

2018 | 2019

SCHOLARSHIP REPORT CIVIL AND ENVIRONMENTAL ENGINEERING

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

Dear Friends,

The coming decades will represent a crucial time, as climate change, urbanization, and technological progress profoundly reshape the ways in which we live and work. From the opportunities of renewable energy and artificial intelligence to the threats of rising sea levels and vulnerable urban infrastructure, Northeastern University's Department of Civil and Environmental Engineering is educating students to serve as leaders in an evolving and complex world.

Our department is strategically focused on urban engineering, preparing students for the great challenges of our time by exploring the unique ways in which the built and natural environment interact. Utilizing the latest advances in simulation, smart sensing, data and network science, and urban informatics, our faculty are conducting critical research in civil infrastructure security, environmental health, and sustainable resource engineering.

Faculty research efforts are broad and interdisciplinary. Among these efforts, we are leveraging artificial intelligence to fight climate change, spearheading a regional effort to make the US a leader in wind energy, harnessing big data to understand population dynamics and urban mobility, and leading a multi-institutional center studying the relationship between environmental contamination and preterm births.

This year sees continued growth in the breadth of our program offerings, with the addition of BS degrees in Civil Engineering and Architectural Studies, Environmental Engineering and Landscape Architecture, and Environmental Engineering and Health Science. We are pleased to augment our expertise in engineered water systems, smart infrastructure, and atmospheric and coastal systems with the hiring of new faculty members.

Our scholars are engineering a resilient and sustainable future through leading-edge research. This sixth annual scholarship report details the exceptional academic and professional accomplishments of our faculty and Ph.D. candidates for the 2018-2019 year. For the latest highlights, please visit us at cee.northeastern.edu. We look forward to building a better world together.



Sincerely,

Jerome F. Hajjar, Ph.D., P.E.
CDM Smith Professor
Department Chair
Civil and Environmental
Engineering
jf.hajjar@northeastern.edu

QUICK FACTS

Civil and Environmental Engineering

3 federally funded research centers

PROTECT,
Puerto Rico
Testsite for
Exploring
Contamination
Threats, funded
by NIEHS

CRECE,
Center for
Research on
Early Childhood
Exposure and
Development,
funded by EPA
and NIEHS

ECHO,
Environmental
Influences on Child
Health Outcomes,
funded by NIH

194 Masters Students



Doctoral Students **68**



RECENT HIRES

Qin Jim Chen
PhD, Old Dominion University
Kelsey Pieper
PhD, Virginia Tech
Aron Stubbins
PhD, Newcastle University
Hao Sun
PhD, Columbia University

45
**TENURED/
TENURE-TRACK**
Including T/TT
Affiliated Faculty

10 Professional
Society Fellows



11 Young Investigator
Awards

8 National Science
Foundation
CAREER Awards

**2018 NSF CAREER
WINNER Ameet
Pinto** for "Developing
a Spatial-Temporal
Predictive Framework
for the Drinking Water
Microbiome."

College of Engineering

With **185** tenured/tenure-track faculty and **16** multidisciplinary research centers and institutes with funding by eight federal agencies, the College of Engineering is a leader in experiential education and interdisciplinary research, with a focus on discovering solutions to global challenges to benefit society.

48 NSF CAREER
Awards



5 Engineering
Departments

90 YOUNG
INVESTIGATOR
Awards



993

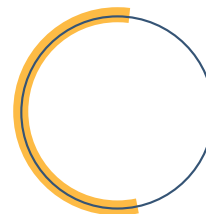


Graduate Students
Placed on Co-op
(2018-19)

STUDENTS ENROLLED

8080

52% Graduate
1485 New MS (Fall 2018)
48% Undergraduate
675 New BS (Fall 2018)



FACULTY BY RESEARCH THRUSTS

SUSTAINABLE RESOURCE ENGINEERING

Luca Caracoglia
Matthew Eckelman
David Fannon
Peter Furth
Auroop Ganguly
Tarik Gouhier
Jonathan Grabowski
Jerome Hajjar
Brian Helmuth
A. Randall Hughes

Michael Kane
Haris Koutsopoulos
Michelle Laboy
Andrew Myers
Mark Patterson
Craig Shillaber
Jennie C. Stephens
Ali Touran
Geoffrey Trussell
Ming Wang
Qi Ryan Wang

ENVIRONMENTAL HEALTH

Akram Alshawabkeh
R. Edward Beighley
Qin Jim Chen
Matthew Eckelman
Loretta Fernandez
Auroop Ganguly
Edgar Goluch
Tarik Gouhier
Jonathan Grabowski
Brian Helmuth
A. Randall Hughes

Philip Larese-Casanova
Amy Mueller
Samuel Muñoz
Annalisa Onnis-Hayden
Mark Patterson
Kelsey Pieper
Ameet Pinto
Thomas Sheahan
Aron Stubbins
Geoffrey Trussell
Kai-Tak Wan

CIVIL INFRASTRUCTURE SECURITY

George Adams
Joseph Ayers
Dionisio Bernal
Luca Caracoglia
Qin Jim Chen
Stephen Flynn
Peter Furth
Auroop Ganguly
Jerome Hajjar
Michael Kane
Haris Koutsopoulos
Yiannis Levendis
Sinan Müftü

Andrew Myers
Mark Patterson
Mehrdad Sasani
Thomas Sheahan
Craig Shillaber
Michael B. Silevitch
Hao Sun
Ali Touran
Sara Wadia-Fascetti
Ming Wang
Qi Ryan Wang
Mishac Yegian

FACULTY HONORS AND AWARDS



Associate Professor **Philip Larese-Casanova** is leading a \$760K grant from the Department of Defense's Strategic Environmental Research and Development Program (SERDP), titled "Electrochemically-Induced in situ Degradation of Legacy Munitions and Insensitive High Explosives in Manufacturing Wastewater." Co-PIs include Assistant Professor **Loretta Fernandez**, and Snell Professor of Engineering and Associate Dean for Research and Graduate Education **Akram Alshawabkeh**.

Assistant Professor **Ameet Pinto** was awarded a National Science Foundation grant, in collaboration with Clemson University and Carollo Engineers, for "Developing an Eco-Genomic Framework for Biofilter Operation."



Professor **Auroop Ganguly** was selected as a Fellow of the American Society of Civil Engineers in recognition of

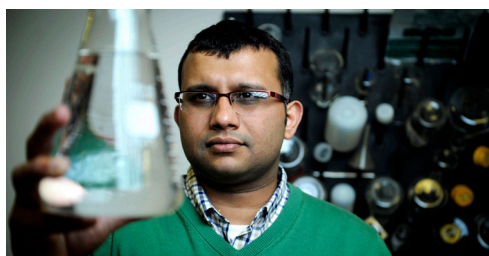
his outstanding contributions to the profession.

Professor **Mehrdad Sasani** was elected a Fellow of the American Concrete Institute for his contributions to ACI and the concrete industry.



Associate Professor and Associate Chair for Research **Matthew Eckelman** was selected by the journals, *Environmental Science & Technology* and *Environmental Science & Technology Letters*, for inclusion in their Early Career Scientists Virtual Issue, which highlights 24 early career scientists with research of outstanding quality.

Professor **Qin Jim Chen** is leading a \$866K CyberSEES National Science Foundation grant, in collaboration with Louisiana State University and Texas A&M University, for "A Coastal Resilience Collaboratory: Cyber-enabled Discoveries for Sustainable Deltaic Coasts."



Assistant Professor **Qi Ryan Wang** and Assistant Professor Farrokh Jazizadeh Karimi of Virginia Tech, held a workshop to explore the systems necessary to create sustainable future urban areas.



Associate Professor **Andrew Myers**, in collaboration with Johns Hopkins University and Vestas Wind Systems, was awarded an \$899K National Science Foundation grant for "Optimization of Infrastructure-Scale Thin-Walled Tube Towers including Uncertainty." The

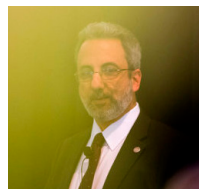


grant is a continuation of Myer's work developing the necessary technical knowledge and policy framework to make the U.S. a leader in onshore and offshore wind energy. The award comes through NSF's Grant Opportunities for Academic Liaison with Industry (GOALI) program and will involve "first-of-its-kind" cooperation with a wind turbine production factory in Colorado.



Associate Professor **Aron Stubbins** is leading, in collaboration with the Sea Education Association, a National Science

Foundation grant for "The Role of Sunlight in Determining the Fate and Microbial Impact of Microplastics in Surface Waters."



CDM Smith Professor and Chair **Jerome Hajjar** and Associate Professor **Andrew Myers**, along with the Office for Science and Technology of the French Consulate in Boston, Professor Franck Schoefs from the University of Nantes, and the Sea and Littoral Institute IUML, hosted French American Innovation Day at Northeastern to share information and ideas on the innovation potential of Floating Offshore Wind Technology.

STUDENT HONORS AND AWARDS

Mary Elizabeth (Lizzy) Warner, PhD'20, interdisciplinary engineering, and her team were awarded second place from the Homeland Security Advisory Council's Crisis Management Case Challenge for their innovative proposal specifying how to increase the resiliency of cities.



PhD student **Yujie Yan** was named a 2018 O.H. Ammann Research Fellow in Structural Engineering by the American Society of Civil Engineers.



Jude Arbogast, E'19, civil engineering, was one of 10 students from across the nation named to the American Society of Civil Engineers "New Faces of Civil Engineering" list. According to the ASCE, "the 2019 honorees are rising stars, inspired and inspiring, many of them drawn to the profession by a desire to help others and protect the planet."

Two Northeastern Civil and Environmental Engineering PhD students, **Cassandra Nickles** and **Katherine Vilardi**, received 2019 Graduate Research Fellowships from the National Science Foundation (NSF).



Max Rome, PhD in Civil Engineering '21, recently led a team of four who were awarded a grant from the inaugural Sasaki Foundation Design Awards. Their entry of "Charles River Floating Wetlands" was one of five winners chosen from proposals submitted by teams from seven countries.



GEORGE ADAMS



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

PhD, University of California at Berkeley, 1975
coe.northeastern.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 Crack Close to and Perpendicular to an Interface: Resolution of Anomalous Behavior with a Cohesive Zone, *Journal of Applied Mechanics*, 86, 2019, 031008

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, 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, 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

AKRAM ALSHAWABKEH



George A. Snell Professor of Engineering, Civil and Environmental Engineering; Senior Associate Dean for Research and Graduate Education; Director, PROTECT Superfund Research Center

PhD, Louisiana State University, 1994
coe.northeastern.edu/people/alshawabkeh-akram

Scholarship focus: geoenvironmental engineering, soil and groundwater remediation; electrokinetic and electrochemical processes; contaminant fate and transport; environmental restoration

Honors and awards: Fellow, American Society of Civil Engineers; ASCE Thomas A. Middlebrooks Award; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

A.L. Cathey, D.J. Watkins, Z.Y. Rosario, C. Velez,

A. Alshawabkeh, J.F. Cordero, J.D. Meeker

Associations of Phthalates and Phthalate Replacements with CRH and Other Hormones Among Pregnant Women in Puerto Rico, *Journal of the Endocrine Society*, 3(6), 2019, Pages 1127-1149

A. Aker, K.K. Ferguson, Z.Y. Rosario, A.M. Calafat, X. Ye,

A. Alshawabkeh, J.F. Cordero, J.D. Meeker

A Repeated Measures Study of Phenol, Paraben, and Triclocarban Urinary Biomarkers and Circulating Maternal Hormones During Gestation in the Puerto Rico PROTECT Cohort, *Environmental Health*, 18(1), 2019, 28

W. Zhou, X. Meng, J. Gao, A.N. Alshawabkeh

Hydrogen Peroxide Generation from O₂ Electroreduction for Environmental Remediation: A State-of-the-Art Review, *Chemosphere*, 225, 2019, 588-607

SELECTED RESEARCH PROJECTS

Electrochemically-Induced in Situ Degradation of Legacy Munitions and Insensitive High Explosives in Manufacturing Wastewater

Co-Principal Investigator, Department of Defense Strategic Environmental Research and Development Program

Environmental Influences on Child Health Outcomes in Puerto Rico (ECHO-PRO)

Principal Investigator and Director, National Institutes of Health

Puerto Rico Testsite for Exploring Contamination Threats (PROTECT)

Principal Investigator, National Institutes of Health

Research Opportunities for Undergraduates: Training in Environmental Health Sciences (ROUTES)

Principal Investigator, National Institutes of Health

JOSEPH AYERS



Professor, Marine and Environmental Sciences; affiliated faculty, Bioengineering, Civil and Environmental Engineering, Electrical and Computer Engineering

PhD, University of California, Santa Cruz, 1975
coe.northeastern.edu/people/ayers-joseph

Scholarship focus: development of underwater robots for civil infrastructure and explosive sensing; neurophysiology and behavior; biomimetics; synthetic biology

SELECTED PUBLICATIONS

R.T. Myers, J. Ayers

A Nitric Oxide Sensor Fabricated Through E-Jet Printing Towards Use in Bioelectronics Interfaces, *Journal of Applied Electrochemistry*, 48, 2018, 1-11

L.L. McGrath, S.V. Vollmer, S.T. Kaluziak, J. Ayers
 De Novo Transcriptome Assembly for the Lobster *Homarus Americanus* and Characterization of Differential Gene Expression Across Nervous System Tissues, *BMC Genomics*, 17, 2016, 3-12

J. Ayers

Underwater Vehicles Based on Biological Intelligence, *ASME Journal of Dynamic Systems, Measurement and Control*, 138, 2016, 1-5

