Welcome to Northeastern University’s Department of Mechanical and Industrial Engineering (MIE), where our star is rising!

Rising quality and quantity of faculty hires have been a departmental priority. Our department welcomed 12 full-time faculty members in the recent two academic years, 2014/2015 and 2015/2016. In addition to junior faculty at the assistant level, these new members include two associate professors that moved here from Georgia Institute of Technology (Ozlem Ergun) and Carnegie Mellon University (Craig Maloney). We are absolutely delighted to witness the ways in which they are already contributing to our department. Welcome, new faculty!

Rising faculty achievement has been constant. In fact, two of our tenure-track faculty members – Prof. Marilyn Minus and Prof. Carol Livermore – were recently granted tenure. Marilyn and Carol each direct a research team with funding of more than $2M in ongoing research grants from agencies such as NSF and AFOSR. We are proud to welcome Marilyn and Carol to the ranks of our tenured faculty!

Rising research effort and new discoveries have been unprecedented. The NSF Nanoscale Science and Engineering Center for High-rate Nanomanufacturing is translating its discoveries into industry innovation – most recently through the launch of a nanoscale offset printing system that promises to revolutionize nanomanufacturing with societal impact on the scale of the PC or 3-D printer. Two major research contract vehicles, received by our department during the 2014-2015 academic year, will have lasting impact; the five year research contract vehicle from the Veterans Health Administration for $125M and three year contract vehicle from the Army Research Office for $20M are bellwethers of both current success and future potential. Financially equipped, they will turbo charge the already strong and vital Health Systems Engineering Institute, currently under the leadership of Professor James Benneyan, and jumpstart the research efforts in the areas of solid mechanics and materials. Major research contracts, experienced faculty and students, state-of-the-art laboratories - we have a recipe for research success!

Rising student quality continues apace. As one indication, the average SAT score of the entering engineering class in 2014-2015 reached 1446 out of a possible 1600 – up 52 points in 2 years. The quality of graduate students rises in parallel. For example, our PhD students have received numerous awards, such as a recent NSF Graduate Research Fellowship awarded to Joshua Martin (under the direction of Prof. Randall Erb), and the PSME American Chemical Society Award to Emily Green (under the direction of Prof. Marilyn Minus). Congratulations, Josh and Emily!

Rising awareness of our accomplishments is also a trend we note and appreciate. According to the US News and World Report, our Mechanical Engineering graduate program moved up 14 places in the past year, while our Industrial Engineering graduate program moved up 6 places during the same year. Hard work, vision and sustained investment pay off.

Rising impact in the Department of Mechanical and Industrial Engineering will undeniably continue with this momentum. Please reach out to me to share your valuable opinions and explore opportunities to collaborate in the near future. I look forward to hearing from you!

Sincerely,

Hanchen Huang
Professor and Department Chair
h.huang@neu.edu
Developed by the NSF-funded Center for High-rate Nanomanufacturing, the Nanoscale Offset Printing System (NanoOPS) prints multiscale multilayered electronics, sensors or medical devices onto polymer and other substrates. The fully automated cluster tool has five modules for the assembly, transfer, registration and alignment. NanoOPS will enable critical manufacturing in areas such as new and more affordable medicines; faster, cheaper sensors and electronics or stronger, lighter building materials. Nanomanufacturing is at the intersection of three disciplines in one department: Mechanical, Materials, and Industrial Engineering.

Learn more about NanoOPS at northeastern.edu/chn
QUICK FACTS
DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

2
FEDERALLY
FUNDED
RESEARCH
CENTERS

NSF/DHHS Healthcare Systems Engineering Institute
NSF CENTER for High-rate Nanomanufacturing

960
GRADUATE
STUDENTS

INCLUDING MS AND PHD PROGRAMS IN:
Engineering Management
Industrial Engineering
Mechanical Engineering
Operations Research

2
NATIONAL
ACADEMY
MEMBERS

NADINE AUBRY
University Distinguished Professor and Dean
VINOD SAHNEY
University Distinguished Professor

50
TENURED/
TENURE TRACK
FACULTY

RECENT HIRES:
Ozlem Ergun
from Georgia Tech
Craig Maloney
from Carnegie Mellon University

15
YOUNG
INVESTIGATOR
AWARDS

Including 11 National Science Foundation CAREER Awards

$145M
CONTRACT
VEHICLE

$125M: five years from Veterans Health Administration
$20M: three years from Army Research Labs

QUICK FACTS
COLLEGE OF ENGINEERING

12
Federally Funded Multi-Institutional Research Centers

36
NEW HIRES
SINCE 2013

50
YOUNG INVESTIGATOR AWARD

151
TENURED/
TENURE-TRACK
FACULTY

Including 69 Fellows of national professional societies

5 DEPARTMENTS
Bioengineering | Chemical Engineering
Civil and Environmental Engineering
Electrical and Computer Engineering
Mechanical and Industrial Engineering

560
GRADS
UNDERGRADS

42
PROGRAMS

9
MINORS

8
BS

14
MS

10
PhD

1
CERTIFICATE
University Distinguished Professor and College of Engineering Dean Nadine Aubry has been named a Fellow of the National Academy of Inventors for her innovations in fluid mechanics.

Associate Professor Yung Joon Jung was awarded a $370K grant from the Korea Automotive Technology Institute and the Ministry of Trade, Industry & Energy of South Korea for “Developing strong, high thermal resistant and lightweight materials and their processing for the high performance automotive lightening systems.”

Associate Professor Yingzi Lin was featured in the Tech Buzz/Hot Labs section of the Mechanical Engineering magazine for “Nano-Scale Transducers.” See article at bit.ly/1L5UO7u.

Professor Abe Zeid, and Associate Professor Sagar Kamarthi, were awarded a $700K NSF grant to transform liberal arts curriculum towards manufacturing.

The Center for High-rate Nanomanufacturing, led by Ahmed Busnaina, WL Smith Chair and University Distinguished Professor of Mechanical and Industrial Engineering, has received a 2015 TechConnect National Innovation Award for their Nanoscale Offset Printing System.

Professor Andrew Gouldstone’s research was featured in Advanced Materials for “Bioinspired Hybrid Materials from Spray-formed Ceramic Templates”.

Associate Professor Ashkan Vaziri’s article about “Contact Kinematics of Biomimetic Scales” was featured on the cover of Applied Physics Letters.

FACULTY-AUTHORED BOOKS

Surendra Gupta co-authored “Six Sigma Case Studies with Minitab” (CRC Press 2014)

Surendra Gupta authored “Reverse Supply Chains: Issues and Analysis” (CRC Press 2013)

Rifat Sipahi co-edited “Delay Systems: From Theory to Numerics and Applications” (Springer 2014)

Nader Jalili authored “Piezoelectric-Based Vibration Control: From Macro to Micro/ Nano Scale Systems” (Springer 2010)

PATENTS

WL Smith Chair and University Distinguished Professor Ahmed Busnaina, was awarded a patent for creating “Nanoscale interconnects fabricated by electrical field directed assembly of nanoelements.”

Professor Teiichi Ando was awarded a patent for creating a nanoscale heater element capable of local selectivity and controlled exposure.

Professor Yiannis Levendis, was awarded a patent for his method of creating “Carbon nanostructures from pyrolysis of organic materials.”

Professor Emeritus Alexander Gorlov, was awarded a patent for a “Universal Spherical Turbine with Skewed Axis of Rotation” to convert fluid flow from any direction into energy.

STUDENTS

Jessica Faust, a student in Assistant Professor Randall Erb’s lab, was awarded the grand poster prize for her work on structuring injectable biocomposites at the Frontiers in BioMagnetics Conference held in Telluride, Colorado.

Alumnus Anthony Fan, ME’13 was awarded a NSF Graduate Research Fellowship. Anthony is doing his PhD at the University of Illinois Urbana-Champaign.

PhD Candidate, Keivan Sadeghzadeh who is advised by Professor Nasser Fard, has been awarded the 2015 Mary G. and Joseph Natrella Scholarship from the American Statistical Association.

PhD student Ruhollah Heydari, received the Best PhD Student Presentation Award at the 2015 Northeast Decision Sciences Institute Conference (NEDSI) for the joint paper with his Advisor, Professor Emanuel Melachrinoudis, “Empty Railcar Distribution Problem as a Multi-Commodity Capacitated Network Flow Model.”

PhD graduate student Joshua Martin won the top poster prize at the Materials Research Society Fall Meeting for his poster entitled “3D Printing Bio-inspired Discontinuous Fiber Composites with Hierarchical Reinforcement.” He was also awarded a NSF Graduate Research Fellowship.
<table>
<thead>
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<td>MECHANICS</td>
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<td>NANOMANUFACTURING</td>
<td>10</td>
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**BIOMECHANICS**
Charles DiMarzio  
Andrew Gouldstone  
Sinan Muftu  
Shashi Murthy  
Hamid Nayeb-Hashemi  
Sandra Shefelbine  
Ashkan Vaziri  
Kai-Tak Wan

**ENERGY**
Ahmed Busnaina  
John Cipolla  
Hanchen Huang  
Yung Joon Jung  
Gregory Kowalski  
Yiannis Levendis  
Yongmin Liu  
Carol Livermore  
Hameed Metghalchi  
Reza Sheikh  
Mohammad Taslim  
Hongli Zhu

**HEALTHCARE SYSTEMS**
James Benneyan  
Jackie Griffin  
Sagar Kamarthi  
Yingzi Lin  
Vinod Sahney  
Ayten Turkcan

**INDUSTRIAL ENGINEERING/ OPERATIONS RESEARCH**
MD Noor E Alam  
James Bean  
James Benneyan  
Thomas Cullinane  
Ozlem Ergun  
Nasser Fard  
Jackie Griffin  
Surendra Gupta  
Sagar Kamarthi  
Yingzi Lin  
Emanuel Melachrinoudis  
Vinod Sahney  
Ayten Turkcan

**MATERIALS SCIENCE**
Teiichi Ando  
Ahmed Busnaina  
Randall Erb  
Andrew Gouldstone  
Hanchen Huang  
Jacqueline Isaacs  
Yung Joon Jung  
Laura H. Lewis  
Yongmin Liu  
Marilyn Minus  
Sandra Shefelbine  
Moneesh Upmanyu  
Ashkan Vaziri  
Hongli Zhu

**MECHANICS**
Nadine Aubry  
George Adams  
Srinath Chakravarthy  
Andrew Gouldstone  
Carlos Hidrovo  
Nader Jalili  
Carol Livermore  
Craig Maloney  
Jose Martinez Lorenzo  
Sinan Muftu  
Hamid Nayeb-Hashemi  
Sandra Shefelbine  
Rifat Sipahi  
Ashkan Vaziri  
Kai-Tak Wan  
John Whitney  
Ibrahim Zeid

**MECHATRONICS**
Jaydeep Bardhan  
Nader Jalili  
Yingzi Lin  
Carol Livermore  
Jose Martinez Lorenzo  
Nicol McGruer  
Robert Platt  
Rifat Sipahi

**THERMOFLUIDS**
Ahmed Busnaina  
John Cipolla  
Carlos Hidrovo  
Alireza Karimi  
Gregory Kowalski  
Yiannis Levendis  
Hameed Metghalchi  
Uichiro Narusawa  
Reza Sheikh  
Kai-tak Wan
GEORGE ADAMS

COE Distinguished Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Civil and Environmental Engineering, Electrical and Computer Engineering

PhD, University of California at Berkeley, 1975
mie.neu.edu/people/adams-george

Scholarship focus: contact mechanics including adhesion, friction, and plasticity; modeling and analysis of MEMS; modeling and analysis in nanomechanics

Honors and awards: Fellow, American Society of Mechanical Engineers; Fellow, Society of Tribologists and Lubrication Engineers; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

G.G. Adams

G.G. Adams, D.A. Hills


G.G. Adams
Stick, Partial Slip and Sliding in the Plane Strain Micro Contact of Two Elastic Bodies, Royal Society Open Science, 1, 2014, 140363

H. Pan, Y.-C. Wu, G.G. Adams, G.P. Miller, N.E. McGruer

J.R. Parent, G.G. Adams
A Model of a Trapped Particle Under a Plate Adhering to a Rigid Surface, Journal of Applied Mechanics, 80, 2013, 051011

Y.-C. Wu, N.E. McGruer, G.G. Adams

Hot-switched Lifetime and Damage Characteristics of MEMS Switch Contacts, Journal of Micromechanics and Microengineering, 23(5), 2013

