAWAY

DiPietro Assistant Professor, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

EDGAR GOLUCH

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

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

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

SELECTED PUBLICATIONS

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

H.J. Sismaet, A. Banerjee, S. McNish, Y. Choi, M. Torralba, S. Lucas, A. Chan, V.K. Shanmugam, E.D. Goluch
Electrochemical Detection of Pseudomonas in Wound Exudate Samples from Patients with Chronic Wounds, Wound Repair and Regeneration, 24(2), 2016, 366-372 *featured in a George Washington University press release

T.A. Webster, H.J. Sismaet, I.J. Chan, E.D. Goluch
Electrochemically Monitoring the Antibiotic Susceptibility of Pseudomonas aeruginosa Biofilms, Analyst, 140, 2015, 7195-7201

P.N. Abadian, N. Yildirim, A.Z. Gu, E.D. Goluch
SPRi-Based Adenovirus Detection Using a Surrogate Antibody Method, Biosensors and Bioelectronics, 74, 2015, 808-814

K. Mathwig, T. Albrecht, E.D. Goluch, L. Rassaei
Challenges of Biomarker Detection at the Nanoscale: Nanopores and Microelectrodes, Analytical Chemistry, 87, 2015, 5470-5475

T.A. Webster, H.J. Sismaet, A.F. Sattler, E.D. Goluch
Improved Monitoring of P. aeruginosa on Agar Plates, Analytical Methods, 7, 2015, 7150-7155 *emerging investigator themed issue

G.E. Aninwene II, P.N. Abadian, V. Ravi, E.N. Taylor, D.M. Hall, A. Mei, G.D. Jay, E.D. Goluch, T.J. Webster
Lubricin: A Novel Means to Decrease Bacterial Adhesion and Proliferation, Journal of Biomedical Materials Research, Part A, 103, 2015, 451-462

P.N. Abadian, E.D. Goluch
Using Surface Plasmon Resonance Imaging (SPRi) to Evaluate Bacterial Adhesion on Surface Coatings, Analytical Methods, 7, 2015, 115-122, *featured as a hot article in Analytical Methods

SELECTED RESEARCH PROJECTS

EAGER: Bio-Inspired Electrochemical Sensing of Small Molecules Using Antibodies
Principal Investigator, National Science Foundation

IDBR: TYPE A Nano-Constriction Devices for Isolation and Cultivation of Environmental Microbes
Principal Investigator, National Science Foundation

ANDREW GOULDSTONE

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

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

Scholarship focus: biomechanics; material science; engineering mechanics

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

SELECTED PUBLICATIONS

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

VINCENT G. HARRIS

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

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

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

Honors and awards: Fellow, American Association for the Advancement fo 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

A.S. Sokolov, M. Geiler, V.G. Harris
Broadband Ferromagnetic Resonance Linewidth Measurement by a Microstripline Transmission Resonator, Applied Physics Letters, 108(17), 2016

P. Taheri, R. Barua, J. Hsu, M. Zamanpour, Y. Chen, V.G. Harris
Structure, Magnetism, and Magnetostrictive Properties of Mechanically Alloyed Fe 81 Ga 19, Journal of Alloys and Compounds, 661, 2016, 306-311

X. Wu, S. Yan, W. Liu, Z. Feng, Y. Chen, V.G. Harris
Influence of Particle Size on the Magnetic Spectrum of NiCuZn Ferrites for Electromagnetic Shielding Applications, Journal of Magnetism and Magnetic Materials, 401, 2016, 1093-1096

M. Bi, X. Wang, H. Lu, L. Deng, K.J. Sunday, M.L. Taheri, V.G. Harris
Magnetic and Microwave Properties of Amorphous FeCoNbBCu Thin Films, Journal of Applied Physics, 119(2), 2016

F. Chen, X. Wang, Y. Nie, Q. Li, J. Ouyang, Z. Feng, Y. Chen, V.G. Harris
Ferromagnetic Resonance Induced Large Microwave Magnetodielectric Effect in Cerium Doped Y3Fe5O12 Ferrites, Scientific Reports, 6, 2016, 28206

