



Northeastern University
College of Engineering

Engineering for Society

Boldly innovating to better our world

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2017 | 2018

SCHOLARSHIP REPORT

Mechanical and Industrial Engineering



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

Welcome to Northeastern's Department of Mechanical and Industrial Engineering

The Department of Mechanical and Industrial Engineering has been on the rise through strategic hiring. As the department rises, a conducive environment has provided a platform for people to work hard and work happily. The addition of 24 new tenured/tenure-track faculty members over five years, with no attrition to other universities, has propelled multiple research clusters in the department toward excellence. In parallel with the tenured/tenure-track faculty hires, the addition of 11 teaching faculty members over four years has enabled educational excellence to advance even further.

Supporting the fast rise is the growing financial resource. The department has started large-scale collaborations with major industrial companies including General Electric, Raytheon, and Northrop. The industrial collaborations augment multiple governmental supports secured by our faculty, such as the \$20M contract order from the US Army Research Office and \$125M contract order from the US Veterans Health Administration.

On the solid foundation of financial resource, people are the center of focus at this department. We work hard and work happily, and take ownership of the department. As an example, Emeritus Professor and former Department Chair John W. Cipolla has given the department \$100K to establish the John and Katharine Cipolla Graduate Student Support Fund. As another example, Emeritus Professor Alexander Gorlov is the namesake of the Gorlov Innovation Prize. This prize is endowed with \$100K from friends and former students of Professor Gorlov, in recognition of his innovations including the invention of the Gorlov Turbine that operates on top of the Eiffel Tower in Paris and all around the world.

Strategic hiring, people focus, and preservation of a conducive environment have enabled people to work hard, happily, and productively. Productive people naturally bring successes. Rising awareness of our successes 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 to No. 43 in five years, while our industrial engineering graduate program has moved up four places to No. 32 during the same period.



This momentum will continue through strategic growth. I invite alums and other stakeholders to join us in propelling this department even further, and also invite all to consider this department for your education or for research and development projects. I look forward to hearing from you!

Sincerely,

Hanchen Huang
Donald W. Smith Professor and Department Chair
h.huang@northeastern.edu

QUICK FACTS — Mechanical and Industrial Engineering

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**FEDERALLY
FUNDED
RESEARCH
CENTERS**

NSF/DHHS Healthcare
Systems Engineering
Institute

NSF CENTER for High-
rate Nanomanufacturing



**GRADUATE
STUDENTS**

**INCLUDING MS AND
PHD PROGRAMS IN:**

Data Analytics,
Engineering Management,
IE, ME, Operations
Research, Engineering
Management and Energy
Systems



**NATIONAL
ACADEMY
MEMBERS**

NADINE AUBRY
University Distinguished
Professor and Dean

VINOD SAHNEY
University Distinguished Professor



**TENURED/
TENURE-TRACK
FACULTY**



**Y O U N G
INVESTIGATOR
AWARDS**

Including 12 National
Science Foundation
CAREER Awards

**\$145M
CONTRACT
VEHICLE**

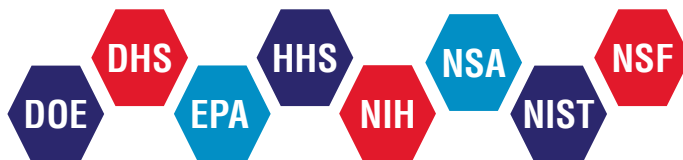
\$125M: five years
from Veterans Health
Administration

\$20M: three years from
Army Research Labs

QUICK FACTS — College of Engineering

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STATE-OF-THE-ART RESEARCH CENTERS
funding by eight federal agencies



**TENURED/
TENURE-TRACK
Faculty**



**NSF CAREER
Awards**

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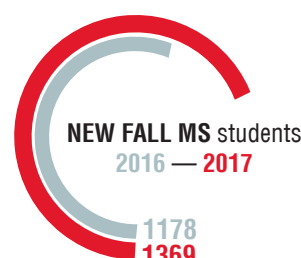
**ENGINEERING
DEPARTMENTS**

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

**3819
UNDERGRADUATE
students**



**3717
GRADUATE
students**



**YOUNG
INVESTIGATOR
Awards**

FACULTY HONORS AND AWARDS



Chair and Professor **Hanchen Huang** has been named a fellow of the American Association for the Advancement of Science.

Professor **Yiannis Levendis** was selected as a fellow of The Combustion Institute for excellent research in the combustion of fossil and alternative fuels, including the evolution of control of pollutants.



Cabot and University Distinguished Professor **Laura Lewis** has received a Fulbright U.S. Scholar Program grant for a research project in Spain where she will conduct

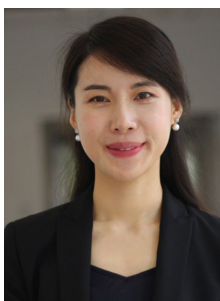
research at the Instituto de Ciencia de Materiales de Madrid as part of a project to tailor magnetic microwires for advanced applications. Lewis was appointed to the rank of University Distinguished Professor in 2018, which is the highest honor the university can bestow upon a faculty member.



Using an autonomous aerial drone system developed by Professor **Hanumant Singh**, researchers from the Woods Hole Oceanographic Institution have discovered a colony

of more than 1,500,000 Adélie Penguins on the Danger Islands—more than the rest of the entire Antarctic Peninsula region

combined. The discovery was announced in a paper in the journal, *Scientific Reports*.



Assistant Professor **Hongli Zhu's** research on "Batteries: Freestanding Metallic 1T MoS₂ with Dual Ion Diffusion Paths as High Rate Anode for Sodium-Ion Batteries"

was featured on the cover of *Advanced Functional Materials*.

Professor **Ahmed Busnaina**, director of the Center for High-Rate Nanomanufacturing, unveiled NanoOPS Gen 2, the university's second-generation-nanoscale offset printing system; a pioneering technology that can print 1,000 times faster and 1,000 smaller circuits—down to a 20 nanometer—than inkjet-based printing systems on the market today.



Northeastern was selected as a host site for the Louis Stokes Alliance for Minority Participation 2018-2020 Bridge to the Doctorate program, under a \$1 million National Science Foundation grant, entitled, "Strategic Advancement of Rising Scholars (STARS)" led by Provost **James Bean** (PI), Professor **Hameed Metghalchi** (co-PI) and other co-PIs across the university, and collaborators Richard Harris, director of NUPRIME, and Vice Provost of the PhD Network and Professor of Civil and Environmental Engineering Sara Wadia-Fascetti.



Associate Professor **Marilyn Minus** was awarded a five-year \$1.25 million Air Force Office of Scientific Research Grant for "Forming True Blends: Developing

New Processing Routes for Polymer-Based Nano-Composites."

Professor **Hanumant Singh**, Assistant Professor **John Peter Whitney**, and Affiliated Faculty Robert Platt were hand-selected to attend Amazon's MARS Conference hosted by Jeff Bezos, CEO of Amazon. The conference brings together leaders in the fields of machine learning, home automation, robotics, and space.

Professor **Ozlem Ergun** has been appointed to a national committee tasked



with capturing key lessons about supply and distribution networks under strain during Hurricanes Harvey, Irma and Maria. The FEMA-sponsored committee, was established by the National Academies

of Sciences, Engineering, and Medicine, and the Chair of Policy and Global Affairs.

Professor **Yung Joon Jung** was awarded a patent for "Flexible and transparent supercapacitors and fabrication using thin film carbon electrodes with controlled morphologies."

Professor **Sinan Muftu**, in collaboration with UMass Amherst, was awarded a \$500K National Science Foundation grant for determining the "High-Strain-Rate Dynamics of Copolymer Microparticles for Advanced Additive Manufacturing."

Assistant Professor Qi "Ryan" Wang, civil and environmental engineering, and Associate Professor **Yingzi Lin** were



awarded a grant from the National Science Foundation for "Personalized Systems for Wayfinding for First Responders." The project will test the theoretical foundation of personalized

wayfinding information systems that can effectively minimize the cognitive load of first responders on the individual level.

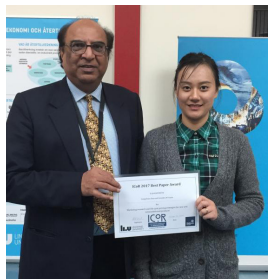
Professor **Nader Jalili** was awarded a patent for a “Sensor system utilizing piezoelectric microcantilever coupled with resonating circuit.”



Masters student **Timothy Aduralere**, ME'18, won the 48th St. Gallen Symposium essay competition for his submission “Reinventing for the Unknown: A Pivotal Approach to

Maximize the Constantly Evolving Future of Work.” He was selected from almost 1,300 submissions, representing 350 universities and more than 100 nationalities.

PhD students **Maozhen Wang**, mechanical and industrial engineering, and **Peng Chang**, electrical and computer engineering, participated in the International Atomic Energy Agency Robotics Challenge in Brisbane, Australia, advised by Associate Professor Taskin Padir, electrical and computer engineering. Wang and Chang’s proposal, entitled “Small-UGV for Conducting In-Field Inspections (SCIFI) in Nuclear Environments” was selected as one of the 10 finalists, the only one from the United States, from 27 applications.



PhD candidate **Liangchuan Zhou** and Professor **Surendra Gupta**’s paper, titled “Marketing Research and Life

Cycle Pricing Strategies for New and Remanufactured Products,” won the Best Paper award at the International Conference on Remanufacturing. Additionally, Gupta and PhD student **Aditya Pandit** won the Best Paper award at the Northeast Decision Sciences Institute Annual Conference, titled, “Identification and Prevention of Fraud for Remanufactured Products in Reverse Supply Chain.”

FACULTY BY RESEARCH AREAS

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Faculty ENERGY SYSTEMS

Muhammad Noor E Alam
Ahmed Busnaina
Hanchen Huang
Yung Joon Jung
Gregory Kowalski
Yiannis Levendis
Yongmin Liu
Carol Livermore
Bala Maheswaran
Hameed Metghalchi
Mohammad E. Taslim
Wei Xie
Hongli (Julie) Zhu

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Faculty IMPACT MECHANICS

George G. Adams
Michael Allshouse
Nadine Aubry
Andrew Gouldstone
Carlos Hidrovo
Nader Jalili
Abhishek Kumar
Yang Liu
Carol Livermore
Craig Maloney
Jose Martinez Lorenzo
Sinan Müftü
Hamid Nayeb-Hashemi
Sandra Shefelbine
Ashkan Vaziri
Kai-Tak Wan
John (Peter) Whitney
Ibrahim Zeid

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Faculty MULTIFUNCTIONAL COMPOSITES

Teiichi Ando
Ahmed Busnaina
Randall Erb
Andrew Gouldstone
Hanchen Huang
Jacqueline Isaacs
Yung Joon Jung
Abhishek Kumar
Yongmin Liu
Marilyn Minus
Sandra Shefelbine
Moneesh Upmanyu
Ashkan Vaziri
Wei Xie
Hongli (Julie) Zhu

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Faculty BIOMECHANICS & SOFT MATTERS – SOLIDS AND FLUIDS

Ambika Bajpayee
Chiara Bellini
Samuel Felton
Andrew Gouldstone
Carlos Hidrovo
Beverly Kris Jaeger-Helton
Safa Jamali
Yingzi Lin
Carol Livermore
Bala Maheswaran
Sinan Muftu
Hamid Nayeb-Hashemi
Jessica Oakes
Sandra Shefelbine
Mohammad E. Taslim
Ashkan Vaziri
Kai-Tak Wan
John (Peter) Whitney

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Faculty SMART AND SUSTAINABLE MANUFACTURING

Muhammad Noor E Alam
Ahmed Busnaina
Randall Erb
Jacqueline Isaacs
Nader Jalili
Yung Joon Jung
Abhishek Kumar
Yongmin Liu
Carol Livermore
Marilyn Minus
Mohsen Moghaddam
Moneesh Upmanyu
Wei Xie
Hongli (Julie) Zhu

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Faculty MECHATRONICS AND SYSTEMS – CONTROL, ROBOTICS, & HUMAN MACHINES

Samuel Felton
Babak Heydari
Nader Jalili
Yingzi Lin
Rifat Sipahi
John (Peter) Whitney

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Faculty MULTI-PHASE STRUCTURED MATTER

Michael Allshouse
Teiichi Ando
Randall Erb
Carlos Hidrovo
Hanchen Huang
Safa Jamali
Yung Joon Jung
Yang (Emily) Liu
Yongmin Liu
Carol Livermore
Craig Maloney
Mohammad E. Taslim
Moneesh Upmanyu
Ashkan Vaziri
Kai-Tak Wan

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Faculty RESILIENT SYSTEMS

Muhammad Noor E Alam
James Bean
Mehdi Behroozi
James Benneyan
Thomas Cullinane
Ozlem Ergun
Nasser Fard
Jacqueline Griffin
Surendra M. Gupta
Babak Heydari
Jacqueline Isaacs
Beverly Kris Jaeger-Helton
Xiaoning (Sarah) Jin
Sagar Kamarthi
Yingzi Lin
Kayse Lee Maass
Hugh McManus
Emanuel Melachrinoudis
Mohsen Moghaddam
Vinod Sahney
Wei Xie

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Faculty HEALTHCARE SYSTEMS

Muhammad Noor E Alam
James Benneyan
Chun-An (Joe) Chou
Jacqueline Griffin
Babak Heydari
Beverly Kris Jaeger-Helton
Sagar Kamarthi
Yingzi Lin
Kayse Lee Maass
Vinod Sahney
Rifat Sipahi
Wei Xie

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

A Semi-Infinite Strip Pressed Against an Elastic Half-Plane With Frictional Slip, *Journal of Applied Mechanics*, 85(2), 2018

N.K. Mohammadi and G.G. Adams

Self-Excited Oscillations of a Finite-Thickness Elastic Layer Sliding Against a Rigid Surface With a Constant Coefficient of Friction, *Journal of Applied Mechanics*, 85(2), 2018

D. Hu and G.G. Adams

A Boundary Condition Correction for the Clamped Constraint of Elastic Plate/Beam Theory, *International Journal of Solids and Structures*, 124, 2017, 229-234

A. Basu, G.G. Adams, N.E. McGruer

A Review of Micro-Contact Physics, Materials, and Failure Mechanisms in Direct-Contact RF MEMS Switches, *Journal of Micromechanics and Microengineering*, 26, 2016

F. Oweiss, G.G. Adams

Adhesion of an Axisymmetric Elastic Body: Ranges of Validity of Monomial Approximations and a Transition Model, *Tribology International*, 100, 2016, 287-292

G. Stan, G.G. Adams

Adhesive Contact Between a Rigid Spherical Indenter and an Elastic Multi-Layer Coated Substrate, *International Journal of Solids and Structures*, 87, 2016, 1-10

D. Hu, G.G. Adams

Adhesion of a Micro-/Nano- Beam/Plate to a Sinusoidal/Grooved Surface, *International Journal of Solids and Structures*, 99, 2016, 40-47

G.G. Adams

Frictional Slip of a Rigid Punch on an Elastic Half-Plane, *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, A 472, 2016

MUHAMMAD 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, healthcare, supply chain, large scale optimization and data analytics

Honors and awards: Analytics Best Track Paper Award, 2016 IEOM Detroit Conference; Postdoctoral Fellowship, Natural Sciences and Engineering Research Council of Canada; Izaak Walton Killam Memorial Scholarship

SELECTED PUBLICATIONS

M.S. Islam, M.M. Hasan, X. Wang, H.D. Germack, M. Noor-E-Alam

A Systematic Review on Healthcare Analytics: Application and Theoretical Perspective of Data Mining, *Healthcare*, 6, 2018, 1-42

J.L. Crespo-Vazquez, C. Carrillo, E. Lorenzo Diaz-Dorado, J.A. Martinez, M. Noor-E-Alam

Evaluation of a Data Driven Stochastic Approach to Optimize the Participation of a Wind and Storage Power Plant in Day-Ahead and Reserve Markets, *Energy*, 156, 2018, 278-291

M. Xu, X. Jin, S. Kamarthi, M. Noor-E-Alam

A Failure-Dependency Modeling and State Discretization Approach for Condition-Based Maintenance Optimization of Multi-Component Systems, *Journal of Manufacturing Systems*, 47, 2018, 141-152

A.M.M. Sharif Ullah, M. Noor-E-Alam

Big Data Driven Graphical Information Based Multi Criteria Decision Making, *Applied Soft Computing*, 63, 2018, 23-38

