DEPARTMENT OF CHEMICAL ENGINEERING

Dear Friends,

I welcome you to the Scholarship Report for the Department of Chemical Engineering at Northeastern University (NU) – the private university which received more undergraduate applications annually than any other university in the United States (earning NU the title of the most applied-to private university in the United States). As you might have noticed, our Department has been on fire over the past four years. For example, over the past four years, 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 four 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 21 conferences in the past 4 years demonstrating our leadership across chemical engineering.

I invite you to explore the NU 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 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

26

TENURED/ TENURE-TRACK Faculty

100+

GRADUATE students

HIGHEST PERCENTAGE OF WOMEN FACULTY IN CHEMICAL ENGINEERING AMONG THE TOP 50 ENGINEERING SCHOOLS

DEPARTMENT OF CHEMICAL ENGINEERING

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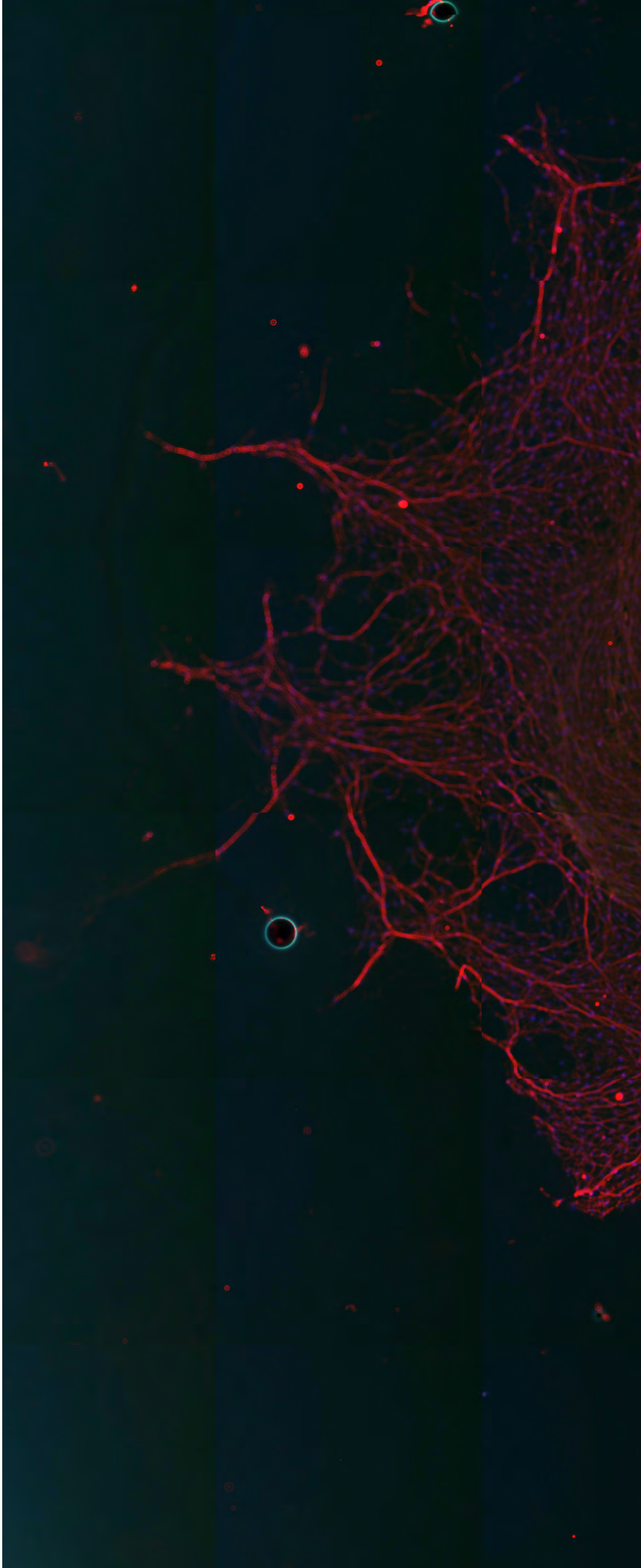
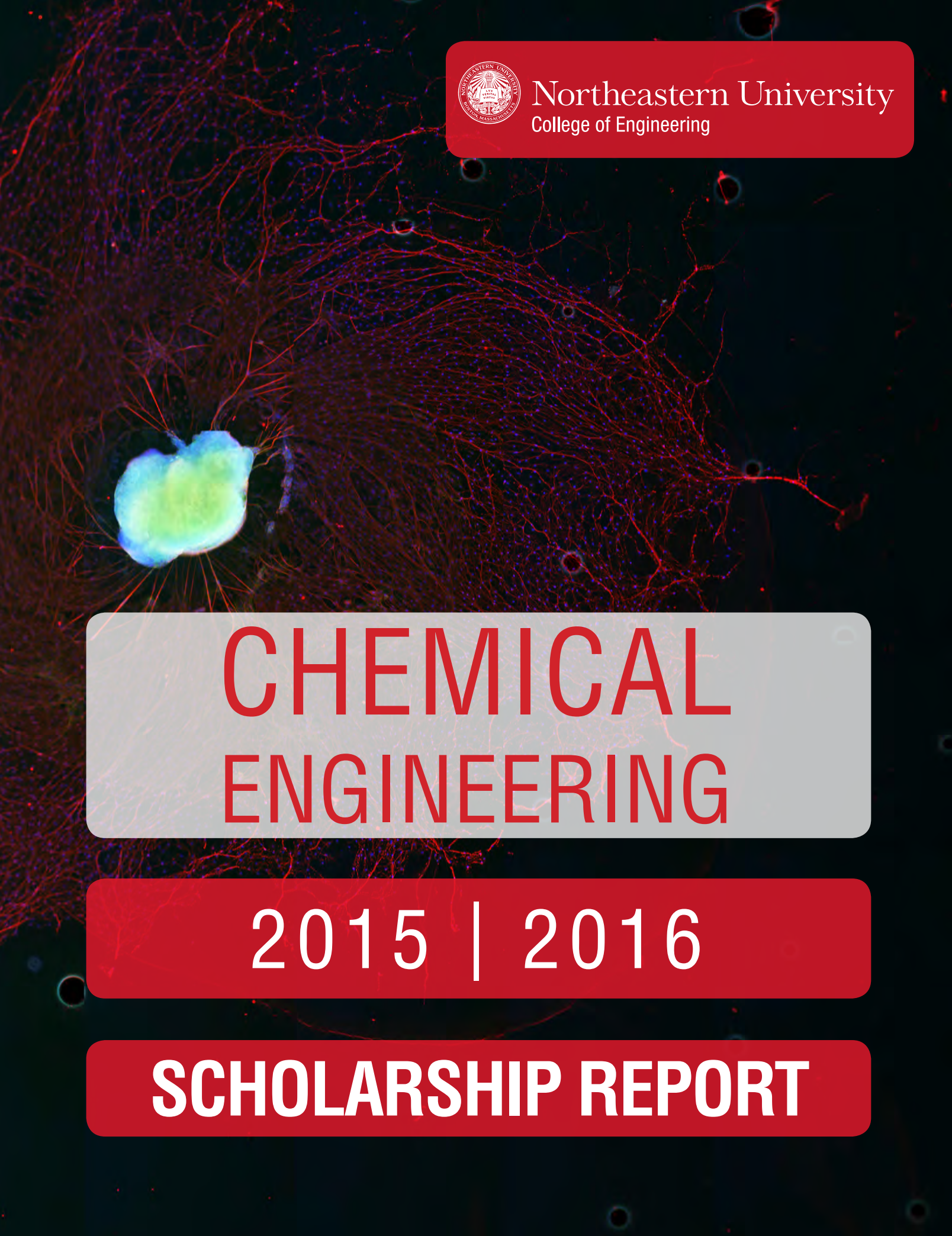
COVER IMAGE