Z. Su, Q. Li, X Wang, B. Hu, Z. Feng, Y. Chen, V.G. Harris
Room Temperature Magnetoelectric Effect of YFeO3-Y3Fe5O12 Ferrite Composites, Journal of Alloys and Compounds, 656, 2016, 465-469

SELECTED RESEARCH PROJECTS

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

Magnetodielectric Heterostructures and Composites
Principal Investigator, Rogers Corp

Nonlinear Properties of Ferrite Materials
Principal Investigator, Raytheon

FRANCISCO HUNG

Associate Professor, Chemical Engineering

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

Scholarship focus: molecular modeling and theory of interfacial and solvated systems relevant to materials, biomaterials, energy and the environment

Honors and awards: NSF CAREER Award; ORAU Ralph E. Powe Award

SELECTED PUBLICATIONS

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

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

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

Y. Shen, X. He, F.R. Hung
Structural and Dynamical Properties of a Deep Eutectic Solvent Confined Inside a Slit Pore, Journal of Physical Chemistry C, 119, 2015, 2489-24500

T.P. Liyana-Arachchi, Z. Zhang, H. Vempati, A.K. Hansel, C. Stevens, A.T. Pham, F.S. Ehrenhauser, K.T. Valsaraj, F.R. Hung
Green Leaf Volatiles on Atmospheric Air/Water Interfaces: A Combined Experimental and Molecular Simulation Study, Journal of Chemical & Engineering Data, 59, 2014, 3025-3035

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

R. Singh, N.N. Rajput, X. He, J. Monk, F.R. Hung
Molecular Dynamics Simulations of the Ionic Liquid [EMIM+] [TFMSI-] Confined Inside Rutile (110) Slit Nanopores, Physical Chemistry Chemical Physics, 15, 2013, 16090-16103

SELECTED RESEARCH PROJECTS

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

BARRY KARGER

Professor and Director, Barnett Institute; affiliated faculty, Bioengineering, Chemical Engineering

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

Scholarship focus: analytical chemistry, bioanalysis, proteomics

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

SELECTED PUBLICATIONS

Z. Liu, S. Dai, B.L. Karger, J.J. Li, et al.
A Quantitative Proteomic Analysis of Cellular Responses to High Glucose Media in Chinese Hamster Ovary Cells, Biotechnology Progress, 31(4), 2015, 1026-1038

S. Li, B.D. Plouffe, B.L. Karger, A.R. Ivanov, et al.
An Integrated Platform for Isolation, Processing and Mass Spectrometry-Based Proteomic Profiling of Rare Cells in Whole Blood, Molecular and Cellular Proteomics, 14(6), 2015, 1672-1683

H. Arthanari, Y. Gao, S.-L. Wu, B.L. Karger, et al.
Constitutively Oxidized CXXC Motifs within the CD3 Heterodimeric Ectodomains of the T Cell Receptor Complex Enforce the Conformation of Juxtaposed Segments, Journal of Biological Chemistry, 290(1), 2015, 18880-18892

S. Li, T. Nakayama, A. Akinc, S.-L. Wu, B.L. Karger
Development of LC-MS Methods for Quantitation Of Hepcidin And Demonstration of siRNA-Mediated Hepcidin Suppression in Serum, Journal of Pharmacological and Toxicological Methods, 71, 2015, 110-119

S. Rodig, J.L. Kutok, E.K. Jackson, B.L. Karger, et al.
Immunological Mechanisms of the Antitumor Effects of Supplemental Oxygenation, Science Translational Medicine, 7(277), 2015, 277

SELECTED RESEARCH PROJECTS

Development of an Analytical Platform for Comprehensive Characterization of Biotherapeutic Proteins Top Down, Middle Down and Bottom up LC and CE-MS of Biopharmaceuticals
Principal Investigator, Biogen Idec