S. Shahinur, A.M.M. Sharif Ullah, M. Noor-E-Alam, H. Haniu, A. Kubo

A Decision Model for Making Decisions Under Epistemic Uncertainty and Its Application to Select Materials, *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, 31(03), 2017, 298-312

M. Noor-E-Alam, B. Todd, J. Doucette

Integer Linear Programming Model for Grid-Based Wireless Transmitter Location Problems, *International Journal of Operational Research*, 22(1), 2015, 48-64

M. Noor-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
2012, 423-438

MICHAEL ALLSHOUSE



Assistant Professor, Mechanical and Industrial Engineering

PhD, MIT, 2013
mie.neu.edu/people/allshouse-michael

Scholarship focus: nonlinear dynamics, geophysical fluid dynamics, computational fluid mechanics, disaster response, experimental fluids

SELECTED PUBLICATIONS

- M.R. Allhouse, et. al.
Impact of Windage on Ocean Surface Lagrangian Coherent Structures, *Environmental Fluid Mechanics*, 17(3), 2017, 473-483
- M.R. Allshouse, F.M. Lee, P.J. Morrison, H.L. Swinney
Internal Wave Pressure, Velocity, and Energy Flux from Density Perturbations, *Physical Review Fluids*, 1(1), 2016, 014301
- M.R. Allshouse, T. Peacock
Lagrangian Based Methods for Coherent Structure Detection, *Chaos*, 25, 2015, 097617
- M.R. Allshouse, T. Peacock
Refining Finite-Time Lyapunov Exponent Ridges and the Challenges of Classifying Them, *Chaos*, 25, 2015, 087410
- M. Mercier, A. Ardekani, M.R. Allshouse, B. Doyle, T. Peacock
Self-Propulsion of Immersed Objects via Natural Convection, *Physical Review Letters*, 112, 2014, 097617
- D. Kelley, M.R. Allshouse, N. Ouellette
Lagrangian Coherent Structures Separate Dynamically Distinct Regions in Fluid Flows, *Physical Review E*, 88, 2013, 013017
- M.R. Allshouse, J-L. Thieault,
Detecting Coherent Structures Using Braids, *Physica D*, 241, 2012, 95-105
- M.R. Allshouse, M.F. Barad, T. Peacock
Propulsion Generated by Diffusion-Driven Flow, *Nature Physics*, 6, 2010, 516-519

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

- Y. Li, Y. Hamada, K. Otobe, T. Ando
A Method to Predict the Thickness of Poor-Bonded Material along Spray and Spray-Layer Boundaries in Cold Spray Deposition, *J. Thermal Spray Technology*, 26(3), 2017, 350-359
- S. Onell, T. Ando
Application of a Simple Sub-regular Solution Model to the Computation of Phase Boundaries and Free-dendritic Growth in the Ag-Cu System, *Acta Mater*, 113, 2016, 109-115
- Y. Shu, S. Gheybi Hashemabad, T. Ando, Zhiyong Gu
Ultrasonic Powder Consolidation of Sn/In Nanosolder Particles and Their Application for Low Temperature Cu-Cu Joining, *Materials and Design*, 111, 2016, 631-639
- 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
A Method for the Estimation of the Interface Temperature in Ultrasonic Joining, *Metallurgical and Materials Transactions A*, 45A, 2014, 2545-2552
- T. Ando
Production, Characterization and Application of Mono-Size Alloy Droplets, *Powder Metallurgy*, 55(5), 2012, 395-401
- S. Onel, T. Ando
Comparison and Extension of Free Dendritic Growth Models with Application to Ag-15 Mass Pct Cu Alloy, *Metallurgical and Materials Transactions A*, 39A, 2008, 2449-58

SELECTED RESEARCH PROJECTS

- Production of Porous Aluminum and High Cobalt WC-Co Composites
Principal Investigator, Hitachi Metals, Ltd
- Engineered Materials and Materials Design of Engineered Materials
Co-Principal Investigator, ARL

NADINE AUBRY



University Distinguished Professor, Mechanical and Industrial Engineering and Dean of the College of Engineering

PhD, Cornell University, 1987
mie.neu.edu/people/aubry-nadine

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

Honors and awards: Member, National Academy of Engineering; Member, American Academy of Arts and Sciences; Fellow, National Academy of Inventors; Fellow, American Association for the Advancement of Science; Fellow, American Institute of Aeronautics and Astronautics; Fellow, American Physical Society; Fellow, American Society of Mechanical Engineers; National Science Foundation Presidential Young Investigator Award; President, International Union of Theoretical and Applied Mechanics; Councilor, National Academy of Engineering; Former Chair, National Academies' U.S. National Committee for Theoretical and Applied Mechanics (USNC/ TAM); Former Chair, Division of Fluid Dynamics of the American Physical Society (APS)

SELECTED PUBLICATIONS

- W.-T. Wu, A. Gandini, N. Aubry, M. Massoudi, J.F. Antaki
Design of Microfluidic Channels for Magnetic Separation of Malaria-Infected Red Blood Cells, *Microfluidics and Nanofluidics*, 20(2), 2016, 1-11
- W.T. Wu, N. Aubry, M. Massoudi, W.R. Wagner, J.F. Antaki
Multi-Constituent Simulation of Thrombus Deposition, *Scientific Reports* 7, 2016, 42720
- 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
- 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
Electric Field Effect on a Two-Fluid Interface Instability in Channel Flow for Fast Electric Times, *Physics of Fluids*, 20, 2008, 031702
- N. Aubry, P. Singh, M. Janjua, S. Nudurupati
Micro- and Nanoparticles Self-Assembly for Virtually Defectfree, Adjustable Monolayers, *Proceedings of the National Academy of Sciences USA (PNAS)*, 105, 2008, 3711-3714
- A.K. Uguz, N. Aubry
Quantifying the Linear Instability of a Flowing Electrified Twofluid Layer in a Channel for Fast Electric Times, *Physics of Fluids*, 20, 2008, 092103

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; 2017 Outstanding Alumnus, Harvey Mudd College

SELECTED PUBLICATIONS

- S. Xu, J. Bean
Scheduling Parallel-Machine Batch Operations to Maximize On-Time Delivery Performance, *Journal of Scheduling*, 2015, 1-18
- S. Xu, J. Bean
A Genetic Algorithm for Scheduling Parallel Non-Identical Batch Processing Machines, *Proceedings of the IEEE Symposium on Computational Intelligence in Scheduling*, 2007, 143-150
- Z.-Z. Lin, J. Bean, C. White III
A Hybrid Genetic/Optimization Algorithm for Finite Horizon Partially Observed Markov Decision Processes, *INFORMS Journal on Computing*, 16, 2004, 27-38
- J. Ohlmann, J. Bean, S. Henderson
Convergence in Probability of Compressed Annealing, *Mathematics of Operations Research*, 29, 2004, 837-860
- C. Kim, G. Keoleian, D. Grande, J. Bean
Life Cycle Optimization of Automobile Replacement: Model and Application, *Environmental Science & Technology*, 37, 2003, 5407-5413
- Z.-Z. Lin, J. Bean, C. White III
Chapter 15: A Genetic Algorithm Heuristic for Finite Horizon Partially Observed Markov Decision Problems, *Evolutionary Optimization*, Eds. R. Sarkar, X. Yao and M. Mohammadian, Kluwer Academic, Boston, 2002, 371-398
- R. Hughes, J. Bean, D. Chaffin
A Method for Classifying Co-Contraction of Lumbar Muscle Activity, *Journal of Applied Biomechanics*, 17, 2001, 253-258
- B. Norman, J. Bean
Scheduling Operations on Parallel Machine Tools, *IIE Transactions*, 32, 2000, 449-459

MEHDI BEHROOZI



Assistant Professor, Mechanical and Industrial Engineering

PhD, University of Minnesota, 2016
mie.neu.edu/people/behroozi-mehdi

Scholarship focus: geographic resource allocation, logistics, transportation, multimodal transport systems, data

visualization, social resilience, and production scheduling; Mathematical programming, data analytics, robust optimization, computational geometry, geometric probability theory, and geospatial analysis

SELECTED PUBLICATIONS

H. Samarghandi, M. Behroozi

On the Exact Solution of the No-Wait Flow Shop Problem with Due Date, *European Journal of Operational Research*, 256(2), 2017, 141-159

J. G. Carlsson, M. Behroozi

Worst-Case Demand Distributions in Vehicle Routing, *European Journal of Operational Research*, 256(2), 2017, 462-472

J.G. Carlsson, M. Behroozi, X. Meng, R. Devulapalli

Household-Level Economies of Scale in Transportation, *Operation Research*, 64(6), 2016, 1372-1387

J.G. Carlsson, M. Behroozi, X. Li

Geometric Partitioning and Robust Ad-Hoc Network Design, *Annals of Operation Research*, 238, 2016, 41-68

M. Behroozi

Plant Layout and Location, 6th Ed., Modaresane Sharif, Tehran, Iran, 2015

M. Behroozi, A.B. Jahromi, A.J. Dehkordi, S. Abbasi, F. Masafinia

Solution Manual for the National Graduate Studies Entrance Exams: Industrial Engineering, 7th Ed., Modaresane Sharif, Tehran, Iran, 2015

H. Samarghandi, P. Taabayan, M. Behroozi

Metaheuristics for Fuzzy Dynamic Facility Layout Problem with Unequal Area Constraints and Closeness Ratings, *International Journal of Advanced Manufacturing Technology*, 67, 2013, 2701-2715

M. Behroozi, K. Eshghi

Modeling and Solving Job Shop Scheduling Problem with Sequence Dependent Setup Times, *International Journal of Industrial Engineering and Production Management*, 21(4), 2010

M. Behroozi, K. Eshghi

A New Hybrid Particle Swarm Optimization for Job Shop Scheduling Problem, *International Journal of Industrial Engineering and Production Management*, 20(2), 2009

SELECTED RESEARCH PROJECTS

Spatial and information space partitioning optimization for data visualization

Co-Principal Investigator, TIER 1: Seed Grant/Proof of Concept Program, Northeastern University

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 systems engineering, operations research, quality and reliability engineering, statistical quality control, high reliability design, patient safety

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

R.R. Krishnan, J. Benneyan, S. Sonuc

Optimization of Medical Supply Chains and Forward Store Locations for Recurrent Homecare Patient Demand with Periodic Interruptions, *American Journal of Operations Research*, 8(3), 2018, 203-220

J. Benneyan, I. Garrahan, I. Ilies, X. Duan

Modeling Approaches, Challenges, and Preliminary Results for the Opioid and Heroin Co-Epidemics, *Proc Winter Simulation Conference*, 2017, 2821-2832

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

A Co-Availability Scheduling Model for Coordinating Multi-Disciplinary Care Teams, *International Journal of Production Research*, 53(24), 2015, 7226-7237

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

SELECTED RESEARCH PROJECTS

Development and Validation of Analytic Spatial-Temporal Models to Help Study and Mitigate the National Opioid-Heroin Co-Epidemic

National Science Foundation

Engineering High Reliability Patient Safety Learning Lab

Agency for Healthcare Research and Quality

Addressing Systemic Health Disparities in Early ASD

Identification and Treatment

National Institutes of Health

Integrating Research Evidence Use: A Healthcare Systems Engineering Approach

WT Grant Foundation

AHMED BUSNAINA



William Lincoln Smith and University
Distinguished Professor, Mechanical and Industrial
Engineering; affiliated faculty, Bioengineering,

PhD, Oklahoma State University, 1983
mie.neu.edu/people/busnaina-ahmed

Scholarship focus: nanomanufacturing,
nano and microscale printing of sensors
and electronics, nano and micro control, particulate and
chemical defects in semiconductor manufacturing, high rate
nanomanufacturing, NEMS devices and nanomaterials based
nanoelectronics

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

SELECTED PUBLICATIONS

- Z. Chai, S.A. Abbasi, A. Busnaina
Scalable Directed Assembly of Highly Crystalline 2,7-Dioctyl[1]
Benzothieno[3,2-b][1]Benzothiophene (C8-BTBT) Films, *ACS
Applied Materials & Interfaces*, 10(21), 2018, 18123-18130
- C. Yilmaz, A. Sirman, A. Halder, A. Busnaina
High-rate Assembly of Nanomaterials on Insulating Surfaces
Using Electro-fluidic Directed Assemblies, *ACS Nano*, 11(8),
2017, 7679-7689
- C. Yilmaz, C. Sarisozen, V. Torchilin, A. Busnaina
Novel Nanoprinting for Oral Delivery of Poorly Soluble Drugs,
Methodist DeBakey Cardiovascular Journal, 12(3), 2016, 157-162
- H. Cho, S. Somu, J.Y. Lee, H. Jeong, A. Busnaina
High-rate Nanoscale Offset Printing Process Using Directed
Assembly and Transfer of Nanomaterials, *Advanced Materials*,
27, 2015, 1759-1766
- C. Yilmaz, A.E. Cetin, G. Goutzamanidis, J. Huang, S. Somu,
H. Altug, D. Wei, A. Busnaina
Three-dimensional Crystalline and Homogeneous Metallic
Nanostructures Using Directed-assembly of Nanoparticles,
ACS Nano, 8(5), 2014, 4547-4558

SELECTED RESEARCH PROJECTS

- Advanced Manufacturing Cluster for Smart Sensors
and Materials
Principal Investigator, Massachusetts Technology Collaborative
- Novel Nanoprinting for Oral Delivery of Poorly Soluble Drugs
Principal Investigator, National Science Foundation
- Fabrication of Mechanical Metamaterials
Principal Investigator, Draper Laboratories
- Development Work Regarding Biomarker Sensor Systems,
Sensor Fabrication and Carbon Nanotube Material Optimization
Principal Investigator, Nano-Bio Manufacturing Consortium

CHUN-AN (JOE) CHOU



Assistant Professor, Mechanical and
Industrial Engineering

PhD, Rutgers University, 2011
mie.neu.edu/people/chou-chun

Scholarship focus: large-scale optimization,
data mining, machine learning, pattern
recognition, data analytics and decision
models for large-scale complex systems (e.g., medical diagnosis,
brain, healthcare systems, biological systems, etc.)