Rosette nanotubes (RNTs) provide tailorable scaffolds that have been used in a variety of applications from tissue engineering to drug delivery and catalysis. The image shows results of a collaboration between Northeastern professors Abigail Koppes and Hicham Fenniri to evaluate the potential of RNTs for neural engineering, in which Dorsal root ganglion neurons were grown on RNT-coated substrates. Extensive neurite outgrowth was seen from the original body of the dorsal root ganglion (large body at center), confirming that neurons attach and grow on the RNTs and warranting further studies towards their applicability to neural engineering. Immunofluorescence shows nuclei in blue (DAPI), neurites in red (BIII tubulin), and actin in green (Phalloidin).





Northeastern University
College of Engineering

CHEMICAL ENGINEERING

2015 | 2016

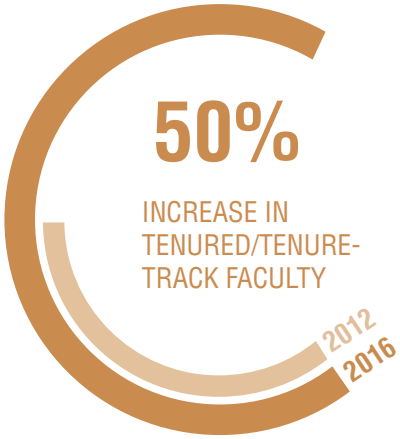
SCHOLARSHIP REPORT

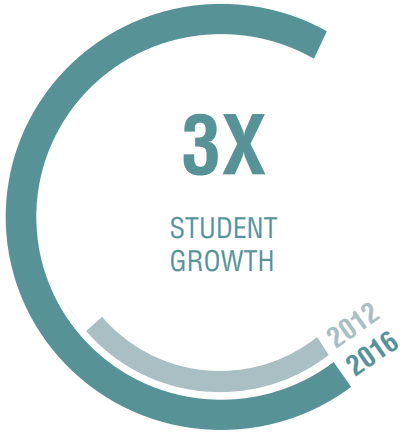
QUICK FACTS — Chemical Engineering

GRADUATE students

TENURED/ TENURE-TRACK Faculty

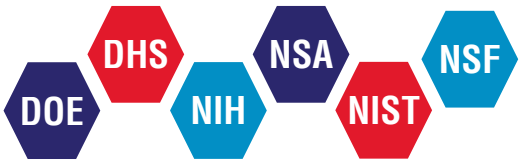
HIGHEST PERCENTAGE OF WOMEN FACULTY IN CHEMICAL ENGINEERING AMONG THE TOP 50 ENGINEERING SCHOOLS





QUICK FACTS — College of Engineering

12 MULTI-INSTITUTIONAL RESEARCH CENTERS funded by six federal agencies

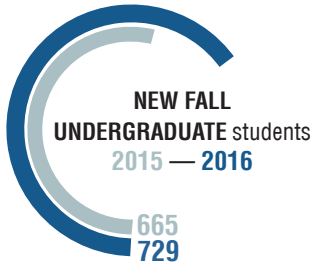


5 ENGINEERING DEPARTMENTS
- Bio
- Chemical
- Civil and Environmental
- Electrical and Computer
- Mechanical and Industrial

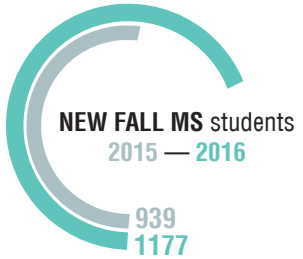
YOUNG INVESTIGATOR Awards

TENURED/ TENURE-TRACK Faculty

NSF CAREER Awards



3550 **UNDERGRADUATE** students



3210 **GRADUATE** students

HONORS ACHIEVEMENTS

FACULTY HONORS AND AWARDS

Professor **Shashi Murthy** has received funding from NSF to for his project entitled, "Bioreactor System for Autologous T-cell Stimulation."

Associate Professor **Ming Su** was awarded an NSF grant for his project entitled, "Enhanced Adsorption Cooling with Monolithic Nanoporous Adsorbents."

Assistant Professor **Richard West** was awarded an NSF grant for his project entitled, "Resolving Discrepancies in Detailed Kinetic Models of Combustion via Automated Transition State Theory Calculations."

Professor and Chair **Thomas Webster** won the Chinese Academy of Science's Lee Hsun Lecture Award by the Institute of Metal Research.

Professor **Srinivas Sridhar** was selected as the recipient of the 2016 Biomedical Engineering Society Diversity Award.

Assistant Professor **Nasim Annabi** Received an American Heart Association Grant for her project entitled, "Engineering Bioprintable Cardiac Tissues."

Assistant Professor **Ryan Koppes** was awarded an NSF I-Corps grant for his project entitled, "Thermally Drawn Nerve Guidance Channels."

Assistant Professor **Eno Ebong** was awarded an NIH Mentored Research Scientist Career Development Award for her project on, "Atheroprotective vs. Atherogenic Glycocalyx Mechanotransduction Mechanisms."

Professor **Laura Lewis** was awarded an NSF grant for her project entitled, "Sustainable Permanent Magnets for Advanced Applications."

Professor **Shashi Murthy** was elected a Fellow of the American Institute for Medical and Biological Engineering for outstanding contributions to the science and technology of cell purification for therapeutic and analytical applications.

University Distinguished Professor and William Lincoln Smith Chair Professor **Vincent Harris** has been named a Fellow of the American Association for the Advancement of Science

Professor and Vice Provost for Curriculum **Katherine Ziemer** was selected as a Fellow of the American Institute of Chemical Engineers (AIChE).

Professor of electrical and computer engineering and chemical engineering **Vincent Harris** and electrical and computer engineering Professor Carmine Vittoria were awarded a patent for, "Voltage Tuning of Microwave Magnetic Devices Using Magnetoelectric Transducers."

STUDENTS

Chemical Engineering PhD student **Marissa Puzan** and Bioengineering PhD student Michelle Stolzoff, both won travel awards from the Women's Initiative Committee of AIChE.

PhD Student **Negar Hamedani Golshan** was chosen to attend the 2016 IEEE Magnetics Society Summer School, a full scholarship from NSF.

PhD student **Sydney Shaw** won the ISPE International Poster Competition (Graduate Student category) at the ISPE Annual Meeting in Philadelphia.