Proteomic Analysis of Cell Lines, Drug Target Identification and Host Cell Impurity
Principal Investigator, Industrial Collaborations

ABIGAIL KOPPES

Assistant Professor, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

D. Ventre, A.N. Koppes
The Body Acoustic: Ultrasonic Neuromodulation for Translational Medicine, Cells, Tissues, and Organs, 202, 2015-16, 23-41

S. Hosic, S.K. Murthy, A.N. Koppes
Microfluidic Sample Preparation for Single Cell Analysis, Analytical Chemistry, 88(1), 2015, 354-380

A.N. Koppes, D.M. Thompson
Neural Innervation of Engineered Musculoskeletal Tissues, Regenerative Engineering of Musculoskeletal Tissues and Interfaces, 2015, 293-323

D.M. Thompson, A.N. Koppes, J.G. Hardy, C.E. Schmidt
Electrical Stimuli in the Central Nervous System Microenvironment, Annual Review of Biomedical Engineering,16, 2014, 397-430

A.N. Koppes, N.W. Zaccor, C.J Rivet, L.A. Williams, J.M. Piselli, R.J. Gilbert, D.M. Thompson
Neurite Outgrowth on Electrospun PLLA Fibers is Enhanced by Exogenous Electrical Stimulation, Journal of Neural Engineering, 11(4), 2014, 046002

D.M. Thompson, A.N. Koppes, J.G. Hardy, C.E. Schmidt
Electrical Stimulation of the CNS Microenvironment, Annual Review of Biomedical Engineering, 16, 2014, 397-430

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
Co-Principal Investigator, National Institute of Health

RYAN KOPPES

Assistant Professor, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

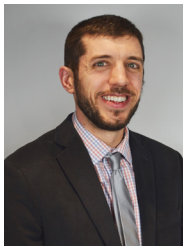
P. Anikeeva, R.A. Koppes
Restoring the Sense of Touch, Science, 350(6258), 2015, 274-275

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

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

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

LUCAS LANDHERR



Associate Teaching Professor, Chemical Engineering

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

Scholarship focus: STEM module development for K-12 classrooms; science comics as novel teaching tools for K-12 and undergraduate education

Honors and awards: Fostering Engineering Innovation in Education Award; American Society for Engineering Education Northeast Section 2016 Outstanding Teacher Award; Omega Chi Epsilon Faculty Member of the Year Award; Dick Sioui Teaching Award

SELECTED PUBLICATIONS

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

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

C. Cogswell, D. Shepard, C. Pietsch
Assumptions*, Boston, MA: Northeastern University, 2016 [8 1/2" X 11" comic. 1-8]

D. Shepherd, J. Cooke
Fugacity*, Boston, MA: Northeastern University, 2016 [8 1/2" X 11" comic. 1-10]

D. Shepherd, M. Lubchansky
Heat Exchangers*, Boston, MA: Northeastern University, 2016 [8 1/2" X 11" comic. 1-6]

D. Shepherd, M. Lubchansky
Purge and Recycle Streams*, Boston, MA: Northeastern University, 2016 [8 1/2" X 11" comic. 1-8]

L.J.T. Landherr
The Production of Science Comics To Improve Undergraduate Engineering, Paper presented and published in the Proceedings of the ASEE Northeast Section Conference, 2016

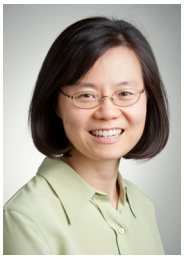
D. Shepherd, B. Sparks
Data Analysis*, Boston, MA: Northeastern University, 2015 [8 1/2" X 11" comic. 1-5]

D. Shepherd, M. Lai
Feedback Controls*, Boston, MA: Northeastern University, 2015 [8 1/2" X 11" comic. 1-8]

D. Shepherd, A. Kahl
Uncertainty*, Boston, MA: Northeastern University, 2015 [8 1/2" X 11" comic. 1-6]

*All articles listed here are independently published science comics for educational distribution. Note that Dante Shepherd is the pseudonym for creative work for Lucas James Landherr