L. Zhu, A.I. Selverston, J. Ayers

The Role of Ih in Differentiating the Dynamics of the Gastric Mill and Pyloric Neurons in the Stomatogastric Ganglion of the Lobster, *Homarus Americanus*, *Journal of Neurophysiology*, 115(5), 2016, 2434-2445

J. Lu, J. Yang, Y.-B. Kim, J. Ayers, K.K. Kim

Implementation of Excitatory CMOS Neuron Oscillator for Robot Motion Control Unit, *Journal of Semiconductor Technology and Science*, 14(4), 2014, 383-390

J. Ayers, D. Blustein, A. Westphal

A Conserved Biomimetic Control Architecture for Walking, Swimming and Flying Robots, *Lecture Notes in Artificial Intelligence*, 2012, 1-12

SELECTED RESEARCH PROJECTS

Utilizing Synthetic Biology to Create Programmable Micro Bio-Robots

Co-Principal Investigator, Office of Naval Research

R. EDWARD BEIGHLEY



Associate Professor and Associate Chair for Undergraduate Studies, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences, Global Resilience Institute; Associate Director of the Coastal Sustainability Institute

PhD, University of Maryland, 2001
coe.northeastern.edu/people/beighley-edward

Scholarship focus: hydrologic and hydraulic modeling; remote sensing of the hydrologic cycle; hydrologic impacts of climate and/or land use change; flood hazard and risk assessment

Honors and awards: Fostering Engineering Innovation in Education Award, College of Engineering, Northeastern University, 2019; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

D. Kim, H. Yu, H. Lee, E. Beighley, M. Durand, D.E. Alsdorf, E. Hwang

Ensemble Learning Regression for Estimating River Discharges using Satellite Altimetry Data: Central Congo River as a Test-Bed, *Remote Sensing of Environment*, 221, 2019, 741-755

J. McCollum, R.E Beighley

Flood Frequency Hydrology with Limited Data for the Weser River Basin, Germany, *ASCE Journal of Hydrologic Engineering*, 24(3), 2019

R. Frasson, T. Pavelsky, M. Fonstad, M. Durand, G. Allen, G. Schumann, C. Lion, R.E. Beighley, X. Yang

Global Relationships Between River Width, Slope, Catchment Area, Meander Wavelength, Sinuosity, and Discharge, *Geophysical Research Letters*, 2019

Y. Feng, E. Beighley, R. Raoufi, J. Melack, Y. Zhao, S. Iacobellis, D. Cayan

Propagation of Future Climate Conditions into Hydrologic Response from Coastal Southern California Watersheds, *Climatic Change*, 153(1-2), 2019, 199-218

SELECTED RESEARCH PROJECTS

Integrating Lateral Contributions and Longitudinal Controls Along River Reaches to Improve SWOT Discharge Estimates

Principal Investigator, National Aeronautics and Space Administration, SWOT Science Team

Integration of SWOT Measurements into Global Hydrologic Models

Co-Principal Investigator, National Aeronautics and Space Administration, SWOT Science Team

Collaborative Research: Re-evaluating Precipitation Extremes and Flood Hazard in the Wake of Hurricane Harvey

Co-Principal Investigator, National Science Foundation

DIONISIO BERNAL



Professor, Civil and Environmental Engineering

PhD, University of Tennessee, 1979
coe.northeastern.edu/people/bernal-dionisio

Scholarship focus: system identification; fault detection and fault localization; earthquake engineering; soil structure interaction; structural stability

Honors and awards: Moisseiff Award, American Society of Civil Engineers

SELECTED PUBLICATIONS

D. Bernal

Eigenvalue Sensitivity of Sampled Systems Operating in Closed-Loop, *Mechanical Systems and Signal Processing*, 105, 2018, 481-487

D. Bernal, M.R. Ulriksen

Output Feedback in the Design of Eigenstructures for Enhanced Sensitivity, *Mechanical Systems and Signal Processing*, 112, 2018, 22-30

M.D. Ulriksen, D. Bernal, L. Damkilde

Shaped Input Distributions for Structural Damage Localization, *Mechanical Systems and Signal Processing*, 110, 2018, 499-508

D. Bernal

State Observers in the Design of Eigenstructures for Enhanced Sensitivity, *Mechanical Systems and Signal Processing*, 110, 2018, 122-129

D. Bernal

Analytical Minimization of Synchronicity Errors in Stochastic Identification, *Mechanical Systems and Signal Processing*, 98, 2017, 415-424

Y. Zhang, D. Bernal

Damage Localization From Projection of Free Vibration Signals, *Journal of Sound and Vibration*, 394, 2017, 146-154

SELECTED RESEARCH PROJECTS

Monitoring the Health of Structural Systems from the Geometry of Sensor Traces

Principal Investigator, National Science Foundation

LUCA CARACOGLIA



Associate Professor, Civil and Environmental Engineering; affiliated faculty, Mechanical and Industrial Engineering

PhD, University of Trieste, 2001
coe.northeastern.edu/people/caracoglia-luca

Scholarship focus: structural dynamics; wind engineering; wind energy; wind-induced vibration; cable dynamics; climate change

Honors and awards: Full Professor, Two National Scientific Habilitations, Ministry of Instruction, University and Research, Italy; Scientific Discipline ICAR 08/B3, Civil Engineering/Structural Design; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

L. Ierimonti, I. Venanzi, L. Caracoglia, A.L. Materazzi

Cost-based Design of Nonstructural Elements for Tall Buildings under Extreme Wind Environments, *Journal of Aerospace Engineering, ASCE*, 32(3), 2019, 04019020

V. Le, L. Caracoglia

Generation and Characterization of a Non-Stationary Flow Field in a Small-Scale Wind Tunnel Using a Multi-Blade Flow Device, *Journal of Wind Engineering and Industrial Aerodynamics*, 186, 2019, 1-16

S. Li, L. Caracoglia

Surrogate Model Monte Carlo Simulation for Stochastic Flutter Analysis of Wind Turbine Blades, *Journal of Wind Engineering and Industrial Aerodynamics*, 188, 2019, 43-60

W. Cui, L. Caracoglia

A Unified Framework for Performance-Based Wind Engineering of Tall Buildings in Hurricane-Prone Regions Based on Lifetime Intervention-Cost Estimation, *Structural Safety*, 73, 2018, 75-86

L. Caracoglia

Modeling the Coupled Electro-Mechanical Response of a Torsional-Flutter-Based Wind Harvester with a Focus on Energy Efficiency Examination, *Journal of Wind Engineering and Industrial Aerodynamics*, 174, 2018, 437-450

SELECTED RESEARCH PROJECTS

Collaborative Research: Active Control of Nonlinear Flow-Induced Instability of Wind Turbine Blades under Stochastic Perturbations

Principal Investigator, National Science Foundation

Performance-Based Wind Engineering: Stochastic Approximation for the Wind-Induced Dynamics of the Next-Generation Tall Buildings and Tower Structures

Principal Investigator, National Science Foundation

QIN JIM CHEN



Professor, Civil and Environmental Engineering; jointly appointed, Marine and Environmental Sciences

PhD, Old Dominion University, 1997
coe.northeastern.edu/people/chen-qin-jim

Scholarship focus: coastal engineering and science, particularly in coastal hydrodynamics; fluid-structure interactions; natural and nature-based solutions; coastal hazard assessment and mitigation; and numerical modeling for coastal resiliency and sustainability

Honors and awards: James M. Todd Technological Accomplishment Medal, LES-BTR; Best Paper Award, Louisiana Association of Professional Biologists; LSU Rainmakers Award for innovative research; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

- L. Zhu, Q. Chen, Y. Ding, N. Jafari J.D. Rosati,
 A Semi-Analytical Model of Depth-Integrated Vegetal Drag Force Based on Stokes Second-Order Wave Theory, *Journal of Waterway, Port, Coastal and Ocean Engineering*, 145(2), 2019, 04018041
- L. Zhu, Q. Chen
 Phase-Averaged Drag Force of Nonlinear Waves Over Submerged and Through Emergent Vegetation, *Journal of Geophysical Research-Oceans*, 124, 2019
- K. Liu, Q. Chen, K. Hu, K. Xu, R. Twilley
 Modeling Hurricane-Induced Wetland-Bay and Bay-Shelf Sediment Fluxes, *Coastal Engineering*, 135, 2018, 77-90
- K. Hu, Q. Chen, H. Wang, E.K. Hartig, P.M. Orton
 Numerical Modeling of Salt Marsh Morphological Change Induced by Hurricane Sandy, *Coastal Engineering* 132, 2018, 63-81

SELECTED RESEARCH PROJECTS

- A Coastal Resilience Collaboratory: Cyber-Enabled Discoveries for Sustainable Deltaic Coasts
 Principal Investigator, National Science Foundation
- Collecting Ecological Data and Models of Living Shoreline Restoration Projects (MD, NJ, NY, VA).
 Principal Investigator, U.S. Geological Survey
- Convergence: RAISE Nearshore Water-Land Interface During Extreme Storms
 Principal Investigator, National Science Foundation
- Updating USACE's Nearshore Coastal Numerical Model to Calculate Benefits of Vegetated Shorelines
 Principal Investigator, U.S. Army Corps of Engineers

MATTHEW ECKELMAN



Associate Professor and Associate Chair for Research, Civil and Environmental Engineering; affiliated faculty, Chemical Engineering, Marine and Environmental Sciences, Public Policy and Urban Affairs

PhD, Yale University, 2009
coe.northeastern.edu/people/eckelman-matthew

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

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

SELECTED PUBLICATIONS

- A.G. Parvatker, M.J. Eckelman
 Comparative Evaluation of Chemical Life Cycle Inventory Generation Methods and Implications for Life Cycle Assessment Results, *ACS Sustainable Chemistry & Engineering*, 7(1), 2018, 350-367
- S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu
 Comparative Life Cycle Assessment of Advanced Wastewater Treatment Processes for Removal of Chemicals of Emerging Concern, *Environmental Science and Technology*, 52, 2018, 11346-11358
- M. Montazeri, M.J. Eckelman
 Life Cycle Assessment of UV-Curable Biobased Wood Flooring Coatings, *Journal of Cleaner Production* 192, 2018, 932-939
- M. Montazeri, G.G. Zaines, V. Khanna, M.J. Eckelman
 Meta-Analysis of Life Cycle Energy and Greenhouse Gas Emissions for Priority Bio-Based Chemicals, *ACS Sustainable Chemistry & Engineering*, 4(12), 2016, 6443-6454
- L. Soh, M.J. Eckelman
 Green Solvents in Biomass Processing, *ACS Sustainable Chemistry & Engineering*, 4(11), 2016, 5821-5837

SELECTED RESEARCH PROJECTS

- Air Climate and Energy Center-SEARCH: Solutions for Energy Air Climate and Health
 Senior Personnel, Environmental Protection Agency
- CAREER: Building Chemical Synthesis Networks for Life Cycle Hazard Modeling
 Principal Investigator, National Science Foundation
- A Decision and Design Framework for Multi-Hazard Resilient and Sustainable Buildings
 Co-Principal Investigator, National Science Foundation

DAVID FANNON



Assistant Professor, School of Architecture;
jointly appointed, Civil and Environmental
Engineering

MS, University of California,
Berkeley, 2015
coe.northeastern.edu/people/fannon-david

Scholarship focus: sustainable and high performance building design; resilient buildings; human comfort within the built environment

SELECTED PUBLICATIONS

- D. Fannon, M. Laboy, P. Wiederspahn
Dimensions of Use, ENQUIRY: The ARCC Journal, 15(1), 2018, 25-45
- H. Deng, D. Fannon, M. Eckelman
Predictive Modeling for U.S. Commercial Building Energy Use: A Comparison of Existing Statistical and Machine Learning Algorithms Using CBECS Microdata, Energy and Buildings, 163, 2018, 34-43
- R. Philips, L. Troup, D. Fannon, M. Eckelman
Do Resilient and Sustainable Design Strategies Conflict in Commercial Buildings? A Critical Analysis of Existing Resilient Building Frameworks and Their Sustainability Implications, Energy and Buildings, 146, 2017, 295-311
- M. Laboy, D. Fannon
Theory and Praxis: A Critical Framework for Architecture, Enquiry the Architectural Research Centers Consortium Journal, 13(2), 2016

SELECTED RESEARCH PROJECTS

- Decision Frameworks for Resilient and Sustainable Buildings
Co-Investigator, National Science Foundation
- Future-Use Architecture: Design for Persistent Change
Principal Investigator, Latrobe Prize, American Institute of Architects
- Building Resilience: A Tool for Adaptability Planning and Decision-Making
Co-Principal Investigator, Northeastern University

LORETTA FERNANDEZ



Assistant Professor, Civil and Environmental
Engineering; jointly appointed, Marine and
Environmental Sciences

PhD, Massachusetts Institute of
Technology, 2010
coe.northeastern.edu/people/fernandez-loretta

Scholarship focus: environmental organic chemistry; passive sampling methods for organic contaminants in water and sediments; transport, transformation, and biological exchange of organic contaminants in the environment

Honors and awards: Research Associateship, National Research Council; Graduate Research Fellowship, National Science Foundation

SELECTED PUBLICATIONS

- M.T.O. Jonker, S. van der Heijden, D. Adelman, J. Apell, R. Burgess, Y. Choi, L. Fernandez, G. Flavetta, et al.
Advancing the use of Passive Sampling in Risk Assessment and Management of Contaminated Sediments: Results of an International Ex Situ Passive Sampling Inter-Laboratory Comparison, Environmental Science & Technology, 52(6), 2018, 3574-3582
- G.M. Flavetta, R.L. Cahill, L.A. Fernandez
Demographics Near Waste-to-Energy Plants: Poverty-Level Changes from 2000 to 2015, Integrated Environmental Assessment and Management, 15(1), 2018, 160-164
- S.N. Schmidt, A.P. Wang, P.T. Gidley, A.H. Wooley, G.R. Lotufo, R.M. Burgess, U. Ghosh, L.A. Fernandez, P. Mayer
Cross Validation of Two Partitioning-Based Sampling Approaches in Mesocosms Containing PCB Contaminated Field Sediment, Biota, and Activated Carbon Amendment, Environmental Science and Technology, 51(17), 2017, 9996-10004

