

Dear Friends,

This second annual scholarship report reflects the exceptional academic and professional accomplishments of the civil and environmental engineering faculty and PhD candidates for the 2014-2015 year. With \$59 million in annual research expenditures, and 151 faculty members, the College of Engineering is expanding in both size and research scope, offering opportunities throughout our program. Over the last five years, our department has more than doubled in size of the faculty, with 30 tenured/tenure track and 9 affiliated faculty in civil and environmental engineering, and of the graduate program, with over 220 graduate students. The college looks forward to new infrastructure in 2016, including adding a 220,000 square foot interdisciplinary science and engineering complex that will provide state-of-the art laboratories.

This year has been particularly exciting for our research presence, with the successful launching of the second four-year term for the PROTECT center, which is funded by the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health to study the relationship between environmental contamination and preterm births. In addition, the Center for Research on Early Childhood Exposure and Development in Puerto Rico (CRECE) has just initiated, with co-funding from NIEHS and the Environmental Protection Agency, to study the effects of environmental contaminants on infants.



Our scholars strive to use today's discovery and research to make tomorrow happen. You can see some highlights of our civil and environmental engineering faculty members at northeastern.edu/tomorrow. We hope you enjoy this report, and we look forward to sharing our future accomplishments in our annual scholarship reports.

Sincerely,

Jerome F. Hajjar, Ph.D., P.E.
CDM Smith Professor
Chair of Civil and Environmental Engineering

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

QUICK FACTS

2

FEDERALLY
FUNDED
RESEARCH
CENTERS

7

NSF CAREER
AWARDS

30

TENURED/
TENURE TRACK
FACULTY

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

400 Snell Engineering Center
Northeastern University
360 Huntington Avenue
Boston, MA 02115

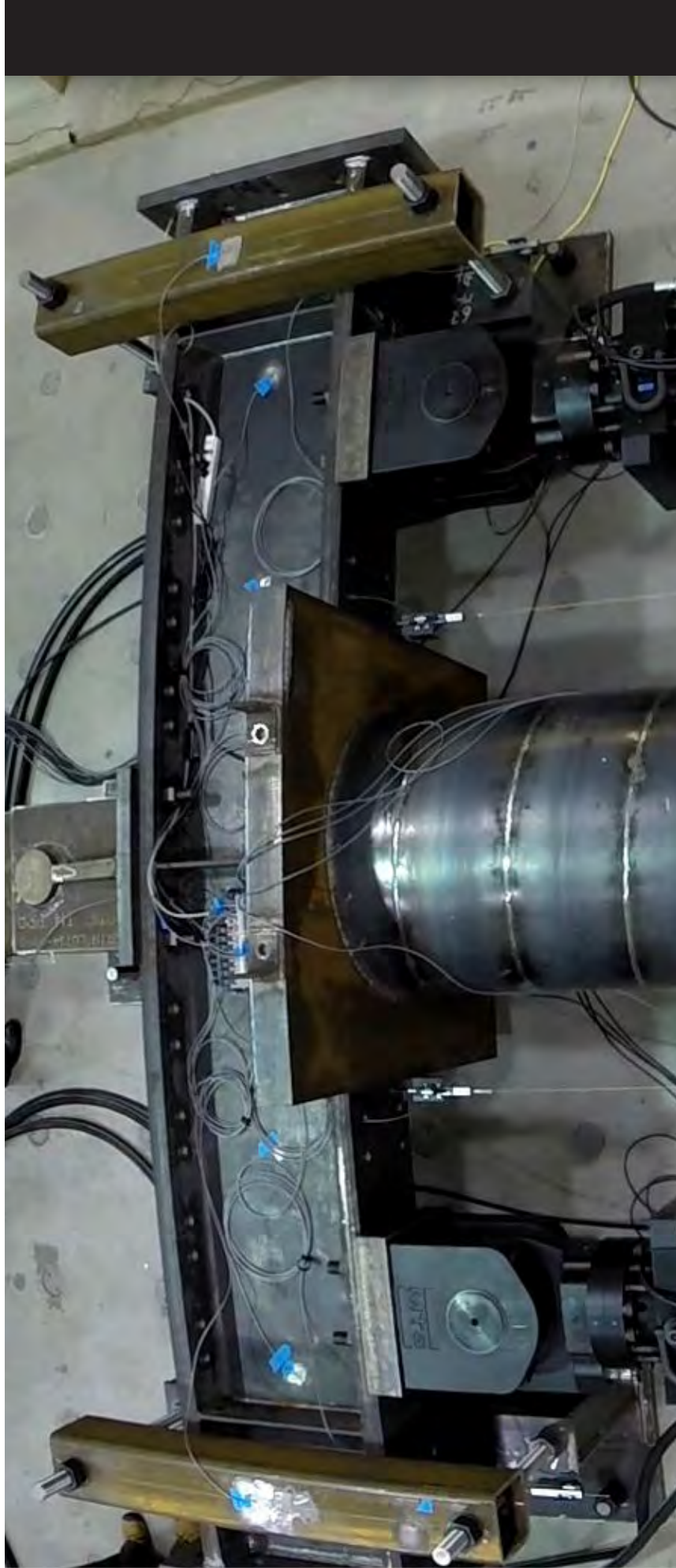
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civ.neu.edu
coe.neu.edu