CAROLYN LEE-PARSONS



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

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

LAURA H. LEWIS

Cabot Professor, Chemical Engineering; jointly appointed, Mechanical and Industrial Engineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

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

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

STEVE LUSTIG

Associate Professor, Chemical Engineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

GREGORY MILLER

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

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

Scholarship focus: addiction sciences, neuropsychiatric disorders

SELECTED PUBLICATIONS

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

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

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

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

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

SANJEEV MUKERJEE

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

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

Scholarship focus: physical/materials chemistry

SELECTED PUBLICATIONS

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

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

SHASHI MURTHY

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

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

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

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

SELECTED PUBLICATIONS

C.H. do Prado, T. Narahari, F.H. Holland, H-N. Lee, S.K. Murthy, H.C. Brenhouse
Effects of Early Adolescent Environmental Enrichment on Cognitive Dysfunction, Prefrontal Cortex Development, and Inflammatory Cytokines After Early Life Stress, Developmental Psychobiology, 2016, 58, 482-491

L. Calvier, E. Legchenko, L. Grimm, H. Sallmon, A. Hatch, B. D. Plouffe, C. Schroeder, J. Bauersachs, S. K. Murthy, G. Hansmann
Galectin-3 and Aldosterone as Potential Tandem Biomarkers in Pulmonary Arterial Hypertension, Heart, 102, 2016, 390-396 Editor's Choice

D. Bavli, E. Ezra, D. Kitsberg, M. Vosk-Artzi, S.K. Murthy, Y. Nahmias
One Step Antibody-Mediated Isolation and Patterning of Multiple Cell Types in Microfluidic Devices, Biomicrofluidics,10, 2016, 024112

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

SELECTED RESEARCH PROJECTS

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

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

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

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

COURTNEY PFLUGER

Assistant Teaching Professor, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

C.A. Pfluger, R. Carrier, B. Sun, K. Ziemer, D.D. Burkey
Cross-linking and Degradation Properties of Plasma Enhanced Chemical Vapor Deposited Poly(2-hydroxyethyl methacrylate), Macromolecular Rapid Communications, 30(2), 2009, 126-132

C.A. Pfluger, R. Carrier, D.D. Burkey
Plasma Enhanced Chemical Vapor Deposited Poly (2-hydroxyethyl methacrylate) for Fabricating a Degradable, Biocompatible Intestinal Tissue Culture Substrate, AIChE Annual Meeting, 2008

MRITYUNJAY SINGH

Affiliated faculty, Chemical Engineering

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

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

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

SELECTED PUBLICATIONS

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, 2017

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, 215, 900-906

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

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

M.C. Halbig, M. Singh, R. Asthana
Diffusion Bonding of SiC Fiber-Bonded Ceramics using Ti/Mo and Ti/Cu Interlayers, Ceramics International, 41(2), 2015, 2140-2149

K.L. Lin, M. Singh, R. Asthana
Effect of Aging Treatment on Interfacial and Mechanical Properties of Yttria Stabilized Zirconia (YSZ)/Stainless Steel Joints, Journal of the European Ceramics Society, 35(3), 2015, 1041-1053

SRINIVAS SRIDHAR

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

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

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

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

SELECTED PUBLICATIONS

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

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

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

J. Belz, N. Castilla-Ojo, S. Sridhar, R. Kumar
Radiosensitizing Silica Nanoparticles Encapsulating Docetaxel for Treatment of Prostate Cancer, Cancer Nanotechnology: Methods and Protocols, 2017, 403-409

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

SELECTED RESEARCH PROJECTS

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

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

Nanoscale Magnetism in Next Generation Magnetic Nanoparticles Sub-project II: Organically Modified Magnetic Nanoparticles
Principal Investigator, Asian Office of Aerospace Research and Development