Thomas Nigl (ChE'16) and **David Urick** (ChE'19) won 2nd and 3rd place at the Undergraduate Poster Competition at the AIChE Annual Student Conference. Both students work in the Choi Research Group at Chemical Engineering.

FACULTY BY RESEARCH AREAS

21
Faculty
ADVANCED MATERIALS RESEARCH

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

21
Faculty
BIOLOGICAL ENGINEERING

Mansoor Amiji
Nasim Annabi
Anand Asthagiri
Debra August
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. Shin, M. Miscuglio, M. Afshar, S.M., M.R. Dokmeci, 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, 1995
bioe.neu.edu/people/asthagiri-anand

Scholarship focus: elucidates design principles for engineering living cells and tissues

SELECTED PUBLICATIONS

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

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

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

K.S. Kushiro, A. Chang, A.R. Asthagiri
Reprogramming Directional Cell Motility by Tuning Micropattern Features and Cellular Signals, Advanced Materials, 22, 4516, 2010, 4516-4519

C.A. Giurumescu, A.R. Asthagiri
Systems Approaches to Developmental Patterning, Systems Biomedicine, Eds: Douglas A. Lauffenburger, Edison Liu and Garry Nolan, Elsevier Press, 2010

S.A. Chapman, A.R. Asthagiri
Quantitative Role of Scaffolding on Signal Propagation, Molecular Systems Biology, 5(313), 2009

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

SELECTED RESEARCH PROJECTS

Multi-scale Complex Systems Transdisciplinary Analysis of Response to Therapy
Co-Principal Investigator, National Institutes of Health

Quantitative Analysis of Epithelial Cell Scatter
Principal Investigator, National Institutes of Health

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: NSF 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; biomedical engineering; material science and engineering; biomaterials for immunotherapy; drug/cell Delivery; tissue engineering; regenerative medicine

SELECTED PUBLICATIONS

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

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, 2015

J. Kim*, S.A. Bencherif*, A. Li, D.J. Mooney
Cell-Friendly Inverse Opal-like Hydrogels for Spatially Separated Coculture System, Macromolecular Rapid Communications, 5, 2014, 1578-1586 *These authors contributed equally to this work

S.A. Bencherif, T.M. Braschler, P. Renaud
Advances in the Design of Macroporous Polymer Scaffolds for Potential Applications in Dentistry, Journal of Periodontal & Implant Science, 43, 2013, 1251-261 **Selected as research highlight by JPIS

S. Kennedy, S.A. Bencherif, D. Norton, L. Weinstock, M. Mehta, D.J. Mooney
Rapid and Extensive Collapse from Electrically Responsive Macroporous Hydrogels, Advanced Healthcare Materials, 5, 2013, 500-507

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

REBECCA L. CARRIER

Associate Professor, Chemical Engineering; Associate Chair of Research

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

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

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

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

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

F. Buyukozturk, S. Di Maio, D.E. Budil, R.L. Carrier
Effect of Ingested Lipids on Drug Dissolution and Release with Concurrent Digestion: A Modeling Approach, Pharmaceutical Research, 30(12), 2013, 3131-3144

C.A. Pfluger, B.J. McMahon, R.L. Carrier, D.D. Burkey
Precise, Biomimetic Replication of the Multiscale Structure of Intestinal Basement Membrane using Chemical Vapor Deposition, Tissue Engineering, 19(5-6), 2013, 649-656

SELECTED RESEARCH PROJECTS

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

Intestinal Mucus Barrier: Role in Necrotizing Enterocolitis (NEC) and Prophylactic "Mucus-strengthening" Treatment to Prevent NEC
Principal Investigator, March of Dimes

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, Pharmaceutical Sciences; affiliated faculty, Bioengineering, Chemical Engineering

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

Scholarship focus: optical nanosensors for biological analysis

SELECTED PUBLICATIONS

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

PAUL DiMILLA

Associate Teaching Professor, Chemical Engineering; jointly appointed: Chemistry and Chemical Biology

PhD, University of Pennsylvania, 1991
che.neu.edu/people/dimilla-paul

Scholarship focus: chemical and engineering education; molecular cell bioengineering; biomaterials and nanotechnology; biophysical chemistry; in silico modeling

SELECTED PUBLICATIONS

R.L. Shapiro, E.O. Wisniewski, E. Kaeli, T.B. Cole, P.A. DiMilla, R. Reisberg
Role of Gender and Use of Supplemental Instruction in a Required Fresh-man Chemistry Course by Engineering Students on Their Course Grades and Subsequent Academic Success, Proceedings of the 123nd ASEE Annual Conference and Exposition, New Orleans, LA, 2016

E.O. Wisniewski, R. Shapiro, E. Kaeli, K.B. Coletti, S. Selvamani, P.A. DiMilla, R. Reisberg
The Impact of Supplemental Instruction on the Performance of Male and Female Engineers in a Freshmen Chemistry Course, Proceedings of the 122nd ASEE Annual Conference and Exposition, Seattle, WA, 2015