SELECTED RESEARCH PROJECTS

- Electrochemically-Induced in Situ Degradation of Legacy Munitions and Insensitive High Explosives in Manufacturing Wastewater
Co-Investigator, Strategic Environmental Research and Development Program
- RAPID: Collaborative Research: Sediment and Contaminant Mobilization by Extreme Flooding Associated with Hurricane Florence
Co-Investigator, National Science Foundation

STEPHEN FLYNN



Professor, Political Science; Founding Director, Global Resilience Institute; affiliated faculty, Civil and Environmental Engineering

PhD, Tufts University, 1991
coe.northeastern.edu/people/flynn-stephen

Scholarship focus: critical infrastructure resilience; public policy

SELECTED PUBLICATIONS

S. Flynn

The Challenge of Securing the Global Supply Chain, C. Lawson (Ed) Beyond 9/11: Building a Homeland Security Enterprise for the 21st Century, MIT Press, 2019

S. Flynn

The Role of Community Resilience in Advancing Security, State, Society, and National Security: Challenges and Opportunities in the 21st Century, S. Jayakumar (Ed) Singapore: World Scientific Publishing, 2016

S. Flynn

The South Carolina Deluge: Lessons from a Watershed Disaster, A Center for Resilience Studies Assessment, Northeastern University, 2016

S. Flynn

Bolstering Critical Infrastructure Resilience After Superstorm Sandy: Lessons for New York and the Nation, Northeastern University, 2015

S. Flynn

International Resilience Symposium: Understanding Standards for Communities and Built Infrastructure Resilience, National Institute of Standards and Technology, 2015

I. Linkov, D. Eisenberg, M. Bates, D. Chang, M. Convertino, J. Allen, S. Flynn, T. Seager

Measurable Resilience for Actionable Policy, Environmental Science and Technology, 47(18), 2013, 10108-10110

SELECTED RESEARCH PROJECTS

Bolstering Counter-Proliferation Efforts within Global Supply Chains

Principal Investigator, MacArthur Foundation

CRISP Type 2: Interdependent Network-based Quantification of Infrastructure Resilience (INQUIRE)

Co-Principal Investigator, National Science Foundation

Learning from Major Disasters that Disrupt Lifeline-Infrastructure

Principal Investigator, U.S. Department of Homeland Security

Resilience Governance for Infrastructure Dependencies and Interdependencies

Principal Investigator, Critical Infrastructure Resilience Institute

PETER FURTH



Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1981
coe.northeastern.edu/people/furth-peter

Scholarship focus: traffic signal control; bicycle transportation; transit operations modeling; transit data collection and sampling

SELECTED PUBLICATIONS

P.G. Furth, A.T.M. Halawani

How Well Does the Traffic System Protect Transit from Congestion? Measuring Route-Level Costs that Traffic Congestion Imposes on Transit Operators and Users, Journal of Advanced Transportation, 2018, 6060898

P.G. Furth, P. Moser, T.V.V.K. Putta

Measuring Low-Stress Connectivity in Terms of Bike-Accessible Jobs and Potential Bike-to-Work Trips: A Case Study Evaluating Alternative Bike Route Alignments in Northern Delaware, Journal of Transport and Land Use, 11(1), 2018, 815-831

M.B. Lowry, P. Furth, T. Hadden-Loh

Prioritizing New Bicycle Facilities to Improve Low-Stress Network Connectivity, Transportation Research, 86, 2016, 124-140

B. Cesme, P. Furth

Self-Organizing Traffic Signals Using Secondary Extension and Dynamic Coordination, Transportation Research Part C, 48, 2014, 1-15

SELECTED RESEARCH PROJECTS

Low-Stress Bicycle Network Planning: New Methods for Network Analysis and Improvement, with Application in Greater Boston

Principal Investigator, Helen and William Mazer Foundation

Traffic Signal Design and Operations Strategies for Non Motorized Users

Principal Investigator, National Cooperative Highway Research Program

AUROOP GANGULY



Professor, Civil and Environmental Engineering; affiliated faculty, Khoury College of Computer Science; Marine and Environmental Sciences; Political Science; Public Policy and Urban Affairs; Global Resilience Institute

PhD, Massachusetts Institute of Technology, 2002
coe.northeastern.edu/people/ganguly-auroop

Scholarship focus: climate adaptation & resilient engineering; water & built environment; urban sustainability; machine learning & AI; nonlinear dynamics and network science

Honors and awards: Fellow, American Society of Civil Engineers; Senior Member, Institute of Electrical and Electronics Engineers; Runner-Up Best Paper Award, ACM KDD 2017; Best Student Paper Award, SIAM Data Mining 2011; United Nations Review Panel; Independent Advisory Committee for Applied Climate Assessment national-scale report (lead author of Artificial Intelligence section); United Nations Association for the United Kingdom (lead author of data-driven solutions section)

SELECTED PUBLICATIONS

R.H. Moss, S. Avery, K. Baja, M. Burkett, A.M. Chischilly, J. Dell, P.A. Fleming, K. Geil, K. Jacobs, A. Jones, K. Knowlton, J. Koh, M.C. Lemos, J. Melillo, R. Pandya, T.C. Richmond, L. Scarlett, J. Snyder, M. Stults, A. Waple, J. Whitehead, D. Zarrilli, J. Fox, A. Ganguly, et al.
 A Framework for Sustained Climate Assessment, United States Bulletin of the American Meteorological Society, 100(5), 2019, 897-907

U. Bhatia, A.R. Ganguly
 Precipitation Extremes and Depth-Duration-Frequency Under Internal Climate Variability, Scientific Reports, Nature Publishing Group, 9, 2019, 9112

A.R. Ganguly, U. Bhatia, S. Flynn
 Critical Infrastructures Resilience: Policy and Engineering Principles, Routledge, Taylor & Francis, 2018 131 pages

SELECTED RESEARCH PROJECTS

Cyber-Based Contingency Analysis of Interdependent Transportation and Communication Networks under Uncertainty

Principal Investigator, United States Department of Energy's Pacific Northwest National Laboratory

Machine Learning in the Earth Systems Sciences and Engineering

Principal Investigator, National Aeronautics and Space Administration

EDGAR GOLUCH



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

PhD, University of Illinois, 2007
coe.northeastern.edu/people/goluch-edgar

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

SELECTED PUBLICATIONS

M.K. Kimani, J. Mwagi, E.D. Goluch
 Bacterial Sample Concentration and Culture Monitoring using a PEG-Based Osmotic System with Inline Impedance and Voltammetry Measurements, Journal of Analysis and Testing, 3(2), 2019, 166-174

M.K. Kimani, R. Loo, E.D. Goluch
 Biosample Concentration Using Microscale Forward Osmosis with Electrochemical Monitoring, Analytical Chemistry, 91, 2019, 7487-7494

P.J. Buch, Y. Chai, E.D. Goluch
 Treating Polymicrobial Infections in Chronic Diabetic Wounds, Clinical Microbiology Reviews, 32(2), 2019, e00091-18

J. Sun, N. Tandogan, A.Z. Gu, S. Müftü, E.D. Goluch, K.T. Wan
 Quantification of Colloidal Filtration of Polystyrene Micro-Particles on Glass Substrate Using a Microfluidic Device, Colloids and Surfaces B: Biointerfaces 165, 2018, 381-387

C.R. Santiveri, H.J. Sismaet, M. Kimani, E.D. Goluch
 Electrochemical Detection of Pseudomonas Aeruginosa in Polymicrobial Environments, ChemistrySelect, 3(11), 2018 2926-2930

H.J. Sismaet, E.D. Goluch
 Electrochemical Probes of Microbial Community Behavior, Annual Review of Analytical Chemistry, 2018

P.N. Abadian, P.J. Buch, E.D. Goluch, J. Li, Z. Zhang
 Real-Time Monitoring of Urinary Encrustation Using a Quartz Crystal Microbalance, Analytical Chemistry, 90(3), 2018, 1531-1535

SELECTED RESEARCH PROJECTS

Point-of-Care Test for Identifying Gram Negative Urinary Tract Infections in Companion Animals

Principal Investigator, National Science Foundation

TARIK GOUHIER



Associate Professor, College of Science;
affiliated faculty, Civil and Environmental
Engineering

PhD, McGill University, 2010
coe.northeastern.edu/people/gouhier-tarik

Scholarship focus: statistical and dynamical modeling; theoretical ecology

SELECTED PUBLICATIONS

- P. Pillai, T.C. Gouhier, S.V. Vollmer
Ecological Rescue of Host-Microbial Systems Under Environmental Change, *Theoretical Ecology*, 10, 2017, 51-63
- B. Spiecker, T.C. Gouhier, F. Guichard
Reciprocal Feedbacks Between Spatial Subsidies and Reserve Networks in Coral Reef Meta-Ecosystems, *Ecological Applications*, 26(1), 2016, 264-278
- D. Wang, T.C. Gouhier, B.A. Menge, A.R. Ganguly
Intensification and Spatial Homogenization of Coastal Upwelling Under Climate Change, *Nature*, 518, 2015, 390-394
- P. Pillai, T.C. Gouhier, S.V. Vollmer
The Cryptic Role of Biodiversity in the Emergence of Host-Microbial Mutualisms, *Ecology Letters*, 17(11), 2014, 1437-1446
- T.C. Gouhier, F. Guichard, B.A. Menge
Designing Effective Reserve Networks for Non-equilibrium Metacommunities, *Ecological Applications*, 23(6), 2013, 1488-1503
- T.C. Gouhier, F. Guichard, B.A. Menge
Ecological Processes Can Synchronize Marine Population Dynamics Over Continental Scales, *Proceedings of the National Academy of Sciences of the United States of America*, 107(18), 2010, 8281-8286

SELECTED RESEARCH PROJECTS

- Coral-Microbial Interactions as Determinants of Disease Dynamics
Principal Investigator, National Science Foundation
- Integrating Broad-Scale Regional Variation in Environmental Forcing and Benthic-Pelagic Coupling
Co-Principal Investigator, National Science Foundation
- Spatio-Temporal Extremes and Association: Marine Adaptation and Survivability Under Climate change and Rising Ocean Temperatures
Co-Principal Investigator, National Science Foundation
- The Effects of Fine-Scale Temperature and Desiccation Variability on the Distribution of Marine Species
Co-Principal Investigator, National Science Foundation

JONATHAN GRABOWSKI



Professor, Marine and Environmental
Sciences; affiliated faculty, Civil and
Environmental Engineering

PhD, University of North Carolina at
Chapel Hill, 2002
coe.northeastern.edu/people/grabowski-jonathan

Scholarship focus: environmental science and policy, fisheries, ecological economics

SELECTED PUBLICATIONS

- L. McClenachan, S. Scyphers, J.H. Grabowski
Views from the dock: Warming Waters, Adaptation, and the Future of Maine's Lobster Fishery, *Ambio*, 2019
- A.R. Hughes, J.H. Grabowski, H.M. Leslie, S. Scyphers, S.L. Williams
Inclusion of Biodiversity in Habitat Restoration Policy to Facilitate Ecosystem Recovery, *Conservation Letters*, 11, 2018, 1-8
- J.H. Grabowski, C.W. Conroy, R. Gittman, J.T. Kelley, S. Sherman, G.D. Sherwood, G. Wippelhauser
Habitat Associations of Juvenile Cod in Nearshore Waters, *Reviews in Fisheries Science and Aquaculture*, 26, 2018, 1-14
- R. Murphy, S. Scyphers, J.H. Grabowski
Perceptions Outweigh Knowledge in Predicting Support for Management Strategies in the Recreational Striped Bass (Morone Saxatilis) Fishery, *Marine Policy*, 97, 2018, 44-50
- J.H. Grabowski, S.P. Powers, H. Roman, S. Rouhani
Potential Impacts of the 2010 Deepwater Horizon Oil Spill on Subtidal Oysters in the Gulf of Mexico, *Marine Ecology Progress Series*, 576, 2017, 163-174
- R.K. Gittman, S.B. Scyphers, C.S. Smitt, I.P. Neylan, J.H. Grabowski
Ecological Consequences of Shoreline Hardening: A Meta-Analysis, *BioScience*, 66, 2016, 763-773

SELECTED RESEARCH PROJECTS

- Aligning Coastal Restoration with Ecological and Societal Needs
Principal Investigator, National Center for Ecological Analysis and Synthesis
- Social and Ecological Factors Influencing Shoreline Hardening in the Northeast: Implications for Vulnerability, Resilience and Informed Decision Making
Principal Investigator, Northeast Sea Grant College Consortium

JEROME HAJJAR



CDM Smith Professor and Chair, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences

PhD, Cornell University, 1988
coe.northeastern.edu/people/hajjar-jerome

Scholarship focus: steel and composite steel/concrete structures; earthquake engineering; structural stability; large-scale experimental testing of structures; regional simulation

Honors and awards: Fellow, American Society of Civil Engineers; Fellow, Structural Engineering Institute; Norman Medal, American Society of Civil Engineers; Shortridge Hardesty Award, American Society of Civil Engineers; Moisseiff Award, American Society of Civil Engineers; T.R. Higgins Lectureship Award, American Institute of Steel Construction; Special Achievement Award, American Institute of Steel Construction; Walter L. Huber Civil Engineering Research Prize, American Society of Civil Engineers; Breakthrough Award, Popular Mechanics; Clemens Hershel Award, Boston Society of Civil Engineers

SELECTED PUBLICATIONS

D. Deniz, J. Song, J.F. Hajjar

Energy-Based Sidesway Collapse Fragilities for Ductile Structural Frames Under Earthquake Loadings, *Engineering Structures*, 174, 2018, 282-294

S.T. Hallowell, A.T. Myers, S.R. Arwade, W. Pang, P. Rawal, E. Hines, J.F. Hajjar, et al.