PARP Inhibitor Nanotherapy for Ovarian Cancer
Principal Investigator, Department of Defense, Ovarian Cancer Research Program

MING SU

Associate Professor & Associate Chair of Graduate Studies, Chemical Engineering

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

SELECTED RESEARCH PROJECTS

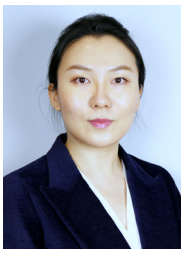
Adsorption Cooling With Nanoporous Monolithic Adsorbents
Principal Investigator, National Science Foundation

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

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

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

LINLIN SUN



Research Assistant Professor, Chemical Engineering

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

VLADIMIR TORCHILIN

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

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

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

Honors and awards: 2015 Chair, XX International Symposium on Microencapsulation; Best Paper Award 2014, European Journal of Pharmaceutics and Biopharmaceutics; 2016 President and Plenary Speaker, BIONANOTOX; 2016 International Chair of Therapeutic Innovation, LabEx LERMIT; 2016 Highly Cited Researcher from Thomson Reuters; Outstanding Excellence Award, Pharmaceutica 2017 Congress

SELECTED PUBLICATIONS

S. Erdogan, V.P. Torchilin
Gadolinium-Loaded Polychelating Polymer-Containing Tumor-Targeted Liposomes, Methods in Molecular Biology, 1522, 2017, 179-182

S.K. Sriraman, G. Salzano, C. Sarosozen, V.P. Torchilin
Anti-Cancer Activity of Doxorubicin-Loaded Liposomes Co-Modified with Transferrin and Folic Acid, European Journal of Pharmaceutics and Biopharmaceutics, 105, 2016, 40-49

R. Riehle, B. Pattni, A. Jhaveri, A. Kulkarni, G. Thakur, A. Degterev, V.P. Torchilin
Comination Nanopreparations of a Novel Proapoptotic Drug - NCL-240, TRAIL and siRNA, Pharmaceutical Research, 33(7), 2016, 1587-1601

T. Wang, B. Narayanaswamy, H. Ren, V.P. Torchilin
Combination Therapy Targeting Both Cancer Stem-Like Cells and Bulk Tumor Cells for Imporved Efficacy of Breast Cancer Treatment, Cancer Biology Therapy, 17(6), 2016, 698-707

S.K. Sriraman, J. Pan, C. Sarisozen, E. Luther, V.P. Torchilin
Enhanced Cytotoxicity of Folic Acid-Targeted Liposomes Co-Loaded with C6 Ceramide and Doxorubicin: In Vitro Evaluation on HeLa, A2780-ADR and H69-AR Cells, Molecular Pharmaceutics, 13(2), 2016, 428-437

SELECTED RESEARCH PROJECTS

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

Dendrimer-Based Nanomedicines
Principal Investigator, National Institutes of Health

Multifunctional Matrix Metalloprotease-2-Sensitive Anti-Cancer Nanopreparations
Principal Investigator, National Institutes of Health

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

THOMAS WEBSTER

Professor and Department Chair, Chemical Engineering; Art Zafiropoulo Chair in Engineering; affiliated faculty, Bioengineering

PhD, Rensselaer Polytechnic Institute, 2000
che.neu.edu/people/webster-thomas

Scholarship focus: design, synthesis, and evaluation of nanomaterials for various medical applications, including self-assembled chemistries, nanoparticles, nanotubes, and nanostructured surfaces

Honors and awards: Fellow, 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

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

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

P. Tran, L. Sarin, R. Hurt, T.J. Webster
Titanium Surfaces with Adherent Selenium Nanoclusters as a Novel Anti-Cancer Orthopedic Material, Journal of Biomedical Materials Research, 93(4), 2014, 1417-1428

P. Tran, L. Sarin, R. Hurt, T.J. Webster
Opportunities for Nanotechnology-Enabled Bioactive Bone Implants, Journal of Materials Chemistry, 19, 2009, 2653-2659

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

SELECTED RESEARCH PROJECTS

Development and Commercialization of Nanostructured Resorbable Urogenital Grafts
Principal Investigator, National Institutes of Health

Developing Injectable Materials for Cartilage Applications: Part 1
Principal Investigator, Audax, Inc.