K. Coletti, E.O. Wisniewski, R. Shapiro, P.A. DiMilla, R. Reisberg, M. Covert
Correlating Freshman Engineers' Performance in a General Chemistry Course to Their Use of Supplemental Instruction, Proceedings of the 121st ASEE Annual Conference and Exposition, Indianapolis, IN, 2014

P.A. DiMilla
General Chemistry for Engineers, 1st ed. San Diego, CA: Cognella Academic Publishing, 2013

K. Coletti, M. Covert, P.A. DiMilla, L. Gianino, R. Reisberg, E.O. Wisniewski
Improving Student Retention, Academic Success, and Satisfaction Using Persistence Advising and Structured Peer Tutoring, Proceedings of the 120th ASEE Annual Conference and Exposition, Atlanta, GA, 2013

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

SELECTED PUBLICATIONS

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

Y. Zeng, E. Ebong, B. Fu, J. Tarbell
The Structural Stability of the Endothelial Glycocalyx after Enzymatic Removal of Glycosaminoglycans, PLoS ONE, 7(8), 2012, e43168

E. Ebong, F. Macaluso, D. Spray, J. Tarbell
Imaging the Endothelial Glycocalyx In Vitro by Rapid Freezing/Freeze Substitution Transmission Electron Microscopy, Arteriosclerosis Thrombosis and Vascular Biology, 31(8), 2011, 1908-1915

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, 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

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. Montazeri, M.J. Eckelman
Life-Cycle Assessment of Catechols from Lignin Depolymerization, ACS Sustainable Chemistry and Engineering, 4(3), 2016, 708-718

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

P. Zhai, J.A. Isaacs, M.J. Eckelman
Net Energy Benefits of Carbon Nanotube Applications, Applied Energy, 173, 2016, 624-634

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

L. Pourzahedi, M.J. Eckelman
Comparative Life Cycle Assessment of Silver Nanoparticle Synthesis Routes, Environmental Science: Nano, 2(4), 2015, 361-369

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
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, N.A. Peppas
Network Structure and Methanol Transport Dynamics in Poly(methyl methacrylate), AIChE Journal, 58(5), 2012, 1600-1609

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

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

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

U.D. Hemraz, M. El Bakkari, T. Yamazaki, J.-Y. Cho, R.L. Beingessner, H. Fenniri
Chiromers: Conformation-driven Mirror-image Supramolecular Chirality Isomerism Identified in a New Class of Helical Rosette Nanotubes, Nanoscale, 6, 2014, 9421-9427 featured on cover

K.J. Ong, T.J. MacCormack, R.J. Clark, J.D. Ede, L. Felix, V. Ortega, M.K.M. Dang, G. Ma, H. Fenniri, et al.
Widespread Nanoparticle-assay Interference: Implications for Nanotoxicity Testing, PLoS One, 9, 2014

A. Childs, U.D. Hemraz, N.J. Castro, H. Fenniri, L.G. Zhang
Novel Biologically-inspired Rosette Nanotube PLLA Scaffolds for Improving Human Mesenchymal Stem Cell Chondrogenic Differentiation, Biomedical Materials, 8(6), 2013

A. Durmus, G. Gunbas, S.C. Farmer, M.M. Olmstead, M. Mascal, B. Legesse, J.-Y. Cho, R.B. Beingessner, T. Yamazaki, H. Fenniri
Synthesis of N-Substituted Pyrido[4,3-d]pyrimidines for the Large Scale Production of Self-assembled Rosettes and Nanotubes, Journal of Organic Chemistry, 78, 2013, 11421-11426

B.-L. Deng, R.L. Beingessner, R.S. Johnson, N.K. Girdhar, C. Danumah, T. Yamazaki, H. Fenniri
Covalent Capture of Self-assembled Rosette Nanotubes, Macromolecules ,45, 2012, 7157-7162

SELECTED RESEARCH PROJECTS

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

Novel Nanomolecules to Reduce Antimicrobial Use to Reduce Gut Bacterial Burden
Principal Investigator, University of Saskatchewan

EDGAR GOLUCH

Associate Professor, Chemical Engineering; affiliated faculty, Bioengineering

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

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

SELECTED PUBLICATIONS

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

H.J. Sismaet, T.A. Webster, E.D. Goluch
Up-regulating Pyocyanin Production by Amino Acid Addition for Early Identification of Pseudomonas aeruginosa, Analyst, 139, 2014, 4241-4246, *featured as a hot article in the Analyst

SELECTED RESEARCH PROJECTS

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 appointment in: Bioengineering, Chemical Engineering