MD NOOR E ALAM

Assistant Professor, Mechanical and Industrial Engineering

PhD, University of Alberta, 2013
mie.neu.edu/people/alam-md-noor-e

Scholarship focus: applied operations research, large scale optimization and data analytics

Honors and awards: Postdoctoral Fellowship, Natural Sciences and Engineering Research Council of Canada

SELECTED PUBLICATIONS

Md. N.-E. Alam, B. Todd, J. Doucette

Md. N.-E. Alam, J. Doucette
Solving Large Scale Fixed Cost Integer Linear Programming Models for Grid-based Location Problems with Heuristic Techniques, Engineering Optimization, 47(8), 2015, 1085-1106

Md. N.-E. Alam, J. Doucette

Md. N.-E. Alam, A. Ma, J. Doucette
Integer Linear Programming Models for Grid-Based Light Post Location Problem, European Journal of Operational Research, 222, 2012, 17-30

Md. N.-E. Alam, J. Doucette
Relax-and-Fix-Based Decomposition Technique for Solving Large Scale GBLPs, Computers and Industrial Engineering, 63, 2012, 1062-1073

Md. N.-E. Alam, A.Z. Kasem, J. Doucette


T.F. Lipi, Md. A.A.Hasin, Md. N.-E. Alam
Fuzzy Multi Objective Machine Reliability & Availability Based Hybrid Flow Shop Scheduling, Asia Pacific Journal of Operational Research, 26(5), 2009, 637-653

TEIICHI ANDO
Professor, Mechanical and Industrial Engineering
PhD, Colorado School of Mines, 1982
mie.neu.edu/people/ando-teiichi

Scholarship focus: rapid solidification processing, droplet-based materials processing, powder metallurgy, material processing by severe plastic deformation, processing-structure-property relationships in materials

Honors and awards: Fellow, American Society of Materials International; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS
B. Yildirim, H. Fukunuma, T. Ando, A. Gouldstone, S. Muftu
A Numerical Investigation into Cold Spray Bonding Processes, Journal of Tribology, 137, 2015, 11102-11113
S. Gheybi Hashemabad, T. Ando
Ignition Characteristics of Hybrid Al-Ni-Fe2O3 and Al-Ni-CuO Reactive Composites Fabricated by Ultrasonic Powder Consolidation, Combustion and Flame, 162, 2015, 1144-1152
T. Hu, S. Zhalehpour, A. Gouldstone, S. Muftu, T. Ando
D. Erdeniz, T. Ando
T. Ando
S. Onel, T. Ando

SELECTED RESEARCH PROJECTS
A Fundamental Investigation of the Mechanisms of Ultrasonic Powder Consolidation and its to Hard-facing of Forging Dies
Principal Investigator, Hitachi Metals, Ltd
Collaborative Research: Microscale Joining Using Nanoheaters
Principal Investigator, National Science Foundation
Fundamentals of Bonding in Kinetic Consolidation Processes
Co-Principal Investigator, National Science Foundation
Metallographic Characterization of Cold Sprayed Materials
Principal Investigator, Fukuda Metal Foil

NADINE AUBRY
University Distinguished Professor and Dean of the College of Engineering, Mechanical and Industrial Engineering
PhD, Cornell University, 1987
mie.neu.edu/people/aubry-nadine

Scholarship focus: fluid dynamics, microfluids, chaotic mixing, particle manipulation

Honors and awards: Fellow, National Academy of Engineering; Fellow, American Society of Materials International; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS
R. Chabreyrie, C. Chandre, N. Aubry
Complete Chaotic Mixing in an Electro-osmotic Channel by Destabilization of Key Periodic Orbits, Physics of Fluids, 23, 2011, 072002
P. Singh, D.D. Joseph, N. Aubry
M. Janjua, S. Nudurupati, P. Singh, N. Aubry
Electrohydrodynamic Removal of Particles from Drop Surfaces, Physical Review E, 80, 2009, 010402
A.K. Uguz, O. Ozen, N. Aubry
N. Aubry, P. Singh, M. Janjua, S. Nudurupati
Micro- and Nanoparticles Self-assembly for Virtually Defect-free, Adjustable Monolayers, Proceedings of the National Academy of Sciences USA (PNAS), 105, 2008, 3711-3714
N. Aubry, P. Singh
A.K. Uguz, N. Aubry
Quantifying the Linear Instability of a Flowing Electrified Two-fluid Layer in a Channel for Fast Electric Times, Physics of Fluids, 20, 2008, 092103
S. Pillapakkam, P. Singh, D. Blackmore, N. Aubry
F. Li, O. Ozen, N. Aubry, D. Papageorgiou, P. Petropoulos
Jaydeep Bardhan
Assistant Professor, Mechanical and Industrial Engineering
PhD, Massachusetts Institute of Technology, 2006
mie.neu.edu/people/bardhan-jaydeep

Scholarship focus: multiscale continuum models; electrolyte solutions in biophysics; boundary-integral methods; fast numerical algorithms

SELECTED PUBLICATIONS
J.P. Bardhan, M.G. Knepley

J.P. Bardhan, P. Jungwirth, L. Makowski

R. Yokota, J.P. Bardhan, M.G. Knepley, L.A. Barba, T. Hamada
Biomolecular Electrostatics using a Fast Multipole BEM on up to 512 GPU and a Billion Unknowns, Computer Physics Communications, 182, 2011, 1272-1283

J.P. Bardhan

S. Park, J.P. Bardhan, B. Roux, L. Makowski
Simulated X-ray Scattering of Protein Solutions using Explicit-solvent Models, Journal of Chemical Physics, 130, 2009, 134114

SELECTED RESEARCH PROJECTS
Critical Analysis of Long-range Interactions in Molecular Dynamics
Principal Investigator, Battelle

Predicting pH-dependent Protein Behavior
Principal Investigator, National Institutes of Health

James Bean
Provost and Senior Vice President of Academic Affairs; Professor, Mechanical and Industrial Engineering; Professor, D’Amore-McKim School of Business
PhD, Stanford University, 1980
mie.neu.edu/people/bean-james

Honors and awards: Fellow, Institute of Operations Research and the Management Sciences; George E. Kimball Medal, Institute of Operations Research and the Management Sciences; Member, Institute for Operations Research and the Management Sciences

SELECTED PUBLICATIONS
S. Xu, J. Bean

S. Xu, J. Bean

Z.-Z. Lin, J. Bean, C. White III

J. Ohlmann, J. Bean, S. Henderson

C. Kim, G. Keoleian, D. Grande, J. Bean

Z.-Z. Lin, J. Bean, C. White III

R. Hughes, J. Bean, D. Chaffin

B. Norman, J. Bean
Scheduling Operations on Parallel Machine Tools, IIE Transactions, 32, 2000, 449-459
AHMED BUSNAINA

William Lincoln Smith Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering, Electrical and Computer Engineering
PhD, Oklahoma State University, 1983
mie.neu.edu/people/busnaina-ahmed

Scholarship focus: nano engineering, nano and micro-contamination control, particulate and chemical contamination and defects, high rate nanomanufacturing, MEMS and NEMS devices with micro and nano-scale channels, nanomaterials

Honors and awards: Fellow, American Society of Mechanical Engineers; Fellow, the Adhesion Society; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS
S. Siavoshi, C. Yilmaz, S. Somu, T. Musacchio, A. Busnaina, et al.

Y.L. Kim, B. Li, X. An, M.G. Hahm, A. Busnaina, et al.

Y. Jung, X. Xiong, L. Jaberansari, M. Hahm, A. Busnaina

A. Busnaina

Three-dimensional Assembly of Single-walled Carbon Nanotube Interconnects using Dielectrophoresis, Nanotechnology, 18(39), 2007, 395204, *journal cover

SELECTED RESEARCH PROJECTS
Collaborative Research in Nanomanufacturing
Principal Investigator, Massachusetts Technology Collaborative

Designing & Integrating LCA Methods for Nanomanufacturing Scale-up
Co-Principal Investigator, National Science Foundation

Electrostatic Deposition of a Seed Layer on Ceramic Substrates using Nanoparticles that Enables Electroplating
Principal Investigator, Rogers Corp.

Fabrication and Characterization of Nanoscale films
Principal Investigator, HC Stark, Inc.

LED manufacturing using Directed Assembly of Nanoparticles
Principal Investigator, Rogers Corp.

NSF Nanoscale Science and Engineering Center for High-Rate Nanomanufacturing
Principal Investigator and Director, National Science Foundation

JAMES BENNEYAN

Director, Healthcare Systems Engineering Institute; Professor, Mechanical and Industrial Engineering
PhD, University of Massachusetts, Amherst, 1997
mie.neu.edu/people/benneyan-james

Scholarship focus: healthcare process improvement, healthcare systems engineering, operations research, quality and reliability engineering, statistical quality control

Honors and awards: Senior Fellow, Institute for Healthcare Improvement; Fellow, Society for Health Systems; Lifetime Fellow, Healthcare Information and Management Systems Society; Fellow, Institute of Industrial Engineers

SELECTED PUBLICATIONS
H. Musdal, B. Shiner, M.E. Ceyhan, B.V. Watts, J.C. Benneyan
In-person and Video-based Post-traumatic Stress Disorder Treatment for Veterans: A Location-allocation Model, Journal of Military Medicine, 179(2), 2014, 150-156

J.S. Peck, D.J. Nightingale, S.A. Gaehde, J.C. Benneyan
Generalizability of a Simple Approach for Predicting Hospital Admission from an Emergency Department, Academic Emergency Medicine, 20(11), 2013, 1156-1163

L. Romeo, J.C. Benneyan
An Economic Model and Sub-optimality Analysis of the CMS Readmissions Incentive and Penalty Policy, National Science Foundation IUCRC/CHOT center white paper series, 2012

S. Demirkan, A. Taseli, J.B. Benneyan
Readmissions from a Statistical Quality Engineering Perspective, 2012

J.C. Benneyan

SELECTED RESEARCH PROJECTS
Scalable Healthcare Systems Engineering Regional Extension, a CMS Healthcare Systems Engineering Center
Center Director and Principal Investigator, Centers for Medicare and Medicaid Services

Center for Healthcare Organizational Transformation (CHOT)-I/UICRC
Co-Director and Site Principal Investigator, National Science Foundation

Drug Safety Risk-Benefit Models
Principal Investigator, National Science Foundation

Reducing Preventable Hospital Readmissions
Principal Investigator, Purdue University
SRINATH CHAKRAVARTHY

Assistant Professor, Mechanical and Industrial Engineering
PhD, University of Connecticut, 2007
mie.neu.edu/people/chakravarthy-srinath

Scholarship focus: multi-scale (spatio temporal)/meso-scale numerical methods in development of predictive material modeling of micro/nanostructural features

SELECTED PUBLICATIONS

The Effects of Knee Joint Kinematics on Anterior Cruciate Ligament Injury and Articular Cartilage Damage, Computer Methods in Biomechanics and Biomedical Engineering, 2015, 1-14

S. Chakravarthy, W.A. Curtin

S. Olarnrithinun, S. Chakravarthy, W.A. Curtin

B.A. Szajewski, S. Chakravarthy, W.A. Curtin
Operation of a 3D Frank–read Source in a Stress Gradient and Implications for Size-dependent Plasticity, Acta Materialia, 61(5), 2012, 1469-1477

S. Chakravarthy, W.A. Curtin

S. Chakravarthy, W.A. Curtin

S. Chakravarthy, W.A. Curtin
Stress Gradient Plasticity, Proceedings of the National Academy of Sciences, 108(38), 2011, 15716-15720

JOHN W. CIPOLLA

Donald W. Smith Professor, COE Distinguished Professor, Mechanical and Industrial Engineering
PhD, Brown University, 1970
mie.neu.edu/people/cipolla-jr-john

Scholarship focus: mathematical methods and modeling; thermodynamics; fluid dynamics; kinetic theory of gases; thermophoresis of aerosols

Honors and awards: Fellow, American Society of Mechanical Engineers; Edwin F. Church Medal, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

G. Jia, Y. Yener, J.W. Cipolla

G. Jia, Y. Yener, J.W. Cipolla

D. DiGiovanni, T.F. Morse, J.W. Cipolla

J.W. Cipolla, T.F. Morse

J.W. Cipolla, M.B. Silevitch

J.W. Cipolla, H. Lang, S.K. Loyalka
Kinetic Theory of Condensation and Evaporation II, Journal of Chemical Physics, 61(1), 1974, 69