Long-term Prevention of Peri-Implantitis via Nano-Textured, TiO/Ag Surfaces
Co-Principal Investigator, National Institutes of Health

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

Testing Orthopedic Materials for Ionic Fusion, Inc.
Principal Investigator, Ionic Fusion, Inc.

Testing RTI Materials for Orthopedic Applications
Principal Investigator, RTI, Inc.

RICHARD WEST

Assistant Professor, Chemical Engineering

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

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

Honors and awards: American Chemical Society Doctoral New Investigator

SELECTED PUBLICATIONS

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

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

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

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

C.W. Gao, J.W. Allen, W.H. Green, R.H. West
Reaction Mechanism Generator: Automatic Construction of Chemical Kinetic Mechanisms, Computer Physics Communications, 203, 2016, 212-225

R. Van de Vijver, N.M. Vandewiele, G.B. Marin, R.H. West, et al.
Automatic Mechanism and Kinetic Model Generation for Gas- and Solution-phase Processes: A Perspective on Best Practices, Recent Advances, and Future Challenges, International Journal of Chemical Kinetics, 47(4), 2015, 199-231

P.L. Bhoorasingh, R.H. West
Transition State Geometry Prediction Using Molecular Group Contributions, Physical Chemistry Chemical Physics, 17(48), 2015, 32173–32182

A. Jalan, R.H. West, W.H. Green
An Extensible Framework for Capturing Solvent Effects in Computer Generated Kinetic Models, Journal of Physical Chemistry B, 117(10), 2013, 2955–2970

SELECTED RESEARCH PROJECTS

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

RONALD WILLEY

Professor and Vice Chair, Chemical Engineering

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

Scholarship focus: process safety and catalysis (industrial)

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

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

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

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

KATHERINE ZIEMER

Professor, Chemical Engineering; Vice Provost for Curriculum

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

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

Dona Doureid Abou-Chakra

PhD 2016, Chemical Engineering; Advisor, Ronald Willey

DYNAMIC MODELING OF INBREATHING REQUIREMENTS FOR LOW-PRESSURE STORAGE TANKS

This study aims at calculating the maximum thermal inbreathing rate by performing dynamic simulations for different tanks using ioMosaic's SuperChems Expert™ software. The first objective of this research was comparing the detailed SuperChems Expert™ single-phase and two-phase wall dynamics model to existing large scale test data and models. The results were successfully reproduced using this software with error margins between ± 5%. Previous to this work, the software had not been evaluated for this important modeling.

See full dissertation at
coe.neu.edu/17/DonaDoureidAbou-Chakra

Pierre Lennox Bhoorasingh

PhD 2016, Chemical Engineering; Advisor, Richard West

AUTOMATED CALCULATION OF REACTION KINETICS VIA TRANSITION STATE THEORY

The work in this thesis was initially developed for hydrogen abstraction reactions, and has been extended to -scission and intra-hydrogen migration reactions. The automatically determined kinetics and state-of-the-art estimation methods were compared to high accuracy theoretical calculations, and the automated calculations were shown to outperform the estimation methods. This enables improved mechanism generation, where high-fidelity complex chemical models can be constructed with minimal human intervention.