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

Scholarship focus: biomechanics; material science; engineering mechanics

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

SELECTED PUBLICATIONS

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

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

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

B. Choi, Y. Wu, S. Sampath, A. Gouldstone
Modified Indentation Techniques to Probe Inelasticity in Ni5%Al Coatings from Different Processes, Journal of Thermal Spray Technology, 18(1), 2009, 65-74

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

SELECTED RESEARCH PROJECTS

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; jointly appointed, 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 of interfacial and solvated systems relevant to materials, manufacturing, energy and the environment

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

SELECTED PUBLICATIONS

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

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

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

N.N. Rajput, J. Monk, R. Singh, F.R. Hung
On the Influence of Pore Size and Pore Loading on Structural and Dynamical Heterogeneities of an Ionic Liquid Confined in a Slit Nanopore, Journal of Physical Chemistry C, 116, 2012, 5169-5181

T.P. Liyana-Arachchi, K.T. Valsaraj, F.R. Hung
A Molecular Simulation Study of the Adsorption of Naphthalene and Ozone on Atmospheric Air/Ice Interfaces, Journal of Physical Chemistry A, 115, 2011, 9226-9236

SELECTED RESEARCH PROJECTS

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

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

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

A.N. Koppes, A.L. Nordberg, G. Paolillo, H. Darwish, et al.
Electrical Stimulation of Schwann Cells Promotes Sustained Increases in Neurite Outgrowth, Tissue Engineering A, 20(3-4), 2014, 494-506

B. Behan, D. DeWitt, D. Bogdanowicz, A.N. Koppes, et al.
Cytotoxicity of Single Walled Carbon Nanotubes on Schwann Cells in 2D and 3D Microenvironments towards the Development of an Electrically Conductive Hydrogel for Neural Engineering, Journal of Biomedical Materials Research Part A, 96(1), 2011, 46-57

A.N. Koppes, A.M. Seggio, D.M. Thompson
Neurite Outgrowth is Significantly Increased by the Simultaneous Presentation of Schwann Cells and Moderate Exogenous Electric Fields, Journal of Neural Engineering, 8(4), 2011, 046023

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

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

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

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

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: Omega Chi Epsilon Faculty Member of the Year Award; Dick Sioui Teaching Award

SELECTED PUBLICATIONS

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

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

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

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

R.M. Gathungu, J.T. Oldham, S.S. Bird, C.W.T. Lee-Parsons, P. Vouros, R. Kautz
Application of an Integrated LC-UV-MS-NMR Platform to the Identification of Secondary Metabolites from Cell Cultures: Benzophenanthridine Alkaloids from Elicited *Eschscholzia californica* (California poppy) Cell Cultures, Analytical Methods, 4, 2012, 1315-1325

SELECTED RESEARCH PROJECTS

Transcriptional Control of Alkaloid Biosynthesis in *Catharanthus roseus* Cultures
Principal Investigator, National Science Foundation

Zinc Finger (ZCT) Transcription Factors: Pivotal Regulators of Growth, Development, and Alkaloid Biosynthesis in *Catharanthus roseus*f
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 including advanced permanent magnetic magnetocaloric materials; strategic materials for technological application

Honors and awards: Northeastern University Excellence in Research and Creative Activity Award; Fulbright Specialist; 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

New Exchange-couple Manganese-based Magnetic Materials
Co-Principal Investigator, Spanish Research Council

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

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, First Year Engineering Program; affiliated faculty, Chemical Engineering

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

Scholarship focus: gateway faculty with a focus on chemical engineering

SELECTED PUBLICATIONS

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

ELIZABETH PODLAHA-MURPHY

Professor, Chemical Engineering

PhD, Columbia University, 1992
che.neu.edu/people/podlaha-murphy-elizabeth

Scholarship focus: understanding, discovering, and developing novel electrodeposited nanomaterials

Honors and awards: National Science Foundation CAREER Award; Chair of the Division of Electrodeposition, The Electrochemical Society

SELECTED PUBLICATIONS

E. Vernickaite, U. Bubniene, H. Cesiulis, A. Ramanavicius, E. J. Podlaha
A Hybrid Approach to Fabricated Nanowire-Nanoparticle Composites of a Co-W Alloy and Au Nnoparticles, Journal of The Electrochemical Society, 163(7), 2016, D344-D348

A. Kola and E. J. Podlaha
Ag-W Electrodeposits with High W Content from Thiourea-Citrate Electrolytes, Journal of Electroanalytical Chemistry, 761, 2016, 125-130

E.J. Podlaha and S. Lucatero
Electrodeposited Au/FeAu Porous Nanowires for Enhanced Catalytic Ability–and Stability–of Reactions on Titania, United States Patent No. US 9,044,746 B2, 2015

S. Sun, E.J. Podlaha
Examination of Ni-W Induced Codeposition by Intensity Modulated Photocurrent Spectroscopy (IMPS), Journal of The Electrochemical Society, 161(6), 2014, D362-D366