J.W. Cipolla, T.F. Morse
Kinetic Theory of an Optically Pumped Gas, Physics of Fluids, 14(9), 1971, 1850
THOMAS CULLINANE

Program Director, Engineering Management; Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Business Administration
PhD, Virginia Polytechnic Institute and State University, 1972
mie.neu.edu/people/cullinane-thomas

Scholarship focus: analysis and design of efficient facilities focusing on inventory space control, materials handling and staffing levels

Honors and awards: Fellow, Institute of Industrial Engineers

SELECTED PUBLICATIONS
S. Erbis, S. Kamarthi, T. Cullinane, J.A. Isaacs
Multistage Stochastic Programming Model (MSP) for carbon Nanotube Production Capacity Expansion Planning, ACS Sustainable Chemistry and Engineering, 2(7), 2014, 1633-1641
A. Topcu, J. Benneyan, T. Cullinane
T. Cullinane, T. Marion, J.H. Friar

SELECTED RESEARCH PROJECTS
A Computer Game to Teach Sustainability in Business and Engineering
Co-Principal Investigator, Northeastern University

RANDALL ERB

Assistant Professor, Mechanical and Industrial Engineering
PhD, Duke University, 2009
mie.neu.edu/people/erb-randall

Scholarship focus: structure/property relationships in composites and ceramics, magnetic manipulation, colloidal physics

SELECTED PUBLICATIONS
J.J. Martin, M.S. Riederer, M.D. Krebs, R.M. Erb
Understanding and Overcoming Shear Alignment of Fibers During Extrusion, Soft Matter, 11, 2015, 400-405
R. Soheilian, Y. Choi, A.E. David, H. Abdi, C.E. Maloney, R.M. Erb
Toward Accumulation of Magnetic Nanoparticles into Tissues of Small Porosity, Langmuir, 31(30), 2015, 8267-8274
A.R. Studart, R.M. Erb
Bioinspired Materials That Self-Shape Through Programmed Microstructures, Soft Matter, 10(9), 2014, 1284-1294
R.M. Erb, J. Sander, R. Grisch, A.R. Studart
Self-shaping Composites with Programmable Bioinspired Microstructures, Nature Communications, 4(1712), 2013, 1-8
R. M. Erb, R. L. Libanori, N. Rothfuchs, A.R. Studart
Soft, Hard and Stretchable Heterogeneous Composites, Nature Communications, 3(1265), 2012
R.M. Erb, H.S. Son, B. Samanta, V.M. Rotello, B.B. Yellen

SELECTED RESEARCH PROJECTS
CPS: Breakthrough: A Cyber-Physical Framework for MRI Guided Magnetic NanoParticles
Principal Investigator, National Science Foundation
EAGER: Dispersion Control of Colloidal Assembly for Graded Architectures in Composites
Principal Investigator, National Science Foundation
Screen-printing of low-loss, High-permittivity Ferrite Films with Ductility
Principal Investigator, Rogers Corporation
The Roles of Heterogeneities and Anisotropy in Fracture Toughness and Crack Propagation
Co-Principal Investigator, National Science Foundation
ÖZLEM ERGUN

Associate Professor, Mechanical and Industrial Engineering
PhD, Massachusetts Institute of Technology, 2001
mie.neu.edu/people/ergun-ozlem

Scholarship focus: design and management of large-scale networks, supply chain design, collaboration, humanitarian logistics

Honors and awards: National Science Foundation CAREER Award; Winner, EURO/INFORMS2007 Management Science Strategic Innovation Prize

SELECTED PUBLICATIONS

M. Celik, Ö. Ergun, P. Keskinocak
The Post-disaster Debris Clearance Problem with Incomplete Information, Operations Research, 63(1), 2015, 65-85

L. Gui, A. Atasu, Ö. Ergun, B. Toktay

Ö. Ergun, L. Gui, J.L. Heier Stamm, P. Keskinocak, J.L. Swann
Improving Humanitarian Operations through Collaboration, Production and Operations Management special issue on Humanitarian Operations and Crisis Management, 23(6), 2014, 1002-1014

Ö. Özener, Ö. Ergun, M. Savelsbergh
Allocating Cost of Service to Customers in Inventory Routing, Operations Research, 61(1), 2013, 112-125


R. Agarwal, Ö. Ergun

D. Altner, Ö. Ergun, N.A. Uhan

R. DesRoches, Ö. Ergun, J. Swann

SELECTED RESEARCH PROJECTS

Staff Reassignment: Negotiations and Compromises to Enhance Stable Matching
Co-Principal Investigator, National Science Foundation

Resource Allocation with Learning in Dynamic and Partially Observable Networks
Principal Investigator, National Science Foundation

Human in the Loop Design and Optimization for Resilient Infrastructure Networks
Co-Principal Investigator, Northeastern University

NASSER FARD

Associate Professor, Mechanical and Industrial Engineering
PhD, University of Arizona, 1982
mie.neu.edu/people/fard-nasser

Scholarship focus: systems reliability; accelerated life testing in reliability prediction; big data-data driven decision making in spatiotemporal streaming environment; life data (survival data) analysis; robust design of experiments

Honors and awards: American Statistical Association Natrella Scholarship Award; Outstanding Presentation Award from the Reliability and Maintainability Symposium; Associate Editor, IEEE Transactions on Reliability; Associate Editor, International Journal of Reliability, Quality and Safety Engineering; Certified Quality Engineer by American Society for Quality (#11909)

SELECTED PUBLICATIONS

N. Fard, H. Xu, Y. Fang

N. Fard, K. Sadeghzadeh
Heuristic Ranking Classification Method for Complex Large-scale Survival Data, Advances in Intelligent Systems and Computing, 360, 2015, 47-55

K. Sadeghzadeh, N. Fard
Nonparametric Data Reduction Approach for Large-scale Survival Data Analysis, IEEE Xplore, 2015, 1-6

K. Sadeghzadeh, N. Fard

A. Mendes, N. Fard
Accelerated Failure Time Models Comparison to the Proportional Hazard Model for Time-dependent Covariates with Recurrent Events, International Journal of Reliability, Quality and Safety Engineering, 21(2), 2014, 1450010

A. Mendes, N. Fard

K. Sadeghzadeh, N. Fard

A. Motaeia, T. A. Niaki, N. Fard
ANDREW GOULDSTONE

Associate Professor, Associate Department Chair and Program Director of Mechanical 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

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
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

Fundamentals of Bonding in Kinetic Consolidation Processes Co-Principal Investigator, National Science Foundation
Garde: An Interdisciplinary Approach to Accommodate Fine Motor Control Disorders Co-Principal Investigator, National Science Foundation
IDR/Collaborative Research: Activities in Thermal Spray Processing and Volcanology Principal Investigator, National Science Foundation

JACKIE GRIFFIN

Assistant Professor, Mechanical and Industrial Engineering
PhD, Georgia Institute of Technology, 2012
mie.neu.edu/people/griffin-jacqueline

Scholarship focus: health care resource allocation with multi-objective resource allocation models

SELECTED PUBLICATIONS

J. Griffin, P. Keskinocak Patient-bed Assignment Policies in Hospital Systems, INFORMS 2013 Annual Meeting, Chicago, IL, 2013
J. Griffin, P. Keskinocak, C. Stokes, N. O’Hara, A. Vats Development of Patient-bed Assignment Algorithms to Support Bed Management Processes for Improvements in the Rate of Overflow Assignments and Average Request to Assign Metrics, Critical Care Medicine, 40(12), 2012, 48

SELECTED RESEARCH PROJECTS

BWH Ambulatory Services Patient Flow Simulation Project Principal Investigator, Brigham and Womens Hospital
SURENDRA M. GUPTA
Professor, Mechanical and Industrial Engineering
PhD, Purdue University, 1977
mie.neu.edu/people/gupta-surendra

Scholarship focus: green manufacturing; green supply chains; disassembly modeling; remanufacturing; reverse logistics; managing end of life products; environmentally conscious manufacturing; manufacturing sustainability; reverse and closed-loop supply chains; just-in-time (jit) manufacturing and materials management; operations research: stochastic and simulation modeling

Honors and awards: Søren Buus Outstanding Research Award, College of Engineering; Best Dissertation Advisor National Award: American Society for Engineering Management

SELECTED PUBLICATIONS
C.B. Kalayci, O. Polat, S.M. Gupta
S.M. McGovern, S.M. Gupta
O. Ondemir, S.M. Gupta
C.B. Kalayci, S.M. Gupta
A Tabu Search Algorithm for Balancing a Sequence-dependent Disassembly Line, Production Planning and Control, 25(2), 2014, 149-160
A. Korugan, S.M. Gupta
M.A. Ilgin, O. Ondemir, S.M. Gupta
O. Ondemir, S.M. Gupta
C.B. Kalayci, S.M. Gupta
Artificial Bee Colony Algorithm for Solving Sequence-dependent Disassembly Line Balancing Problem, Expert Systems With Applications, 40(18), 2013, 7231-7241
C.B. Kalayci, S.M. Gupta

CARLOS HIDROVO
Assistant Professor, Mechanical and Industrial Engineering
PhD, Massachusetts Institute of Technology, 2001
mie.neu.edu/people/hidrovo-chavez-carlos

Scholarship focus: fluid mechanics and mechanics of microscale multiphase transport phenomena with applications in portable biochemical diagnostics, thermal management and water desalination

Honors and awards: National Science Foundation CAREER Award; Defense Advanced Research Projects Agency Young Faculty Award; American Society of Mechanical Engineers Robert T. Knapp Award

SELECTED PUBLICATIONS
O.N. Demirer, C. Hidrovo
Laser Induced Fluorescence Visualization of Ion Transport in a Pseudo-Porous Capacitive Deionization Microstructure, Microfluidics and Nanofluidics, 16(1-2), 2014, 109-122
R. Hale, R.T. Bonnecaze, C. Hidrovo
A. Chhabra, R. Kanapuram, T.J. Kim, J. Geng, A. da Silva, C. Bielawski, C. Hidrovo
B. Carroll, C. Hidrovo
T.J. Kim, C. Hidrovo
Pressure and Partial Wetting Effects on Superhydrophobic Friction Reduction in Microchannel Flow, Physics of Fluids, 24(11), 2012, 112003-112018

SELECTED RESEARCH PROJECTS
Advanced Thermo-Adsorptive Battery Climate Control System Co-Principal Investigator, Advanced Research Projects Agency-Energy
CAREER: Inertial Two-Phase Gas-Liquid Droplet Microflows Principal Investigator, National Science Foundation
HANCHEN HUANG
Professor and Chair, Department of Mechanical and Industrial Engineering
PhD, University of California at Los Angeles, 1995
mie.neu.edu/people/huang-hanchen

Scholarship focus: growth of nanorods using theoretical formulations, experiments, and atomistic simulations; mechanics and radiation damage of nanostructured materials using atomistic simulations

Honors and awards: Fellow, American Society of Mechanical Engineers; Member, Connecticut Academy of Sciences and Engineering; Senior Member, Chinese Mechanical Engineering Society; Royal Society of London KTP Visiting Professor in Hong Kong; Keynote/invited speaker of 120 lectures or seminars

SELECTED PUBLICATIONS
X. B. Niu, S.P. Stagon, H. Huang, J.K. Baldwin, A. Misra
Smallest Metallic Nanorods Using Physical Vapor Deposition, Physical Review Letters, 110(13), 2013, 136102

H. Huang, H. van Swygenhoven

L.G. Zhou, H. Huang

H. Huang
Insight: Multiscale Modeling and Simulation, Sandia Technology, 2007, 8-9

J. Wang, H. Huang, S.V. Kesapragada, D. Gall
Growth of V-shaped Nanorods through Physical Vapor Deposition, Nano Letters, 5(12), 2005, 2505-2508

SELECTED RESEARCH PROJECTS
A New Characteristic Length Scale on Surfaces
Principal Investigator, National Science Foundation

Characteristic Length Scales of Growing Nanorods
Principal Investigator, Department of Energy Office of Basic Energy Science Core Program

Characteristic Length Scales of Growing Nanorods
Principal Investigator, Defense Threat Reduction Agency

Collaborative Nuclear Fellowship Program Applied Research in Radiation Damage and Mitigation
Principal Investigator, Nuclear Regulatory Commission

Collaborative Research: Atomistic Mechanisms of Stabilizing Oxide Nanoparticles in Oxide-dispersion Strengthened Structural Materials
Principal Investigator, National Science Foundation

From Nanofabrication to Commercial Production of Solar Cells
Principal Investigator, National Science Foundation