Hurricane Risk Assessment of Offshore Wind Turbines, *Renewable Energy*, 125, 2018, 234-249

L. Wang, M.D. Webster, J.F. Hajjar

Pushout Tests on Deconstructable Steel-Concrete Shear Connections in Sustainable Composite Beams, *Journal of Constructional Steel Research*, 153, 2018, 618-637

B. Güldür Erkal, J.F. Hajjar

Laser-Based Surface Damage Detection and Quantification Using Predicted Surface Properties, *Automation in Construction*, 83, 2017, 285-302

V.V. Saykin, T.H. Nguyen, J.F. Hajjar, D. Deniz, J. Song
 Material Characterization Using Finite Element Deletion Strategies for Collapse Modeling of Steel Structures, *Engineering Structures*, 147, 2017, 125-133

T.H. Nguyen, C.H. Le, J.F. Hajjar

Topology Optimization Using the P-Version of the Finite Element Method, *Structural and Multidisciplinary Optimization*, 56(3), 2017, 571-586

SELECTED RESEARCH PROJECTS

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

Collaborative Research: Transforming Building Structural Resilience Through Innovation in Steel Diaphragms

Co-Principal Investigator, National Science Foundation

Steel Diaphragm Innovation Initiative

Co-Principal Investigator, American Institute of Steel Construction and Industry

BRIAN HELMUTH



Professor, Marine and Environmental Sciences; jointly appointed, School of Public Policy and Urban Affairs; affiliated faculty, Civil and Environmental Engineering

PhD, University of Washington, 1997
coe.northeastern.edu/people/helmuth-brian

Scholarship focus: ecological forecasting and resilience of coastal environments

Honors and awards: Google Science Communications Fellow

SELECTED PUBLICATIONS

A. Cryan, B. Helmuth, S. Scyphers

Ecological Design for Urban Coastal Resilience, In *Handbook on the Resilience of Socio-Technical Systems*, Edward Elgar Publishing, 2018

A.E. Bates, B. Helmuth, M.T. Burrows, M.I. Duncan, J. Garrabou, T. Guy-Haim, F. Lima, A.M. Queiros, R. Seabra, R. Marsh, J. Belmaker, N. Bensoussan, Y. Dong, A.D. Mazaris, D. Smale, M. Wahl, G. Rilov

Biologists Ignore Ocean Weather at their Peril, *Nature*, 560, 2018, 299-301

X. Zhou, X. Ji, B. Wang, Y. Cheng, Z. Ma, F. Choi, B. Helmuth, W. Xu

Pido: Predictive Delay Optimization for Intertidal Wireless Sensor Networks, *Sensors*, 18, 2018, 1464

R. Judge, F. Choi, B. Helmuth

Recent Advances in Data Logging for Intertidal Ecology, *Frontiers in Ecology and Evolution*, 6, 2018, 213

SELECTED RESEARCH PROJECTS

Predicting How Fine-Scale Temperature Variation will Affect the Spatial Distribution and Temporal Stability of Species and Communities Under Climate Change

Principal Investigator, National Science Foundation

Tide Gate Modulation of Wetland Function: Measurements, Models, and Decision Support for Best Practices

Co-Principal Investigator, National Science Foundation

Using an Energetics Framework to Forecast the Interactive Effects of Abiotic and Biotic Stressors on Intertidal Mussels

Principal Investigator, National Science Foundation

A. RANDALL HUGHES



Associate Professor, Marine and Environmental Sciences; affiliated faculty, Civil and Environmental Engineering

PhD, University of California-Davis, 2006
coe.northeastern.edu/people/hughes-randall

Scholarship focus: marine community ecology and biodiversity

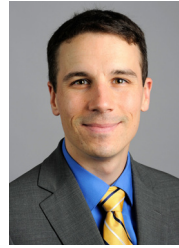
SELECTED PUBLICATIONS

- A.R. Hughes, T.C. Hanley, J.E. Byers, J.H. Grabowski, T. McCrudden, M.F. Piehler, D.L. Kimbro
 Genetic Diversity and Phenotypic Variation within Hatchery-Produced Oyster Cohorts Predict Size and Success in the Field, *Ecological Applications*, 2019, e01940
- A.R. Hughes, T.C. Hanley, A.F.P. Moore, C. Ramsay-Newton, R.A. Zerebecki, E.E. Sotka
 Predicting the Sensitivity of Marine Populations to Rising Temperatures, *Frontiers in Ecology and the Environment* 17, 2019, 17-24
- A.R. Hughes, J.H. Grabowski, H.M. Leslie, S. Scyphers, S.L. Williams
 Inclusion of Biodiversity in Habitat Restoration Policy to Facilitate Ecosystem Recovery, *Conservation Letters*, 11(3), 2018, e12419
- A.R. Hughes, J. Cebrian, K. Heck, J. Goff, T.C. Hanley, W. Scheffel, R.A. Zerebecki
 Effects of Oil Exposure, Plant Species Composition, and Plant Genotypic Diversity on Salt Marsh and Mangrove Assemblages, *Ecosphere*, 9, 2018, e02207

SELECTED RESEARCH PROJECTS

- CAREER: Linking Genetic Diversity, Population Density, and Disease Prevalence in Marine Foundation Species: Integrating Research, Education, and Stakeholder Knowledge to Enhance Resilience of Seagrass and Oyster Ecosystems
 Principal Investigator, National Science Foundation Biological Oceanography
- Effects of Genetic Diversity, Epigenetic Change, and Root-Associated Fungal Colonization on Trait Variation in the Foundation Plant *Spartina alterniflora*
 Principal Investigator, National Science Foundation
- Collaborative Research: Trait Differentiation and Local Adaptation to Depth within Meadows of the Foundation Seagrass *Zostera Marina*
 Principal Investigator, National Science Foundation Biological Oceanography

MICHAEL KANE



Assistant Professor, Civil and Environmental Engineering

PhD, University of Michigan, 2014
coe.northeastern.edu/people/kane-michael

Scholarship focus: occupant-centric building controls, community resilience, model predictive control, hybrid systems

SELECTED PUBLICATIONS

- M.B. Kane, J.P. Lynch, J. Scruggs
 Run-Time Efficiency of Bilinear Model Predictive Control Using Variational Methods, With Applications to Hydronic Cooling, *IEEE/ASME Transactions on Mechatronics*, 24(2), 2019, 718-728
- M.B. Kane, L.P. Jerome, J. Scruggs
 Development of a Scalable Distributed Model Predictive Control System for Hydronic Networks with Bilinear and Hybrid Dynamics, *Journal of Computing in Civil Engineering*, 32(5), 2018, 04018038
- M.B. Kane
 Modeling Human-in-the-Loop Behavior and Interactions with HVAC Systems, *American Control Conference (ACC)*, IEEE, 2018, 6
- M.B. Kane, C. Peckens
 Digital Control Systems, Chapter in *Marks' Standard Handbook for Mechanical Engineers*, McGraw-Hill Professional, 2017, 1257-1265
- M.W. Häckell, R. Rolfes, M.B. Kane, J.P. Lynch
 Three-Tier Modular Structural Health Monitoring Framework Using Environmental and Operational Condition Clustering for Data Normalization: Validation on an Operational Wind Turbine System, *Proceedings of the IEEE*, 108(8), 2016, 1-15
- M.B. Kane, J. Scruggs, J.P. Lynch
 Model-Predictive Control Techniques for Hydronic Systems Implemented on Wireless Sensor and Actuator Networks, *2014 American Control Conference*, 2014, 3542-3547

SELECTED RESEARCH PROJECTS

- Understanding the Algorithmic Workplace: A Multi-Method Study for Comprehensive Optimization of Platforms
 Co-Principal Investigator, National Science Foundation

HARIS N. KOUTSOPOULOS



Professor and Associate Chair for Graduate Studies, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1986
coe.northeastern.edu/people/koutsopoulos-haris

Scholarship focus: urban transportation networks and informatics; mobility on demand; intelligent transportation systems; public transportation operations

Honors and awards: August-Wilhelm Scheer Visiting Professor, TUM, Technical University of Munich; Traffic Simulation Lifetime Achievement Award, Transportation Research Board

SELECTED PUBLICATIONS

- A. Tympakianaki, H.N. Koutsopoulos, E. Jenelius, Anatomy of Tunnel Congestion: Causes and Implications for Tunnel Traffic Management, Tunnelling and Underground Space Technology, 83, 2019, 498-508
- Z. Ma, H.N. Koutsopoulos, Y. Chen, N.H.M. Wilson Estimation of Denied Boarding in Urban Rail Systems: Alternative Formulations and Comparative Analysis, Forthcoming, Transportation Research Record (TRR), Journal Transportation Research Board, 2019
- A. Halvorsen, H.N. Koutsopoulos, Z. Ma, J. Zhao Design and Evaluation of Transit Demand Management Programs Using Smart Card Data, Transportation, 2019
- Z. Zhao, H.N. Koutsopoulos, J. Zhao Detecting Pattern Changes in Individual Travel Behavior: A Bayesian Approach, Transportation Research B, 112, 2018, 73-88
- P. Noursalehi, H.N. Koutsopoulos, J. Zhao Real time Transit Demand Prediction Capturing Station Interactions and Impact of Special Events, Transportation Research C, 97, 2018, 277-300
- H. N. Koutsopoulos, Z. Ma, P. Noursalehi, Y. Zhu Transit Data Analytics for Planning, Monitoring, Control and Information, In Mobility Patterns, Big Data and Transportation Analytics, Chapter 10, C. Antoniou, editor, Elsevier, 2018

SELECTED RESEARCH PROJECTS

- Transport for London Research Partnership
Principal Investigator, Transport for London
- Mass Transit Railway Research Partnership
Principal Investigator, Mass Transit Railway
- Massachusetts Bay Transportation Authority
Principal Investigator, Boston Research Partnership

MICHELLE LABOY



Assistant Professor, School of Architecture; affiliated faculty, Civil and Environmental Engineering

MArch, MUP, University of Michigan, Ann Arbor, 2005
coe.northeastern.edu/people/laboy-michelle

Scholarship focus: building and site systems integration; structures and landscape performance; building and urban resilience; green infrastructure; socio-ecological factors in design; transdisciplinary teaching and learning

Honors and awards: Latrobe Prize, American Institute of Architects College of Fellows

SELECTED PUBLICATIONS

- M. Laboy
1-Inch Urbanism: An Architectural Agenda for Decentralized Storm Water Buffering, Future Praxis: Applied Research as a Bridge Between Theory and Practice: Journal of Proceedings of the 2019 ARCC International Conference
- M. Laboy, A. Onnis-Hayden
Bridging the Gap Between Architecture and Engineering: a Transdisciplinary Model for a Resilient Built Environment, Proceedings of BTES 2019: Integration and Innovation, 2019 Conference of the Building Technology Educators Society
- D. Fannon, M. Laboy, P. Wiederspahn
Dimensions of Use: From Determinism to a New Humanism, Enquiry, The ARCC Journal of Architectural Research, 15(1), 2018
- D. Fannon, M. Laboy
Resilient Homes Online Design Aid: Connecting Research and Practice for Socially Resilient Communities, Design and Resilience: Proceedings of the 2018 AIA/ACSA Intersections Symposium, Washington, DC, 2018
- M. Laboy
On Groundwater: Invisible Architectural Environments, Journal of Architectural Education, 71(2), 2017

SELECTED RESEARCH PROJECTS

- Boston LightWells
Principal Investigator, Boston Groundwater Trust and Autodesk BUILD Grant
- Future-Use Architecture: Design for Persistent Change
Co-Principal Investigator, American Institute of Architects College of Fellows

PHILIP LARESE-CASANOVA



Associate Professor, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences

PhD, University of Iowa, 2006
coe.northeastern.edu/people/larese-casanova-philip

Scholarship focus: environmental chemistry and mineralogy; transformation and remediation of water pollutants; nanomaterial sorbents for water treatment

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

S.M. Navarro Gallón, E. Alpaslan, M. Wang, P. Larese-Casanova, et al.