S. Sun, T. Bairchanya, E.J. Podlaha
Induced Codeposition Behavior of Electrodeposited NiMoW Alloys, Journal of The Electrochemical Society, 160(10), 2013, D434-D440

SELECTED RESEARCH PROJECTS

Electrodeposition of NiFeMoW Alloys
Principal Investigator, National Association for Surface Finishing

Gigabyte Biomolecular Processor for Comprehensive Diagnostics and Precision
Co-Principal Investigator, Roche Diagnostics

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

J. Schuemann, R. Berbeco, D.B. Chithrani, S. Hyun Cho, R. Kumar, S.J. McMahon, S. Sridhar, S. Krishnan
Roadmap to Clinical Use of Gold Nanoparticles for Radiation Sensitization, International Journal of Radiation Oncology Biology Physics, 94(1), 2016, 189-205

B.M. Geilich, A.L. van de Ven, G.L. Singleton, L.J. Sepulveda, S. Sridhar, T.J. Webster
Silver Nanoparticle-embedded Polymersome Nanocarriers for the Treatment of Antibiotic-resistant Infections, Nanoscale, 7(8), 2015, 3511-3519

S. Kunjachan, A. Detappe, R. Kumar, T. Ireland, L. Cameron, D.E. Biancur, V. Motto-Ros, L. Sancey, S. Sridhar, G.M. Makrigiorgos, R.I. Berbeco
Nanoparticle Mediated Tumor Vascular Disruption: A Novel Strategy in Radiation Therapy, Nano Letters,15(11), 2015, 7488-7496

S. Kumar, J. Belz, S. Markovic, T. Jadhav, S. Sridhar, et al.
Nanoparticle-based Brachytherapy Spacers for Delivery of Localized Combined Chemoradiation Therapy, International Journal of Radiation Oncology, 91(2), 2015, 393-400

R. Tangutoori, P. Baldwin, S. Sridhar
Parp Inhibitors: A New Era of Targeted Therapy, Maturitas, 81(1), 2015, 5-9

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

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

Y. Qiao, P. Zhang, C. Wang, L. Ma, M. Su
Reducing X-ray Induced Oxidative Damages in Fibroblasts with Graphene Oxide, Nanomaterials, 4(2), 2014, 522-534

Y. Luo, M. Hossain, C. Wang, Y. Qiao, J. An, L. Ma, M. Su
Targeted Nanoparticles for Enhanced X-ray Radiation Killing of Multidrug Resistant Bacteria, Nanoscale, 5(2), 2013, 687-694

M. Hossain, M. Su
Nanoparticle Location and Materials Dependent Enhancement of X-ray Radiation Therapy, Journal of Physical Chemistry C, 116(43), 2012, 23047-23052

C. Wang, Z. Sun, L. Ma, M. Su
Simultaneous Detection of Multiple Biomarkers With Several Orders of Concentration Difference Using Phase Change Nanoparticles, Analytical Chemistry, 83(6), 2011, 2215-2219

M. Zhang, Y. Hong, S. Ding, J. Hu, Y. Fan, A. Voevodin, M. Su
Encapsulated Nano-Heat-Sinks for Thermal Management of Heterogeneous Chemical Reactions, Nanoscale, 2(12), 2010, 2790-2797

Y. Hong, S. Ding, W. Wu, M. Su, et al.
Enhancing Heat Capacity of Colloidal Suspension Using Nanoscale Encapsulated Phase Change Materials for Heat Transfers, Applied Materials and Interfaces, 2(6), 2010, 1685-1691

SELECTED RESEARCH PROJECTS

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

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

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

THOMAS WEBSTER

Professor 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

SELECTED PUBLICATIONS

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

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

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

G. Balasundaram, T.J. Webster
A Perspective on Nanophase Materials for Orthopedic Implant Applications, Journal of Materials Chemistry, 16, 2006, 3737-3745

A. Chun, J. G. Moralez, H. Fenniri, T.J. Webster
Helical Rosette Nanotubes: A More Effective Orthopaedic Implant Material, Nanotechnology, 15, 2004, 234-239

T.J. Webster, J.U. Ejiofor
Increased Osteoblast Adhesion on Nanophase Metals, Biomaterials, 25, 2004, 4731-4739

SELECTED RESEARCH PROJECTS

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

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

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

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

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

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

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

Honors and awards: American Chemical Society Doctoral New Investigator

SELECTED PUBLICATIONS

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

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

A. Jalan, R.W. Ashcraft, R.H. West, W.H. Green
Predicting Solvation Energies for Kinetic Modeling, Annual Reports Section "C", 106, 2010, 211-258