JACQUELINE ISAACS
Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: School of Public Policy and Urban Affairs
PhD, Massachusetts Institute of Technology, 1991
mie.neu.edu/people/isaacs-jacqueline

Scholarship focus: economic-environmental assessment of alternative manu/manufacturing routes towards sustainable design and manufacturing, societal implications of nanomanufacturing, with interdisciplinary collaborations in political science, philosophy, industrial hygiene and industrial engineering, development and assessment of educational games for engineering students and for K-12 outreach activities

Honors and awards: National Science Foundation CAREER Award; ELATE Fellow; College of Engineering Excellence in Mentoring Award; Northeastern University Excellence in Teaching Award; Northeastern University Aspiration Award

SELECTED PUBLICATIONS

L.M. Gilbertson, A.A. Busnaina, J.A. Isaacs, J.B. Zimmerman, M.J. Eckelman
Life Cycle Impacts and Benefits of a Carbon Nanotube-enabled Chemical Gas Sensor, Environmental Science and Technology, 48(19), 2014, 11360-11368

V.S. Espinoza, S. Erbis, L. Pourzahedi, M.J. Eckelman, J.A. Isaacs
Material Flow Analysis of Carbon Nanotube Lithium-ion Batteries used in Portable Computers, ACS Sustainable Chemistry & Engineering, 2(7), 2014, 1642-1648

S. Erbis, S. Kamarthi, T.P. Cullinan, J.A. Isaacs

A.A. Busnaina, J. Mead, J. Isaacs, S. Somu

SELECTED RESEARCH PROJECTS
ADVANCE: Institutional Transformation Award
Co-Principal Investigator, National Science Foundation

Designing and Integrating LCA Methods for Nanomanufacturing Scale-up
Principal Investigator, National Science Foundation

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

Research Collaborative Networks: Sustainable Energy Systems
Co-Principal Investigator, National Science Foundation
NADER JALILI

Professor and Associate Chair for Graduate Studies and Research, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering

PhD, University of Connecticut, 1998
mie.neu.edu/people/jalili-nader

Scholarship focus: piezoelectric-based actuators and sensors, dynamic modeling and vibration control of distributed-parameters systems, dynamics and control of MEMS and NEMS sensors and actuators, control and manipulation at the nanoscale

Honors and awards: Fellow, American Society of Mechanical Engineers; National Science Foundation CAREER Award; Northeastern University Excellence in Teaching Award; College of Engineering Translational Research Award; College of Engineering Martin Essigman Outstanding Teaching Award

SELECTED PUBLICATIONS

M. Khabiry, N. Jalili

S. Faegh, N. Jalili, S. Sriddhar

S. Eslami, N. Jalili
Model Development and Boundary Interaction Force Control of A Piezoresistive-based Microcantilever, Robotica, 2014, 1-19

S. Faegh, N. Jalili
Comprehensive Distributed-parameters Modeling and Experimental Validation of Microcantilever-based Biosensor with Application to Ultrasmall Biological Species Detection, Journal of Micromechanics and Microengineering, 23(2), 2013, 025007

N. Jalili

SELECTED RESEARCH PROJECTS

Design and Development of Nanoscale Package-embedded Vibration Sensing and Active Isolation – Phases I-IV
Principal Investigator, Raytheon
High Temperature and High Acceleration End-Effector Pads for Semiconductor Applications – Phases I-III: Carbon Nanotube (CNT)-based Surface Treatment for Improved Adhesion and Friction Properties
Principal Investigator, Brooks Automation Inc.
Robotic Leg Advancement Device
Principal Investigator, National Science Foundation
The Gear Bearing Drive: A Novel Compact Actuator for Robotic Joints
Principal Investigator, National Science Foundation

YUNG JOON JUNG

Associate Professor, Mechanical and Industrial Engineering

PhD, Rensselaer Polytechnic Institute, 2003
mie.neu.edu/people/jung-yung-joon

Scholarship focus: synthesis of low dimensional nanomaterials and engineering their molecular structures; assembly, transfer and integration of nanomaterials and nanostructured architectures and study properties and underlying fundamental science; nanoelectronics, flexible devices, chemical sensors and energy application

SELECTED PUBLICATIONS

B. Li, Y. He, S. Lei, S. Najmaei, Y. Gong, X. Wang, J. Zhang, L. Ma, Y. Yang, S. Hong, J. Hao, G. Shi, A. George, K. Keyshar, P. Dong, L. Ge, R. Vajtai, J. Lou, Y.J. Jung, P. Ajayan
Scalable Transfer of Suspended Two Dimensional Single Crystals, Nano Letters, 15(8), 2015, 5089-5097


Y. Kim, H. Jung, S. Park, B. Li, F. Liu, J. Hao, Y.J. Jung, et al.

Bundling Dynamics Regulates the Active Mechanics and Transport in Carbon Nanotube Networks and their Nanocomposites, Nanoscale, 4, 2012, 3584-3590, *This article was selected for Cover Page

H.Y. Jung, M.B. Karimi, M.G. Hahm, P.M. Ajayan, Y.J. Jung

B. Li, M. G. Hahm, Y.L. Kim, H.Y. Jung, S. Kar, Y.J. Jung

SELECTED RESEARCH PROJECTS

Developing Strong, High thermal resistant, and Light Weight Materials and their Processing for the High Performance Automotive Lighting System
Principal Investigator, KATECH
DMREF: Engineering Strong, Highly Conductive Nanotube Fibers Via Fusion
Principal Investigator, National Science Foundation
High Performance Photoswitches Using Carbon Nanotube-Si Heterojunctions for Optoelectronic Logic devices
Co-Principal Investigator, National Science Foundation
FACULTY

SAGAR KAMARTHI
Associate Professor, Mechanical and Industrial Engineering
PhD, Pennsylvania State University, 1994
mie.neu.edu/people/kamarthi-sagar

Scholarship focus: industrial engineering; advanced manufacturing; personalized disease management; sensor based diagnostics and prognostics

SELECTED PUBLICATIONS
S. Onel, A. Zeid, S. Kamarthi

I. Zeid, J. Chin, C. Duggan, S. Kamarthi

A. Zeid, S. Kamarthi, V. Sahney

G.M. Uddin, K.S. Ziemer, I. Zeid, S. Kamarthi
Monte Carlo Study of the Molecular Beam Epitaxy Process for Manufacturing Magnesium Oxide Nano Scale Films, IIE Transactions, 47, 2014, 1-16

S. Vadde, A. Zeid, S. Kamarthi

E. Tuncel, I. Zeid, S. Kamarthi

SELECTED RESEARCH PROJECTS
Cost-effective Thermal Envelope Retrofits in Woodframed Residential Buildings
Co-Principal Investigator, Northeastern University

TRANSFORM: TRANSFORMing Liberal Arts Careers to Meet Demand for Advanced Manufacturing Workforce
Co-Principal Investigator, National Science Foundation

ALIREZA KARIMI
Assistant Professor, Mechanical and Industrial Engineering
PhD, Virginia Polytechnic Institute and State University, 2012
mie.neu.edu/people/karimi-alireza

Scholarship focus: collective behavior of swimming microorganisms, formation and development of biofilms, nonlinear dynamics and chaos, pattern formation and spatiotemporal chaos in fluidic systems, multiphase flow in porous media, computational fluid dynamics, high performance computing and parallel processing

Honors and awards: Liviu Librescu Memorial Scholarship Award

SELECTED PUBLICATIONS
A. Karimi, D. Karig, A. Kumar, A.M. Ardekani

G.-J. Li, A. Karimi, A.M. Ardekani

A. Karimi, M. R. Paul
Bioconvection in Spatially Extended Domains, Physical Review E, 87, 2013, 053016

A. Karimi, A.M. Ardekani

A. Karimi, S. Yazdi, A.M. Ardekani
Hydrodynamic Mechanisms of Cell and Particle Trapping in Microfluidics, Biomicrofluidics, 7, 2013, 021501

A. Karimi, M.R. Paul

A. Karimi, M.R. Paul
GREGORY KOWALSKI

Energy Systems Program Director; Associate Professor, Mechanical and Industrial Engineering

PhD, University of Wisconsin, 1978
mie.neu.edu/people/kowalski-gregory

Scholarship focus: energy related and calorimeter studies related to pharmaceutical developments; simulation of thermal effects on laser beam propagation through heated materials; simulating microscale heat transfer phenomena and its effects on laser beam propagation; Simulation of laser welding processes

Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS


U. Piana, G.J. Kowalski, M. Zenouzi

A. Emdadi, Y. Emami, M. Zenouzi, A. Lak, B. Panahirad, A. Lotfi, F. Lak, G.J. Kowalski

G.J. Kowalski, M. Modaresifar, M. Zenouzi

YIANNIS LEVENDIS

COE Distinguished Professor, Mechanical and Industrial Engineering

PhD, California Institute of Technology, 1988
mie.neu.edu/people/levendis-yiannis

Scholarship focus: gasification and combustion of solid fuels, generation and containment of combustion-generated pollution, synthesis and characterization of combustion-generated materials, fire suppression – fire extinction, engine design and operation

Honors and awards: Fellow, American Society of Mechanical Engineers; Fellow, Society of Automotive Engineers; Søren Buus Outstanding Research Award, College of Engineering; George Westinghouse Gold Medal, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

J. Chase, C. Zhuo, Y.A. Levendis

A. Ruscio, F. Kazanc, Y.A. Levendis


C. Zhuo, W. Nowak, Y.A. Levendis

A. Davies, R. Soheilian, C. Zhuo, Y.A. Levendis


C. Zhuo, Y.A. Levendis

SELECTED RESEARCH PROJECTS

Co-firing Illinois Bituminous Coals with Highly-fragmenting Lignite Coals for SO2/HCl Control
Principal Investigator, Illinois Clean Coal Institute

NU STEP-UP: Science, Technology, Engineering
Co-Principal Investigator, National Science Foundation
LAURA H. LEWIS

Cabot Professor, joint faculty appointment in Chemical Engineering and 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.

R. McCallum, L.H. Lewis, R. Skomski, M.J. Kramer, I.E. Anderson

L.H. Lewis, F. Jiménez-Villacorta


SELECTED RESEARCH PROJECTS

Multiscale Development of L10 Materials for Rare-Earth-Free Permanent Magnets
Principal Investigator, Department of Energy

Nanomedicine Science and Technology
Co-Principal Investigator, National Science Foundation

Rare-Earth-Free Permanent Magnets
Principal Investigator, Office of Naval Research

YINGZI LIN

Associate Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering
PhD, University of Saskatchewan, 2004
mie.neu.edu/people/lin-yingzi

Scholarship focus: human-machine interactions, interface design and user experiences, system integration and evaluation; smart systems and nonintrusive sensors, human friendly mechatronics, human state detection and information fusion; human factors in transportation and healthcare

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

M. Yu, Y. Lin, X. Wang, D. Schmidt, Y. Wang

S. Radhakrishnan, Y. Lin, A. Zeid, S. Kamarthi

H. Cai, Y. Lin

Y. Lin

G. Yang, Y. Lin, P. Bhattacharya
A Driver Fatigue Recognition Model Based on Information Fusion and Dynamic Bayesian Network, Information Sciences, 180, 2010, 1942-1954

SELECTED RESEARCH PROJECTS

CAREER: Bridging Cognitive Science and Sensor Technology: Nonintrusive and Multimodality Sensing in Human Machine Interactions
Principal Investigator, National Science Foundation

Integrated Individualized Modeling towards Cognitive Control of Human-machine Systems
Principal Investigator, National Science Foundation
YONGMIN LIU
Assistant Professor, joint faculty appointment in Mechanical and Industrial Engineering and Electrical and Computer Engineering
PhD, University of California, Berkeley, 2009
mie.neu.edu/people/liu-yongmin

Scholarship focus: nano optics; nanoscale materials and engineering; nano devices; plasmonics; metamaterials; applied physics