Characterization and Study of the Antibacterial Mechanisms of Silver Nanoparticles Prepared with Microalgal Exopolysaccharides, *Materials Science and Engineering C*, 99, 2019, 685-695

P. Joshi, M.S. Fantle, P. Larese-Casanova, C.A. Gorski
 Susceptibility of Goethite to Fe²⁺-Catalyzed Recrystallization over Time, *Environmental Science & Technology*, 51(20), 2017, 11681-11691

N. Cai, P. Larese-Casanova
 Application of Positively-Charged Ethylenediamine-Functionalized Graphene for the Sorption of Anionic Contaminants from Water, *Journal of Environmental Chemical Engineering*, 4, 2016, 2941-2951

N. Cai, D. Peak, P. Larese-Casanova
 Factors Influencing Natural Organic Matter Sorption onto Commercial Graphene Oxides, *Chemical Engineering Journal*, 273, 2015, 568-579

G. Guisbiers, Q. Wang, E. Khachatryan, L.C. Mimun, R. Mendoza-Cruz, P. Larese-Casanova, et al.
 Inhibition of E. coli and S. Aureus with Selenium Nanoparticles Synthesized by Pulsed Laser Ablation in Deionized Water, *International Journal of Nanomedicine*, 11, 2016, 3731-3736

SELECTED RESEARCH PROJECTS

CAREER: Quantum Dot Degradation in Aquatic Environments

Principal Investigator, National Science Foundation
 Insights to Selenium Cycling and Remediation Revealed by Stable Oxygen Isotopes

Principal Investigator, National Science Foundation
 Recrystallization of Stable Iron Oxides in Reducing Environments

Principal Investigator, National Science Foundation

YIANNIS LEVENDIS



COE Distinguished Professor, Mechanical and Industrial Engineering; affiliated faculty, Civil and Environmental Engineering

PhD, California Institute of Technology, 1987
coe.northeastern.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

C. Wen, J. Zhang, Y.A. Levendis, M.A. Delichatsios
 A Method to Assess Downward Flame Spread and Dripping Characteristics of Fire-Retardant Polymer Composites, *Fire and Materials*, 42, 2018, 347-357

C. Zhuo, H. Richter, Y.A. Levendis
 Carbon Nanotube Production from Ethylene in CO₂/N₂ Environments, *Journal of Energy Resources Technology*, 140(8), 2019, 085001-1-9

X. Ren, X. Meng, A. Panahi, E. Rokni, R. Sun, Y.A. Levendis
 HCl Release from Combustion of Corn Straw in a Fixed Bed, *Journal of Energy Resources Technology*, 140, 2018, 051801-1-9

A. Panahi, M. Tarakcioglu, M. Schiemann, M. Delichatsios Y.A. Levendis
 On the Particle Sizing of Torrefied Biomass for Co-Firing with Pulverized Coal, *Combustion and Flame*, 194, 2018, 72-84

SELECTED RESEARCH PROJECTS

Containment of Greenhouse Gases Through use of Refrigerants that are based on Petroleum-derived Products and Recycled Carbon Dioxide
 Principal Investigator, Funded by The American Chemical Society

Pyrolysis of Polyethylene Terephthalate (PETE) Wastes to MW-CNTs,
 Principal Investigator, Funded by Canon Virginia Inc

AMY MUELLER



Assistant Professor, Civil and Environmental Engineering; jointly appointed, Marine and Environmental Sciences; affiliated faculty, Electrical and Computer Engineering

PhD, Massachusetts Institute of Technology, 2012
coe.northeastern.edu/people/mueller-amy

Scholarship focus: biogeochemistry of natural and engineered systems; in-situ sensors and instrumentation for high-resolution process characterization; remediation and sustainability in natural and built coastal environments; sensor-driven closed-loop controls for resource optimization in engineered systems; signal processing and machine learning, embedded systems, and sensor networks

Honors and awards: National Science Foundation Ocean Sciences Postdoctoral Research Fellowship

SELECTED PUBLICATIONS

A. Snaffer, U. Chauhan, K. Cogert, M.K.H. Winkler, A. Mueller

Data Fusion for Environmental Process Control: Maximizing Useful Information Recovery for Process Control under Data Limited Constraints, *IEEE Sensors Letters: Special Issue Multimodal Data Fusion*, 3(1), 2019

C.-A. Chou, J. Xiaoning, A. Mueller, S. Ostadabbas
 Multimodal Data Fusion-Moving from Domain-Specific Algorithms to Trans-Domain Understanding for Accelerated Solution Development, *IEEE Sensors Letters, Special Issue on Multimodal Data Fusion*, 3(1), 2019, 7100104

A.V. Mueller, H.F. Hemond

Statistical Generation of Training Sets for Measuring NO₃⁻, NH₄⁺, and Major Ions in Natural Waters by an Ion Selective Electrode Array, *Environmental Science: Processes and Impacts*, 18(5), 2016, 590-599

SELECTED RESEARCH PROJECTS

Implementation of a synthetic Anammox Bio-Granular Technology in the Main Wastewater Treatment Line
 Co-Principal Investigator, Defense Advanced Research Projects Agency Biological Technologies

PRISM: Better Ocean Data for Better Ocean Management
 Principal Investigator, Massachusetts Technology Transfer Center - Acorn Innovation Fund

Real-Time Responsive Nutrient Loading Management in Urban Catchments Through Sewer-Embedded Sensing and Controls

Principal Investigator, United States Geological Survey Water Resources Research Institute Program

SINAN MÜFTÜ



Interim Associate Dean for Faculty Affairs; Professor, Mechanical and Industrial Engineering; affiliated faculty, Civil and Environmental Engineering

PhD, University of Rochester, 1994
coe.northeastern.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

E. Lin, Q. Chen, O.C. Ozdemir, V.K. Champagne, S. Müftü
 Effects of Interface Bonding on the Residual Stresses in Cold-Sprayed Al-6061: A Numerical Investigation, *Journal of Thermal Spray Technology*, 28, 2019, 472-483

O.C. Ozdemir, Q. Chen, S. Müftü, V.K. Champagne
 Modeling the Continuous Heat Generation in the Cold Spray Coating Process, *Journal of Thermal Spray Technology*, 28, 2019, 108-123

J. Sun, A. Gu, S. Müftü, K.T. Wan
 Adhesion of a Solid Elastic Sphere onto a Rigid Planar Substrate in the Presence of Moisture, *Journal of Applied Mechanics*, 85, 2018, 061009

Q. Chen, A. Alizadeh-Dehkarghani, 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

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

SAMUEL MUÑOZ



Assistant Professor, Marine and Environmental Sciences; jointly appointed, Civil and Environmental Engineering

PhD, University of Wisconsin-Madison, 2015
coe.northeastern.edu/people/munoz-samuel

Scholarship focus: sedimentary records of environmental change; paleoclimate and climate change; rivers and fluvial processes; hydroclimatic extremes

SELECTED PUBLICATIONS

- J.R. Walsh, J.R. Corman, S.E. Muñoz
 Coupled Long-Term Limnological Data and Sedimentary Data Reveal Novel Control on Water Quality in a Eutrophic Lake, *Limnology & Oceanography*, 64(S1), 2019, S34-S48
- A.J. White, L.R. Stevens, V. Lorenzi, S.E. Muñoz, S. Schroeder, A. Cao, T. Bogdanovich
 Fecal Stanols Show Simultaneous Flooding and Seasonal Precipitation Change Correlate with Cahokia's Population Decline, *Proceedings of the National Academy of Sciences*, 116(12), 2019, 5461-5466
- S.E. Muñoz, L. Giosan, J. Blusztajn, C. Rankin, G.E. Stinchcomb
 Radiogenic Fingerprinting Reveals Anthropogenic and Buffering Controls on Sediment Dynamics of the Mississippi River System, *Geology*, 47(3), 2019, 271-274
- S.E. Muñoz, L. Giosan, M.D. Therrell, J.W. Remo, Z. Shen, R.M. Sullivan, J.P. Donnelly
 Climatic Control of Mississippi River Flood Hazard Amplified by River Engineering, *Nature*, 556(7699), 2018, 95-98
- S.E. Muñoz, S.G. Dee
 El Niño Increases the Risk of Lower Mississippi River Flooding, *Scientific Reports*, 7, 2017, 1772

SELECTED RESEARCH PROJECTS

- Collaborative Research: Re-evaluating Precipitation Extremes and Flood Hazard in the Wake of Hurricane Harvey
 Principal Investigator, National Science Foundation Hydrologic Sciences
- Collaborative Research: Extreme Floods on the Lower Mississippi River in the Context of Late Holocene Climatic Variability
 Principal Investigator, National Science Foundation Paleo-Perspectives on Climate Change
- Coastal Flooding Prediction and Mitigation: Integrating High-Fidelity Computer Models with Field Observations
 Principal Investigator, Global Resilience Institute of Northeastern University

ANDREW MYERS



Associate Professor, Civil and Environmental Engineering

PhD, Stanford University, 2009
coe.northeastern.edu/people/myers-andrew

Scholarship focus: offshore wind structures; multi-scale experimental testing of structures; computational simulation; fracture and damage mechanics of metals; probabilistic modeling

Honors and awards: National Science Foundation CAREER Award; Civil and Environmental Engineering Excellence in Teaching Award

SELECTED PUBLICATIONS

- S. Hallowell, A.T. Myers, S.R. Arwade, W. Pang, P. Rawal, E. Hines, J.F. Hajjar, C. Qiao, V. Valamanesh, K. Wei, W. Carswell, C. Fontana
 Hurricane Risk Assessment of Offshore Wind Turbines, *Renewable Energy*, Elsevier, 2018
- A. Mahmoud, S. Torabian, A. Jay, F. Mirzaie, A.T. Myers, E. Smith, B.W. Schafer
 Modeling the Flexural Collapse of Thin-Walled Spirally Welded Tapered Tubes, *Journal of Structural Engineering*, ASCE, 123, 2018, 270-281
- S.T. Hallowell, S.R. Arwade, C.M. Fontana, D.J. DeGroot, C.P. Aubeny, B.D. Diaz, A.T. Myers, M.E. Landon
 System Reliability of Floating Offshore Wind Farms with Multiline Anchors, *Ocean Engineering*, 160, 2018, 94-104
- F. Mirzaie, A.T. Myers, A. Jay, A. Mahmoud, S. Torabian, E. Smith, B.W. Schafer
 Imperfection Measurements to Predict Buckling Behavior of Slender Steel Tubes, *Thin-Walled Structures*, Elsevier, 2017
- A. Jay, A.T. Myers, F. Mirzaie, A. Mahmoud, S. Torabian, E. Smith, B.W. Schafer
 Large-Scale Bending Tests of Slender, Tapered Spirally Welded Steel Tubes, *Journal of Structural Engineering*, ASCE, 2016

SELECTED RESEARCH PROJECTS

- CAREER: Advancing Multi-Hazard Assessment and Risk-based Design for Offshore Wind Energy Technology
 Principal Investigator, National Science Foundation
- GOALI/Collaborative Research: Optimization of Infrastructure-Scale Thin-Walled Tube Towers including Uncertainty
 Principal Investigator, National Science Foundation

ANNALISA ONNIS-HAYDEN



Teaching Professor, Civil and Environmental Engineering

PhD, University of Cagliari, Italy, 2004
coe.northeastern.edu/people/onnis-hayden-annalisa

Scholarship focus: biological treatment processes; ecotoxicology and toxicity assessment; microbial population dynamics and ecology in engineered biological systems

Honors and awards: Civil and Environmental Engineering Excellence in Teaching Award; Martin W. Essigman Outstanding Teaching Award, College of Engineering

SELECTED PUBLICATIONS

M. Laboy, A. Onnis-Hayden

Bridging the Gap between Architecture and Engineering: a Transdisciplinary Model for a Resilient Built Environment, Building Technology Educator's Society, 1, 2019, 38

A. Onnis-Hayden, N. Majed, Y. Li, S.M. Rahman, D. Drury, L. Risso, A.Z. Gu

Impact of Solid Residence Time (SRT) on Functionally Relevant Microbial Populations and Performance in Full-Scale Enhanced Biological Phosphorus Removal (EBPR) Systems, Water Environment Research, 2019

S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu
 Comparative Life Cycle Assessment of Advanced Wastewater Treatment Processes for Removal of Chemicals of Emerging Concern, Environmental Science and Technology, 52(19), 2018, 11346-11358

Y. Zhao, Z. Zhang, G. Wang, X. Li, J. Ma, S. Chen, H. Deng, A. Onnis-Hayden

High Sulfide Production Induced by Algae Decomposition and its Potential Stimulation to Phosphorus Mobility in Sediment, Science of the Total Environment, 650, 2018, 163-172

A. Onnis-Hayden, C. Venegas-Martinez, L. Carver, M. Dreyer

Integrating Engineering, Innovation, and Research at All Levels: An Educational Model for Water Reuse Design, Proceeding of the 2017 ASEE Annual Conference, Columbus, Ohio

SELECTED RESEARCH PROJECTS

Practices to Enhance Internal Fermentation of Side-Stream Secondary Sludge and Mixed Liquor Suspended Solids for Biological Phosphorus Removal

Co-Principal Investigator, Water Research Foundation

MARK PATTERSON



Professor, Marine and Environmental Sciences; jointly appointed, Civil and Environmental Engineering; Associate Dean for Research and Graduate Affairs, COS, and Chief Technology Officer, Global Resilience Institute

PhD, Harvard University, 1985
coe.northeastern.edu/people/patterson-mark

patterson-mark

Scholarship focus: development of autonomous underwater robots for civil infrastructure and marine sensing; decision support tools for gray/green infrastructure like tide gates; environmental fluid mechanics; biomechanics and mass transfer in living systems

Honors and awards: Member of the Year Award, Association of Unmanned Vehicle Systems International; Lockheed Martin Award for Excellence in Ocean Science and Engineering

SELECTED PUBLICATIONS

N. Relles, M. Patterson, D. Jones

Change Detection in a Marine Protected Area (MPA) over Three Decades on Bonaire, Dutch Caribbean, Journal of the Marine Biological Association of the United Kingdom, 2018, 1-10

A.C. Trembanis, A.L. Forrest, B.M. Keller, M.R. Patterson
 Mesophotic Coral Ecosystems: A Geoacoustically Derived Proxy for Habitat and Relative Diversity for the Leeward Shelf of Bonaire, Dutch Caribbean, Frontiers in Marine Science, 4(51), 2017

R.H. Certner, A.M. Dwyer, M.R. Patterson, S.V. Vollmer
 Zooplankton as a Potential Vector for White Band Disease Transmission in the Endangered Coral, Acropora Cervicornis, Journal of Life and Environmental Sciences, 5, 2017, e3502