Honors and awards: Research Foundation for SUNY
Collaboration Fund Award, 2013; Finalist of the INFORMS Data
Mining Best Student Paper Award, 2011

SELECTED PUBLICATIONS

- M. Fan, C.-A. Chou
Detecting Abnormal Patterns of Epileptic Seizures Via Temporal
Synchronization of EEG Signals, *IEEE Transactions on
Biomedical Engineering*, 2018
- S. Khanmohammadi, C.-A. Chou
Adaptive Seizure Onset Detection Framework Using a Hybrid
PCA-CSP Approach, *IEEE Journal of Biomedical and Health
Informatics*, 22(1), 2018, 154-160
- M.S. Tootooni, P.K. Rao, C.-A. Chou, Z. Kong
A Spectral Graph Theoretic Approach for Monitoring
Multivariate Time Series Data From Complex Dynamical
Processes, *IEEE Transactions on Automation Science and
Engineering*, 15(1), 2018, 127-144
- C.-A. Chou, T.O. Bonates, C. Lee, W.A. Chaovalitwongse
Multi-Pattern Generation Framework for Logical Analysis of
Data, *Annals of Operations Research*, 249(1), 2017, 329-349
- S. Khanmohammadi, C.-A. Chou
A New Gaussian Mixture Model Based Discretization Algorithm
for Associative Classification of Medical Data, *Expert Systems
with Applications*, 58, 2016, 119-129
- V. Miskovic, X. Ma, C.-A. Chou, M. Fan, M. Owens, H. Sayama,
B.E. Gibb
Developmental Changes in Spontaneous Electroocortical Activity
and Network Organization From Early to Late Childhood,
Neuroimage, 118, 2015, 237-247
- C.-A. Chou, K. Kampa, S.H. Mehta, R.F. Tunganaza, W.A.
Chaovalitwongse, T.J. Grabowski,
Voxel Selection Framework in Multi-Voxel Pattern Analysis
of fMRI Signals for Prediction of Neural Response to Visual
Stimuli, *IEEE Transactions on Medical Imaging*, 33(4), 2014,
925-934

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
A Simulation Optimization Approach for Reconfigurable
Inventory Space Planning in Remanufacturing Facilities,
*International Journal of Business Performance and Supply
Chain Modeling*, 5(1), 2013, 86-114
- T. Cullinane, T. Marion, J.H. Friar
A Multi-Disciplinary New Product Development Course for
Technological Entrepreneurs, *Journal of the Academy of
Business Education*, 13, 2012, 71-89

MOHAMMAD DEHGHANI



Assistant Teaching Professor, Mechanical and
Industrial Engineering

PhD, Western New England University, 2016
mie.neu.edu/people/dehghani-mohammad

Scholarship focus: simulation and
optimization, supply chain, healthcare
operations, metaheuristics

Honors and awards: IEOM Outstanding Track Chair Award, 2016
IEOM Doctoral Dissertation Competition Award (2nd place), 2016
Society for Engineering & Management Systems (SEMS) Award,
IISE Conference, 2016, Engineering Management Track Best
Paper Award, IISE Conference, 2016, Best PhD Student Paper
Award, Winter Simulation Conference, 2015, Award of Recogni-
tion, Simio Student Competition Judge, 2015

SELECTED PUBLICATIONS

- N.O. Fernandes, M. Dehghanimohammadabadi, C. Silva
Iterative Optimization-Based Simulation: A Decision Support
Tool for Job Release, 6th World Conference on Information
Systems and Technologies, Naples, Italy, 2018
- A. Negahban, M. Dehghanimohammadabadi
Optimizing the Supply Chain Configuration and Production
Sales Policies for New Products Over Multiple Planning
Horizons, *International Journal of Production Economics*, 2017
- M. Dehghanimohammadabadi, T.K. Keyser, S.H. Cheraghi
A Novel Iterative Optimization-Based Simulation (IOS)
Framework: An Effective Tool to Optimize System's
Performance, *Computers & Industrial Engineering*, 111,
2017, 1-17
- M. Dehghanimohammadabadi, M. Rezaeiahari, T. Keyser
Simheuristic of Patient Scheduling Using a Table-Experiment
Approach - Simio and Matlab Integration Application, *Winter
Simulation Conference*, Las Vegas, NV, 2017
- M. Demirtas, N. Ahmadi, M. Dehghanimohammadabadi
Highlighting the Main Factors of Internet Banking via Multiple
Criteria Decision Analysis, *ISERC Conference*, Anaheim CA,
USA, 2016
- M. Dehghanimohammadabadi, T. Keyser
Intelligent Simulation: Integration of SIMIO and MATLAB to
Deploy Decision Support Systems to Simulation Environment,
Simulation Modelling Practice and Theory, 2016
- S.M. Hosseini, M. Dehghanimohammadabadi
A Weighted Monte Carlo Simulation Approach to Risk
Assessment of Information Security Management System,
International Journal of Enterprise Information Systems, 11(4),
2015, 63-79
- M. Dehghanimohammadabadi, T. Keyser
Tradeoffs Between Objective Measures and Execution Speed
in Iterative Optimization-Based Simulation (IOS), *Winter
Simulation Conference*, Huntington Beach CA, USA, 2015

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

- R.M. Erb, J.J. Martin, R. Soheilian, C. Pan, J.R. Barber
Actuating Soft Matter with Magnetic Torque, *Advanced Functional Materials*, 26(22), 2016, 3859-3880
- J.S. Sander, R.M. Erb, L. Li, A. Gurijala, Y.-M. Chiang
High-Performance Battery Electrodes via Magnetic Templating, *Nature Energy*, 1, 2016, 16099
- J.J. Martin, B.E. Fiore, R.M. Erb
Designing Bioinspired Composite Reinforcement Architectures via 3D Magnetic Printing, *Nature Communications*, 6, 2015, 8641
- 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
- R. M. Erb, R.L. Libanori, N. Rothfuchs, A.R. Studart
Composites Reinforced in Three Dimensions by Using Low Magnetic Fields, *Science*, 335, 2012, 199-204
- R.M. Erb, H.S. Son, B. Samanta, V.M. Rotello, B.B. Yellen
Magnetic Assembly of Colloidal Superstructures with Multipole Symmetry, *Nature*, 457, 2009, 999-1002

SELECTED RESEARCH PROJECTS

- CPS: Breakthrough: A Cyber-Physical Framework for MRI Guided Magnetic NanoParticles
Principal Investigator, National Science Foundation
- The Roles of Heterogeneities and Anisotropy in Fracture Toughness and Crack Propagation
Co-Principal Investigator, National Science Foundation
- Incorporating Composite Design into Biopolymer Hydrogels for Strong Scaffolds in Bone Regeneration
Co-Principal Investigator, AO Foundation
- Aligning Boron Nitride Nanotubes within Dense Ceramics-Reinforced Polymer Films
Principal Investigator, Rogers Corporation

ÖZLEM ERGUN



Professor, Mechanical and Industrial Engineering; affiliated faculty appointment in: Electrical and Computer Engineering, Global Resilience Institute

PhD, MIT, 2001
mie.neu.edu/people/ergun-ozlem

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

design and resilience, collaboration and crowdsourcing in logistics, humanitarian logistics

Honors and awards: National Science Foundation CAREER Award; Winner, EURO/INFORMS 2007 Management Science Strategic Innovation Prize

SELECTED PUBLICATIONS

- M. Celik, A. Lorca, Ö. Ergun, P. Keskinocak
A Decision-Support Tool for Post-Disaster Debris Operations, *Production and Operations Management*, 26(6), 2017, 1076-1091
- M. Jahre, J. Kembro, T. Rezvanian, Ö. Ergun, S. J. Håpnes, P. Berling
Integrating Supply Chains for Emergencies and Ongoing Operations in UNHCR, *Journal of Operations Management*, 45, 2016, 1-134
- 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
Fair and Efficient Implementation of Collective Extended Producer Responsibility Legislation, *Management Science*, 2014, 1-56
- 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

SELECTED RESEARCH PROJECTS

- Multi-Agent Modeling Framework for Mitigating Distributed Disruptions in Critical Supply Chains
Co-Principal Investigator, National Science Foundation
- Food Aid Quality Review Phase III Program
Principal Investigator, subcontract from Tufts University's USAID grant
- Resource Allocation with Learning in Dynamic and Partially Observable Networks
Principal Investigator, National Science Foundation
- Same Day Delivery Operations
Principal Investigator, Deliv
- Staff Reassignment: Negotiations and Compromises to Enhance Stable Matching
Co-Principal Investigator, National Science Foundation

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

- H. Xu, Y. Fang, N. Fard
Reliability Assessment of Repairable Load-Sharing k-out-of-n: G System with Flowgraph Model, IEEE Xplore, Annual Reliability and Maintainability Symposium (RAMS), 2018
- Y. Fang, H. Xu, N. Fard
Time Series Chain Graph for Reliability Covariate Modelling, IEEE Xplore, Annual Reliability and Maintainability Symposium (RAMS), 2018
- H. Xu, Y. Fang, N. Fard
Optimal Design for Resilient Load-Sharing Systems with Nonidentical Components, Quality and Reliability Engineering International, 2018, 1-17
- N. Fard, S. Davis
Statistical Method for Predicting Inpatient Bed Demand, Annual ISSAT International Conference on Reliability and Quality in Design, RQD, 2018
- N. Fard, H. Xu, Y. Fang
Reliability Assessment of Load-Sharing Systems by Flowgraph for Non-Identical Components with Time-Varying Repair Rates, International Conference on Computers and Industrial Engineering, CIE47, 2017
- Fang, Y., Xu, H., Fard, N
Neural Network-WPCA Based Method for Multi-Objective Optimal Redundancy Allocation, International Journal of Reliability, Quality and Safety Engineering, 24(5), 2017, 1750024-1-1750024-22
- K. Sadeghzadeh, N. Fard
Analytical Clustering Procedures in Massive Failure Data, IEEE Xplore Annual Reliability and Maintainability Symposium (RAMS), 2017
- M. Liu, N. Fard, K. Sadeghzadeh
Large-Scale Spectral Clustering for Managing Big Data in Healthcare Operations, International Journal of Big Data Intelligence, 4(3), 2017, 195-207

SAMUEL FELTON



Assistant Professor, Mechanical and Industrial Engineering

PhD, Harvard University, 2015
mie.neu.edu/people/felton-samuel

Scholarship focus: soft robots; transformable robots; self-folding machines; rapid prototyping; biomimetic design

Honors and awards: National Defense Science and Engineering Graduate Fellowship

SELECTED PUBLICATIONS

- F. Zuliani, C. Liu, J. Paik, S. Felton
Minimally Actuated Transformation of Origami Machines, IEEE Robotics and Automation Letters 3(3), 2018, 1426-1433
- C. Liu, S. Felton
A Self-Folding Robot Arm for Load-Bearing Operations, IEEE/RSJ International Conference on Intelligent Robots and Systems, 2017, 1979-1986
- S. Felton, K. Becker, D. Aukes, R. Wood
Self-Folding with Shape Memory Composites at the Millimeter Scale, Journal of Micromechanics and Microengineering, 25(8), 2015, 085004
- M. Tolley, S. Felton, S. Miyashita, D. Aukes, D. Rus, R. Wood
Self-Folding Origami: Shape Memory Composites Activated by Uniform Heating, Smart Materials and Structures, 23, 2014, 094006
- S. Felton, M. Tolley, E. Demaine, R. Rus, R. Wood
A Method for Building Self-Folding Machines, Science, 345(6197), 2014, 644-646
- S. Felton, D. Lee, K. Cho, R. Wood
A Passive, Origami-Inspired, Continuously Variable Transmission, IEEE International Conference on Robotics and Automation, 2014, 2913-2918

ANDREW GOULDSTONE



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

PhD, MIT, 2001
mie.neu.edu/people/gouldstone-andrew

Scholarship focus: biomechanics; material science; engineering mechanics

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

SELECTED PUBLICATIONS

- T. Hu, S. Zhalehpour, A. Gouldstone, et al.
A Method for the Estimation of the Interface Temperature in Ultrasonic Joining, *Metallurgical And Materials Transactions A-Physical Metallurgy And Materials Science*, 45A(5), 2014, 2545-2552
- C.T. Nguyen, H.M. Gonnermann, Y. Chen, A. Gouldstone
Film Drainage and the Lifetime of Bubbles, *Geochemistry Geophysics Geosystems*, 14(9), 2013, 3616-3631
- J.H. Kim, A. Gouldstone, C.S. Korach
Analysis of Spherical Indentation of an Elastic Bilayer Using a Modified Perturbation Approach, *MEMS and Nanotechnology*, 4, 2011, 53-57
- B. Choi, Y. Wu, S. Sampath, A. Gouldstone
Modified Indentation Techniques to Probe Inelasticity in Ni5%Al Coatings from Different Processes, *Journal of Thermal Spray Technology*, 18(1), 2009, 65-74
- L.H. Weng, A. Gouldstone, Y.H. Wu, W.L. Chen
Mechanically Strong Double Network Photocrosslinked Hydrogels from N,N-Dimethylacrylamide and Glycidyl Methacrylated Hyaluronan, *Biomaterials*, 29(14), 2008, 2153-2163

SELECTED RESEARCH PROJECTS

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

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; modeling resiliency in complex systems; design and management of outpatient health care clinics; simulation: discrete event simulation and systems dynamics; deterministic and stochastic optimization

Honors and awards: ARCS (Achievement Rewards for College Scientists) Foundation; George Fellowship, Health Systems Institute, Georgia Institute of Technology

SELECTED PUBLICATIONS

- V. Vahdat, J. Griffin, J.E. Stahl, C. Yang
Analysis of the Effects of EHR Implementation on Timeliness of Care in a Dermatology Clinic: A Simulation Study, *Journal of the American Medical Informatics Association*, 25(7), 2018, 827-832
- V. Vahdat, J. Griffin
Decreasing Patient Length of Stay via New Flexible Exam Room Allocation Policies in Ambulatory Care Clinics, *Health Care Management Science*, 2017, 1-25
- V. Vahdat, J. Griffin, S. Burns, R. Azghandi
Proactive Patient Flow Redesign for Integration of Multiple Outpatient Clinics, *Proceedings of 2017 Winter Simulation Conference (WSC)*, 2017, 2893-2904

SELECTED RESEARCH PROJECTS

- Design of New Orthopedic Clinics Via Simulation
Principal Investigator, Boston Children's Hospital
- Improving Patient Flow in New Musculoskeletal Floor of the 'Brigham Building for the Future'
Principal Investigator, Brigham and Women's Hospital
- Patient Flow Simulation Projects in Dermatology and Cardiology Clinics
Principal Investigator, Brigham and Women's Hospital
- CRISP Type 1: Multi-Agent Modeling Framework for Mitigating Distributed Disruptions in Critical Supply Chains
Principal Investigator, National Science Foundation
- CRISP Type 2: Identification and Control of Uncertain, Highly Interdependent Processes Involving Humans with Applications to Resilient Emergency Health Response
Co-Principal Investigator, National Science Foundation

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; Outstanding IE Professor Award

SELECTED PUBLICATIONS

S.M. Gupta, M.A. Ilgin

Multiple Criteria Decision Making Applications in Environmentally Conscious Manufacturing and Product Recovery, CRC Press, 2018

M.T. Dulman, and S.M. Gupta

Evaluation of Maintenance and EOL Operation Performance of Sensor-Embedded Laptops, Logistics, 2, 1(3), 2018, 1-22

A. Ishigaki, T. Yamada, S.M. Gupta

Design of a Closed-Loop Supply Chain with Stochastic Product Returns, International Journal of Automation Technology, 11(4), 2017, 563-571

A.Y. Alqahtani, S.M. Gupta

Optimizing Two-Dimensional Renewable Warranty Policies for Sensor Embedded Remanufactured Products, Journal of Industrial Engineering and Management, 10(2), 2017, 145-187

C.B. Kalayci, O. Polat, S.M. Gupta

A Hybrid Genetic Algorithm for Sequence-Dependent Disassembly Line Balancing Problem, Annals of Operations Research, 242(2), 2016, 321-354

M.A. Ilgin, S.M. Gupta, O. Battaia

Use of MCDM Techniques in Environmentally Conscious Manufacturing and Product Recovery: State of the Art, Journal of Manufacturing Systems, 37(3), 2015, 746-758

S.M. McGovern, S.M. Gupta

Unified Assembly-and Disassembly-Line Model Formulae, Journal of Manufacturing Technology Management, 26(2), 2015, 195-212

O. Oudemir, S.M. Gupta

A Multi-Criteria Decision Making Model for Advanced Repair-to-Order and Disassembly-to-Order System, European Journal of Operational Research, 233(2), 2014, 408-419

BABAK HEYDARI



Associate Professor, Mechanical and Industrial Engineering

PhD University of California, Berkeley, 2008
mie.neu.edu/people/heydari-babak

Scholarship focus: socio-technical systems, systems engineering and design, social and economic networks, resilience of networked systems, computational social sciences, platform-based systems, sharing economy systems, computational social sciences, game theory, artificial intelligence

Honors and awards: National Science Foundation CAREER Award, Stevens Institute of Technology sole nominee for National Blavatnik award, Member of the scientific advisory board of Future Resilient Systems (FRS)

SELECTED PUBLICATIONS

M. Mosleh, B. Heydari

Fair Topologies: Community Structure and Network Hubs Drive Emergence of Fairness Norms, Scientific Reports, 2686(7), 2017

M. Mosleh, K. Dalili, B. Heydari

Distributed or Monolithic? A Computational Architecture Decision Framework, IEEE Systems Journal, 1(12), 2016, 125-136

A. Ehsanfar, B. Heydari

An Incentive Compatible Scheme for Electricity Cooperatives: Axiomatic Approach, IEEE Transactions on Smart Grids, 9(2), 2016, 1416-1424

B. Heydari, M. Mosleh, K. Dalili

From Modular to Distributed Open Architectures: A United Decision Framework, Systems Engineering, 19(3), 2016, 252-266

M. Mosleh, P. Ludlow, B. Heydari

Distributed Resource Management in Systems of Systems: An Architecture Perspective, Systems Engineering, 2016, 19(4), 362-374

D.A. Gianetto, B. Heydari

Sparse Cliques Trump Scale-Free Networks in Coordination and Competition, Scientific Reports, 6, 2016

SELECTED RESEARCH PROJECTS

CAREER: Architecting Products to Balance Innovation and Competition in Business Ecosystems

Principal Investigator, National Science Foundation

Hybrid Socio-Technical Teams: A Theoretical Framework for Modeling and Design of Hybrid Networks of Human and Autonomous Agents