Honors and awards: Air Force Summer Faculty Fellow

SELECTED PUBLICATIONS
W.L. Gao, F.Z. Fang, Y.M. Liu, S. Zhang
Chiral Surface Waves Supported by Biaxial Hyperbolic Metamaterials, Light: Science and Applications, 2015, e238
Z.B. Li, K. Yao, F.N. Xia, S. Shen, J.G. Tian, Y. M. Liu
Graphene Plasmonic Metasurfaces to Steer Infrared Light, Scientific Reports, 5, 2015, 12423
Q.H. Guo, W.L. Gao, J. Chen, Y.M. Liu, S. Zhang
Line Degeneracy and Strong Spin-orbit Coupling of Light with Bulk Biaxialisotropic Metamaterials, Physical Review Letters, 115, 2015, e067402
C. L. Zhao, Y. M. Liu, Y. H. Zhao, N. Fang, T. J. Huang
Reconfigurable Plasmofluidic Lens, Nature Communications, 4(2350), 2013, 1-8
Y.M. Liu, S. Palomba, Y. Park, T. Zentgraf, X.B. Yin, X. Zhang
Compact Magnetic Antennas for Directional Excitation of Surface Plasmons, Nano Letters, 12(9), 2012, 4853-4858
Y.M. Liu, X. Zhang
Metamaterials: A New Frontier of Science and Technology, Chemical Society Reviews, 40, 2011, 2494-2507
S.C. Kehr, Y.M. Liu, et al.
Near-field Examination of Perovskite-based Superlenses and Superlens-enhanced Probe-object Coupling, Nature Communications, 2(249), 2011, 1-9
T. Zentgraf, Y.M. Liu, M.H. Mikkelsen, J. Valentine, X. Zhang
M. Liu, T. Zentgraf, Y.M. Liu, G. Bartal, X. Zhang
Y. M. Liu, T. Zentgraf, G. Bartal, X. Zhang
Optical Negative Refraction in Bulk Metamaterials of Nanowires, Science, 321(5891), 2008, 930
Y.M. Liu, G. Bartal, D.A. Genov, X. Zhang

CAROL LIVERMORE
Associate Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering, Electrical and Computer Engineering
PhD, Harvard University, 1998
mie.neu.edu/people/livermore-clifford-carol

Scholarship focus: MEMS-enabled systems for assistive technologies, energy harvesting, and microscale vacuum systems, tissue engineering via MEMS-enabled cell assembly and origami folding, carbon nanotube-based energy storage

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS
T. Liu, R. St. Pierre, C. Livermore
Passively-switched Energy Harvester for Increased Operational Range, Smart Materials and Structures, 23(9), 2014, e095045
Scalable, MEMS-enabled, Vibration Actuators for High Resolution Tactile Displays, Journal of Micromechanics and Microengineering, 24(12), 2014, 125014
A.S. Dighe, C. Livermore
G. Agarwal, A. Servi, C. Livermore
Size-selective, Biocompatible, Manufacturable Platform for Structuring Deformable Microsystems, Lab on a Chip, 14(17), 2014, 3385-3393
Enhancing the Tensile Properties of Continuous Millimeter-scale Carbon Nanotube Fibers by Densification, ACS Applied Materials and Interfaces, 5(15), 2013, 7198-7207

SELECTED RESEARCH PROJECTS
DMREF: Engineering Strong, Highly Conductive Nanotube Fibers Via Fusion
Co-Principal Investigator, National Science Foundation
EFRI-ODISSEI: Origami and Assembly Techniques for Human-Tissue-Engineering (OATH)
Principal Investigator, National Science Foundation
Tiny, Robust Tactile Elements for Scalable, High Resolution Tactile Displays (Phase I)
Principal Investigator, Samsung
CRAIG MALONEY
Associate Professor, Mechanical and Industrial Engineering
PhD, University of California, Santa Barbara, 2005
mie.neu.edu/people/maloney-craig

Scholarship focus: modeling, simulation, and theory of nanoscale mechanics, soft matter, and glasses and amorphous materials

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS
A. Garg, A. Acharya, C.E. Maloney

K.M. Salerno, C.E. Maloney, M.O. Robbins

A. Hasan, C.E. Maloney

A. Hasan, C.E. Maloney

D. Kaya, N. Green, C.E. Maloney, M.F. Islam
Density Invariant Vibrational Modes in Disordered Colloidal Crystals, Physical Review E, 83(5), 2011, e051404

K. Karimi, C.E. Maloney

SELECTED RESEARCH PROJECTS
CAREER: Plasticity and Jamming
Principal Investigator, National Science Foundation

CDSE: A Data-driven Statistical Approach to Aging and Elasticity in Colloidal Glasses
Principal Investigator, National Science Foundation

JOSE MARTINEZ LORENZO
Assistant Professor, joint faculty appointment in Mechanical and Industrial Engineering and Electrical and Computer Engineering
PhD, University of Vigo, 2005
mie.neu.edu/people/martinez-lorenzo-jose-angel

Scholarship focus: devices, circuits and sensing; antenna analysis, modeling, design, and optimization; subsurface scattering analysis; computational methods of electromagnetics; novel radar system specification and design; explosives detection

SELECTED PUBLICATIONS
I.A. Osaretin, M.W. Shields, J.A. Martinez-Lorenzo, W.J. Blackwell

Fourier-based Imaging for Multistatic Radar Systems, IEEE Transactions on Microwave Theory and Techniques, 62(8), 2014, 1798-1810

On the Combination of SAR and Model Based Techniques for High-Resolution Real-Time Two-Dimensional Reconstruction, IEEE Transactions on Antennas & Propagation, 62(10), 2014, 5180-5189

SELECTED RESEARCH PROJECTS
Advanced Algorithm Development for Multiband GPR Radar Detection of Buried Mines
Co-Principal Investigator, US Army Night Vision and Electronic Sensors Directorate

Advanced Imaging and Detection of Security Threats using Compressive Sensing
Principal Investigator, Department of Homeland Security

Advanced Mechanical-Electromagnetic Applications for next Generation Environmental Monitoring
Principal Investigator, National Oceanic and Atmospheric Administration

Multi-Modality Electromagnetic Detection and Localization of Implanted Explosives Using Ultra low Field MRI and Nuclear Quadrupole Resonance
Co-Principal Investigator, Defense Advanced Research Projects Agency
EMANUEL MELACHRINOUDIS

Associate Professor, Associate Department Chair and Program Director of Industrial Engineering
PhD, University of Massachusetts, Amherst, 1980
mie.neu.edu/people/melachrinoudis-emanuel

Scholarship focus: deterministic operations research and multi-criteria optimization; facility location; supply chain, transportation and logistics; wireless sensor network lifetime maximization with sink mobility; network design for maximum survivability

Honors and awards: Outstanding Faculty Service Award, College of Engineering

SELECTED PUBLICATIONS

E. Melachrinoudis, E. Yavuz, R. Heydari
An O(m^2+mn^2) Algorithm for the Bi-objective Location Problem on a Network with Mixed Metrics, International Journal of Operational Research, 23, 2015, 427-450

E. Melachrinoudis, H. Min, C. Selneck

N. Zaarour, E. Melachrinoudis, M. Solomon, H. Min

N. Zaarour, E. Melachrinoudis, M. Solomon, H. Min

R. Heydari, E. Melachrinoudis
Location of an Obnoxious Facility with Elliptic Maximin and Network Minimax Objectives, European Journal of Operational Research, 223(2), 2012, 452-460

M. Mekuria, P. Furth, E. Melachrinoudis
Optimization of Spacing of Transit Stops on a Realistic Street Network, Transportation Research Record, 4, 2012, 29-37

E. Melachrinoudis

J. Santivanez, E. Melachrinoudis, M. Helander
Network Location of a Reliable Center Using the Most Reliable Route Policy, Computers and Operations Research, 36, 2009, 1437-1460

S. Basagni, A. Carosi, E. Melachrinoudis, C. Petrioli, M.Z. Wang
Controlled Sink Mobility for Prolonging Wireless Sensor Networks Lifetime, Wireless Networks, 14, 2008, 831-858

HAMEED METGHALCHI

Professor, Mechanical and Industrial Engineering
ScD, Massachusetts Institute of Technology, 1980
mie.neu.edu/people/metghalchi-mohamad

Scholarship focus: fundamentals of combustion such as burning speed and onset of autoignition measurement and flame stability analysis; development of chemistry reduction such as rate-controlled constrained-equilibrium method; non-equilibrium thermodynamics

Honors and awards: American Society of Mechanical Engineers James H. Potter Gold Medal; American Society of Mechanical Engineers Edward Obert Award; American Society of Mechanical Engineers Dedicated Service Award; Editor in Chief, American Society of Mechanical Engineers Journal of Energy Resources Technology; Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

E. Rokni, A. Mossadagh, O. Askari, H. Metghalchi

O. Askari, M. Janbozorgi, R. Greig, A. Moghaddas, H. Metghalchi
Developing Alternative Approaches to Predicting the Laminar Burning Speed of Refrigerants Using the Minimum Ignition Energy, Science and Technology for the Built Environment, 21(2), 2015, 220-227

G. Nicolas, H. Metghalchi

G. Nicolas, M. Janbozorgi, H. Metghalchi

A. Moghaddas, C. Bennett, E. Rokni, H. Metghalchi
Laminar Burning Speeds and Flame Structures of Mixtures of Difluoromethane (HFC-32) and 1,1-Difluoroethane (HCF-152a) with Air at Elevated Temperatures and Pressures, HVAC&R Research, 20, 2014, 42-50

O. Askari, H. Metghalchi, S.K. Hannani, H. Hemmati, R. Ebrahimi

SELECTED RESEARCH PROJECTS

Combustion Research
Principal Investigator, Novatio Engineering

LSAMP Educational Research Project: Retention of URM Engineering Students through Practice-oriented Experiential Education
Principal Investigator, National Science Foundation
Marilyn Minus

Associate Professor, Mechanical and Industrial Engineering
PhD, Georgia Institute of Technology, 2008
mie.neu.edu/people/minus-marilyn

Scholarship focus: process-structure-properties relationships in polymer-based nano-composites fibers; polymer/nano-carbon interfacial interactions and interphase formations; lightweight composite materials; carbon-carbon composites

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

Y. Zhang, N. Tajaddod, K. Song, M.L. Minus
Low Temperature Graphitization of Interphase Polyacrylonitrile (PAN), Carbon, 91, 2015, 479-493

J. Meng, N. Tajaddod, S.W. Cranford, M.L. Minus
Polyethylene Assisted Exfoliation of Hexagonal Boron Nitride in Composite Fibers: A Combined Experimental & Computational Study, Macromolecular Chemistry and Physics, 216(8), 2015, 847-855

Y. Zhang, M.L. Minus

E.C. Green, Y. Zhang, M.L. Minus

SELECTED RESEARCH PROJECTS

CAREER: Understanding Directionally Templated Interphase Processing-structure Development and Relationships in Polymer Nano-composite Materials
Principal Investigator, National Science Foundation

EAGER: Dispersion and Selective Positioning of Reinforcement in Polymer Matrix Composites
Co-Principal Investigator, National Science Foundation

Evolution of Interphase-polyacrylonitrile (i-PAN) Structure during Carbon Fiber Processing
Principal Investigator, Defense Advanced Research Projects Agency

Multi-scale Characteristics of Bone Toughness
Co-Principal Investigator, National Science Foundation

Studying the Dependency of Interfacial Formation with Carbon Nanotube Length for Stress Transfer in Polymer Composite Fibers
Principal Investigator, Air Force Office of Scientific Research

Sinan Müftü

Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering, Civil and Environmental Engineering
PhD, University of Rochester, 1994
mie.neu.edu/people/muftu-sinan

Scholarship focus: mechanics and tribology of axially moving materials, webs; numerical simulation of tissue healing and bone remodeling; high velocity impact of micron scale particles

Honors and awards: Fellow, American Society of Mechanical Engineers; Søren Buus Outstanding Research Award, College of Engineering; Martin W. Essigman Outstanding Teaching Award, College of Engineering

SELECTED PUBLICATIONS


Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, Experimental Mechanics, 54(6), 2014, 935-942

T. Hu, S. Zhalehpour, A. Gouldstone, S. Müftü, T. Ando,

K. Michalakis, P. Calvani, S. Müftü, A. Pissiotis, H. Hirayama

SELECTED RESEARCH PROJECTS

A Novel Biomechanical Model of Bacterial Adhesion and Aggregation
Co-Principal Investigator, National Science Foundation

Collaborative Research: Mechano-Lipidomics and Mechano-Cytosis of Drug Delivery Liposomes
Co-Principal Investigator, National Science Foundation

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

Improving Theoretical Models of Advanced Tape Transport Systems
Principal Investigator, Oracle Corporation
UICHIRO NARUSAWA
Associate Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering

PhD, University of Michigan, 1972
mie.neu.edu/people/narusawa-uichiro

Scholarship focus: biomechanics on respiratory systems; turbine blade cooling

SELECTED PUBLICATIONS
F. Forghan, O. Askari, U. Narusawa, H. Metghalchi
Computational Design of Turbine Blade Film Cooling with Expanded Exit Holes, Proceedings of ASME Turbo Expo, 2015