J. Elliott, M. Patterson, N. Summers, C. Mitermiqué, E. Montocchio, E. Vitry

How Does the Proliferation of the Coral-Killing Sponge Terpios hoshinota Affect Benthic Community Structure on Coral Reefs?, Coral Reefs, 2016, 1-13

SELECTED RESEARCH PROJECTS

MantaRay Microplastics Sampler

Co-Principal Investigator, Schmidt Marine Technology Partners, Schmidt Family Foundation

Tide Gate Modulation of Wetland Function: Decision Support Through Engineering Best Practices

Principal Investigator, National Science Foundation Environmental Sustainability

KELSEY PIEPER



Assistant Professor, Civil and Environmental Engineering

PhD, Virginia Tech, 2015
coe.northeastern.edu/people/pieper-kelsey

Scholarship focus: applied environmental chemistry; corrosion; drinking water quality, treatment, and infrastructure; post-disaster drinking water recovery; public health engineering

SELECTED PUBLICATIONS

D. Dai, W. Rhoads, A. Katner, L. Strom, M. Edwards, A. Pruden, K.J. Pieper

Molecular Survey of *Legionella* and *Naegleria Fowleri* in Private Well Water and Premise Plumbing Following the 2016 Louisiana Flood, *Environmental Science: Water Research & Technology*, 2019

K.J. Pieper, V.E. Nystrom, J. Parks, K. Jennings, H. Faircloth, J.B. Morgan, J. Bruckner, M.A. Edwards

Elevated Lead in Water of Private Wells Poses Health Risks: Case Study in Macon County, North Carolina, *Environmental Science & Technology*, 52(7), 2018, 4350–4357

K.J. Pieper, R. Martin, M. Tang, L. Walters, J. Parks, S. Roy, C. Devine, M.A. Edwards

Evaluating Water Lead Levels During the Flint Water Crisis, *Environmental Science & Technology*, 52(15), 2018, 8124–8132

J. Parks, K.J. Pieper, A. Katner, M. Tang, M. Edwards
 Potential Challenges Meeting the American Academy of Pediatrics' Lead in School Drinking Water Goal of 1 µg/L, *Corrosion*, 74(8), 2018, 914–917

K.J. Pieper, M. Tang, M.A. Edwards

Flint Water Crisis caused by Interrupted Corrosion Control: Investigating “Ground Zero” Home, *Environmental Science & Technology*, 51(4), 2017, 2007–2014

SELECTED RESEARCH PROJECTS

Identification of Factors Impacting Efficacy and Adoption of Low-Cost Point of Use Filters

Co-Principal Investigator, U.S. Department of Housing and Urban Development

Impact of Hurricane Florence on Well Quality in Communities Surrounding Coal Ash Impoundments in North Carolina

Principal Investigator, National Science Foundation

Untapping the Crowd: Consumer Detection and Control of Lead in Drinking Water

Co-Principal Investigator, U.S. Environmental Protection Agency

AMEET PINTO



Assistant Professor, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences

PhD, Virginia Tech, 2009
coe.northeastern.edu/people/pinto-ameet

Scholarship focus: microbial ecology and physiology; drinking water treatment and distribution; wastewater treatment; public health microbiology, molecular microbiology; ‘omics analyses

Honors and awards: Bright IDEAS Award, Engineering and Physical Sciences Research Council; National Science Foundation CAREER Award; International Water Association/International Society of Microbial Ecology BioCluster Award (Rising Star); Virginia Tech CEE Outstanding Young Alumni

SELECTED PUBLICATIONS

M.J. Kiristis, M. Emelko, A.J. Pinto

Applying Biotechnology for Drinking Water Biofiltration: Advancing Science and Practice, *Current Opinions in Biotechnology*, 57, 2019, 197–204

N.M. Hull, F. Ling, A.J. Pinto, M. Albertsen, et al.

Drinking Water Microbiome Project: Is it Time?, *Trends in Microbiology*, 27(8), 2019, 670–677

I. Bradley, M. Sevillano-Rivera, A.J. Pinto, J.S. Guest

Impact of Solids Residence Time on Community Structure and Nutrient Dynamics of Mixed Phototrophic Wastewater Treatment Systems, *Water Research*, 150(1), 2019, 271–282

S. Potgieter, A.J. Pinto, M. Sigudu, H. du Preez, E. Ncube, S. Venter

Long-Term Spatial and Temporal Microbial Community Dynamics in a Large-Scale Drinking Water Distribution System with Multiple Disinfectant Regimes, *Water Research*, 139(1), 2018, 406–419

S.T. Calus, U.I. Ijaz, A.J. Pinto

NanoAmpli-Seq: A Workflow for Amplicon Sequencing from Mixed Microbial Communities on the Nanopore Sequencing Platform, *Gigascience*, 7(12), 2018

SELECTED RESEARCH PROJECTS

Estimating the Comammox Contribution to Ammonia Oxidation in Nitrogen Removal Systems

Principal Investigator, Water Environment & Reuse Foundation

CAREER: Developing a Spatial-Temporal Predictive Framework for the Drinking Water Microbiome

Principal Investigator, National Science Foundation

MEHRDAD SASANI



Professor, Civil and Environmental Engineering

PhD, University of California at Berkeley, 2001
coe.northeastern.edu/people/sasani-mehrdad

Scholarship focus: progressive collapse of structures; earthquake engineering; structural resilience, integrity and reliability

Honors and awards: Fellow, American Concrete Institute; Fellow, American Society of Civil Engineers; Fellow, Structural Engineering Institute; National Science Foundation CAREER Award; Boston Society of Civil Engineers Section President's Award; BSCES/ASCE Clemens Herschel outstanding paper award

SELECTED PUBLICATIONS

M. Joyner, M. Sasani

A Multihazard Risk-Based Resilience Analysis of East and West Coast Buildings Designed to Current Codes, *Journal of Structural Engineering*, ASCE, 144(9), 2018, 1-16

R. Ceskavich, M. Sasani

Methodology for Evaluating Community Resilience, *Natural Hazards Review*, ASCE, 19(1), 2018, 1-13

J.A. Murray, M. Sasani

Collapse Resistance of a 7-Story Structure With Multiple Shear-Axial Column Failures Using Hybrid Simulation, *Journal of Structural Engineering*, ASCE, 143(5), 2017, 1-13

J.A. Murray, M. Sasani

Seismic Hybrid Simulation of a Nonductile RC Building with Severe Damage to Multiple Columns, *Earthquake Engineering and Structural Dynamics*, 46, 2017, 733-752

C. Wan, C. Audi, M. Sasani

Modeling Floor Systems for Collapse Analysis, *Engineering Structures*, 127, 2016, 278-286

J.A. Murray, M. Sasani

Near-Collapse Response of Existing RC Building Under Severe Pulse Type Ground Motion Using Hybrid Simulation, *Earthquake Engineering and Structural Dynamics*, 45(7), 2016, 1109-1127

SELECTED RESEARCH PROJECTS

A Decision and Design Framework for Multi-Hazard Resilient and Sustainable Buildings (RSB)

Principal Investigator, National Science Foundation

Near Collapse Performance of Existing RC Concrete Frame Buildings (NEESR)

Principal Investigator, National Science Foundation

THOMAS SHEAHAN



Sr. Vice Provost for Curriculum and Programs; Professor, Civil and Environmental Engineering; Training Core Leader, PROTECT Center

ScD, Massachusetts Institute of Technology, 1991
coe.northeastern.edu/people/sheahan-thomas

Scholarship focus: soft ground engineering; coastal adaptation education; and training for engineers and scientists

Honors and awards: Fellow, American Society of Civil Engineers, Tau Beta Pi National McDonald Mentoring Award

SELECTED PUBLICATIONS

E. Hamin, Y. Abunnasr, M.R. Dilthey, P. Judge, M. Kenney, P. Kirshen, T.C. Sheahan, D.J. DeGroot, R.L. Ryan, B. McAdoo, L. Nurse, J. Buxton, E. Roper, E. Albright, M. Buchanan, A. Marielos Marin, R. Fricke

Pathways to Coastal Resiliency: The Adaptation Gradients Framework, *Sustainability*, 2018

D. Meric, F. Hellweger, A.N. Alshawabkeh, T.C. Sheahan Nonlinear Nonequilibrium One-Dimensional Large-Strain Consolidation-Coupled Contaminant Transport Model of Capped Sediments, *American Society of Civil Engineers Journal of Geotechnical and Geoenvironmental Engineering*, 143(8), 2017

D. Meric, A.N. Alshawabkeh, J.P. Shine, T.C. Sheahan Bioavailability of Hydrophobic Organic Compounds in Thin-Layered Sediments, *Chemosphere*, 103, 2014, 281-289

D. Cheney, L. Rajicb, E. Sly, D. Meric, T.C. Sheahan Uptake of PCBs Contained in Marine Sediments by the Green Macroalga *Ulva Rigida*, *Marine Pollution Bulletin*, 88(1-2), 2014, 207-214

R.D. Holtz, W.D. Kovacs, T.C. Sheahan
 An Introduction to Geotechnical Engineering, 2nd Edition, Upper Saddle River, NJ: Pearson Prentice-Hall, 2011

SELECTED RESEARCH PROJECTS

Puerto Rico Testsite for Exploring Contamination Threats (PROTECT)

Training Core Leader, National Institutes of Health

Sustainable Adaptive Gradients in the Coastal Environment: Reconceptualizing the Role of Infrastructure in Resilience

Co-Principal Investigator, National Science Foundation

MICHAEL B. SILEVITCH



Robert D. Black Professor, COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Civil and Environmental Engineering; Director, CenSSIS

PhD, Northeastern University, 1971
coe.northeastern.edu/people/silevitch-michael

Scholarship focus: subsurface sensing and imaging systems; detection of explosives related anomalies; engineered system development and engineering leadership

Honors and awards: Life Fellow, Institute of Electrical and Electronics Engineers; 2015 National Academy of Engineering Gordon Prize, for developing an innovative method to provide graduate engineers with the necessary personal skills to become effective engineering leaders

SELECTED RESEARCH PROJECTS

ALERT: Awareness and Localization of Explosives Related Threats, A Department of Homeland Security Center of Excellence. ALERT seeks to conduct transformational research, technology and educational development for effective characterization, detection, mitigation and response to the explosives-related threats facing the country and the world

Director and Principal Investigator, Department of Homeland Security

CenSSIS: Center for Subsurface Sensing and Imaging Systems, Gordon-CenSSIS, a graduated NSF Engineering Research Center, was created to develop new technologies to detect hidden objects, and to use those technologies to meet real-world subsurface challenges in areas as diverse as noninvasive breast cancer detection and underground pollution assessment

Director and Principal Investigator, National Science Foundation

Research and Development of Reconstruction Advances in CT Based Object Detection Systems

Principal Investigator, Department of Homeland Security

JENNIE C. STEPHENS



Director, School of Public Policy & Urban Affairs; Dean's Professor of Sustainability Science and Policy; affiliated faculty, Civil and Environmental Engineering; Director of Strategic Research Collaborations, Global Resilience Institute

PhD, California Institute of Technology, 2002
coe.northeastern.edu/people/stephens-jennie

stephens-jennie

Scholarship focus: renewable energy transformation, reducing fossil fuel reliance; energy resilience; energy democracy; integrating social justice with climate and energy innovations

Honors and awards: Arab-American Frontiers Fellowship, National Academy of Sciences; Leopold Leadership Fellowship, Stanford Woods Institute for the Environment

SELECTED PUBLICATIONS

J.C. Stephens

Energy Democracy: Redistributing Power to the People Through Renewable Transformation, *Environment: Science and Policy for Sustainable Development*, 61(2), 2019, 4-13

E. Allen, H. Lyons, J.C. Stephens

Women's Leadership in Renewable Energy Transitions, *Energy Justice and Energy Democracy: Redistributing Power*, *Energy Research and Social Science*, 2019

M. Burke, J.C. Stephens

Political Power and Renewable Energy Futures: A Critical Review, *Energy Research & Social Science*, 35, 2018, 78-93

A. Massol-Deyá, J.C. Stephens, J.L. Colón

Renewable Energy for Puerto Rico, *Science*, 362 (6410), 2018, 7

A.M. Feldpausch-Parker, T.R. Peterson, J.C. Stephens, E.J. Wilson

Smart Grid Electricity System Planning and Climate Disruptions: A Review of Climate and Energy Discourse Post-Superstorm Sandy, *Renewable and Sustainable Energy Reviews*, 2017

R. Pearl-Martinez, J.C. Stephens

Toward a Gender Diverse Workforce in the Renewable Energy Transition, *Sustainability: Science, Practice and Policy*, 12(1), 2016

J.C. Stephens, E.J. Wilson, T.R. Peterson

Smart Grid (R)Evolution: Electric Power Struggles, Cambridge University Press, 2015

ARON STUBBINS



Associate Professor, Marine and Environmental Sciences; jointly appointed, Civil and Environmental Engineering, Chemistry and Chemical Biology

PhD, Newcastle University, 2002
coe.northeastern.edu/people/stubbins-aron

Scholarship focus: environmental chemistry; geochemistry; the carbon cycle; freshwater, coastal and ocean biogeochemistry; feedbacks between natural biogeochemical cycles and climate change; permafrost; black carbon; aquatic microplastics

Honors and awards: Fellow of the Association for the Sciences of Limnology and Oceanography

SELECTED PUBLICATIONS

S. Wagner, J.H. Fair, S. Matt, J. Hosen, P. Raymond, J. Saiers, J. Shanley, T. Dittmar, A. Stubbins
 Molecular Hysteresis: Hydrologically-Driven Changes in Riverine Dissolved Organic Matter Chemistry during a Storm Event, *Journal of Geophysical Research: Biogeosciences*, 124(4), 2019, 759-774