Principal Investigator, National Science Foundation

CARLOS HIDROVO



Assistant Professor, Mechanical and Industrial Engineering

PhD, MIT, 2001
mie.neu.edu/people/hidrovo-chavez-carlos

Scholarship focus: multiscale and multiphase flow and transport phenomena, surface tension interactions in micro/nanoengineered structures, and electrokinetic ion transport in porous media for applications in energy storage, portable biochemical diagnostics, thermal management, and water treatment systems

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

- P. Tirandazi, C.H. Hidrovo
An Integrated Gas-Liquid Droplet Microfluidic Platform for Digital Sampling and Detection of Airborne Targets, *Sensors and Actuators B: Chemical*, 267, 2018, 279-293
- Y. Salamat, C.H. Hidrovo
A Parametric Study of Multiscale Transport Phenomena and Performance Characteristics of Capacitive Deionization Systems, *Desalination*, 438(7), 2018, 24-36
- P. Tirandazi, C.H. Hidrovo
Liquid In-Gas Droplet Microfluids; Experimental Characterization of Droplet Morphology, Generation Frequency, and Monodispersity in a Flow-Focusing Microfluidic Device, *Journal of Micromechanics and Microengineering*, 27(7), 2017, 075020-9
- T.J. Kim, M. Kim, S. Hann, J. Trejo, C.H. Hidrovo
Thermal Characterization of Microheated Microchannels with Spatially Resolved Two-Color Fluorescence Thermometry, *Journal of Microelectromechanical Systems*, 24(1), 2015, 115-125
- R.S. Hale, R. Ranjan, C.H. Hidrovo
Capillary Flow through Rectangular Micropillar Arrays, *International Journal of Heat and Mass Transfer*, 75, 2014, 710-717
- O.N. Demirer, C.H. Hidrovo
Laser Induced Fluorescence Visualization of Ion Transport in a Pseudo-Porous Capacitive Deionization Microstructure, *Microfluidics and Nanofluidics*, 16(1-2), 2014, 109-122

SELECTED RESEARCH PROJECTS

- Formation and Transport Dynamics of High Speed Gas-Liquid Droplet Microfluidics
Principal Investigator, National Science Foundation, Fluid Dynamics
- The Role of Electrode Microscale Topology in Electro-Diffusion and its Coupling to Macroscale Convection in Capacitive Deionization (CDI) Systems for Water Desalination
Principal Investigator, Bureau of Reclamation
- Elucidating the True Role of Surface Microtexturing in Friction Reduction and Enhanced Convective Heat Transfer
Principal Investigator National Science Foundation (NSF), Thermal Transport Processes

HANCHEN HUANG



Donald W. Smith Professor and Department Chair, Mechanical and Industrial Engineering

PhD, University of California at Los Angeles, 1995
mie.neu.edu/people/huang-hanchen

Scholarship focus: development of a theoretical framework for nanorod growth and innovation of metallic glue for ambient environments; and atomistic simulation methods

Honors and awards: Fellow, American Association for the Advancement of Science; Fellow, Society of Engineering Science; 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; Hsue Shen Tsien Engineering Science Professor in China; and Connecticut Clean Energy Fund Endowed Professor in US

SELECTED PUBLICATIONS

- F. Du H. Huang
A Generalized Theory of Thin Film Growth, *Surface Science*, 669, 2018, 154-159
- S.P. Stagon, A. Knapp, P.R. Elliot, H. Huang
Metallic Glue for Ambient Environments Making Strides, *Advanced Materials and Processes*, 174, 2016, 22-25
- 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
- L.G. Zhou, H. Huang
A Characteristic Length Scale of Nanorods Diameter during Growth, *Physical Review Letters*, 101(26), 2008, 266102
- H. Huang
Insight: Multiscale Modeling and Simulation, *Sandia Technology*, 2007, 8-9
- J. Wang, H. Huang, S.V. Kesapragada, D. Gall
Growth of Y-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 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
- Novel Thermal Management Technologies
Co-Principal Investigator, Raytheon Company

JACQUELINE ISAACS



Professor and Associate Dean for Faculty Affairs, Mechanical and Industrial Engineering; affiliated faculty appointment in: the School of Public Policy and Urban Affairs

PhD, MIT, 1991

mie.neu.edu/people/isaacs-jacqueline

Scholarship focus: economic-environmental assessment of materials processing towards sustainable design and manufacturing, ethical, societal and legal implications of nanomanufacturing, 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

- J. Zhang, A. Panwar, D. Bello, J.A. Isaacs, T. Jozokos, J. Mead
The Effects of Recycling on the Structure and Properties of Carbon Nanotube Filled Polycarbonate, *Polymer Science and Engineering*, 2017
- S. Radhakrishnan, S. Erbis, J.A. Isaacs, S. Kamarthi
Analysis of Scientific Literature on Nano Environmental, Health, and Safety Risk Using Keyword Co-Occurrence Networks, *PLOS ONE*, 2017, 0172778
- L. Pourzahedi, P. Zhai, J.A. Isaacs, M.J. Eckelman
Life Cycle Energy Benefits of Carbon Nanotubes for Electromagnetic Interference (EMI) Shielding Applications, *Journal of Cleaner Production*, 142(4), 2017, 1971-1978
- P. Zhai, J.A. Isaacs, M.E. Eckelman
Net Energy Benefits of Carbon Nanotube Applications, *Applied Energy*, 173, 2016, 624-634
- S. Ebris, S. Kamarthi, A. Namin, A. Hakimian, J.A. Isaacs
Stochastic Goal Programming Model for Sustainable CNT-Enabled Lithium-Ion Battery Manufacturing, *Environmental Science: Nano*, 3, 2016, 1447-1459
- V.H. Grassian, A.J. Haes, I.A. Mudunkotuwa, P. Demokritou, A.B. Kane, C.J. Murphy, J.E. Hutchison, J.A. Isaacs, et. al.
NanoEHS – Defining Fundamental Science Needs: No Easy Feat When the Simple Itself is Complicated, *Perspective in Environmental Science: Nano*, 3, 2015, 15-27
- J.A. Isaacs, C.L. Alpert, M. Bates, C.J. Bosso, M.J. Eckelman, I. Linkov, W.C. Walker
Engaging Stakeholders in Nano-EHS Risk Governance, *Editorial, Environment Systems and Decisions*, 35, 2015, 24-28

SELECTED RESEARCH PROJECTS

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

NADER JALILI



Professor 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
A Microfluidic Platform Containing Sidewall Microgrooves for Cell Positioning and Trapping, *Nanobiomedicine*, 2015
- S. Faegh, N. Jalili, S. Sridhar
A Novel Sensor System Utilizing Piezoelectric Microcantilever Coupled with Resonating Circuit, *US Patent*, 2015
- S. Faegh, N. Jalili, S. Sridhar
Ultrasensitive Piezoelectric-Based Microcantilever Biosensor: Theory and Experiment, *IEEE/ASME Transactions on Mechatronics*, 20(1), 2015, 308-312
- 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
Piezoelectric-Based Vibration Control: From Macro to Micro/Nano Scale Systems, *Springer, New York, NY*, 1st Ed., 2010, 517 pages, with 293 figures

SELECTED RESEARCH PROJECTS

- 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

SAFA JAMALI



Assistant Professor, Mechanical and Industrial Engineering

PhD, Case Western Reserve University, 2015
mie.neu.edu/people/jamali-safa

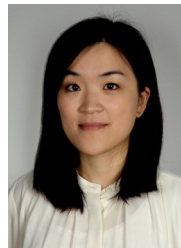
Scholarship focus: microstructure-macroscopic properties relationship in complex fluids, with emphasis on

rheology and physics of soft matter and structured fluids; colloidal suspensions; mesoscale computational science; non-Newtonian fluid mechanics; physics of living systems; hemorrheology and hemodynamics

SELECTED PUBLICATIONS

- S. Jamali, G.H. McKinley, R.C. Armstrong
Rheology, Microstructure and Heterogeneity in Thixotropic Elasto-Visco-Plastic Fluids, *Physical Review Letters*, 118, 2017, 048003
- A. Boromand, S. Jamali, J. Maia
Structural Fingerprints of Yielding in Short-Ranged Attractive Colloidal Gels, *Soft Matter*, 13(2), 2017, 458-473
- S. Liu, S. Jamali, J.-B. Baek, J. Maria, L. Dai
Solvent Induced Conformational Switching of Polymer Brush Functionalized Graphene Transistors, *Macromolecules*, 49(19), 2016, 7434-7441
- S. Jamali, et al.
A Gaussian-Inspired Auxiliary Thermostat for Non-Equilibrium Dissipative Particle Dynamics Simulations, *Computer Physics Communications*, 197, 2015, 27-34
- S. Jamali, et al.
Generalized Mapping of the Many-Body Dissipative Particle Dynamics Simulation Parameters onto Fluid Compressibility and the Flory-Huggins Theory, *Journal of Chemical Physics*, 142(16), 2015, 1-11
- S. Jamali, et al.
Microstructure and Rheology of Soft to Rigid Shear-Thickening Colloidal Suspensions, *Journal of Rheology*, 59(6), 2015, 1377-1395
- S. Khani, S. Jamali, A. Boromand, M. Hore, J. Maia
Polymer-Mediated Nanorod Self-Assembly Predicted by Dissipative Particle Dynamics Simulations, *Soft Matter*, 11(34), 2015, 6881-6892
- S. Jamali, A. Boromand, J. Maia
Viscosity Measurement Techniques in Dissipative Particle Dynamics, *Computer Physics Communications*, 196, 2015, 149-160
- S. Jamali, M. Yamanoi, J. Maia
Bridging the Gap Between Microstructure and Macroscopic Behavior of Monodisperse and Bimodal Colloidal Suspensions, *Soft Matter*, 9(5), 2013, 1506-1515

XIAONING JIN



Assistant Professor, Mechanical and Industrial Engineering

PhD, University of Michigan, 2012
mie.neu.edu/people/jin-xiaoning

Scholarship focus: developing advanced models for prognostics and health management using physics-based

models and data analytics; designing preventive strategies for manufacturing operations

SELECTED PUBLICATIONS

- X. Gu, X. Jin, J. Ni
Estimation of Active Maintenance Opportunity Windows in Production Lines, *Journal of Manufacturing Systems*, 45, 109-120
- Xu, M. X. Jin, S. Kamarthi, Md. Noor-E-Alam
A Failure-Dependency Modeling and State Discretization Approach for Condition-Based Maintenance Optimization of Multi-Component Systems, *Journal of Manufacturing Systems*, 47, 2018, 141-152
- F. Momeni, X. Jin, J. Ni
A Microscopic Approach for Genetic Degradation Modeling, *International Journal of Prognostics and Health Management*, 7(27), 2016, 1-9
- X. Jin, D. Siegel, B. Weiss, E. Gamel, W. Wang, J. Lee, J. Ni
The Present Status and Future Growth of Maintenance in US Manufacturing: Results from a Pilot Survey, *Manufacturing Review*, 2016
- X. Gu, X. Jin, J. Ni
Prediction of Passive Maintenance Opportunity Windows on Bottleneck Machines in Complex Manufacturing Systems, *ASME Transactions on Journal of Manufacturing Science and Engineering*, 137(3), 2015, 031017
- H. Dong, X. Jin, J. Ni
Lithium-Ion Battery State of Health Monitoring and Remaining Useful Life Prediction based on Support Vector Regression-Particle Filter, *Journal of Power Sources*, 271, 2014, 114-123
- X. Jin, S.J. Hu, J. Ni, G. Xiao
Assembly Strategies for Product Remanufacturing with Variable Quality Returns, *IEEE Transactions on Automation Science and Engineering*, 10(1), 2013, 76-85
- X. Jin, J. Ni
Joint Production and Preventive Maintenance Strategy for Manufacturing Systems with Stochastic Demand, *ASME Transactions on Manufacturing Science and Engineering*, 135(3), 2013

SELECTED RESEARCH PROJECTS

Achieving Smart Factory through Predictive Dynamic Scheduling
Principal Investigator, Digital Manufacturing Innovation Institute

YUNG JOON JUNG



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

- J. Hao, B. Li, H. Jung, S. Hong, Y. Jung, S. Kar
Vapor-Phase-Gating Induced Ultrasensitive Ion Detection in Graphene and Single-Walled Carbon Nanotube Networks, *Advanced Materials*, 2017, 1606883
- S. Hong, T. Lundstrom, R. Ghosh, H. Abdi, J. Hao, S.K. Jeoung, P. Su, J. Suhr, A. Vaziri, N. Jalili, Y.J. Jung,
Highly Anisotropic Adhesive Film Made from Upside-Down Flat and Uniform Vertically Aligned CNTs, *ACS Applied Materials and Interfaces*, 8, 2016, 34061
- H. Jung, Y. Kim, J. Robinson, M. Zalalutdinov, S. Hong, J. Hao, KT. Wan, Y. Jung, B. Li, X. Wang
Printing Highly Controlled Suspended Carbon Nanotube Network on Micro-Patterned Superhydrophobic Surface, *Scientific Reports*, 5, 2015, 15908
- 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
- H. Jung, S. Kar, J. Kong, M.S. Dresselhaus, Y.J. Jung, et al.
Sculpting Carbon Bonds: Allotropic Transformation Through Solid-State Re-Engineering of sp^2 carbon, *Nature Communications*, 5, 2014, 4941
- Y. Kim, H. Jung, S. Park, B. Li, F. Liu, J. Hao, Y.J. Jung, et al.
Voltage-switchable Photocurrents in Single-wall Carbon Nanotube – Silicon Junctions for Analogue and Digital optoelectronics, *Nature Photonics*, 8, 2014, 239-243

SELECTED RESEARCH PROJECTS

- Developing Strong, High Thermal Resistant, and Light Weight Materials and their Processing for the High Performance Automotive Lighting System
Principal Investigator, Ministry of Industry, Korea
- DMREF: Engineering Strong, Highly Conductive Nanotube Fibers Via Fusion
Principal Investigator, National Science Foundation
- PFI:AIR-TT: Design and Development of High-performance Miniature Radiation Detectors using Ultrasensitive Graphene and Carbon Nanotube ion Sensors
Principal Investigator, National Science Foundation

SAGAR KAMARTHI



Professor of Mechanical and Industrial Engineering, Founding Director of Data Analytics Engineering Program

PhD, Pennsylvania State University, 1994
mie.neu.edu/people/kamarthi-sagar

Scholarship focus: machine learning applications in smart and sustainable manufacturing; predictive analytics for smart and connected health; data driven approaches to mass customized instruction

SELECTED PUBLICATIONS

- S. Radhakrishnan, S. Erbis, J.A. Isaacs, S. Kamarthi
Novel Keyword Co-Occurrence Networks Based Methods to Foster Systematic Reviews of Scientific Literature, *PLOS ONE*, 2017
- M.G. Uddin, K.S. Ziemer, A. Zeid, Y.-T.T. Lee, S. Kamarthi
Process Control Model for Growth Rate of Molecular Beam Epitaxy of MgO (111) Nanoscale Thin Films on 6H-SiC (0001) Substrates, *International Journal of Advanced Manufacturing Technology*, 91(1-4), 2017, 907–916
- S. Radhakrishnan, A. Duvvuru, S. Sultornsanee, S. Kamarthi
Phase Synchronization Based Minimum Spanning Trees for Analysis of Financial Time Series with Nonlinear Correlations, *Physica A: Statistical Mechanics and its Applications*, 444, 2016, 259-270
- S. Kamarthi, S. Sultornsanee, A. Zeid
Recurrence Quantification Analysis to Estimating Surface Roughness in Finish Turning Processes, *International Journal of Advanced Manufacturing Technology*, 87(1-4), 2016, 451–460
- S. Erbis, Z. Ok, J.A. Isaacs, J.C. Benneyan, S. Kamarthi
Review of Research Trends and Methods in Nano Environmental, Health and Safety Risk Analysis, *Risk Analysis: An International Journal*, 2016, 1-18
- S. Erbis, S. Kamarthi, A. Abdollahi-Namin, A. Hakimian, J.A. Isaacs
Stochastic Goal Programming Model for Sustainable CNT-Enabled Lithium-Ion Battery Manufacturing, *Environmental Science: Nano*, 3, 2016, 1447-1459