M. Nabian, U. Narusawa

F. Forghan, O. Askari, U. Narusawa, H. Metghalchi

F. Forghan, U. Narusawa, H. Metghalchi
Discharge Coefficient of an Expanded Exit Hole for Film Cooling of Turbine Blades, American Institute of Aeronautics and Astronautics Journal of Propulsion Power, 26, 2010, 1322-1325

H. Liu, P.R. Patil, U. Narusawa

R. Amini, K. Creeden, U. Narusawa

H. Liu, U. Narusawa

HAMID NAYEB-HASHEMI
Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering

PhD, Massachusetts Institute of Technology, 1982
mie.neu.edu/people/nayeb-hashemi-hamid

Scholarship focus: biomechanics and mechanics

Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS
Buckling of Regular, Chiral and Hierarchical Honeycombs Under a General Macrotscopic Stress State, Proceedings of The Royal Society A, 470(2167), 2014, 1-23


SELECTED RESEARCH PROJECTS
High-Performance Biodegradable Composites from Qatari Date Palm Waste
Principal Investigator, National Priorities Research Program

Knee Injury Prevention and Osteoarthritis Risk in Obesity
Co-Principal Investigator, National Priorities Research Program

Novel Multi Functional Composite Sandwich Panel
Principal Investigator, National Priorities Research Program
**VINOD SAHNEY**

University Distinguished Professor, Mechanical and Industrial Engineering

PhD, University of Wisconsin, Madison, 1970

mie.neu.edu/people/sahney-vinod

**Scholarship focus**: health care initiatives; industrial engineering; operations research

**Honors and awards**: Member, Institute of Medicine, National Academy of Science; Member, National Academy of Engineering; Fellow, Health Care Information and Management Systems Society; Fellow, Institute of Industrial Engineers; Gilbreth Award for Lifetime Contribution to Industrial Engineering; Institute for Industrial and Systems Engineering; Atrius Health Care, Boston, MA Board of Directors; Syntel Inc., Board of Directors; SCL Health System, Denver, Board of Directors; Brigham and Women’s Hospital, Boston, MA, Patient Safety Research Center, Advisory Board

**SELECTED PUBLICATIONS**

A. Zeid, S. Kamarthi, V.K. Sahney  

V.K. Sahney  

V.K. Sahney  

J.R. Griffith, V. Sahney, R.A. Mohr  
Re-engineering Health Care: Building on CQI, Health Administration Press, Ann Arbor, MI, 1995

**SANDRA SHEFELBINE**

Associate Professor, joint faculty appointment in Mechanical and Industrial Engineering and Bioengineering

PhD, Stanford University, 2002

mie.neu.edu/people/shefelbine-sandra

**Scholarship focus**: multi-scale bone biomechanics–how the structure and composition of bone influences its mechanical properties; mechano-adaptation of bone and joint–how tissue responds to mechanical signals

**SELECTED PUBLICATIONS**

A. Carriero, E.A. Zimmermann, S.J. Shefelbine, R.O. Ritchie  

N. Rodriguez-Florez, M.L. Oyen, S.J. Shefelbine  
Age Related Changes in Mouse Bone Permeability, Journal of Biomechanics, 47(5), 2014, 1110-1116

A. Levchuk, P. Schneider, R. Müller, S.J. Shefelbine, et al.  
Altered Lacunar and Vascular Porosity in Osteogenesis Imperfecta Mouse Bone as Revealed by Synchrotron Tomography Contributes to Bone Fragility, Bone, 61, 2014, 116-124 (cover picture)

A. Carriero, L. Abela, A.A. Pitsillides, S.J. Shefelbine  
Ex Vivo Determination of Bone Tissue Strains for an in Vivo Mouse Tibial Loading Model, Journal of Biomechanics, 47(10), 2014, 2490-2497


B. Depalle, Z. Qin, S.J. Shefelbine, M.J. Buehler  

M. Giorgi, A. Carriero, S.J. Shefelbine, N. C. Nowlan  

S.J. Shefelbine, N. J. Horwood, M. Marenzana, P. De Coppi, et al.  
Potential of Human Fetal Chorionic Stem Cell for the Treatment of Osteogenesis Imperfect, Stem Cells and Development, 23(3), 2014, 262-276

Reference Point Indentation is not Indicative of Whole Mouse Bone Measures of Stress Intensity Fracture Toughness, Bone, 69, 2014,174-179

**SELECTED RESEARCH PROJECTS**

Heterogeneity and Anisotropy in Tough Materials  
Principal Investigator, National Science Foundation

Multi-scale Characteristics of Bone Toughness  
Principal Investigator, National Science Foundation
REZA SHEIKHI
Assistant Professor, Mechanical and Industrial Engineering
PhD, University of Pittsburgh, 2005
mie.neu.edu/people/sheikhi-reza

Scholarship focus: turbulence; combustion and propulsion; computational fluid dynamics and high performance computing

Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS
M. Safari, M.R.H. Sheikhi
M. Safari, M.R.H. Sheikhi
M. Safari, F. Hadi, M.R.H. Sheikhi
M. Janbozorgi, M.R.H. Sheikhi, H. Metghalchi
M.R.H. Sheikhi, M. Safari, H. Metghalchi

SELECTED RESEARCH PROJECTS
Large-scale Simulation of Turbulent Flames with Detailed Chemistry
   Principal Investigator, American Chemical Society
Investigation of Coal-biomass Catalytic Gasification Using Experiments, Reaction Kinetics and Computational Fluid Dynamics
   Principal Investigator, Department of Energy
Advancing Coal Catalytic Gasification to Promote Optimum Syngas Production
   Principal Investigator, Department of Energy
Experimental and Computational Investigations of the Ignition and Combustion of GTL and Jet Fuel Blends
   Principal Investigator, Qatar National Research Fund

RIFAT SIPAHI
Associate Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering
PhD, University of Connecticut, 2005
mie.neu.edu/people/sipahi-rifat

Scholarship focus: control systems and mechatronics; stability analysis and control synthesis of dynamical systems with delays; interplay between stability, delays, and graphs; control-systems-aided human-machine systems; engineering education research; disability research; systems biology

Honors and awards: College of Engineering Faculty Fellow; Defense Advanced Research Projects Agency Young Faculty Award; Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS
W. Qiao, R. Sipahi
R. Sipahi
R. Sipahi, I.I. Delice
On Some Features of Core Hypersurfaces Related to Stability Switching of LTI Systems with Multiple Time Delays, IMA Mathematical Control and Information, 31(2), 2014, 257-272
W. Qiao, R. Sipahi
A Linear Time-invariant Consensus Dynamics with Homogeneous Delays: Analytical Study and Synthesis of Rightmost Eigenvalues, SIAM Journal on Control and Optimization, 51(5), 2013, 3971-3992
I.I. Delice, R. Sipahi
Delay-independent Stability Test for Systems with Multiple Time-Delays, IEEE Transactions on Automatic Control, 57(4), 2012, 963-972

SELECTED RESEARCH PROJECTS
GARDE: An Interdisciplinary Approach to Accommodate Fine Motor Control Disorders
   Principal Investigator, National Science Foundation
Model-free Algorithms to Assist and Control Human-Task Missions against Dynamic Environments
   Principal Investigator, Defense Advanced Research Projects Agency
MOHAMMAD E. TASLIM

Professor, Mechanical and Industrial Engineering
PhD, University of Arizona, 1981
mie.neu.edu/people/taslim-mohammad

Scholarship focus: experimental and numerical research in gas turbine cooling technology, solar and wind energy, non-Newtonian liquid droplet interactions with hydrophobic surfaces, nano-sensors

Honors and awards: Fellow, American Society of Mechanical Engineers; Associate Fellow, American Institute of Aeronautics and Astronautics; Member, IGTI Heat Transfer Committee

SELECTED PUBLICATIONS
M.E. Taslim, J.S. Halabi

M.E. Taslim, X. Huang

M.E. Taslim, M.K.H. Fong

K. Elebiary, M.E. Taslim

M.E. Taslim, A. Nongsaeng
Experimental and Numerical Cross-over Jet Impingement in an Airfoil Trailing-edge Cooling Channel, Journal of Turbomachinery, 133(4), 2011, 1-10

A.A. Adebiyi, M.E. Taslim, K.D. Crawford

SELECTED RESEARCH PROJECTS
Experimental Heat Transfer Coefficients and Pressure Drops in Two Test Sections Simulating the Mid-chord Cooling Cavities of a GE Turbine Airfoil roughed with Two Rib Geometries
Principal Investigator, General Electric Company

Experimental Heat Transfer and Pressure Drops Research in a Two-legged Rib-roughened Rig with Three Rib Geometries
Principal Investigator, General Electric Company

Measurements of Heat Transfer Coefficients and Pressure Drops in Seven Test Sections Simulating the Mid-chord and Trailing-edge Cooling Cavities of a GE Turbine Airfoils
Principal Investigator, General Electric Company

AYTEN TURKCAN

Assistant Professor, Mechanical and Industrial Engineering
PhD, Bilkent University, 2003
mie.neu.edu/people/turkcan-upasani-ayten

Scholarship focus: implementation of operations research techniques to solve planning and scheduling problems in healthcare systems; appointment scheduling, chemotherapy scheduling, nurse staffing, diabetes management, and planning of mental health services

SELECTED PUBLICATIONS
S. Mutlu, J. Benneyan, J. Terrell, V. Jordan, A. Turkcan

B. Liang, A. Turkcan

B. Liang, A. Turkcan, M.E. Ceyhan, K. Stuart

A. Turkcan, T. Toscos, B. Doebbeling


A. Turkcan, A. Zeng, M.A. Lawley

J. Daggy, M.A. Lawley, D.R. Willis, D. Thayer, C. Suelzer, P. DeLaurentis, A. Turkcan, S. Chakraborty, L. Sands
Using No-show Modeling to Improve Clinic Performance, Health Informatics Journal, 16(4), 2010, 246-259

SELECTED RESEARCH PROJECTS
Improving Health Care Systems for Access to Care by Under Served Patients
Co-Principal Investigator, Patient-Centered Outcomes Research Institute
MONEESH UPMANYU
Associate Professor, Mechanical and Industrial Engineering
PhD, University of Michigan, 2001
mie.neu.edu/people/upmanyu-moneesh

Scholarship focus: computational techniques that span multiple scales, atomic-to-continuum, to quantify the structure property relations in established and emerging material systems, both in technology and nature

SELECTED PUBLICATIONS
P. Waduge, J. Larkin, M. Upmanyu, S. Kar, M. Wanunu
Programmed Synthesis of Freestanding Graphene Nanomembrane Arrays, Small, 11(5), 2015, 597-603
L. X. Lu, M. S. Bharathi, M. Upmanyu, Y. W. Zhang
C. Wang, M. Upmanyu
Shear Accommodation in Dirty Grain Boundaries, Europhysics Letters, 106(2), 2014, 1-6
E. T. Nilsen, R. Arora, M. Upmanyu
Thermonastic Leaf Movements in Rhododendron During Freezethaw Events: Patterns, Functional Significances, and Causes, Environmental and Experimental Botany, 106, 2014, 34-43
Z. Ma, D. McDowell, E. Panaitescu, A.V. Davidov, M. Upmanyu, L. Menon

SELECTED RESEARCH PROJECTS
Computational Studies of Nanocrystal Growth Principal Investigator, National Science Foundation
DMREF: Engineering Strong, Highly Conductive Nanotube Fibers Via Fusion Co-Principal Investigator, National Science Foundation

ASHKAN VAZIRI
Associate Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering
PhD, Northeastern University, 2004
mie.neu.edu/people/vaziri-ashkan

Scholarship focus: solid mechanics, materials, computational methods, biomechanics, nanotechnology

Honors and awards: Air Force Office of Scientific Research Young Investigator Award; National Science Foundation CAREER Award; Soren Buus Outstanding Research Award, College of Engineering; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS
Bending Behavior of Lightweight Sandwich-walled Shells with Pyramidal Truss Cores, Composite Structures, 116, 2014, 793-804
Buckling of Regular, Chiral, and Hierarchical Honeycombs Under a General Macroscopic Stress State, Proceedings of the Royal Society A, 470(2167), 2014, 20130856
R. Ghosh, H. Ebrahimi, A. Vaziri
R. Oftadeh, B. Haghpanah, D. Vella, A. Boudaoud, A. Vaziri
H. Abdi, H. Nayeb-Hashemi, A. M. S. Hamouda, A. Vaziri
R. Ghosh, A. Kumar, A. Vaziri
Type-IV Pilus Deformation Can Explain Retraction Behavior, PLOS ONE, 2014, 9, 114613