M. Jennings, H. Abdulla, A. Stubbins, L. Sun, R. Wang, K. Mopper
 A Dissolved Organic Carbon (DOC) Analyzer Capable of Detecting Sub- μM DOC Differences in Natural Fresh Waters: A Proof of Concept Study, *Limnology and Oceanography: Methods*, 16, 2018, 309-321

S. Wagner, R. Jaffé, A. Stubbins
 Dissolved Black Carbon in Aquatic Ecosystems, *Limnology and Oceanography Letters*, 3, 2018, 168-185

J.T. Van Stan, A. Stubbins
 Tree-DOM: Dissolved Organic Matter in throughfall and Stemflow, *Limnology and Oceanography Letters*, 3, 2018, 199-214

SELECTED RESEARCH PROJECTS

CBET: The Role of Sunlight in Determining the Fate and Microbial Impact of Microplastics in Surface Waters
 Principal Investigator, National Science Foundation, Chemical, Bioengineering, Environmental and Transport Systems

Constraining the Source of Oceanic Dissolved Black Carbon Using Compound-Specific Stable Carbon Isotopes
 Co-Principal Investigator, National Science Foundation

Linking Microbial Diversity, Gene Expression, and the Transformation of Terrestrial Organic Matter in Major U.S. Rivers
 Principal Investigator, National Science Foundation

HAO SUN



Assistant Professor, Civil and Environmental Engineering

PhD, Columbia University, 2014
coe.northeastern.edu/people/sun-hao

Scholarship focus: physics-informed AI for scarce data interpretation; smart and resilient infrastructure; innovative sensing; big data analytics; machine/deep learning; uncertainty quantification and inverse computational mechanics with applications to civil infrastructure monitoring and resilience assessment

Honors and awards: Forbes 30 Under 30: Science; Top 10 Outstanding Chinese American Youth; Boeing Fellowship

SELECTED PUBLICATIONS

R. Zhang, Z. Chen, S. Chen, J. Zheng, O. Buyukozturk, H. Sun
 Deep Long Short-Term Memory Networks for Nonlinear Structural Response Prediction, *Computers & Structures*, 220, 2019, 55-68

G. Yan, H. Sun
 Identification of Impact Force for Composite Structures Using a Non-Negative Bayesian Learning, *Journal of Sound and Vibration*, 457, 2019, 354-367

G. Chen, Travis M. Adams, H. Sun, E.S. Bell, O. Buyukozturk
 Camera-Based Vibration Measurement of the Portsmouth, NH WWI Memorial Bridge, *ASCE Journal of Structural Engineering*, 144(11), 2018, 04018207

H. Sun, A. Mordret, G.A. Prieto, N. Toksoz, O. Buyukozturk
 Bayesian Characterization of Buildings Using Seismic Interferometry on Ambient Vibrations, *Mechanical Systems and Signal Processing*, 85, 2017, 468-486

H. Sun, O. Buyukozturk
 Probabilistic Updating of Building Models Using Incomplete Modal Data, *Mechanical Systems and Signal Processing*, 75(0) 2016, 27-40

SELECTED RESEARCH PROJECTS

Data Interferometry for Field Monitoring: Development and Applications in Structural and Crustal Systems
 Principal Investigator, Subcontract from MIT; Shell Global

Image Processing and Machine Learning Algorithms to Measure Axial Stress in Rails
 Co-Principal Investigator, Federal Railroad Administration

Physics-Encoded Sparsity-Promoted Deep Learning for Data-Driven Discovery of Nonlinear Governing Laws
 Principal Investigator, Northeastern University

ALI TOURAN



Professor, Civil and Environmental Engineering

PhD, Stanford University, 1980
coe.northeastern.edu/people/touran-ali

Scholarship focus: risk assessment; construction cost/schedule uncertainty; project delivery systems; simulation; construction productivity

Honors and awards: Fellow, American Society of Civil Engineers; President's Award, Boston Society of Civil Engineers

SELECTED PUBLICATIONS

- N. Montazeri, A. Touran
 Multi-Objective Reliability-Based Optimization of Life-Cycle Maintenance for Bridges under Cost Uncertainty, Proceedings of the Construction Research Congress, ASCE, 2018
- R. Tapia, D.D. Gransberg, A. Touran
 Managing Scheduling Risk due to Geotechnical Uncertainty Using Linear Scheduling, Proceedings of the Transportation Research Board, Washington, D.C., 2017
- A. Touran, F. Panah
 Use of the Alternative Technical Concepts in Transportation Projects, ISEC, 9 Conference, 2017
- R. Masoumi, A. Touran
 A Framework to Form Balanced Project Portfolios, Proceedings of the Construction Research Congress, San Juan, Puerto Rico, 2016
- A. Touran, J. Liu
 A Method for Estimating Contingency based on Project Complexity, Procedia Engineering, Elsevier, 123, 2015, 574-580
- A.P. Gurgun, A. Touran
 Public-Private Partnership Experience in the International Arena: Case of Turkey, Journal of Management in Engineering, 30(6), 2014

SELECTED RESEARCH PROJECTS

- Integrated Project Delivery in Industrial Projects
 Co-Principal Investigator, Construction Industry Institute
- Systematic Approach for Estimating Construction Contract Time
 Co-Principal Investigator, National Cooperative Highway Research Program

GEOFFREY C. TRUSSELL



Professor and Chair, Department of Marine and Environmental Sciences; Director Coastal Sustainability Institute & Marine Science Center; affiliated faculty, Civil and Environmental Engineering

PhD, College of William & Mary, 1998
coe.northeastern.edu/people/trussell-geoffrey

Scholarship focus: evolutionary and community ecology; coastal sustainability

Honors and awards: Ray Lankester Investigatorship; Sigma Delta Tau Outstanding Professor

SELECTED PUBLICATIONS

- S.C. Donelan, G.C. Trussell
 The Effects of Embryonic Experience with Predation Risk Vary Across a Wave Exposure Gradient, Ecosphere, 10(4), 2019, e02676
- C.M. Matassa, P.J. Ewanchuk, G.C. Trussell
 Cascading Effects of a Top Predator on Intraspecific Competition at Intermediate and Basal Trophic Levels, Functional Ecology, 2018, 1-12
- S.C. Donelan, G.C. Trussell
 Parental and Embryonic Experiences with Predation Risk Affect the Behavior and Performance of their Offspring, Proceedings of Roy. Soc. B., 2018
- S.C. Donelan, G.C. Trussell
 Synergistic Effects of Parental and Embryonic Exposure to Predation Risk on Offspring Size at Emergence, Ecology, 99, 2018, 68-78
- M.E.S. Bracken, J.G. Douglass, V. Perini, G.C. Trussell
 Environmental Context and Scale Mediate the Effects of Biodiversity on Marine Primary Producers, Ecology, 98, 2017, 1434-1443
- G.C. Trussell, C.M. Matassa, P.J. Ewanchuk
 Moving Beyond Linear Food Chains: Trait-Mediated Indirect Interactions in a Rocky Intertidal Food Web, Proceedings of the Royal Society, 2017

SELECTED RESEARCH PROJECTS

- Collaborative Research: Intertidal Community Assembly and Dynamics: Integrating Broad-scale Regional Variation in Environmental Forcing and Benthic-pelagic Coupling
 Principal Investigator, National Science Foundation
- Collaborative Research: Using an Energetics Framework to Forecast the Interactive Effects of Abiotic and Biotic Stressors on Intertidal Mussels
 Co-Principal Investigator, National Science Foundation
- Research Coordination Network: Evolution in Changing Seas
 Co-Principal Investigator, National Science Foundation

SARA WADIA-FASCETTI



Vice Provost, PhD Network; Professor, Civil and Environmental Engineering

PhD, Stanford University, 1994
coe.northeastern.edu/people/wadia-fascetti-sara

Scholarship focus: condition assessment methodologies for infrastructure systems; life cycle and

life span analysis; nondestructive testing and evaluation; structural and earthquake engineering uncertainty

Honors and awards: American Society of Engineering Education Sharon Keillor Award for Women in Engineering Education; Minorities in Engineering Award, American Society of Engineering Education; National Science Foundation CAREER Award; Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, selected by President Bush and awarded at the White House

SELECTED PUBLICATIONS

D. Vine, S. Shahini Shamsabadi, Y. Zhao, R. Birken, M. Wang, S. Wadia-Fascetti

City-Wide Application of the Affordable and Rapid StreetScan Pavement Management System, *ASCE Journal of Infrastructure Systems*, 23(2), 2017

A. Ganguli, C.M. Rappaport, D. Abramo, S. Wadia-Fascetti
 Synthetic Aperture Imaging for Flaw Detection in a Concrete Medium, *Independent Nondestructive Testing and Evaluation*, 45(1), 2012, 79-90

K. Belli, S. Wadia-Fascetti, C. Rappaport
 Integrated Sensor and Media Modeling Environment Developed and Applied to Ground-Penetrating Radar Investigation of Bridge Decks, *Journal of Computing in Civil Engineering*, 25(1), 2011, 10-20

K. Belli, C. Rappaport, S. Wadia-Fascetti
 A Time Domain Equivalent Source Model of an Impulse GPR Antenna Based on Measured Radiation Field, *Research in Nondestructive Evaluation*, 22(4), 2011, 197-207

SELECTED RESEARCH PROJECTS

IGERT: Intelligent Diagnostics for Aging Civil Infrastructure
 Principal Investigator, National Science Foundation
 Northeastern ADVANCE
 Principal Investigator, National Science Foundation

VOTERS: Versatile Onboard Traffic Embedded Roaming Sensors

Co-Principal Investigator/Deputy Director, National Institute of Standards and Technology

KAI-TAK WAN



Professor, Mechanical and Industrial Engineering; affiliated faculty, Bioengineering, Civil and Environmental Engineering

PhD, University of Maryland at College Park, 1993
coe.northeastern.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

S. Liu, K.-T. Wan

A Preliminary Two-Dimensional Palpation Mechanics for Detecting a Hard Inclusion by Indentation of a Soft Matrix Under Large Strain, *Journal of Applied Mechanics*, 86, 2019, 051009

S.E. Julien, A. Lii-Rosales, K.-T. Wan, Y. Han, M.C. Tringides, J.W. Evans, P.A. Thiel

Squeezed Nanocrystals: Equilibrium Configuration of Metal Clusters Embedded Beneath the Surface of a Layered Material, *Nanoscale*, 11, 2019, 6445

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

J. Sun, N. Tandogan, A.Z. Gu, Sinan Müftü, E.D. Goluch, K.-T. Wan

Quantification of Colloidal Filtration of Polystyrene Micro-Particles on Glass Substrate Using a Microfluidic Device, *Colloids and Surfaces B: Biointerfaces*, 165, 2018, 381-387

SELECTED RESEARCH PROJECTS

Mechanical Integrity and Long Term Reliability of Photovoltaic Panels

Principal Investigator, National Institute of Standards and Technology/Department of Energy

Mechanics of Fusion of Dissimilar Lipid BiLayers and Multi-Lamellar Vesicles

Principal Investigator, National Science Foundation

MING WANG



COE Distinguished Professor, Civil and Environmental Engineering

PhD, University of New Mexico, 1983
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Scholarship focus: network-wide pavement and bridge deck inspections; sensor technology for infrastructure; saliva-based sensor technology for disease diagnosis and monitoring; structural health monitoring for bridges; subsurface fault detection using air-coupled GPR systems

Honors and awards: Fellow, SPIE; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

- Y. Du, W. Zhang, M.L. Wang
 An On-Chip Disposable Salivary Glucose Sensor for Diabetes Control, *Journal of Diabetes Science and Technology*, 2016
- W. Zhang, M.L. Wang, S. Khalili, S. Cranford
 Materiomics for Oral Disease Diagnostics and Personal Health Monitoring: Designer Biomaterials for the Next Generation Biomarkers, *OMICS: A Journal of Integrative Biology*, 20, 2016, 12-29
- N. Martino, K. Maser, R. Birken, M.L. Wang
 Quantifying Bridge Deck Corrosion Using Ground Penetration Radar, *Research in Nondestructive Evaluation*, 27(2), 2016, 112-124
- W. Zhang, M.L. Wang, S. Cranford
 Ranking of Molecular Biomarker Interaction with Targeted DNA Nucleobases via Full Atomistic Molecular Dynamics, *Scientific Report, Nature Publishing Group*, 6, 2016, 18659
- Y. Du, W. Zhang, M.L. Wang
 Sensing of Salivary Glucose Using Nano-Structured Biosensors, *Biosensors*, 6(1), 2016, 10
- W. Zhang, Y. Du, M.L. Wang
 Noninvasive Glucose Monitoring Using Saliva Nano-Biosensor, *Sensing and Biosensing Research*, 4, 2015, 23-29

SELECTED RESEARCH PROJECTS

- Breath and Saliva Based Nano-Bio Sensing System for Disease Diagnosis and Monitoring
 Principal Investigator, Northeastern University
- VOTERS: Versatile Onboard Traffic Embedded Roaming Sensors
 Principal Investigator, National Institute of Standards and Technology

QI RYAN WANG



Assistant Professor, Civil and Environmental Engineering

PhD, Virginia Tech, 2015
coe.northeastern.edu/people/wang-ryan

Scholarship focus: urban and social resilience; geo-social networking; coupled, human-natural systems, natural disaster response and evacuation; urban computing