SELECTED RESEARCH PROJECTS

- Achieving Smart Factory Through Predictive Dynamic Scheduling
Co-Principle Investigator, Digital Manufacturing and Design Innovation Institute
- Smart Manufacturing Performance Assurance (Mpass) Through Equipment Monitoring
Principle Investigator, National Institute of Standards of Technology
- TRANSFORMing Liberal Arts Careers to Meet Demand for Advanced Manufacturing Workforce
Co-Principle Investigator, National Science Foundation

GREGORY KOWALSKI



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

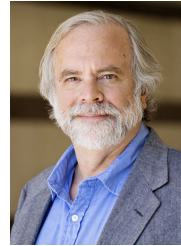
SELECTED PUBLICATIONS

- A.J. Conway, W.M. Saadi, F.L. Sinatra, G.J. Kowalski, D. Larson, J. Fiering
Dispersion of a Nanoliter Bolus in Microfluidic Co-Flow, *Journal of Micromechanics and Microengineering: Structures, Devices, and Systems*, 24(3), 2014, 034006
- U. Piana, G.J. Kowalski, M. Zenouzi
Incorporating Reliability and Failure Models into Energy System Analysis, *Proceedings of the 8th International Conference on Energy Sustainability co-located with the 12th Fuel Cell Science, Engineering & Technology Conference*, Boston, MA, 2014, 1-9
- A. Emdadi, Y. Emami, M. Zenouzi, A. Lak, B. Panahirad, A. Lotfi, F. Lak, G.J. Kowalski
Potential Of Electricity Generation By The Salinity Gradient Energy Conversion Technologies in the System of Urmia Lake-Gadarchay River, *Proceedings of the 8th International Conference on Energy Sustainability Co-located with the 12th Fuel Cell Science, Engineering & Technology Conference*, Boston, MA, 2014, 1-8
- G.J. Kowalski, M. Modaresifar, M. Zenouzi
Significance of Transient Exergy Terms in a New Tray Design Solar Desalination Device, *Journal of Energy Resources Technology*, 137(1), 2014, 1-8

SELECTED RESEARCH PROJECTS

Energy Storage Systems
Principal Investigator, 3 Phase Renewables

ARTHUR F. KRAMER



Senior Vice Provost for Research & Graduate Education, Office of the Provost; Professor, Department of Psychology; Professor, Mechanical and Industrial Engineering

PhD, University of Illinois, 1984
mie.neu.edu/people/kramer-arthur

Scholarship focus: Cognitive Psychology, Cognitive Neuroscience, Aging, and Human Factors

Honors and awards: NIH Ten Year MERIT Award; Fellow, American Psychological Association; Fellow, American Psychological Society

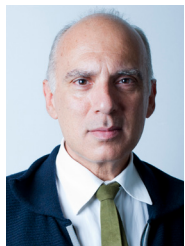
SELECTED PUBLICATIONS

- L. Chaddock-Heyman, K.I. Erickson, M.A. Chappel, C.L. Johnson, C. Kienzler, A. Knecht, E.S. Drolette, L.B. Raine, M.R. Scudder, S.C. Kao, C.H. Hillman, A.F. Kramer
Aerobic Fitness is Associated with Greater Hippocampal Cerebral Blood Flow in Children, *Developmental Cognitive Neuroscience*, 20, 2016, 52-58
- D.M. Pindus, E.S. Drollette, M.R. Scudder, N.A. Khan, L.B. Raine, L.B. Sherar, D.W. Esliger, A.F. Kramer, C.H. Hillman
Associations Among Moderate to Vigorous Physical Activity, Indices of Cognitive Control, and Academic Achievement in Preadolescents, *The Journal of Pediatrics*, 173, 2016, 136-142
- M.W. Voss, T.B. Weng, A.Z. Burzynska, C.N. Wong, R. Clark, J. Fanning, R. Awick, E.O. Olson, E. McAuley, A.F. Kramer
Fitness, but not Physical Activity, is Related to Functional Integrity of Brain Networks Associated with Aging, *Neuroimage*, 131, 2016, 113-125
- J.G. Gaspar, N. Ward, M.B. Neider, J. Crowell, R. Carbonari, H. Kaczmarek, R.V. Ringer, A.P. Johnson, A.F. Kramer, L. Loschky
Measuring the Useful Field of View with Gaze-Contingent Displays, *Human Factors*, 58(4), 2016, 630-641
- L.E. Oberlin, T.D. Verstynen, A.Z. Burzynska, M.W. Voss, R.S. Prakash, L. Chaddock-Heyman, C. Wong, J. Fanning, E. Awick, N. Gothe, S.M. Phillips, E. Maliey, D. Ehlers, E. Olson, T. Wojcicki, E. McAuley, A.F. Kramer, K.I. Erickson
White Matter Microstructure Mediates the Relationship Between Cardiorespiratory Fitness and Spatial Working Memory in Older Adults, *Neuroimage*, 131, 2016, 91-101

SELECTED RESEARCH PROJECTS

- Enhancing Children's Cognitive and Brain Health Through Physical Activity Training
Principal Investigator, National Institute of Child Health and Human Development
- Reshaping the Path of Mild Cognitive Impairment by Refining Exercise Prescription: Understanding Training Type and Exploring Mechanisms
Principal Investigator, Canadian Institutes of Health

YIANNIS LEVENDIS



COE Distinguished Professor, Mechanical and Industrial Engineering,

PhD, California Institute of Technology, 1987
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, Combustion Institute; 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; Percy Nicholls Award, jointly awarded by the American Society of Mechanical Engineers and the Society of Manufacturing Engineers, 2015; Elected to the Steering committee of the Greek Energy Forum, 2016; Elected Fellow of the Combustion Institute, 2018;

SELECTED PUBLICATIONS

X. Ren, R. Sun, X. Meng, N. Vorobiev, M. Schiemann, Y. A. Levendis
Carbon, Sulfur and Nitrogen Oxide Emissions from Combustion of Pulverized Raw and Torrefied Biomass, *Fuel*, 188, 310–323, 2017

E. Rokni, H. Chi, Y. A. Levendis
In-Furnace Sulfur Capture by Co-Firing Coal With Alkali-Based Sorbents, *Journal of Energy Resources Technology, Transactions of ASME*, 139(4), 2017, 1-7

X. Ren, R. Sun, H. Chi, X. Meng and Y.A. Levendis
Hydrogen Chloride Emissions from Combustion of Pulverized Raw and Torrefied Biomass, *Fuel*, 200, 2017, 37-46

A. Panahi, Y.A. Levendis, N. Vorobiev, M. Schiemann
Direct Observations on the Combustion Characteristics of Miscanthus and Beechwood Biomass Including Fusion and Spherodization, *Fuel Processing Technology*, 166, 2017, 41-49

E. Rokni Y. A. Levendis
Utilization of a High-Alkali Lignite Coal Ash for SO₂ Capture in Power Generation, *Journal of Energy Engineering (ASCE)*, 143(4), 2017, 1-7

N. Vorobiev, A. Becker, H. Kruggel-Emden, A. Panahi, Y.A. Levendis, M. Schiemann
Particle Shape and Stefan Flow Effects on the Burning Rate of Torrefied Biomass, *Fuel*, 210, 2017, 107-120

E. Rokni, X. Ren, A. Panahi Y. A. Levendis
Emissions of SO₂, NO_x, CO₂, and HCl from Co-firing of Coals with Raw and Torrefied Biomass Fuels, *Fuel*, 211, 2017, 363-374

SELECTED RESEARCH PROJECTS

Pyrolysis of polyethylene terephthalate (PETE) wastes to MW-CNTs,
Principal Investigator, Funded by Canon Virginia Inc

LAURA H. LEWIS



Distinguished University and Cabot Professor of Chemical Engineering; jointly appointed, Mechanical and Industrial Engineering; George J. Kostas Research Institute for Homeland Security

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

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

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

SELECTED PUBLICATIONS

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

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

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

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

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

SELECTED RESEARCH PROJECTS

Promotion and Control of L₁₀ FeNi Phase Formation for Permanent Magnet Applications
Principal Investigator, Rogers Corporation

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

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

Rapid Assessment of AIT₂X₂ (T = Fe, Co, Ni, X = B, C) Layered Materials for Sustainable Magnetocaloric Applications
Principal Investigator, Department of Energy

YINGZI LIN



Associate Professor, Mechanical and Industrial Engineering; affiliated faculty appointed 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, J. Breugelmans, X. Wang, G. Gao, X. Tang
A Spatial-Temporal Trajectory Clustering Algorithm for Eye Fixations Identification, *International Journal of Intelligent Data Analysis*, 20(2), 2016, 377-393
- P. Wan, C. Wu, Y. Lin, X. Ma, Z. Huang
A Recognition Model of Driving Anger Based on Belief Rule Base, *Transportation Systems Engineering and Information*, 15(5), 2015, 1-8
- M. Yu, Y. Lin, X. Wang, D. Schmidt, Y. Wang
Human-Robot Interaction Based on Gaze Gesture for the Drone Teleoperation, *Journal of Eye Movement Research*, 7(4), 2014, 1-14
- S. Radhakrishnan, Y. Lin, A. Zeid, S. Kamarthi
Design, Evaluation and Implementation of Gesture Based Functions for CAD Modeling System Using the Multitouch Interface, *International Journal of Human-computer Studies*, 71(3), 2013, 261-275
- H. Cai, Y. Lin
Coordinating Cognitive Assistances with Cognitive Engagement Control Approaches in Human-Machine Interactions, *IEEE Transactions on Systems, Man and Cybernetics Part A: Humans and Systems*, 42(2), 2012, 286-294
- Y. Lin
A Natural Contact Sensor Paradigm for Non-intrusive and Real-time Sensing of Bio-Signals in Human-Machine Interactions, *IEEE Sensors Journal*, Special Issue on Cognitive Sensor Networks, 11(3), 2011, 522-529
- 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

YANG (EMILY) LIU



Assistant Professor, Mechanical and Industrial Engineering

PhD, Columbia University, 2015
mie.neu.edu/people/liu-yang

Scholarship focus: multiscale/multiphysics computational modeling of complex materials and structures; computational mechanics; large scale impact and blast simulation; high performance computing

Honors and awards: Best Paper Award, U.S. National Congress on Computational Mechanics

SELECTED PUBLICATIONS

- H. Zhang, Y. Liu, H. Sun, S. Wu
Transient Dynamic Behavior of Polypropylene Fiber Reinforced Mortar Under Compressive Impact Loading, *Construction and Building Materials*, 111(0), 2016, 30-42
- Y. Liu, W. C. Sun, Z. Yuan, J. Fish
A Nonlocal Multiscale Discrete-Continuum Model for Predicting Mechanical Behavior of Granular Materials, *International Journal for Numerical Methods in Engineering*, 106(2), 2016, 129-160
- Y. Liu, W. C. Sun, J. Fish
Determining Material Parameters for Critical State Plasticity Models Based on Multilevel Extended Digital Database, *ASME Journal of Applied Mechanics*, 83(1), 2016
- H. Sun, D. Feng, Y. Liu, M.Q. Feng
Statistical Regularization for Identification of Structural Parameters and External Loadings Using State Space Models, *Computer-Aided Civil and Infrastructure Engineering*, 30(11), 2015, 843-858
- Y. Liu, V. Filonova, N. Hu, Z. Yuan, J. Fish, Z. Yuan, T. Belytschko
A Regularized Phenomenological Multiscale Damage Model, *International Journal for Numerical Methods in Engineering*, 99(12), 2014, 867-887

YONGMIN LIU



Associate 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: NSF CAREER Award, Office of Naval Research Young Investigator Award; SPIE Rising Researcher; 3M Non-Tenured Faculty Award

SELECTED PUBLICATIONS

- W. Ma, F. Cheng, Y.M. Liu
Deep-Learning-Enabled On-Demand Design of Chiral Metamaterials, *ACS Nano*, 12(6), 2018, 6326–6334
- Z.J. Wang, L.Q. Jing, K. Yao, Y.H. Yang, B. Zheng, C.M. Soukoulis, H.S. Chen, Y.M. Liu
Origami-Based Reconfigurable Metamaterials for Tunable Chirality, *Advanced Materials*, 29, 2017, 1700412
- K. Yao, Y.M. Liu
Controlling Electric and Magnetic Resonances for Ultracompact Nanoantennas with Tunable Directionality, *ACS Photonics*, 3, 2016, 953-963
- Z.J. Wang, K. Yao, M. Chen, H. Chen, Y.M. Liu
Manipulating Smith-Purcell Emission with Babinet Metasurfaces, *Physical Review Letters*, 117(15), 2016, 157401
- 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
- C.L. Zhao, Y.M. Liu, Y.H. Zhao, N. Fang, T.J. Huang
Reconfigurable Plasmodic 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
- T. Zentgraf, Y.M. Liu, M.H. Mikkelsen, J. Valentine, X. Zhang
Plasmonic Luneburg and Eaton Lenses, *Nature Nanotechnology*, 6, 2011, 151-155

SELECTED RESEARCH PROJECTS

- CAREER: Spin Plasmonics for Ultrafast All-Optical Manipulation of Magnetization in Hybrid Metal-Ferromagnet Structures
Principal Investigator, National Science Foundation
- Reconfigurable Metamaterials for Beam Steering, Imaging and Sensing at Infrared Frequencies
Principal Investigator, Office of Naval Research

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 origami folding, carbon nanomaterials

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

SELECTED PUBLICATIONS

- X. Xie, C. Livermore
Passively Self-Aligned Assembly of Compact Barrel Hinges for High-Performance, Out-of-Plane MEMS Actuators, *IEEE 30th International Conference on Micro Electro Mechanical Systems*, 2017, 813-816
- C. Yang, X. Xie, S. Liu, C. Livermore
Resealable, Ultra-Low Leak Micro Valve Using Liquid Surface Tension Sealing for Vacuum Applications, *Proceedings of Transducers 2017*, 2071-2074
- Yang, C., S. Liu, X. Xie, C. Livermore
Compact, Planar, Translational Piezoelectric Bimorph Actuator with Archimedes' Spiral Actuating Tethers, *Journal of Micromechanics and Microengineering*, 26(2), 2016, 124005
- S. Liu, C. Martin, D. Lashmore, M. Schauer, C. Livermore
Carbon Nanotube Torsional Springs for Regenerative Braking Systems, *Journal of Micromechanics and Microengineering*, 25(10), 2015, 104005
- N.S. Shaar, G. Barbastathis, C. Livermore
Integrated Folding, Alignment, and Latching for Reconfigurable Origami MEMS, *Journal of Microelectromechanical Systems*, 24(4), 2015, 1043-1051
- T. Liu, R. St. Pierre, C. Livermore
Passively-Switched Energy Harvester for Increased Operational Range, *Smart Materials and Structures*, 23(9), 2014, e095045
- X. Xie, Y. Zaitsev, L.F. Velásquez-García, S. Teller, C. Livermore
Scalable, MEMS-Enabled, Vibrational Tactile Actuators for High Resolution Tactile Displays, *Journal of Micromechanics and Microengineering*, 24(12), 2014, 125014

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

DAVID LUZZI



Senior Vice Provost for Research
Vice President of the Innovation Campus at
Burlington, MA; Chairman of the Board, KRI
at Northeastern University LLC; Professor,
Mechanical and Industrial Engineering

PhD, Northwestern University, 1986
mie.neu.edu/people/luzzi-david

Scholarship focus: security, intelligence and resilience; corporate partnerships; intellectual property policy; technology readiness and transition; engineered materials; additive manufacturing; expeditionary cyber; cybersecurity; UAS swarms; workforce training and development

Honors and awards: Ellis Island Medal of Honor; Air Force Meritorious Civilian Service Medal; George Heilmeier Award for Research Innovation