SELECTED RESEARCH PROJECTS
Development of Novel High Friction, low Adhesion Materials Co-Principal Investigator, Brooks Automation
Mechanics of Carbon Nanotube Surface Decontamination Principal Investigator, FM Global
Multifunctional Cellular Structures for Energy Harvesting and Energy Management Applications Principal Investigator, Qatar Foundation
FACULTY

KAI-TAK WAN
Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Bioengineering, Civil and Environmental Engineering
PhD, University of Maryland at College Park, 1993
mie.neu.edu/people/wan-kai-tak
Scholarship focus: cellular biomechanics; water filtration; thin film adhesion and characterization; subsurface mechano-sensing; shell adhesion; fundamental intersurface forces
Honors and awards: National Science Foundation CAREER Award; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS
M. Robitaille, N. Belisle, S. Dang, E. Faigle, C. Morck, P. Uth, K.-T. Wan
An Optical Topographic Technique to Map the 3-D Deformed Profile of a Convex Lens under External Loading, Experimental Mechanics, 55, 2015, 641-646
Y. Li, X. Wang, A. Onnis-Hayden, K.-T. Wan, A.Z. Gu
Universal Quantifier Derived from AFM Analysis Links Cellular Mechanics Properties and Cell-surface Integration Forces with Microbial Deposition and Transport Behavior, Environmental Science and Technology, 48, 2014, 1769-1778
G. Li, K.-T. Wan
G. Li, C. Yilmaz, X. An, S. Somu, S. Kar, Y. Jung, A. Busnaina, K.-T. Wan
M. Robitaille, J. Shi, S. McBride, K.-T. Wan
Mechanical Performance of Hydrogel Contact Lenses with a Range of Power Under Parallel Plate Compression and Central Load, Journal of the Mechanical Behavior of Biomedical Materials, 22, 2013, 59-64

SELECTED RESEARCH PROJECTS
A Novel Biomechanical Model of Bacterial Adhesion and Aggregation
Principal Investigator, National Science Foundation
Mechano-lipidomics and Mechano-cytosis of Drug Delivery Liposomes
Principal Investigator, National Science Foundation
Mechanical Integrity and Long Term Reliability of Photovoltaic Panels
Principal Investigator, National Institute of Standards and Technology

JOHN (PETER) WHITNEY
Assistant Professor, Mechanical and Industrial Engineering
PhD, Harvard University, 2012
Scholarship focus: human-safe robots, medical robotics, soft robotics and soft-material manufacturing, MEMS, microrobotics, bio-inspired design, flapping aerodynamics and insect flight

SELECTED PUBLICATIONS
N.O. Perez-Arancibia, J.P. Whitney, R.J. Wood,
J.P. Whitney, R.J. Wood
Conceptual Design of Flapping-wing Micro Air Vehicles, Bioinspiration and Biomimetics, 7, 2012, 1-10
P.S. Sreetharan, J.P. Whitney, M.D. Strauss, R.J. Wood
Monolithic Fabrication of Millimeter-scale Machines, Journal of Micromechanics and Microengineering, 22(5), 2012, 055027 *cover article
H. Tanaka, J.P. Whitney, R.J. Wood
Effect of Flexural and Torsional Wing Flexibility on Lift Generation in Hoverfly Flight, Integrative and Comparative Biology 51(1), 2011, 142-150
J.P. Whitney, P.S. Sreetharan, K. Ma, R.J. Wood
Pop-up Book MEMS, Journal of Micromechanics and Microengineering, 21(11), 2011, 1-7 *cover article
J.P. Whitney, R.J. Wood
IBRAHIM ZEID
Professor, Mechanical and Industrial Engineering
PhD, University of Akron, 1981
mie.neu.edu/people/zeid-ibrahim
Scholarship focus: mechanics; personalized medicine; simulation techniques and complex networks analysis
Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS
S. Onel, A. Zeid, S. Kamarthi

I. Zeid, J. Chin, C. Duggan, S. Kamarthi

A. Zeid, S. Kamarthi, V. Sahney

G.M. Uddin, K.S. Ziemer, I. Zeid, S. Kamarthi
Monte Carlo Study of the Molecular Beam Epitaxy Process for Manufacturing Magnesium Oxide Nano Scale Films, IIE Transactions, 47, 2014, 1-16

S. Vadde, A. Zeid, S. Kamarthi

E. Tuncel, I. Zeid, S. Kamarthi

SELECTED RESEARCH PROJECTS
ITEL: Investing in Tomorrow's Engineering Leaders
Principal Investigator, National Science Foundation

TRANSFORMing Liberal Arts Careers to Meet Demand for Advanced mfg Workforce
Principal Investigator, National Science Foundation

HONGLI ZHU
Assistant Professor, Mechanical and Industrial Engineering
PhD, South China University of Technology, 2009
mie.neu.edu/people/zhu-hongli
Scholarship focus: advanced manufacturing, electrochemical energy storage; multifunctional bio-inspired materials; nano/micro fabrication of devices and materials
Honors and awards: Innovator of the year 2013, University of Maryland; Jakob Wallenberg Scholarship, Sweden

SELECTED PUBLICATIONS
H. Zhu, S. Zhu, Z. Jia, S. Parvinian, Y. Li, T. Li, L. Hu
Anomalous Scaling Law of Strength and Toughness of Cellulose Nanopaper, Proceeding of the National Academy of Sciences (PNAS), 112(29), 2015, 8971-8976

Interfacial Oxygen Stabilizes Composite Silicon Anodes, Nano Letters, 15(1), 2015, 703-708

Nanocellulose Fibers as Green Dispersant for Two Dimensional Materials, Nano Energy, 2015, 346-354

Self-powered Human Interactive Transparent Nanopaper Systems, ACS Nano, 9(7), 2015, 7399-7406

Aqueous Gating of Van der Waals Materials on Bilayer Nanopaper, ACS Nano, 2014, 10606-10612

Highly Transparent Paper with Tunable Haze for Green Electronics, Energy and Environmental Science, 7, 2014, 3313-3319

High conductive microfiber of graphene oxide templated carbonized cellulose, Advanced Functional Materials, 35(7), 2014, 1471-1479


Mary K. Balaconis
PhD 2014, Mechanical Engineering; Advisor, Heather Clark

THE DEVELOPMENT AND DESIGN OF FLUORESCENT SENSORS FOR CONTINUOUS IN VIVO GLUCOSE MONITORING

This dissertation details the design of novel fluorescent glucose-sensitive sensors for monitoring glucose levels non-invasively and continuously after initial implantation. Sensing components were selected for appropriate response at physiological concentrations and were fully characterized for dynamic range, sensitivity, and lifetime in vitro. In preclinical testing, glucose-sensitive sensors tracked changes in glucose levels in mice, but sensor monitoring was limited to one hour. Sensor design was further improved after these studies to prolong in vivo lifetime, increase response at hypoglycemic levels, and enhance sensor biocompatibility. These efforts resulted in in vivo lifetimes greater than one hour, incorporation of more advance sensing moieties, and a biodegradable sensor platform. Future work with these sensors will involve Clark Error Grid Analysis and biodistribution studies to address clinical application requirements.

See full dissertation at coe.neu.edu/iris/MaryBalaconis

Jessica Selina Cho Chin
PhD 2014, Industrial Engineering; Advisor, Ibrahim Zeid

INVESTIGATING A SYSTEMS APPROACH TO THE PREDICTIVE MODELING AND ANALYSIS OF TIME-VARYING WOUND PROGRESSION AND HEALING

This dissertation presents three predictive statistical models, namely, multiple linear regression, non-linear regression, and neural networks, and compares their performance. These models take wound parameters such as length, width, and depth as inputs and produce the remaining time to heal as an output. These predictive models also allow us to determine the wound parameters that are most influential on wound healing. These models are developed and analyzed with insight gained from four major wound clinics around the country...The outcomes of this project are beneficial to building a chronic wound predictive modeling system with the capabilities of integrating two-dimensional imaging and three-dimensional modeling with predictive analytics to provide patients and clinicians with an estimated time to wound closure.

See full dissertation at coe.neu.edu/iris/JessicaChin

Hanchul Cho
PhD 2014, Mechanical Engineering; Advisor, Ahmed Busnaina

DEVELOPMENT OF HIGH-RATE NANO-SCALE OFFSET PRINTING TECHNOLOGY FOR ELECTRIC AND BIO APPLICATIONS

In the dissertation, we have newly developed ‘damascene template,’ reusable and versatile template, for high-rate directed assembly and transfer of nanomaterials. In addition, a flexible damascene template based on a polymer substrate has been developed to apply to the roll to roll system for continuous assembly and transfer. The governing parameters for assembly and transfer were investigated to achieve the uniform assembly and high transfer yield. Our approaches demonstrate that the combination of reusable damascene template and directed assembly and transfer is significantly compatible with various nanomaterials such as polymer, silica, semiconductor nanoparticles and SWNTs by controlling the surface energy of the template, assembly and transfer parameters. This process and template will enable high-rate manufacturing of flexible devices such as a flexible transistor, display, bio and chemical sensors, energy harvesting.

See full dissertation at coe.neu.edu/iris/HanchulCho

Ryan Patrick Hennessy
PhD 2014, Mechanical Engineering; Advisor, George Adams

EXPLORATION OF HOT SWITCHING DAMAGE AND DAMAGE MECHANISMS IN MEMS SWITCH CONTACTS

This work explores the effect of multi-domain coupling on the behavior of an electrical contact, what makes hot switching damaging, the making of contact under bias as it compares to the breaking of contact under bias (leading versus trailing edge hot switching), and the specific mechanisms that could be responsible for hot switching damage. Theoretically, it was found that for a contact operating under displacement control, such as an asperity on the surface of a contact bump, thermal-electrical-mechanical coupling has a significant effect. Generalized (non-dimensional) equations are presented to describe the behavior of the contact in this situation...This work makes significant progress toward defining the specific mechanisms responsible for the additional damage associated with hot switching, thereby helping to solve a problem that has plagued the microswitch and inhibited it from significant commercial market penetration.

See full dissertation at coe.neu.edu/iris/RyanHennessy
Babak Haghpanah Jahromi
PhD 2014, Mechanical Engineering; Advisor, Ashkan Vaziri

MECHANICS OF REGULAR, CHIRAL AND HIERARCHICAL HONEYCOMBS
In this dissertation approaches to obtain analytical closed-form expressions for the macroscopic elastic, plastic collapse, and buckling response of various two-dimensional cellular structures are presented. First, analytical models to estimate the effective elastic modulus and Poisson’s ratio of hierarchical honeycombs using the concepts of mechanics of materials and compare the analytical results with finite element simulations and experiments are provided. For plastic collapse, we present a numerical minimization procedure to determine the macroscopic ‘plastic collapse strength’ of a tessellated cellular structure under a general stress state. The method is illustrated with sample cellular structures of regular and hierarchical honeycombs. Based on the deformation modes found by minimization of plastic dissipation, closed-form expressions for strength are derived. The work generalizes previous studies on plastic collapse analysis of lattice structures, which are limited to very simple loading conditions.

See full dissertation at coe.neu.edu/iris/BabakJahromi

Kholoud Khateeb
PhD 2015, Industrial Engineering; Advisors: Peter O’Reilly, Sagar Kanamarthi

ECONOMIC ANALYSIS OF REMOTE PATIENT MONITORING: THE CASE (SIC) OF HEART FAILURE
This research evaluated the economic impact of integrating a Remote Patient Monitoring (RPM) system into the conventional heart failure disease care process. The first part of the work used a Markov chain model to represent patients’ discrete health states in the disease management process and the transition probabilities between the states over time. The model presented 8 health states of a heart failure patient in the disease management process. These states are home/Post-Acute Care (PAC), doctor visit, Urgent Care (UC) visit, transfer from other health facility, Emergency Room (ER) visit, hospitalization, 30-day readmission, and death...This research indicates that RPM is a promising enabler of a new model of care with better outcomes for the heart failure disease management; however, further research is required to find an optimal RPM design with economic feasibility.