See full dissertation at
coe.neu.edu/17/PierreLennoxBhoorasingh

Dinara Andirova

PhD 2016, Chemical Engineering; Advisor, Sunho Choi

STRUCTURAL MODIFICATION OF METAL ORGANIC FRAMEWORKS FOR APPLICATIONS IN CARBON DIOXIDE CAPTURE

In the first part of this work structural optimization of MOFs for practical CO_2 capture processes have been studied. It has been reported that the adsorption properties of MOFs in practical CO_2 capture tend to be harmed by the presence of moisture possibly due to the hydrophilic nature of the coordinatively unsaturated sites (CUSs) present within the frameworks. Here, the CUSs were functionalized with amine-containing molecules to prevent its structural degradation in a humid CO_2 capture environment. Specifically, it was demonstrated that amine groups could be grafted on the metal sites of the magnesium dioxybenzenedicarboxylate (Mg/DOBDC) without changing the framework structure of the material. The amine modified framework showed better structural preservation and retained CO_2 capture capacity after exposure to strident humid conditions.

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

Daniel James Hickey

PhD 2016, Chemical Engineering; Advisor, Thomas Webster

NANOSTRUCTURED SURFACE MODIFICATIONS TO DECREASE INFECTION AND IMPROVE BONE CELL RESPONSES ON ORTHOPEDIC BIOMATERIALS

In this work, cell- and bacteria-substrate interactions were investigated on two common (but very different) orthopedic biomaterials with the objective of finding common parameters that may improve the performance of all biomaterials.

First, a newly-developed severe shot peening (SSP) treatment was performed on 316L stainless steel, inducing increased nanoscale surface roughness and a network of overlapping slip bands (contributing to surface work hardening and substantial nanoscale grain refinement). Separation of the effects of nanoscale surface roughness and grain size was achieved by performing a secondary grinding/polishing step to remove differences in roughness between sample groups. Experiments with cells and bacteria revealed that the expression of vinculin focal adhesion contacts from osteoblasts was inversely related to grain size, while the adhesion of gram-positive bacteria (S. aureus and S. epidermidis) was inversely related to nanoscale surface roughness.

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

SELECTED PhD THESES

Avinash Raj Kola

PhD 2016, Chemical Engineering;
Advisor, Elizabeth Podlaha-Murphy

ELECTRODEPOSITION OF NI-W, AG-W AND AG-NI-W ALLOYS FROM THIOUREA-CITRATE ELECTROLYTES

The objective of this research is to investigate the electrodeposition behavior of binary Ni-W, Ag-W and ternary Ag-Ni-W alloys from a cyanide free electrolyte. First, electrolyte deposition conditions; pH, applied current density, concentration of additives and temperature on the deposit composition and thickness of Ni-W thin films are examined. Electrolyte pH is a crucial variable, as it affects the metallic species present in the electrolyte. Increasing the electrolyte pH increases the W wt % in the alloy, while increasing the electrolyte temperature resulted in improved metal deposition rates, thereby increasing the deposit thickness, as characterized by XRF. The effect of additives: sodium gluconate, boric acid and 2-butyne-1,4-diol (BD), in the Ni-W electrolyte is examined using factorial design to increase the W wt % in the alloy, thickness and improve deposit appearance.

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

Mark Louis Lalli

PhD 2016, Chemical Engineering; Advisor, Anand Asthagiri

THE INFLUENCE OF THE BIOPHYSICAL ENVIRONMENT AND CELL-CELL INTERACTIONS ON EPITHELIAL CELL ELECTROTAXIS

In this study, we sought to investigate the interactions between electric fields and intercellular connections on the electrotaxis of epithelial cells. We found that the non-transformed mammary epithelial cell line, MCF-10A, cells migrate toward the anode of an applied electric field. Although cells in isolation will display electrotaxis, they require an electric field at or above a threshold of 0.26 V/cm in order to migrate toward the anode. Increasing the strength of the stimulating field increased the degree to which the cells migrate toward the anode. However, when adjacent to other cells in a cell cluster, they not only migrate toward the anode with more directed paths, but also require no threshold of electric field to begin migration. Analysis of these migration paths indicated that being in the clustered cell state inhibited reorientation for migration.

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

Luting Liu

PhD 2017, Chemical Engineering; Advisor, Thomas Webster

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

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

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

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

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COVER IMAGE

Mian Wang, PhD'17, develops new nanoparticles to kill bacteria and grow tissue in the Egan Engineering Research Center.