SELECTED PUBLICATIONS

- E. Abou-Hamad, Y. Kim, M. Bouhrara, Y. Saih, T. Wågberg, D.E. Luzzi, C. Goze-Bac
NMR Strategies to Study the Local Magnetic Properties of Carbon Nanotubes, *Physics B: Condensed Matter*, 407(4), 2012, 740-742
- Y. Kim, E. Abou-Hamad, A. Rubio, T. Wågberg, A. Talyzin, D.E. Boesch, S. Aloni, A. Zettl, D. Luzzi, C. Goze-Bac
Communications: Nanomagnetic Shielding: High-Resolution NMR in Carbon Allotropes, *The Journal of Chemical Physics*, 132(2), 2010, 21102
- E. Abou-Hamad, Y. Kim, T. Wågberg, D. Boesch, S. Aloni, A. Zettl, A. Rubio, D.E. Luzzi, C. Goze-Bac
Molecular Dynamics and Phase Transition in One-Dimensional Crystal of C60 Encapsulated Inside Single Wall Carbon Nanotubes, *ACS nano*, 3(12), 2009, 3878-3883
- E. Abou-Hamad, Y. Kim, A. Talyzin, C. Goze-Bac, D.E. Luzzi, C. Goze-Bac, A. Rubio, T. Wågberg
Hydrogenation of C60 in Peapods: Physical Chemistry in Nano Vessels, *American Chemical Society*, 113(2), 2009, 8583-8587
- P. Jaroenapibal, Y. Jung, S. Evoy, D.E. Luzzi
Electromechanical Properties of Individual Single-Walled Carbon Nanotubes Grown on Focused-Ion-Beam Patterned Substrates *Ultramicroscopy*, 109(2), 2009, 167-171

KAYSE LEE MAASS



Assistant Professor, Mechanical and
Industrial Engineering

PhD, University of Michigan, 2017
mie.neu.edu/people/maass-kayse

Scholarship focus: large-scale optimization, stochastic optimization, deterministic optimization, network theory, queueing theory, mental health, facility location modeling, supply chain design, social inequality, human trafficking, healthcare operations

Honors and awards: NSF Graduate Research Fellowship, INFORMS Judith Liebman Award, Richard and Eleanor Towner Prize for Outstanding PhD Research

SELECTED PUBLICATIONS

- L.M. Flowers, K.L. Maass, G.J. Melin, R.L. Campbell, C.M. Lohse, P.J. Novotny, J.J. Westphal, D.M. Nestler, K.S. Pasupathy
Consequences of the 48-Hour Rule: A Lens into the Psychiatric Patient Flow Through an Emergency Department, *American Journal of Emergency Medicine* (online)
- K.L. Maass, M.S. Daskin
A Cyclic Allocation Model for the Inventory-Modulated Capacitated Location Problem, *Information Systems and Operational Research*, 55(4), 2017, 312-338
- K.L. Maass, M.S. Daskin, S. Shen
Mitigating Hard Capacity Constraints with Inventory in Facility Location Modeling, *IIE Transactions*, 48(2), 2016, 120-133
- K.L. Maass, B. Liu, M.S. Daskin, M. Duck, Z. Wang, R. Mwenesi, H. Schapiro
Incorporating Nurse Absenteeism Into Staffing with Demand Uncertainty, *Health Care Management Science*, 20(1), 2015, 141-155
- K.L. Maass, A. Weiss, V.M.H. Lo, M.S. Daskin
Maximizing Diversity in the Engineering Global Leadership Cultural Families, *Interfaces*, 45(4), 2015, 293-304
- M.S. Daskin, K.L. Maass
The p-Median Problem, Chapter 2, *Location Science*, (G. Laporte, S. Nickel, and F. Saldanha-da-Gama editors), Springer, 2015, 21-45

SELECTED RESEARCH PROJECTS

- EAGER: Modeling Operations of Human Trafficking Networks for Effective Interdiction
Co-Principal Investigator, National Science Foundation
- EAGER: A Data Analytic Approach to Understanding Human Trafficking Networks
Co-Principal Investigator, National Science Foundation

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
A Study of Conditions for Dislocation Nucleation in Coarser-than-Atomistic Scale Models, *Journal of the Mechanics and Physics of Solids*, 75, 2015, 76–92
- K.M. Salerno, C.E. Maloney, M.O. Robbins
Avalanches in Strained Amorphous Solids: Does Inertia Destroy Critical Behavior?, *Physical Review Letters*, 109, 2012, e105703
- A. Hasan, C.E. Maloney
Inferring Elastic Properties of an fcc Crystal from Displacement Correlations: Sub-Space Projection and Statistical Artifacts, *Physical Review E* 90, 87(5-1), 2012, e062309
- A. Hasan, C.E. Maloney
Saddle-node Scalings in Homogeneous Dislocation Nucleation, *International Journal for Multiscale Computational Engineering* 10, 2012, 101-108
- 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
Local Anisotropy in Globally Isotropic Granular Packings, *Physical Review Letters*, 107, 2011, e268001

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, Mechanical and Industrial Engineering; jointly appointed, 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

- A. Molaei, A. Bisulco, L. Tirado, A. Zhu, D. Cachay, A.G. Dagheyan, and J.A. Martinez-Lorenzo
3D Printed E-Band Compressive Horn Antenna for High-sensing-capacity Imaging Applications, *IEEE Antennas and Wireless Propagation Letters*, 2018, 1
- J.L. Crespo-Vázquez, C.J.C. Gonzalez, E. Diaz-Dorado, J.A. Martinez-Lorenzo, M. Noor-E-Alam
Evaluation of a Data Driven Stochastic Approach to Optimize the Participation of a Wind and Storage Power Plant in Day-Ahead and Reserve Markets, *Energy* 156(8), 2018, 278–291
- A.G. Dagheyan, C. Liu, A. Molaei, J.H. Jueas, J. A. Martinez-Lorenzo
Holey-Cavity-Based Compressive Sensing for Ultrasound Imaging, *Sensors*, 18(6), 2018, 1674
- J.H. Jueas, J.E. Thatcher, Y. Lu, J.J. Squiers, D. King
W. Fan, J.M. DiMaio, J.A. Martinez-Lorenzo
Burn-Injured Tissue Detection for Debridement Surgery through Non-Invasive Optical Imaging Techniques, *Biomed Opt Express*, 9(4), 2018, 1809–1826
- Y. Rodriguez-Vaqueiro, P. Paayam, R. Sipahi, J.A. Martinez-Lorenzo
Development of a Combined Time Frequency Technique for Accurate Extraction of pNN50 Metric from Noisy Heart Rate Measurements, *International Journal of Intelligent Robotics and Applications*, 2, 2018, 193–208
- A. Molaei, J.H. Jueas, W. Blackwell, J.A. Martinez-Lorenzo
Interferometric Sounding Using a Metamaterial-based Compressive Reflector Antenna, *IEEE Transactions on Antennas and Propagation*, 66(5), 2018, 2188–2198

SELECTED RESEARCH PROJECTS

- Petrophysical Characterization and Dynamic Imaging of Flow Transport Using Coupled Multi-Physical-Field and Multi-Scale Sensing Models
Principal Investigator, Department of Homeland Security
- CAREER: 4D mm-Wave Compressive Sensing and Imaging at One Thousand Volumetric Frames per Second
Principal Investigator, National Science Foundation
- Improved Millimeter Wave Radar AIT Characterization of Concealed Low-Contrast Body- Borne Threats
Co-Principal Investigator, Department of Homeland Security

EMANUEL MELACHRINOUDIS



Professor, Associate Chair and 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; wildfire prediction and mitigation

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

SELECTED PUBLICATIONS

- R. Heydari, E. Melachrinoudis
A Path-Based Capacitated Network Flow Model for Empty Railcar Distribution, *Annals of Operations Research*, 253(2), 2017, 773-798
- M. Hajian, E. Melachrinoudis, P. Kubat
Modeling Wildfire Propagation Using the Stochastic Shortest Path Problem: A Network Size Reduction Methodology, *Environmental Modeling and Software*, 82, 2016, 73-88
- N. Zaarour, E. Melachrinoudis, M. Solomon
Phase-out of Obsolete Inventory Items in Retail Stores, *European Journal of Operational Research*, 255, 2016, 133-141
- H. Min, E. Melachrinoudis
A Model-based Decision Support System for Solving Vehicle Routing and Driver Scheduling Problems under Hours of Service Regulations, *International Journal of Logistics Research and Applications*, 19, 2016, 256-277
- 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
- N. Zaarour, E. Melachrinoudis, M. Solomon, H. Min
The Optimal Determination of the Collection Period for Returned Products in the Sustainable Supply Chain, *International Journal of Logistics Research and Applications*, 17, 2014, 35-45
- R. Heydari, E. Melachrinoudis
Location of an Obnoxious Facility with Elliptic Maximin and Network Minisum 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
The Location of Undesirable Facilities, Chapter 10, *Foundations of Location Analysis*, International Series in Operations Research and Management Science, Springer, New York, 2010, 207-239

HAMEED METGHALCHI



Professor, and Director of Energy Systems Program, Mechanical and Industrial Engineering

ScD, MIT, 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
Measurement of Laminar Burning Speed and Investigation of Flame Stability of Acetylene (C_2H_2)/air Mixtures, *ASME Journal of Energy Resources Technology*, 137, 2015, e012204
- 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
Comparison Between RCCE and Shock Tube Ignition Delay Time at Low Temperatures, *ASME Journal of Energy Resources Technology*, 137, 2015, e062203
- G. Nicolas, M. Janbozorgi, H. Metghalchi
Constrained-Equilibrium Modeling of Methane Oxidation in Air, *ASME Journal of Energy Resources Technology*, 136(3), 2014, 1-7
- 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
Lean Partially Premixed Combustion Investigation of Methane Direct-Injection under Different Characteristic Parameters, *ASME Journal of Energy Resources Technology*, 136, 2014, 1-7

SELECTED RESEARCH PROJECTS

- Combustion of GTL Fuel
Principal Investigator, Qatar Foundation
- LSAMP Research Project
Principal Investigator, National Science Foundation

MARILYN MINUS



Associate Professor, Associate Chair for Graduate Studies and Research, 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 and Computational Study, *Macromolecular Chemistry and Physics*, 216(8), 2015, 847-855
- Y. Zhang, M.L. Minus
Characterization and Structural Analysis of Solution-Grown Polyacrylonitrile-co-Methacrylic Acid (PAN-co-MAA) Single Crystals, *Macromolecules*, 47(12), 2014, 3987-3996
- E.C. Green, Y. Zhang, M.L. Minus
Understanding the Effects of Nano-Carbons on Flexible Polymer Chain Orientation and Crystallization: Polyethylene/Carbon Nano-Chip Hybrid Fibrillar Crystal Growth, *Journal of Applied Polymer Science*, 131(18), 2014, 40763

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

MOHSEN MOGHADDAM



Assistant Professor, Mechanical and Industrial Engineering

PhD, Purdue University, 2016
mie.neu.edu/people/moghaddam-mohsen

Scholarship focus: smart manufacturing, complex adaptive systems, machine Intelligence

SELECTED PUBLICATIONS

- M. Moghaddam, M. Cadavid, A. Deshmukh
Resilience Measure for Complex Manufacturing Systems, Council of Engineering Systems Universities (CESUN) Global Conference, Tokyo, Japan, 2018
- M. Moghaddam, S.Y. Nof
Collaborative Service-Component Integration in Cloud Manufacturing, *International Journal of Production Research*, 56(1-2), 2017, 677-691
- M. Moghaddam, S.Y. Nof
Best Matching Theory & Applications, Springer International Publishing, 2017
- M. Moghaddam, S.Y. Nof
Real-time Optimization and Control Mechanisms for Collaborative Demand and Capacity Sharing, *International Journal of Production Economics*, 171(P4), 2016, 495-506
- M. Moghaddam, S.Y. Nof
Parallelism of Pick-and-Place Operations by Multi Gripper Robotic Arms, *Robotics and Computer-Integrated Manufacturing*, 42(C), 2016, 135-146
- M. Moghaddam, S.Y. Nof
Best Matching with Interdependent Preferences: Implications for Capacitated Cluster Formation and Evolution, *Decision Support Systems*, 79(C), 2015, 125-13
- S.Y. Nof, J. Ceroni, W. Jeong, M. Moghaddam
Revolutionizing Collaboration through e-Work, e-Business, e-Service, Springer-Verlag, Berlin Heidelberg, 2015
- M. Moghaddam, S.Y. Nof
Balanceable Assembly Lines with Dynamic Tool Sharing and Best Matching Protocols—A Collaborative Assembly Framework, *IIE Transactions*, 47(12), 2015, 1363-1378
- M. Moghaddam, S.Y. Nof
Real-time Administration of Tool Sharing by Best Matching to Enhance Assembly Lines Balanceability and Flexibility, *Mechatronics*, 31, 2015, 147-157

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

- T. Kasıkcı, M.-C. Weng, A. Nayak, T. Goker, S. Müftü
Contact Mechanics of a Thin, Tensioned, Translating Tape With a
Grooved Roller, *Journal of Tribology*, 140, 2018, 011405-1
- T. Zhu, S. Müftü, K.-T. Wan
One-Dimensional Constrained Blister Test to Measure Thin Film
Adhesion, *Journal of Applied Mechanics*, 85, 2018, 0545010-1
- Q. Chen, A. Alizadeh-Dehkharghani, W. Xie, X. Wang,
V. Champagne, A. Gouldstone, J.-H. Lee, S. Müftü
High Strain Rate Material Behavior and Adiabatic Material
Instability in Impact of Micron-Scale Al-6061 Particles, *Journal
of Thermal Spray Technology*, 27, 2018, 641-653
- J. Sun, N. Tandogan, A. Gu, S. Müftü, E.D. Goluch, K.T. Wan
Measuring Particle Adhesion-Detachment and Filtration
Efficiency by Microfluidics, *Colloids and Surfaces B:
Interfaces*, 165, 2018, 381-387
- B. Yildirim, H. Yang, A. Gouldstone, S. Müftü
Rebound Mechanics of Micrometre-Scale, Spherical Particles
in High Velocity Impacts, *Proceedings of the Royal Society of
London A*, 473, 2017, 20160936
- W. Xie, A. Alizadeh-Dehkharghani, Q. Chen, V.K. Champagne,
X. Wang, A. Nardi, S. Kooi, S. Müftü, J.-H. Lee
Dynamics and Extreme Plasticity of Metallic Microparticles in
Supersonic Collisions, *Nature Scientific Reports*, 2017

SELECTED RESEARCH PROJECTS

- Collaborative Research: High-Strain-Rate Dynamics of Copolymer
Microparticles for Advanced Additive Manufacturing
Principal Investigator, National Science Foundation
- Collaborative Research: Mechanics of Fusion of Dissimilar Lipid
Bilayers and Multi-Lamellar Vesicles
Co-Principal Investigator, National Science Foundation
- Engineered Materials and Materials Design of Engineered
Materials (EMMDEM)
Technical Point of Contact, Army Research Laboratory

HAMID NAYEB-HASHEMI



Professor, Mechanical and Industrial Engineering;
affiliated faculty, Bioengineering

PhD, MIT, 1982
mie.neu.edu/people/nayeb-hashemi-hamid

Scholarship focus: biomechanics and
mechanics

Honors and awards: Fellow, American Society of Mechanical Engineers

SELECTED PUBLICATIONS

- A.D. Orsi, P.K. Canavan, A. Vaziri, R. Goebel, O.A. Kapasi
H. Nayeb-Hashemi
The Effects of Graft Size and Insertion Site Location During
Anterior Cruciate Ligament Reconstruction on Intercondylar
Notch Impingement, *The Knee*, 24, 2017, 525-535
- Y. Zheng, H. Bahloo, D. Mousanezhad, A. Vaziri
H. Nayeb-Hashemi
Displacement and Stress Fields in a Functionally Graded Fiber-
Reinforced Rotating Disk with Nonuniform Thickness and
Variable Angular Velocity, *Journal of Engineering Materials and
Technology*, Transaction of the ASME, 2017, 139, 1-10
- G. Liu, R. Ghosh, A. Vaziri, A. Hossieni, H. Bahloo
H. Nayeb-Hashemi
Biomimetic Composite Inspired by Venous Leaf, *Journal Of
Composite Materials*, 2017, 1-12
- G. Liu, R. Ghosh, D. Mousanezhad, A. Vaziri, H. Nayeb-Hashemi
Thermal Conductivity of Biomimetic Leaf Composite, *Journal Of
Composite Materials*, 2017, 1-10
- H. Abdi, J. Papadopoulos, H. Nayeb-Hashemi, A. Vaziri
Enhanced Elastic-Foundation Analysis of Balanced Single Lap
Adhesive Joints, *International Journal of Adhesion & Adhesive*,
2, 2017, 80-91

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

Research Issues in Patient Centric Healthcare, *International Journal of Collaborative Enterprise*, 4(1/2), 2014, 1-135

V.K. Sahney

Managing Implementation: The Unanswered Question, *Frontiers of Health Services Management*, 20(3), 2004, 29-36