R.H. West, R.A. Shirley, M. Kraft, C.F. Goldsmith, W.H. Green
A Detailed Kinetic Model for Combustion Synthesis of Titania from $TiCl_4$, Combustion and Flame, 156(9), 2009, 1764-1770

SELECTED RESEARCH PROJECTS

Identifying and Resolving Discrepancies in Kinetic Models of Hydrocarbon Combustion
Principal Investigator, National Science Foundation

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

Transition-state Prediction for High-throughput Calculation of Accurate Chemical Reaction Rates
Principal Investigator, American Chemical Society

RONALD WILLEY

Professor and Associate 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

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

Daniel Francis Milano

PhD 2016, Chemical Engineering; Advisor, Anand R. Asthagiri

THE INFLUENCE OF THE FIBRILLAR TUMOR MICROENVIRONMENT ON THE CELL-CELL CONTACT RESPONSE OF MIGRATING CANCER CELLS

The results presented within this thesis advance our understanding of how the fibrillar TMEN contributes to local invasion during metastasis. Our work shows the extent of fiber maturation within the TMEN conspires with metastasis-promoting molecular perturbations to enhance the invasive phenotype of cancer cells. We show that the accrual of multiple molecular perturbations enhances this invasive phenotype in non-transformed cells and propose the characteristic fiber-like dimension (CFD) as a novel metric to quantify and compare metastatic potential. The controlled molecular perturbations confirmed a direct correlation between the ability of cells to slide in vitro and the ability of cells to metastasize in vivo, thus validating this platform as a potential preclinical drug-screening tool to guide future therapeutic strategies to treat metastatic breast cancer.

See full dissertation at **coe.neu.edu/DanielMilano**

Fariba Seyedzadeh Khanshan

PhD 2016, Chemical Engineering; Advisor, Richard Henry West

AUTOMATIC GENERATION OF DETAILED KINETIC MODELS FOR COMPLEX CHEMICAL SYSTEMS

The first section of this thesis describes significant contributions in detailed kinetic modeling of bio-oil gasification for syngas production using RMG. The second section of this thesis presents a theoretical study of the gas-phase unimolecular thermal decomposition of heterocyclic compounds via single step exo and endo ring opening reaction classes. The third section of this thesis provides significant contributions toward facilitating the automatic generation of predictive detailed kinetic models for 1,1,2,3-tetrachloropropene (1230xa) production and other hydrocarbon chlorination processes. The ability to automatically generate these models for such complex chemical systems demonstrates the predictive capability of detailed chemical modeling. The impact of such models significantly improves the scientific understanding of two industrial chemical processes, bio-oil gasification and chlorination.

See full dissertation at **coe.neu.edu/FaribaSeyedzadehKhanshan**

Pegah Naghshriz Abadian

PhD 2016, Chemical Engineering; Advisor, Edgar D. Goluch

PATHWAYS FOR TAILORING THE MAGNETOSTRUCTURAL RESPONSE OF FeRh-BASED SYSTEMS

This study used a SPRi system to study the physiological behavior of bacterial cells and biofilm dynamics was monitored in real-time. This information were used to help predict and control bacteria activity in fluidic systems. Studies were conducted to determine the effectiveness of different chemicals and antibiotics in removing biofilm from a sensor surface. The efficacy of antibiotics and surface coatings for preventing biofilm formation on the surface were also studied. Finally, the effects of fluid dynamics on bacterial surface adhesion and removal was investigated.

Staphyloccocus aureus, a gram positive bacteria and one of the major causes of hospital acquired infections, Pseudomonas aeruginosa, a gram negative species and model organism for biofilm studies, Eschericia coli, a gram negative and a model prokaryotic organism, and Bacillus cereus a gram positive and facultative anerobic bacteria, were used in this study.

See full dissertation at **coe.neu.edu/PegahNaghshrizAbadian**

Nil Tandogan

PhD 2016, Chemical Engineering; Advisor, Edgar D. Goluch

ISOLATION AND STUDY OF BACTERIA USING PHYSICAL CONSTRICTIONS

This dissertation describes the development of new devices and techniques for the isolation and study of bacterial cells. In aim one, a conceptually simple and effective polymer microfluidic device with sub-micrometer constrictions was used to isolate individual bacterial species from complex mixtures. In the second aim, polycarbonate and aluminum oxide membranes were integrated onto polymer microfluidic devices to optimize the system for in-situ isolation and cultivation of species from the environment and human fecal samples. The third aim focuses on bacterial behavior in confinements under applied pressure, which is critical in water filtration processes. In the fourth aim, initial studies were conducted to investigate the antibiotic susceptibility of bacteria in real-time by coupling a microfluidic device to a Surface Plasmon Resonance imaging (SPRi) system. This protocol will provide a new direction to monitor biofilm removal in microfluidic devices in real-time using SPRi technology.

See full dissertation at **coe.neu.edu/NilTandogan**

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