SCHOLARSHIP REPORT
CIVIL AND ENVIRONMENTAL ENGINEERING

Chair’s Message | 1  Quick Facts | 2  Honors | 4  Our Faculty | 6
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

### 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

### 68 Doctoral Students

### 45 Tenured/Tenure-Track Faculty
Including T/TT Affiliated Faculty

### 10 Professional Society Fellows

### 11 Young Investigator Awards

### 8 National Science Foundation CAREER Awards

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

### 8080 Students Enrolled
- 52% Graduate
  - 1485 New MS (Fall 2018)
- 48% Undergraduate
  - 675 New BS (Fall 2018)

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### 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.

### RECENT HIRES
- **Qin Jim Chen**, PhD, Old Dominion University
- **Kelsey Pieper**, PhD, Virginia Tech
- **Aron Stubbins**, PhD, Newcastle University
- **Hao Sun**, PhD, Columbia University

### NSF CAREER Awards
- **48**

### Engineering Departments
- **5**

### YOUNG INVESTIGATOR Awards
- **90**

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

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**Qin Jim Chen**
PhD, Old Dominion University

**Kelsey Pieper**
PhD, Virginia Tech

**Aron Stubbins**
PhD, Newcastle University

**Hao Sun**
PhD, Columbia University
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
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 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.”

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.”

Associate Professor Aroop 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.

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.

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.
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.”

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.

Two Northeastern Civil and Environmental Engineering PhD students, Cassandra Nickles and Katherine Vilardi, received 2019 Graduate Research Fellowships from the National Science Foundation (NSF).
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
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. Basu, G.G. Adams, N.E. McGruer
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
W. Zhou, X. Meng, J. Gao, A.N. Alshawabkeh

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
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
beighley-edward
doe.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
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
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

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
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
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
J. Ayers, D. Blustein, A. Westphal

SELECTED RESEARCH PROJECTS
Utilizing Synthetic Biology to Create Programmable Micro Bio-Robots
Co-Principal Investigator, Office of Naval Research
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
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
D. Bernal
Y. Zhang, D. Bernal

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
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
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

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

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,

L. Zhu, Q. Chen

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

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

H. Deng, D. Fannon, M. Eckelman

R. Philips, L. Troup, D. Fannon, M. Eckelman

M. Laboy, D. Fannon

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
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

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

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


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


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

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

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 Nonequilibrium Metacommunities, Ecological Applications, 23(6), 2013, 1488-1503

T.C. Gouhier, F. Guichard, B.A. Menge

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. McClanachan, 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

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


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 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 Herschel 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
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
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
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
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, J.H. Grabowski, H.M. Leslie, S. Scyphers, S.L. Williams
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
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
M.B. Kane, L.P. Jerome, J. Scruggs
M.B. Kane
M.B. Kane, C. Peckens
M.W. Häckell, R. Rolfs, M.B. Kane, J.P. Lynch
M.B. Kane, J. Scruggs, J.P. Lynch

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. 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

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


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

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. Rotki, R. Sun, Y. A. Levendis

A. Panahi, M. Tarakcioglu, M. S. 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
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
O.C. Ozdemir, Q. Chen, S. Müftü, V.K. Champagne
J. Sun, A. Gu, S. Müftü, K.T. Wan
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 (EMMDM)
Technical Point of Contact, Army Research Laboratory

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

FACULTY
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
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
Hurricane Risk Assessment of Offshore Wind Turbines, Renewable Energy, Elsevier, 2018
Modeling the Flexural Collapse of Thin-Walled Spirally Welded Tapered Tubes, Journal of Structural Engineering, ASCE, 123, 2018, 270-281
System Reliability of Floating Offshore Wind Farms with Multiline Anchors, Ocean Engineering, 160, 2018, 94-104
Imperfection Measurements to Predict Buckling Behavior of Slender Steel Tubes, Thin-Walled Structures, Elsevier, 2017

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
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
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 PATTERTON

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

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 Geoaoustically 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
J. Elliott, M. Patterson, N. Summers, C. Miternique, E. Montocchio, E. Vitry
How Does the Proliferation of the Coral-Killing Sponge Terpios hoshinata 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
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
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
Evaluating Water Lead Levels During the Flint Water Crisis, Environmental Science & Technology, 52(15), 2018, 8124–8132
Potential Challenges Meeting the American Academy of Pediatrics’ Lead in School Drinking Water Goal of 1 μg/L, Corrosion, 74(8), 2018, 914–917

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
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
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  
J.A. Murray, M. Sasani  
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  
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**  
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  
D. Cheney, L. Rajicb, E. Sly, D. Meric, T.C. Sheahan  
R.D. Holtz, W.D. Kovacs, T.C. Sheahan  

**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

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

A. Massol-Deyá, J.C. Stephens, J.L. Colón
Renewable Energy for Puerto Rico, Science, 362 (6410), 2018, 7

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
ARON STUDDINS

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


M. Jennings, H. Abdulla, A. Stubbins, L. Sun, R. Wang, K. Mopper

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

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
doe.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

R. Masoumi, A. Touran

A. Touran, J. Liu

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

K. Belli, S. Wadia-Fascetti, C. Rappaport

K. Belli, C. Rappaport, S. Wadia-Fascetti

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

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
coe.northeastern.edu/people/wang-ming

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

W. Zhang, M.L. Wang, S. Khalili, S. Cranford

N. Martino, K. Maser, R. Birken, M.L. Wang

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

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

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 (CogDNA): 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

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
SELECTED PhD THESES

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 grow 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 coe.northeastern.edu/18/BabakFard

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 coe.northeastern.edu/18/DongmeiFeng
Ahmend T.M. Halawani  
PhD 2018, Civil Engineering Transportation; Advisor, Peter Furth


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 coe.northeastern.edu/18/AhmendHalawani

Niloofar 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.

See full dissertation at coe.northeastern.edu/18/NiloofarMontazeri
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 coe.northeastern.edu/18/PooyaPaydary

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.

See full dissertation at coe.northeastern.edu/18/RuthRoman
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 coe.northeastern.edu/18/ThomasJamesVandal

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 coe.northeastern.edu/18/YuanhaoZhao
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.
Professor Auroop Ganguly, civil and environmental engineering, works with PhD students in his Sustainability and Data Sciences laboratory at Northeastern University.