V.K. Sahney

Generating Management Research on Improving Quality, *Health Care Management Review*, 2(4), 2003, 335-347

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, Mechanical and Industrial Engineering; joint faculty 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

R.B. Woodward, S.J. Shefelbine, R. Vaidyanathan

Pervasive Monitoring of Motion and Muscle Activation: Inertial and Mechanomyography Fusion, *IEEE/ASME Transactions on Mechatronics*, 22(5), 2017, 2022-2033

R. DeSouza, B. Javaheri, R.S. Collinson, C. Chenu,

S.J. Shefelbine, P.D. Lee, A.A. Pitsillides

Prolonging Disuse in Aged Mice Amplifies Cortical but not Trabecular Bones' Response to Mechanical Loading, *Journal of Musculoskeletal & Neuronal Interactions*, 17(3), 2017, 218-225

K.P. Chadwick, S.J. Shefelbine, Pitsillides, J.R. Hutchinson

Finite-Element Modelling of Mechanobiological Factors Influencing Sesamoid Tissue Morphology in the Patellar Tendon of an Ostrich, *Royal Society Open Science*, 4(6), 2017, 170133

P. Yadav, S.J. Shefelbine, E. Pontén, E.M. Gutierrez-Farewik

Influence of Muscle Groups' Activation on Proximal Femoral Growth Tendency, *Biomechanics and Modeling in Mechanobiology*, 2017

A.E. Draghici, D. Potart, J.L. Hollmann, V. Pera, Q. Fang,

C.A. DiMarzio, J.A. Taylor, M.J. Niedre, S.J. Shefelbine

Near Infrared Spectroscopy for Measuring Changes in Bone Hemoglobin Content after Exercise in Individuals with Spinal Cord Injury, *Journal of Orthopaedic Research: Official Publication of the Orthopaedic Research Society*, 36(1), 2017, 183-191

A.E. Draghici, G. Picard, J.A. Taylor S.J. Shefelbine

Assessing Kinematics and Kinetics of Functional Electrical Stimulation Rowing, *Journal of Biomechanics*, 53, 2017, 120-126

M. Nguyen, P. Singhal, J.W. Piet, S.J. Shefelbine, M. Maden, S.R. Voss, J. R. Monaghan

Retinoic Acid Receptor Regulation of Epimorphic and Homeostatic Regeneration in the Axolotl, *Development (Cambridge, England)*, 144(4), 2017, 601-611

SELECTED RESEARCH PROJECTS

Heterogeneity and Anisotropy in Fracture Toughness

Principal Investigator, National Science Foundation

Mechanobiology of Joint Morphogenesis: Manipulating Salamander Limbs

Principal Investigator, National Science Foundation

HANUMANT SINGH



Professor, Electrical and Computer Engineering; jointly appointed, Mechanical and Industrial Engineering

PhD, MIT, 1995
ece.neu.edu/people/singh-hanumant

Scholarship focus: robotic sensors, systems, platforms, and algorithms including high resolution optical and acoustic sensing; underwater vehicles (AUV, ROV, towed and manned vehicles), unmanned surface vehicles, and unmanned aerial systems; system architectures for navigation, docking and power; and the interactions between these subsystems

SELECTED PUBLICATIONS

- C. Murphy, J. Walls, T. Schneider, H. Singh, et al.
CAPTURE: A Communications Architecture for Progressive Transmission via Underwater Relays with Eavesdropping, *IEEE Journal of Oceanic Engineering*, 39(1), 2014, 1-13
- H. Singh, W. Freeman, et al.
Camouflaging an Object from Many Viewpoints, *Proceedings of the 2014 Computer Vision and Pattern Recognition Conference*, 1-8
- K.E. Smith, H. Singh, H., et al.
Discovery of a Recent, Natural Whale Fall on the Continental Slope Off Anvers Island, Western Antarctic Peninsula, *Deep Sea Research Part I: Oceanographic Research Papers*, 90, 2014, 76-80
- G. Williams, J. Wilkinson, T. Maksym, H. Singh, C. Kunz, et al.
Mapping Ice Thickness and Extreme Deformation of Antarctic Sea Ice from an Autonomous Underwater Vehicle, *Nature Geoscience*, 8, 2014, 61-67
- M. Yi Cheung, J. Leighton, U. Mitra, H. Singh, F.S. Hover
Performance of Bandit Methods in Acoustic Relay Positioning, *Proceedings of the 2014 Automatic Control Conference*, 2014, 4708-4714
- C. Kunz, H. Singh
Map Building Fusing Acoustic and Visual Information Using Autonomous Underwater Vehicles, *Journal of Field Robotics*, 30(5), 2013, 1556-4967
- H. Singh, K. Nakamura, M. Jakobssen, T. Shank, et al.
Effusive and Explosive Volcanism on the Ultraslow-Spreading Gakkel Ridge, 85°E, *Geochemistry, Geophysics, Geosystems*, 13(10), 2012

RIFAT SIPAHI



Professor, Mechanical and Industrial Engineering; affiliated faculty, 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: Outstanding Young Investigator, Dynamic Systems and Control Division/American Society of Mechanical Engineers; College of Engineering Faculty Fellow; Defense Advanced Research Projects Agency Young Faculty Award; Fellow, American Society of Mechanical Engineers; Senior Member, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

- A. Ramirez, S. Mondie, R. Garrido, R. Sipahi
Design of Maximum Exponential Decay Rate for LTI-SISO Systems via Delay-based Controllers, *SIAM Control and Optimization*, 55(1), 2017, 397-412
- T. Yucelen, Y. Yildiz, R. Sipahi, E. Yousefi, N. Nguyen
Stability Limit of Human-in-the-Loop Model Reference Adaptive Control Architectures, *International Journal of Control*, 2017, 1-18
- P. Parsinejad, R. Sipahi
Analysis of Subjects' Vulnerability in a Touch Screen Game Using Behavioral Metrics, *Applied Psychophysiology and Biofeedback*, 2017
- A. Ramirez, R. Sipahi
Design of a Delay-Based Controller for Fast Stabilization in a Network System with Input Delays via the Lambert W Function, *Procedia IUTAM*, 22, 2017, 83-90
- Zhi, N., Gouldstone, A., Jaeger, B.K., Sipahi, R., S. Frank
Toward Monitoring Parkinson's through Analysis of Static Handwriting Samples: A Quantitative Analytical Framework, *IEEE Journal of Biomedical & Health Informatics*, 21(2), 2017, 488-495

SELECTED RESEARCH PROJECTS

- Graph-Based Control Design for Network Dynamics with Time Delays
Principal Investigator, National Science Foundation
- A Three-Dimensional Model of Spinal Cord Growth and Repair in a Regeneration-Competent Organism
Co-Principal Investigator, National Science Foundation

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

F. Xue, M.E. Taslim

Detailed Flow Analyses through Crossover Holes between Two Adjacent Rib-Roughened Cooling Channels and the Resulting Impingement Heat Transfer, *Journal of Turbomachinery*, 2018

Z. Borzooeian, M.E. Taslim, O. Ghasemi, S. Rezvani, G. Borzooeian, A. Nourbakhsh

A High Precision Method for Length-Based Separation of Carbon Nanotubes Using Bio-Conjugation, SDS-PAGE and Silver Staining, *PLOS one Journal*, 13(6), 2018

Z. Borzooeian, M.E. Taslim, G. Borzooeian, O. Ghasemi, M. Aminlari

Activity and Stability Analysis of Covalent Conjugated Lysozyme-single walled carbon Nanotubes: Potential Biomedical and Industrial Applications, *Royal Society of Chemistry Advances*, 7, 2017, 48692-48701

M.E. Taslim, F. Xue

Crossover Jet Impingement in a Rib-Roughened Trailing-Edge Cooling Channel, *Journal of Turbomachinery*, 139(7), 2017, 1-12

M.E. Taslim, X. Huang

Experimental/Numerical Investigation on the Effects of Trailing-Edge Cooling Hole Blockage on Heat Transfer in a Trailing-Edge Cooling Channel, *Journal of Engineering for Gas Turbines and Power*, 136(8), 2014, 082603

SELECTED RESEARCH PROJECTS

Measurements of Heat Transfer and Pressure Drops Research in a Two-Legged Test Section with a 180-Turn, Rib-Roughened with Three Rib Geometries, Simulating Two Mid-Chord Cooling Cavities of a GE Turbine Airfoils

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

MONEESH UPMANYU



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
Growing Ordered and Stable Nanostructures on Polyhedral Nanocrystals, *Applies Physics Letters*, 105, 2014, 1-6

A. Shahabi, H. Wang, M. Upmanyu
Shaping van der Waals Nanoribbons via Torsional Constraints: Scrolls, Folds and Supercoils, *Scientific Reports* 4, 2014, 7004

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

Vapor-Liquid-Solid Growth of Serrated GaN Nanowires: Shape Selection Driven by Kinetic Frustration, *Journal of Materials Chemistry C*, 1, 2013, 7294-7302

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

Enhanced Stability and Mechanics of Ultra-fine Grained Metals via Engineered Solute Segregation

Principal Investigator, US Army Research Office

Microstructure-sensitive Modeling and Experimentation of Single Particle Impact During Cold Spray of Metallic Particles

Co-Principal Investigator, ARO

ASHKAN VAZIRI



Professor, Mechanical and Industrial Engineering;
affiliated faculty, 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; Søren Buus Outstanding Research Award, College of
Engineering; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

- J.Y. Chung, A. Vaziri, L. Mahadevan
Reprogrammable Braille on an Elastic Shell,
Proceedings of the National Academy of Sciences, 2018
- H. Ebrahimi, D. Mousanezhad, H. Nayeb-Hashemi, J. Norato,
A. Vaziri
3D Cellular Metamaterials with Planar Anti-Chiral Topology,
Materials & Design 145, 2018, 226-231
- S. Kamrava, D. Mousanezhad, S.M. Felton, A. Vaziri
Programmable Origami Strings, Advanced Materials
Technologies, 3(3), 2018, 1700276
- M.S. Ghiasi, J. Chen, A. Vaziri, E.K. Rodriguez, A. Nazarian
Bone Fracture Healing in Mechanobiological Modeling: A Review
of Principles and Methods, Bone Reports, 6, 2017, 87-100
- S. Kamrava, D. Mousanezhad, H. Ebrahimi, R. Ghosh, A. Vaziri
Origami-Based Cellular Metamaterial with Auxetic, Bistable, and
Self-Locking Properties, Scientific Reports, 7, 2017, 46046
- H. Ebrahimi, D. Mousanezhad, B. Haghpahan, R. Ghosh,
A. Vaziri
Lattice Materials with Reversible Foldability, Advanced
Engineering Materials, 19(2), 2017, 1600646

SELECTED RESEARCH PROJECTS

- Functional Biomimetic Materials with Extreme Topology
Principal Investigator, National Science Foundation
- Mechanics of Carbon Nanotube Surface Decontamination
Principal Investigator, FM Global
- Multifunctional Cellular Structures for Energy Harvesting and
Energy Management Applications
Principal Investigator, Qatar Foundation

KAI-TAK WAN



Professor, Mechanical and Industrial Engineering;
affiliated faculty, 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

- J. Sun, N. Tandogan, A.Z. Gu, Sinan Müftü, E.D. Goluch,
K.-T. Wan
Quantification of Colloidal Filtration of Polystyrene Micro-P-
articles on Glass Substrate Using a Microfluidic Device, Colloids
and Surfaces B: Biointerfaces, 165, 2018, 381-387
- J. Sun, S. Müftü, A.Z. Gu, K.-T. Wan
Intersurface Adhesion in the Presence of Capillary
Condensation, Journal of Applied Mechanics, 85, 2018, 061009
- W. Wang, J.V. Gray, S.E. Julien, K.-T. Wan
Mechanical Characterization of a Convex Shell (Contact Lens)
with Meridional Thickness Variation, Experimental Mechanics,
58(6), 2018, 997-1002
- T. Zhu, G. Li, S. Müftü, K.-T. Wan
One-Dimensional Constrained Blister Test to Measure Thin Film
Adhesion, Journal of Applied Mechanics, 85, 2018, 054501
- T. Zhu, G. Li, S. Müftü, K.-T. Wan
Revisiting the Constrained Blister Test to Measure Thin Film
Adhesion, Journal of Applied Mechanics, 84, 2017, 071005
- X. Wang, B. Li, J. Hao, Y.J. Jung, K.-T. Wan
Mechanical Characterization of Suspended Strips of Meshed
Single-Walled Carbon Nanotubes, Journal of Applied Physics,
119, 2017, 045305

SELECTED RESEARCH PROJECTS

- Mechanics of Fusion of Dissimilar Lipid BiLayers and Multi-
Lamellar Vesicles
Principal Investigator, National Science Foundation
- Mechanical Integrity and Long Term Reliability of
Photovoltaic Panels
Principal Investigator, National Institute of Standards and
Technology/Department of Energy

JOHN (PETER) WHITNEY



Assistant Professor, Mechanical and Industrial Engineering

PhD, Harvard University, 2012
mie.neu.edu/people/whitney-peter

Scholarship focus: human-safe robots, medical robotics, soft robotics and soft-material manufacturing, MEMS, microrobotics, bio-inspired design, flapping aerodynamics and insect flight

Honors and awards: Best paper award finalist, International Conference on Robotics and Automation (2016, 2017)

SELECTED PUBLICATIONS

N. Burkhard, S. Frishman, A. Gruebele, J.P. Whitney, R. Goldman, B.L. Daniel, M.R. Cutkosky

A Rolling-Diaphragm Hydrostatic Transmission for Remote MR-Guided Needle Insertion, IEEE International Conference on Robotics and Automation, 2017

J.P. Whitney, T. Chen, J. Mars, J.K. Hodgins

A Hybrid Hydrostatic Transmission and Human-Safe Haptic Telepresence Robot, IEEE International Conference on Robotics and Automation, 2016

N.O. Perez-Arancibia, J.P. Whitney, R.J. Wood,

Lift Force Control of Flapping-Wing Microrobots Using Adaptive Feedforward Cancellation Schemes, IEEE Transactions of Mechatronics, 18, 2013, 1-14

P.S. Sreetharan, H. Tanaka, J.P. Whitney, et al.