SELECTED PUBLICATIONS

- A. Akhavan, N.E. Phillips, J. Du, J. Chen, B. Sadeghi, Q. Wang
 Accessibility Inequality in Houston, *IEEE Sensors Letters*, 3(1), 2019
- J. Chen, W. Wang, N. Li, Q. Wang
 Linking Energy-Cyber-Physical System Through Human-Centric Occupancy Predication and Interpretation with Wi-Fi Probe-Based Ensemble Classifications, *Applied Energy*, 236, 2019, 55-69
- J. Chen, Q. Wang, Z. Lin, X. Guo
 Measuring the Cognitive Loads of Construction Safety Sign Designs During Selective and Sustained Attention, *Safety Science*, 105, 2018, 9-21
- Q. Wang, N.E. Phillips, M.L. Small, R.J. Sampson
 Urban Mobility and Neighborhood Isolation in America's 50 Largest Cities, *Proceedings of the National Academy of Sciences*, 2018
- Q. Wang, J.E. Taylor
 Aggregated Responses of Human Mobility to Severe Winter Storms: An Empirical Study, *PLoS one*, 12, 2017
- N. Mohammadi, Q. Wang, J.E. Taylor
 Diffusion Dynamics of Energy Saving Practices in Large Heterogeneous Online Networks, *PLoS one*, 10, 2016
- Y. Wang, Q. Wang, J.E. Taylor
 Patterns and Limitations of Urban Human Mobility Resilience Under the Influence of Multiple Types of Natural Disaster, *PLoS one*, 11(1), 2016

SELECTED RESEARCH PROJECTS

- Cognition-Driven Display for Navigation Activities (Cog-DNA): Personalized Spatial Information System Based on Information Personality of Firefighters
 Co-Principal Investigator, National Institute of Standards and Technology
- Collaborative Research: Less is More: Personalized Spatial Information System Based on Real-Time Cognitive Load for First Responders in Emergency Indoor Wayfinding
 Principal Investigator, National Science Foundation
- Geosocial Networks in America's 50 Largest Cities
 Principal Investigator, Microsoft Azure for Research

MISHAC YEGIAN



COE Distinguished Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1976
coe.northeastern.edu/people/yegian-mishac

Scholarship focus: geotechnical earthquake engineering; soil dynamics; geosynthetics; seismic response of landfills; base isolation; liquefaction; bridge engineering; use of shaking table in earthquake engineering

Honors and awards: Fellow, American Society of Civil Engineers; ASCE Thomas A. Middlebrooks Award

SELECTED PUBLICATIONS

- E. Eseller-Bayat, S. Gokyer, M.K. Yegian
 Earthquake Engineering Experimental Facility for Research and Public Outreach, *Seismic Evaluation and Rehabilitation of Structures*, 26, 2014, 379-387
- E. Eseller-Bayat, S. Gokyer, M.K. Yegian, O. Deniz, A. Alshawabkeh
 Bender Elements and Bending Disks for Measurement of Shear and Compression Wave Velocities in Large Fully and Partially Saturated Sand Specimens, *ASTM Geotechnical Testing Journal*, 36(2), 2013, 1-8
- E. Eseller-Bayat, S. Gokyer, M.K. Yegian, E. Ortakci, A. Alshawabkeh
 Design and Application of Simple Shear Liquefaction Box, *ASTM Geotechnical Testing Journal*, 36(3), 2013, 1-9
- E. Eseller-Bayat, S. Gokyer, M.K. Yegian, A. Alshawabkeh
 Liquefaction Response of Partially Saturated Sands: An Empirical Model, *ASCE Journal of Geotechnical and Geoenvironmental Engineering*, 139(6), 2013, 872-879

SELECTED RESEARCH PROJECTS

- Field Application of Induced Partial Saturation (IPS) for Liquefaction Mitigation
 Principal Investigator, National Science Foundation

Babak Jalalzadeh Fard

PhD 2018, Interdisciplinary Engineering; Advisor,
Auroop Ganguly

Climate Extremes: Informing Local Heat-health Action Plans, Impact Of Megaregions On Heatwaves, And Predictability Of Precipitation In Global Scale

The problem of climate extremes has had detrimental effects on human life and environment and it is known that climate change is going to make these hazards more frequent, higher in intensity, and longer in durations. On the other hand, the growth in population, and the complexities of modern life are going to add to the vulnerabilities against these hazards. Effective solutions to this problem need to consider different interconnected and complex nature of them. Both in science and engineering, also in policy making phases. While the major source of the problem is in global scale and, there are many local stressors that need to be considered for local planning, such as city-wide planning and decision making. Considering this sophisticated anatomy, different organizations with different focus levels are created and actively working to address the situation. The Intergovernmental Panel on Climate Change (IPCC), The Global Goals universal call for action, and C40 cities are some samples of scientific, policy making, engineering and decision-making groups created to understand and quantify the problems, design solutions, interact them and make decisions. Reaching these goals requires interdisciplinary approaches in many ways. This dissertation has such an interdisciplinary approach around this problem.

See full dissertation at
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Dongmei Feng

PhD 2018, Environmental Engineering; Advisor,
Edward Beighley

Characterizing Changes In Hydrologic Fluxes And Uncertainties For Current And Future Climate Conditions

The global mean surface temperature has increased by roughly 1 °C during last century due to the greenhouse gas emission. According to the Fifth Assessment report of Intergovernmental Panel on Climate change (IPCC AR5), the surface temperature is projected to likely increase by 0.3-4.8 °C under different emission scenarios, compared to 1986-2005. Although the surface temperature is likely to increase globally, changes in precipitation are projected to be spatially non-uniform leading to potentially significant changes in the hydrologic cycle for select regions. To understand how the hydrologic cycle may be impacted by altered climate conditions, the objectives of this work are to: (i) investigate the changes in hydrologic fluxes under current and future climate conditions, (ii) identify the main driving mechanisms of these changes, and (iii) quantify the associated uncertainties for the estimated impacts. This project investigated the spatial and temporal variations of streamflow in multiple regions (eastern and southwestern United States, western Amazon) under altered climate conditions. A hydrologic modeling framework which integrates multiple runoff generation approaches with surface, subsurface and channel routing processes was developed and an auto-calibration routine was included. Forced with hindcasted and projected temperature and precipitation from a select suite of the General Circulation Models (GCMs) in the Coupled Model Intercomparison Project Phase 5 (CMIP5), this framework enables the estimation of streamflow and corresponding uncertainties resulting from different sources, which is essential to extract actionable information for stakeholders regarding adaptation to climate change.

See full dissertation at
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Ahmend T.M. Halawani

PhD 2018, Civil Engineering Transportation; Advisor,
Peter Furth

Using Traffic Signal Control to Better Serve Pedestrians and Limit Speeding on Urban Arterials: Adaptive Walk Intervals and Speeding Opportunities

Safe and efficient multimodal transportation system is a priority for many agencies around the world. Traffic signals, in practice, are commonly applied to regulate conflicts, increase capacity, and decrease vehicular delay, with little or no attention given to speed control and pedestrian delay. The dissertation investigates two broad subjects, using traffic signal to improve pedestrian service and to control speed on urban roads. These subjects are presented in the dissertation in three separate research.

See full dissertation at
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Niloofer Montazeri

PhD 2018, Construction Management; Advisor,
Ali Touran

Multi-Objective Optimization For Life-Cycle Reliability-based Bridge Maintenance Scheduling

In the United States, the deterioration of bridge structures is a multibillion-dollar problem. About 10% of over 600,000 highway bridges in the country require substantial maintenance actions. Many of these bridges have exceeded their designed life-cycle by more than a decade and the number of the bridges reaching critical conditions is increasing. Therefore, facilitating decision-making for optimal bridge maintenance scheduling is crucial and plays a significant role in bridge management. In order to achieve such schedule, analytical method is required to optimize conflicting factors over the life-cycle of the bridge, which are (i) structural performance, and (ii) maintenance cost. In this dissertation, to enrich previous works as a continuation and overcome limitations in maintenance decision-making process, an advanced reliability-based multi-objective optimization methodology for maintenance scheduling of deteriorating bridges is proposed. The objective is to optimize probabilistic total maintenance cost and minimum annual system reliability index as structural performance metric. The outcome is a decision-making framework regarding repair and replacement of the structure over the life-cycle in terms of schedule and type of action to-be-performed on selected components, considering system requirements, structure specification, as well as available budget.

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Pooya Paydary

PhD 2018, Environmental Engineering; Advisor,
Philip Larese-Casanova

Degradation Of Quantum Dots In Aqueous Environments

QDs are mixed-metal nanocrystals with the smallest of particle sizes (2-10 nm). QDs application (in electronics, pharmaceutical industry, etc.) has been rising dramatically in the recent years. QDs readily leach heavy metal cations in water, potentially creating a co-occurrence of nanoparticulate and dissolved metal pollutants. It has been observed in the literature that QDs degradation in photic and aphotic environments are different. QDs degrade faster in light and produce reactive oxygen (ROS) species. These ROS are thought to be the culprit in QDs fast degradation. However, knowledge on QD's degradation kinetics, mechanism, and interfering parameters in photic and aphotic conditions lag behind their application and vast usage. This lag in QD studies partly comes from the difficulty in QD and dissolved metals separation and quantification. This work aimed to first develop a cheap and fast analytical method to separate and quantify QDs and their corresponding dissolved phase metals and then use it to describe QDs degradation kinetics, mechanism and influencing factors in photic and aphotic conditions. SEC-ICPMS method was developed and used to separate CdSe/ZnS and InP/Zn QDs, along with Au NPs from their corresponding dissolved phase metals. SEC-ICPMS lowers cost and time associated with NP characterization 90% and 50% respectively.

See full dissertation at
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Ruth Roman

PhD 2018, Civil Engineering; Advisor,
Steven Cranford

Mechanical Characterization Of 2d Nanomaterials And Composites

Since the recent emergence of graphene, the potential of atomistically two-dimensional (2D) materials has created a new paradigm of materials science. Subsequently, the field of two-dimensional (2D) layered nanomaterials has grown extensively over the past decade ignited by immense technological promise. Beyond graphene, encouraging work has already been intensively reported from different material systems such as boron nitrides (e.g., hBN, so-called white graphite), dichalcogenides (e.g., MoS₂), silicene, germanane, stanene, etc. Critical to successful implementation of these materials in nanodevices and systems is the determination of their respective elastic and mechanical properties, to define the serviceability limits of promising applications such as flexible electronics. In this research, we make use of robust full atomistic computational methods to delineate the mechanical properties of 2D materials, including axial stiffness, bending rigidity, shear stiffness, ultimate strength, ultimate strain, and adhesion energy, along with multilayer and composite behavior. Specifically, we focus on silicene (2D silicon) as a material platform, and from there we develop computational protocols and assessment methods to characterize mechanical properties (e.g., strength, stiffness, toughness, etc.), performance limits, and stochastic models for failure (e.g., defect sensitivity and flaw tolerance). The proposed techniques can be easily adapted to other 2D system of interest.

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Thomas James Vandal

PhD 2018, Interdisciplinary Engineering; Advisor,
Auroop Ganguly

Statistical Downscaling of Global Climate Models with Image Super-Resolution and Uncertainty Quantification

High-resolution probabilistic projections of precipitation and temperature under climate change are crucial for stakeholders to make well-informed decisions in mitigating and adapting to more intense, longer duration, and more frequent extreme weather events. General circulation models (GCMs) provide us with the data to study climate change at the continental spatial scales, but are too coarse for local adaption. Furthermore, ensembles of multiple models, initial conditions, and emission trajectories must be harnessed for well quantified probabilistic estimates. Statistical downscaling, an approach that learns a functional mapping between low- and high-resolution GCMs, can be used to generate high-resolution ensemble projections in a computationally efficient manner. However, this process exacerbates, at a local scale, uncertainties inherently found in GCMs. Hence, it is crucial for our statistical downscaling methods to incorporate and quantify uncertainties, including both epistemic, or parameter misunderstanding, and aleatoric, or observational, uncertainties. In this work, we present a Bayesian deep learning and image super-resolution approach for statistical downscaling using discrete-continuous and non-normal likelihoods. Promising results for downscaling daily precipitation in the contiguous United States measured on predictive accuracy and uncertainty quantification are presented. Future work on stacking Bayesian deep learning networks and harnessing ensembles of high-resolution GCMs is discussed.

See full dissertation at
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Yuanhao Zhao

PhD 2018, Civil Engineering; Advisor,
Edward Beighley

Scaling Surface And Subsurface Flow Processes In Hydrologic Models

Hydrologic models have improved significantly over the past 50 years, transforming from empirically-based and spatially-lumped to physically-based and distributed. In light of these advances, new challenges such as scaling have emerged. Although challenges related to scaling in hydrology have been investigated for decades, they still persists throughout the measurement and modeling communities. This dissertation investigates hydraulic scaling in hydrologic models with three specific objectives: (i) quantify how simulated flowpath and runoff response timing characteristics varying with spatial model resolution; (ii) develop an approach for estimating scale-dependent routing process parameters based on model resolution; and (iii) apply the scaling approach in a multi-scale model calibration application. To overcome scaling effects on simulated streamflow dynamics, an upscaling framework is developed to minimize the surface and subsurface travel time differences between conceptual model representations and distributed topographic-based methods. Surface roughness and hydraulic conductivity are modified to increase and/or decrease the surface and subsurface flow velocities and associated travel times. Results show that the scaling approach leads to streamflow responses from coarse model resolutions that are consistent with responses from fine model resolutions. The scaling method is used in a model calibration application. Surface and subsurface routing parameters are upscaled to a coarse model resolution and calibrated using runoff derived from USGS streamflow measurements. The calibrated parameters are then downscaled to a fine model resolution and the resulting fine scale model performance are verified.

See full dissertation at
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Coastal engineering and resilience expert Professor Qin Jim Chen (right) and his student prepare to deploy a wave sensor at Northeastern's Marine Science Center in Nahant, Massachusetts.



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Professor Auroop Ganguly, civil and environmental engineering, works with PhD students in his Sustainability and Data Sciences laboratory at Northeastern University.