See full dissertation at coe.neu.edu/iris/KholoudKhateeb

Reza Khatami
PhD 2014, Mechanical Engineering; Advisor, Yiannis A. Levendis

IGNITION AND COMBUSTION OF PULVERIZED COAL AND BIOMASS UNDER DIFFERENT OXY-FUEL O₂/N₂ AND O₂/CO₂ ENVIRONMENTS
This dissertation studied the ignition and combustion of burning pulverized coals and biomasses particles under either conventional combustion in air or oxy-fuel combustion conditions. Oxy-fuel combustion is a ‘clean-coal’ process that takes place in O₂/CO₂ environments, which are achieved by removing nitrogen from the intake gases and recirculating large amounts of flue gases to the boiler. Removal of nitrogen from the combustion gases generates a high CO₂-content, sequestration-ready gas at the boiler effluent. Flue gas recirculation moderates the high temperatures caused by the elevated oxygen partial pressure in the boiler. In this study, combustion of the fuels took place in a laboratory laminar-flow drop-tube furnace (DTF), electrically-heated to 1400 K, in environments containing various mole fractions of oxygen in either nitrogen or carbon-dioxide background gases.

See full dissertation at coe.neu.edu/iris/RezaKhatami

Alexandre Consul Mendes
PhD 2014, Industrial Engineering; Advisor, Nasser Fard

PROPORTIONAL HAZARD MODEL APPLICATIONS IN RELIABILITY
This dissertation proposes two main methods as a modification of the semi-parametric Proportional Hazard Model (PHM) with innovative application for reliability testing. The first method developed uses a median of lifetime survival history for subjects with multiple occurrences to be modeled using the non-recurrent PHM method. The second method developed proposes censoring of influential observations, applying recurrent PHM theory. Both methods are validated using small electromechanical appliances with covariates identifying typical user performance as part of accelerated reliability testing.

See full dissertation at coe.neu.edu/iris/AlexandreMendes
Hande Musdal  
PhD 2014, Industrial Engineering; Advisor, James Benneyan

**SYSTEMS ENGINEERING MODELS FOR SIGNATURE INJURIES OF MODERN MILITARY CONFLICTS**

This dissertation presents several systems engineering models to optimize the overall design, effectiveness, and capacity of healthcare systems for detecting and treating silent injuries, such as TBI and PTSD, as well as a general health problem that is common among veterans, sleep apnea, by addressing the following needs: (1) sequential screening processes, (2) categorical diagnostic methods, and (3) care services location-allocation (network optimization) models. The first focus of this dissertation is analyzing and optimizing the design of disease screening processes. Several probability and Monte Carlo simulation models are developed to investigate the current and proposed PTSD screening processes within the Veterans Health Administration (VHA). Results indicate that a more systematically designed system, which consists of a series of annual screenings along with a standardized confirmatory testing, results in lower false diagnosis rates, predictable performance, and reduced costs.

See full dissertation at [coe.neu.edu/iris/HandeMusdal](http://coe.neu.edu/iris/HandeMusdal)

Jeffrey Paten  
PhD 2014, Mechanical Engineering; Advisors: Jeffrey Ruberti, Christopher Trainor

**INVESTIGATION INTO THE MECHANO-CHEMISTRY OF DE NOVO COLLAGEN ASSEMBLY**

The proposed research in this dissertation is motivated by basic science to determine the essentiality of the cells in creating tissue in vitro. The results of this investigation strengthen the concept that upon completion of the initial anlage, cells are potentially relegated to mechanical stimulators/molecular production houses, and the mechanosensitive, physiochemical properties of the molecules drive tissue growth and maintenance. Successful demonstration will provide a significant opportunity for a generation of new engineering methods capable of acellularly recapitulating the development of load-bearing tissue.

See full dissertation at [coe.neu.edu/iris/JeffreyPaten](http://coe.neu.edu/iris/JeffreyPaten)

Payam Mahmoodi Nia  
PhD 2014, Mechanical Engineering; Advisor, Rifat Sipahi

**CONTROL-PARAMETER-SPACE CLASSIFICATION FOR DELAY-DEPENDENT-STABILITY OF LINEAR TIME-ININVARIANT TIME-DELAY SYSTEMS; [SIC] THEORY AND EXPERIMENTS**

Within this dissertation, a purely algebraic approach is developed for designing controllers for regulation purposes of the general class of linear time-invariant (LTI) systems with uncertain delays. The results are new and address the major issue of extending the DIS control design to increased number of discrete delays. This is achieved mainly by procedures based on algebraic tools which allow designing controllers that can stabilize such systems regardless of how large/small the delays are.

See full dissertation at [coe.neu.edu/iris/PayamNia](http://coe.neu.edu/iris/PayamNia)

Wei Qiao  
PhD 2014, Mechanical Engineering; Advisor, Rifat Sipahi

**INTERPLAY BETWEEN STABILITY, DELAYS, AND GRAPHS OF A CLASS OF MULTI-AGENT LTI SYSTEM WITH APPLICATIONS**

This dissertation shows how networked dynamical systems with delays studied can be tolerant to delays by utilizing the Responsible Eigenvalue concept, which simply requires checking finite number of eigenvalues in order to conclude on the infinitely dimensional stability problem. Then the author reveals that the networked system can be made more tolerant to destabilizing effects of delays even by increasing delay. In particular, the author shows that by increasing delay, the settling time of the network system consensus reach can be reduced. Note the author develops two topology construction methods to build large scale systems while assuring improved tolerance to delay. Followed by this, delay dependent coupling design is introduced where agent couplings are designed as an explicit parameter of delay which insures the design of delay dependent or delay independent stability properties. Finally, an experimental setup of a three-robot system is used to validate the theoretical results, which show good agreement with simulations.

See full dissertation at [coe.neu.edu/iris/WeiQiao](http://coe.neu.edu/iris/WeiQiao)
Michael Conrad Robitaille
PhD 2014, Mechanical Engineering; Advisor, Kai-Tak Wan

MULTI-SCALED ADHESION MECHANICS OF HYDROGEL CONTACT LENSES
This thesis establishes novel experimental protocols and methods to accurately characterize hydrogel contact lens adhesion and mechanical properties in a variety of contexts and length scales. Throughout all aims/experiments, two commercially available hydrogel lenses are characterized for comparison, Narafilcon A/Acuvue TruEye and Etafilcon A/Acuvue2.
The first aim of this thesis focuses on macroscopic hydrogel lens adhesion characterization achieved via the Planar Adhesion Test (PAT). The PAT is a novel experimental technique that utilizes the lens native geometry to characterize both mechanical and adhesion properties. The lens is compressed and subsequently removed from a planar substrate, during which the applied load $P$, the maximum tensile force or "pull-off" force $P^*$, approach distance $w_0$, and contact radius $a$ are measured.

See full dissertation at coe.neu.edu/iris/MichaelRobitaille

Jungho Seo
PhD 2014, Mechanical Engineering; Advisor, Ahmed Busnaina

DEVELOPMENT OF HIGH-RATE SWNTS ASSEMBLY FOR LARGE-SCALE SWNTS-BASED FUNCTIONAL DEVICE APPLICATIONS
In this thesis, I have focused on CNTs assembly techniques and nanotemplate manufacturing for single-walled carbon nanotubes (SWNTs)-based functional device applications. A template-guided fluidic assembly method has been utilized because it is directed, robust, and precisely controllable over other assembly methods. Since the fluidic assembly uses capillary force at the interface of the surface, however, it is a diffusion-limited process; the SWNTs are slowly attached on the surface while the solution is evaporated. Hence, a significantly progressive assembly technique is destined to meet all the integration requirements of precise control of the desired location, density, large area and alignment simultaneously. Therefore, I developed an electric-assisted template-guided fluidic assembly technique for high-rate SWNTs assembly accurately to assemble highly aligned SWNTs arrays with high density.

See full dissertation at coe.neu.edu/iris/JunghoSeo

Mehdi Safari-Qariq
PhD 2014, Mechanical Engineering; Advisor, Reza Sheikhi

ENTROPY FILTERED DENSITY FUNCTION FOR LARGE EDDY SIMULATION OF TURBULENT REACTING FLOWS
The objective of this work is to predict entropy and entropy generation in turbulent reacting flows using large eddy simulation (LES). Entropy generation is not only an essential part of entropy dynamics, but also a significant quantity in its own right with many applications in diverse fields. In fluid systems, production of entropy is a manifest of irreversible dissipation inherent in the underlying transport processes such as fluid flow, heat transfer and mass diffusion. The entropy transport equation in LES contains several unclosed terms. These are the subgrid scale (SGS) entropy flux and entropy generation caused by irreversible processes: heat conduction, mass diffusion, chemical reaction and viscous dis-sipation. The SGS effects are taken into account using a novel methodology based on the filtered density function (FDF). This methodology, entitled entropy FDF (En-FDF), is developed and utilized in the form of joint entropy-velocity-scalar-turbulent frequency FDF and the marginal scalar-entropy FDF, both of which contain the chemical reaction effects in a closed form.

See full dissertation at coe.neu.edu/iris/MehdiSafari

Asli Sirman
PhD 2014, Mechanical Engineering; Advisor, Ahmed Busnaina

DEVELOPMENT OF HIGH-RATE ELECTRO-FLUIDIC DIRECTED ASSEMBLY OF NANOELEMENTS ON INSULATING SURFACES
In this study, governing parameters and important process kinetics, such as applied voltage and pH of the solution, were studied to establish a repeatable and robust assembly technique. A generalized assembly efficiency graph was obtained for different pulling speeds. We were also able to examine monolayer and multilayer assemblies with different geometries down to 100 nm scale. We have demonstrated assembly of polystyrene latex (PSL) nanoparticles, copper nanoparticles, silica nanoparticles, quantum dots and single walled carbon nanotubes (CNT). Finally, a single wall carbon nanotube based NO$_2$ gas sensor was fabricated. The overall significance of our results is twofold: first, the electro-fluidic assembly process is two orders of magnitude faster than the conventional fluidic assembly technique, and second, nanoelements are directly placed on the insulating layer unlike the electric field assembly technique. Our findings indicate that knowledge gained from this study could possibly aid in the understanding of high yield and repeatable assembly—leading to various nanoscale device applications.

See full dissertation at coe.neu.edu/iris/AsliSirman
Kenan Song
PhD 2015, Mechanical Engineering; Advisor, Marilyn Minus

CUSTOMIZING FIBER SPINNING APPROACHES FOR POLYMER/NANO-CARBON COMPOSITES

This thesis focuses on customizing a new spinning approach for fabricating polymer/nC high-performance composite fibers. In particular, the nCs used in this work include stacked graphitic platelets (carbon nanochips (CNC)), carbon nanotubes (CNT), and layered carbon nano-spheres (CNS). Mechanical properties are characterized using both static tensile tests and dynamic mechanical analysis (DMA). Thermal properties are examined using differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). Finally the microstructures of the materials are experimentally probed using wide-angle X-ray diffraction (WAXD) and small-angle X-ray (SAXS). Detailed exploration regarding the fabricated fiber microstructure is conducted to fundamentally understand the processing-microstructure-performance relationship in these polymer-based composite fiber systems.

See full dissertation at coe.neu.edu/iris/KenanSong

Chuanwei Zhuo
PhD 2014, Mechanical Engineering; Advisor, Yiannis Levendis

ON THE SYNTHESIS OF CARBON NANOTUBES FROM WASTE SOLID HYDROCARBONS

In this doctoral dissertation, the feasibility of utilizing municipal/industrial/agriculture wastes as carbon sources for CNTs has been examined and proven. It was also found that the effluents of the CNT synthesis process can also serve as gaseous fuels for “clean” power production, which can then be used for energy self-sustaining CNT synthesis. Besides, a facile catalyst pretreatment has been developed to activate stainless steel based substrate/catalyst for efficient CNT growth. Finally, the efforts of CO₂ on the pyrolyzate gases and on the CNT co-generation were also investigated.

See full dissertation at coe.neu.edu/iris/ChuanweiZhuo

Yiying Zhang
PhD 2014, Mechanical Engineering; Advisor, Marilyn Minus

A SYSTEMATIC STUDY OF THE PROCESS-STRUCTURE RELATIONSHIP FOR BUILDING POLYMER INTERPHASE REGIONS IN CARBON NANOTUBE COMPOSITES

This dissertation work focuses on understanding the development of interfacial zones in polymer/CNT composites, which is necessary for producing mechanically outstanding composite materials. Highly crystalline and confined interphase structure plays a significant role for (i) interfacial stress transfer (affecting the overall composite properties), and (ii) structural evolution during heat treatment (enabling low-temperature graphitization of polyacrylonitrile (PAN)). For this reason, control of the structural development in the interphase regions during composite processing is a key to success.

See full dissertation at coe.neu.edu/iris/MEYiyingZhang