Progress on "Pico" Air Vehicles, International Journal of Robotics Research, 31(11), 2012, 1292-1302

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

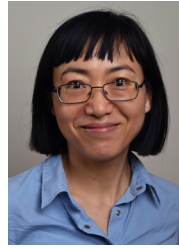
Effect of Flexural and Torsional Wing Flexibility on Lift Generation in Hoverfly Flight, Integrative and Comparative Biology 51(1), 2011, 142-150

SELECTED RESEARCH PROJECTS

Teleoperation with Passive, Transparent Force Feedback for MR-Guided Interventions

Principal Investigator, National Science Foundation

WEI XIE



Assistant Professor, Mechanical and Industrial Engineering

PhD, Northwestern University, 2014
mie.neu.edu/people/xie-wei

Scholarship focus: interpretable AI, computer simulation, data analytics, data-driven stochastic optimization for end-to-end cyber-physical system risk management with applications, including pharmaceutical supply chains, smart power grids with renewable energy, health care, semiconductor manufacturing, transportation infrastructure, and metal additive manufacturing

Honors and awards: Outstanding Publication Award from the INFORMS Simulation Society

SELECTED PUBLICATIONS

W. Xie, P. Zhang, R. Chen, Z. Zhou

A Nonparametric Bayesian Framework for Short-Term Wind Power Probabilistic Forecast, IEEE Transactions on Power Systems, 2018, 1-1

W. Xie, B. Wang, Q. Zhang

Metamodel-Assisted Risk Analysis for Stochastic Simulation with Input Uncertainty, Winter Simulation Conference, 2018

W. Xie, P. Zhang, I. Ryzhov

A Simulation-Based Prediction Framework for Stochastic System Dynamic Risk Management, Winter Simulation Conference, 2018

Y. Yi, W. Xie, Z. Zhou

Simulation-based Stochastic Programming to Guide Real-Time Scheduling for Smart Power Grids under Cyberattacks, Winter Simulation Conference, 2018

W. Xie, C. Li, P. Zhang

A Factor-Based Bayesian Framework for Risk Analysis in Large-Scale Stochastic Simulations, ACM Transactions on Modeling and Computer Simulation, 27(4), 2017, 1-31

Y. Yi, W. Xie

An Efficient Budget Allocation Approach for Quantifying the Impact of Input Uncertainty in Stochastic Simulation, ACM Transactions on Modeling and Computer Simulation, 27(4), 2017, 25

W. Xie, B.L. Nelson, R.R. Barton

Multivariate Input Uncertainty in Output Analysis for Stochastic Simulation, ACM Transactions on Modeling and Computer Simulation, 27(5), 2016, 1-22

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
Agent-Based Simulation and Analysis of a Complex Adaptive Supply Network, *International Journal of Collaborative Enterprise*, 4(3), 2014, 188
- I. Zeid, J. Chin, C. Duggan, S. Kamarthi
Engineering Based Learning: A Paradigm Shift for High School STEM Teaching, *International Journal of Engineering Education*, 30(4), 2014, 1-12
- A. Zeid, S. Kamarthi, V. Sahney
Forward: Research Issues in Patient Centric Healthcare Delivery, *International Journal of Collaborative Enterprise*, 4(1-2), 2014, 1-2
- 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
Optimal Pricing and Disposal Decisions for Product Recovery Facilities Under a Single Portfolio, *International Journal of Collaborative Enterprise*, 4(3), 2014
- E. Tuncel, I. Zeid, S. Kamarthi
Solving Large Scale Disassembly Line Balancing Problems with Uncertainty Using Reinforcement Learning, *International Journal of Intelligent Manufacturing*, 25, 2014, 647-659

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 (JULIE) ZHU



Assistant Professor, Mechanical and Industrial Engineering

PhD, South China University of Technology, 2009
mie.neu.edu/people/zhu-hongli

Scholarship focus: advanced manufacturing, multifunctional bio-inspired material from nature; sustainable energy

storage; nano/micro fabrication of devices and materials; bendable, implantable and biocompatible electronics; application of sustainable biomaterials in life science

Honors and awards: Innovator of the year 2013, University of Maryland; Jakob Wallenberg Scholarship, Sweden

SELECTED PUBLICATIONS

- H.A. M., J. Yucong, S. Jianjian, M. Yi, C. Daxian, L. Yuanyue, Z. Hongli
Stable Metal Anode enabled by Porous Lithium Foam with Superior Ion Accessibility, *Advanced Materials*, 2018, 1802156
- Y. Jiao, A. Mukhopadhyay, Y. Ma, L. Yang, A.M. Hafez, H. Zhu
Ion Transport Nanotube Assembled with Vertically Aligned Metallic MoS₂ for High Rate Lithium-Ion Batteries, *Advanced Energy Materials*, 2018, 1702779-1702787
- X. Geng, Y. Jiao, Y. Han, A. Mukhopadhyay, L. Yang, H. Zhu
Freestanding Metallic 1T MoS₂ with Dual Ion Diffusion Paths as High Rate Anode for Sodium-Ion Batteries, *Advanced Functional Materials*, 27(40), 2017, 1702998-1703007
- X. Geng, Y. Zhang, Y. Han, J. Li, L. Yang, M. Benamara, H. Zhu
Two-Dimensional Water-Coupled Metallic MoS₂ with Nanochannels for Ultrafast Supercapacitor, *Nano Letter*, 17(3), 1825-1832, 2017
- H. Zhu, P. Ciesielski, M. Himmel, J. Zhu, G. Henriksson, L. Hu
Wood-Derived Materials for Green Electronics, Sustainable Energy, and Biological Applications, *Chemical Reviews*, 2016
- X. Geng, W. Sun, W. Wu, B. Chen, A. Al-Hilo, M. Benamara, H. Zhu, F. Watanabe, J. Cui, T. Chen
Pure and Stable Metallic Phase Molybdenum Disulfide Nanosheets for Hydrogen Evolution Reaction, *Nature Communications*, 7, 2016
- 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
- C. Sun, H. Zhu, M. Okada, K. Gaskell, Y. Inoue, L. Hu, Y. Wang
Interfacial Oxygen Stabilizes Composite Silicon Anodes, *Nano Letters*, 15(1), 2015, 703-708

SELECTED RESEARCH PROJECTS

- Ultra-Stable and Conductive Metallic MoS₂ for Hydrogen Evolution Reaction
Principal Investigator, Northeastern University

Adebayo Adebisi

PhD 2017, Mechanical Engineering;
Advisor, Mohammad E. Taslim

PSEUDO-POTENTIAL LATTICE BOLTZMANN MODEL FOR WETTABILITY GRADIENT-BASED MICRODROPLET MANIPULATION

The focus of this work is wedge-patterned wettability gradient passive on-chip droplet manipulation. Specifically, this work investigated the effect of different droplet parameters, namely: wedge-surface relative wettability, pattern wedge angle, initial droplet position and gravitational acceleration on the droplet dynamic behavior on a numerical basis. To this end, we used the lattice Boltzmann method (LBM)-an alternative powerful method for solving fluid dynamics problems.

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

Moaz Omar Allehaibi

PhD 2017, Mechanical Engineering; Advisor, Hameed Metghalchi

LAMINAR BURNING SPEED MEASUREMENTS OF METHANE /AIR/CARBON DIOXIDE MIXTURES

The experiments were conducted in a constant volume cylindrical chamber with the aid of a Z-shaped Schlieren/shadowgraph system. Pressure rise data during the flame propagation were recorded through pressure transducer on the cylindrical chamber wall and were the main input into the thermodynamic model used to measure the laminar burning speed. A high-speed CMOS camera capable of taking pictures up to 40,000 frames per second was used to determine the cellularity of the flame.

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

Paul Asare Agyapong

PhD 2017, Mechanical Engineering; Advisor, Yung Joon Jung

X-RAY GAS IONIZATION STUDIES WITH A SINGLE- WALLED NANOTUBE (SWNT) SENSOR

In this dissertation we start with an explanation of the different types of radiation that can be detected, describe how a radiation transport model was used to model the x-ray source in the experiments, and show how to calculate energy spectra and deposition in different materials. We investigate the mechanisms by which x-rays generate an electrical response in a conventional silicon-based diode radiation detector and the SWNT sensor. We then present an experimental setup that can be used to calibrate the SWNT sensor relative to the diode based on simulation data. The experiment involves distance variation, air pressure variation, and fill-gas variation. After a thorough analysis of sensor performance future avenues for improved design and evaluation are presented.

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

Benjamin P. Harris

PhD 2017, Industrial Engineering; Advisor, Sagar Kamarthi

COMPUTATIONAL MODELS OF COMPETITIVE BUSINESS DEVELOPMENT UNDER IMPERFECT INFORMATION

Governments and other large organizations are increasingly finding themselves contracting products and services to firms whose specialties align more closely than the original firm. To accomplish this, a number of resources are available for firms seeking to do business with large firms or governmental organizations. These customers solicit bids from prospective suppliers to meet their product or service needs, but often pay little attention to the interactions amongst the competitors during the competition. This can cause the products and services provided to be sub-optimal either in performance or cost. From the perspective of the competitor, I present a number of models by which a complex competition can be envisioned which lead to improved decision-making even when a competitor does not possess complete information.

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

James Earl Kopriva

PhD 2017, Mechanical Engineering; Advisor, Hameed Metghalchi

THE ROLE OF FREE-STREAM TURBULENCE ON HIGH PRESSURE TURBINE AERO-THERMAL STAGE INTERACTION

Turbulence plays an important role on the aero-thermal performance of modern aircraft engine High Pressure Turbines (HPT). The role of the vane wake and passage turbulence on the downstream blade flow field is an important consideration for both performance and durability. Obtaining measurements to fully characterize the flow field can be challenging and costly in an experimental facility. Advances in computational Fluid Dynamic (CFD) modeling and High Performance Computing (HPC) are providing opportunity to close these measurement gaps. In order for CFD to be adopted, methods need to be both accurate and efficient. Meshing approaches must also be able to resolve complex HPT geometry while maintaining quality adequate for scale-resolved simulations.

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

Yangfan Li

PhD 2017, Mechanical Engineering; Advisor, Teiichi Ando

CHARACTERIZATION OF COLD SPRAYED COPPER AND COPPER ALLOYS AND SIMULATION OF COATING PROFILE, DEPOSITION YIELD AND DEFECT FORMATION IN COLD SPRAY DEPOSITION

In this dissertation, a series of characterization studies of CS deposits of Cu and Cu-alloys are presented, addressing both single-traverse and multi-traverse deposition. Single-traverse deposits were created to investigate the thickness profile and deposition efficiency distributions in single-traverse deposition. Multi-traverse two-spray layer coatings were deposited to investigate the effects of spray parameters, powder characteristics, and post-spray heat treatment on the densification and bonding in the deposited material.

See full dissertation at coe.neu.edu/18/YangfanLi

Tian Liu

PhD 2017, Mechanical Engineering; Advisor, Carol Livermore

PASSIVELY-SWITCHED VIBRATIONAL ENERGY HARVESTERS

This work presents the design, modeling, optimization, and demonstration of a new class of resonant vibrational energy harvesters that passively switch among dynamics with different characteristic frequencies to adapt to low-frequency excitations and changing vibrational environment. The passively-switched harvester consists of a driving beam that couples into ambient vibrations at low frequencies and a generating beam that converts mechanical energy into electrical energy at high frequencies. The interaction between the driving beam and the generating beam enables multiple characteristic dynamics of the system, namely coupled-motion dynamics and plucked dynamics. When the system passively switches between coupled-motion harvesting and plucked harvesting, its operational range is increased. The system is simulated in the time domain using a lumped element model that predicts power output. Based on the model, a passively-switched harvester in which the driving beam faces the generating beam is designed and experimentally tested over an operational range of 0.1g-2.6g and 4 Hz-27 Hz. The experimental results agree with the simulation that the harvester has increased operational range due to the systems ability of passive switching among multiple dynamics.

See full dissertation at coe.neu.edu/18/TianLiu

Zhengdong Liu

PhD 2017, Industrial Engineering; Advisor, Sagar Kamarthi

ECONOMIC COMPARISON OF SELECTIVE LASER MELTING AND CONVENTIONAL SUBTRACTIVE MANUFACTURING PROCESSES

As one of the leading techniques in additive manufacturing processes, selective laser melting (SLM) has shown great potential for commercialization and scale-up in various applications in industry. The ability to build near net shape end-usable products shows advantages in some cases, with more freedom in product design and processing; greater part complexity; and increased ability to structurally optimize parts that are manufactured directly from powder metal materials. In this study, cost analyses of selective laser melting process is compared with conventional subtractive manufacturing (SM) processes. A generic cost models for SLM and SM processing were developed, and several case studies are used to illustrate the conditions and drivers that demonstrate cost advantages for SLM processing. Factors such as production volume and raw material price are analyzed to investigate the influence on fabrication cost.

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

Jianfeng Sun

PhD 2017, Mechanical Engineering; Advisor, Kai-tak Wan and Sinan Müftü

SOLID MECHANICS IN COLLOIDAL AND BACTERIAL FILTRATION

This dissertation addresses this problem by developing a new microfluidic test method and a theoretical model based on contact mechanics. The new microfluidic test simplifies the physics behind microbial/colloidal filtration, and allows us to focus on the surface attachment/detachment due to inter-surface and hydrodynamic interactions. Filtration efficacy was directly measured using this new microfluidic test. The results of the tests were then compared with the conventional flow-through column test. The two show a good agreement with each other. This implies that surface adsorption is the dominant filtration mechanism in the column test. The coupled effect of flow rate, salt concentration and microbial properties were analysed using the classical DLVO theory, fluid mechanics and contact mechanics. The fundamental physics that control the microbial/colloidal attachment were suggested.

See full dissertation at coe.neu.edu/18/JianfengSun

Navid Tajaddod

PhD 2017, Mechanical Engineering; Advisor, Marilyn Minus

IMPROVING MULTI FUNCTIONAL PROPERTIES IN POLYMER BASED NANO COMPOSITES BY INTERFACIAL ENHANCEMENT

Polymer nanocomposites (PNCs) have become an area of increasing interest for study in the field of polymer science and technology since the rise of nanotechnology research. Despite the significant amount of progress being made towards producing high quality PNC materials, improvement in the mechanical, electrical, thermal and other functional properties still remain a challenge. To date, these properties are only a fraction of the expected theoretical values predicted for these materials. Development of interfacial regions between the filler and matrix within the composite has been found to be an important focus in terms of processing. Proper interfacial control and development may ensure excellent interaction and property transfer between the filler and polymer matrix in addition to improvement of multi-functional properties of PNCs. The property-structure importance for the existence of the interfacial and interphase region within PNCs is discussed in this thesis work. Two specific PNC systems are selected for study as part of this dissertation in order to understand the effect of interfacial region development on influencing multi-functional property trends. Polyethylene (PE)/boron nitride (BN) and polyacrylonitrile (PAN)/carbon nanotube (CNT) composites were selected to investigate their mechanical performance and thermal and electrical conductivity properties, respectively. For these systems it was found that the interfacial region structure is directly related to the enhancement of the subsequent multi-functional properties.

See full dissertation at coe.neu.edu/18/NavidTajaddod

Nooshin Valibeig

PhD 2018, Industrial Engineering; Advisor, Jacqueline Griffin

SUBSTITUTE RESOURCE ALLOCATION POLICIES FOR PREVENTING RESOURCE SHORTAGES IN HEALTHCARE APPLICATIONS

This dissertation examines multiple facets of substitute resource allocation in healthcare systems. First, we develop a novel decision mining methodology to identify the rate of substitute resource allocation using historical data from multiple databases. Next, we demonstrate the effect of applying new substitute resource allocation policies for a blood management problem using a Monte Carlo simulation model. Specifically, we examine two resource allocation policies accounting for substitute resource allocation in the assignment of limited blood inventory, including multiple blood types, in an isolated environment. A two-stage stochastic optimization model is developed to determine the optimal make-up of the initial blood bank in these environments, as defined by the level of inventory for each blood type. Finally, in Chapter 4, we analyze a generalized online assignment problem, inspired by the blood management setting, and characterize the problem features for which the proposed algorithm performs optimally with results matching those from the corresponding offline assignment problem. For those problems not conforming to these features an upper-bound on the performance of the algorithm is derived.

See full dissertation at coe.neu.edu/18/NooshinValibeig

Chenye Yang

PhD 2017, Mechanical Engineering; Advisor, Carol Livermore

RESEALABLE, ULTRA-LOW LEAK MICRO VALVE USING SOLDER SEALING

MEMS valves typically actuate a flow-obstructing element to cover or uncover a gas flow path. This approach is prone to leakage, causing incomplete isolation across the valve. As a result, an exceptional open-to-closed flow rate ratio would be on the order of 10^6 . The limited open-to-closed flow rate ratios of conventional MEMS valves limit their utility for higher vacuum systems. One reason for the relatively high leakage in conventional MEMS valves is that the roughness of the valves contact surfaces prevents leak-free seals. Liquid-based sealing offers an opportunity for improved sealing.

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

Jing Xu

PhD 2018, Industrial Engineering; Advisor, Yingzi Lin

FROM INDIVIDUAL TO CONNECTED DRIVING : AN INTERACTIVE DRIVER VEHICLE ENVIRONMENT FOR ROAD USER SAFETY

This dissertation proposes a new framework for conducting controlled driving behavior studies based on a networked multi-driver simulation platform. This new simulation system can conduct specific single-driver behavior experiments, and can also engage multiple drivers in a common virtual environment, reproducing real-life interaction scenarios. To demonstrate the effectiveness of this framework, various traffic scenarios were created in the driving simulation platform to conduct studies on elderly and teenage drivers, as well as bicyclists. Results show how different road users react in a particular manner to traffic scenarios and road hazards. A survey asking for opinions on connected vehicle technology and how it can improve specific driving situations was conducted. Public feedback directed attention towards driver distraction and front collision hazards. A four-driver platoon was used to explore how distracted driving affects other drivers, as well as how the designed forward collision warning system influences driver behavior on individual and group levels. The presented work showcases the effectiveness of a robust driving simulation system and how it can serve as a valuable tool for simultaneously investigating multiple drivers, as well as their interactions and mutual influences, especially under safety critical situations. The work presented can pave the way for developing a fully connected Driver-Vehicle-Environments and exploring the human factors related roles in Connected Vehicle technologies.

See full dissertation at coe.neu.edu/18/JingXu

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COVER IMAGE

Rifat Sipahi, professor of mechanical and industrial engineering, designs algorithms that enable groups of robots to make good decisions despite inherent communication delays in information sharing.