COVER IMAGE

Large-scale testing of offshore wind turbine towers conducted by Professor Andrew Myers at the Civil and Environmental Laboratory for Structural Testing of Resilient and Sustainable Systems (STReSS Laboratory).

Learn more at
civ.neu.edu/research/stresslab





Northeastern University
College of Engineering

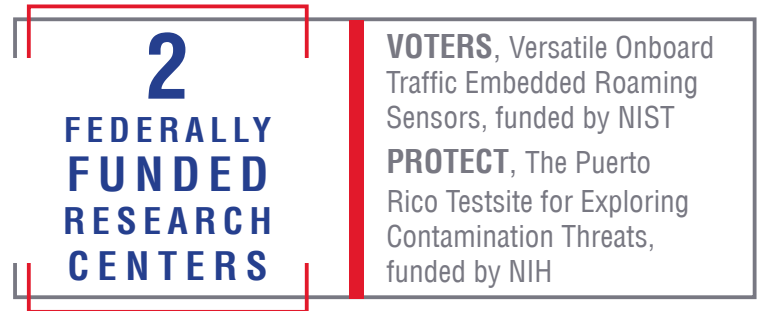
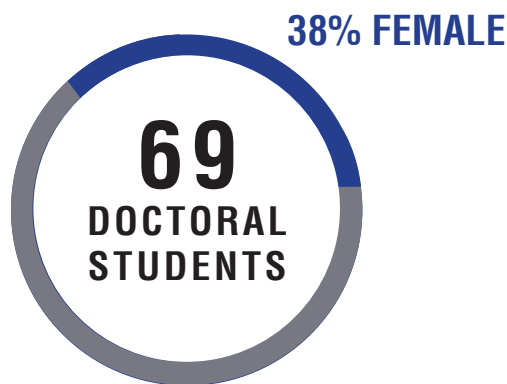
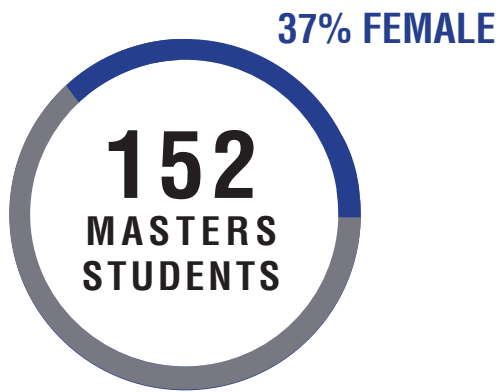
CIVIL AND ENVIRONMENTAL ENGINEERING

2014 | 2015

SCHOLARSHIP REPORT

QUICK FACTS

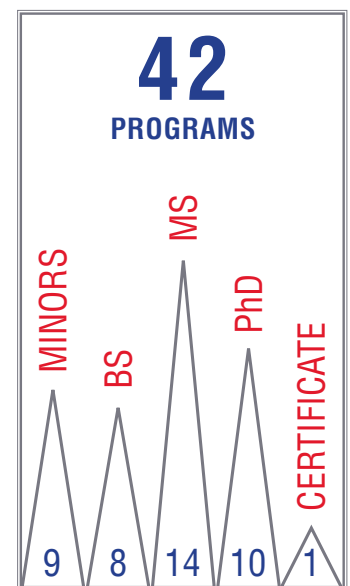
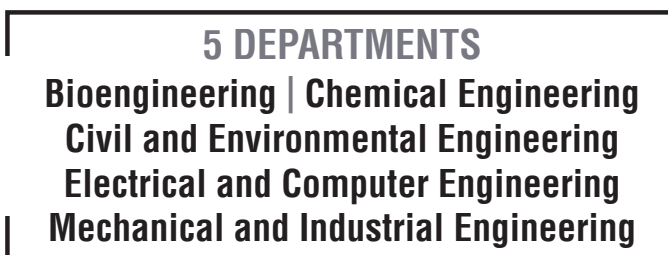
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING



QUICK FACTS

COLLEGE OF ENGINEERING

12 Federally Funded Multi-Institutional Research Centers



HONORS

ACHIEVEMENTS

ACHIEVEMENTS

Mehrdad Sasani, Associate Professor of Civil and Environmental Engineering, was named a Fellow of the American Society of Civil Engineers and a Fellow of the Structural Engineering Institute.

Jerome Hajjar, Professor and Chair of Civil and Environmental Engineering, was recognized as the CDM Smith Professor in Civil Engineering. He also won the 2015 BSCES Clemens Hershel Award from the Boston Society of Civil Engineers Section of the American Society of Civil Engineers.

Auroop Ganguly, Associate Professor of Civil and Environmental Engineering, was awarded a **National Science Foundation Big Data Science and Engineering** research grant for his collaborative research project, "High-Dimensional Statistical Machine Learning for Spatio-temporal Climate Data."

Matthew Eckelman, Assistant Professor of Civil and Environmental Engineering, was awarded a **\$503K NSF CAREER Award** for "Building Chemical Synthesis Networks for Life Cycle Hazard Modeling."

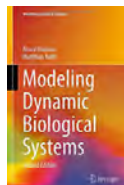
Auroop Ganguly is co-PI of a **\$1.2M NSF CyberSEES grant**, entitled "Spatio-temporal Extremes and Associations: Marine Adaptation and Survivorship under Changes in extreme Ocean Temperatures."

Philip Larese-Casanova, Assistant Professor of Civil and Environmental Engineering, was awarded a **\$140K NSF Grant** to study the "Recrystallization of Stable Iron Oxides in Reducing Environments."



Steven Cranford, Assistant Professor of Civil and Environmental Engineering, and CEE Graduate Student **Ruth Roman** whose paper

FACULTY-AUTHORED BOOKS



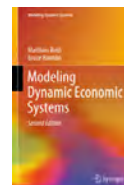
Matthias Ruth
co-authored "Modeling Dynamic Biological Systems" (Springer 2014)



Steven Cranford
co-authored "Biomateriomics" (Springer 2012)



Ming Wang
co-authored "Sensor Technologies for Civil Infrastructures" (Woodhead Publishing 2014)



Matthias Ruth
co-authored "Modeling Dynamic Economic Systems" (Springer 2012)

entitled, "Strength and Toughness of Graphdiyne/Copper Nanocomposites" made the cover of Advanced Engineering Materials.

Akram Alshawabkeh, George A. Snell Professor of Engineering, received a five-year **\$13.5M** award to renew the Puerto Rico Testsite for Exploring Contamination Threats Center from the National Institute of Environmental Health Sciences within the National Institutes of Health.

Mark Patterson, Professor of Civil and Environmental Engineering and Marine and Environmental Sciences, and Assistant Professor **Loretta Fernandez** were part of a group of Northeastern researchers who investigated the effects of global change on reef ecology as part of Mission 31, a 31-day expedition 63 feet under the surface and nine miles off the coast of Florida.

An interdisciplinary team of Northeastern researchers, including Principal Investigator **Mehrdad Sasani**, **Matthias Ruth**, **David Fannon** and **Matthew Eckelman**, received a three-year, **\$1.1M** grant from the National Science Foundation to develop a decision framework for designing buildings that are both resilient and sustainable in the face of multiple hazards—specifically, earthquakes, flooding, and high winds.

Civil and Environmental Engineering Professor and Associate Dean of Graduate Education, **Sara Wadia-Fascetti** was one of 28 women with breakthroughs in science that were featured in Scientific Computing.

STUDENTS

Nimet Yildirim, a PhD student in the bioengineering program and in the CEE department, advised by Professor April Gu and MIE Professor Ahmed Busnaina, along with the coauthors Jin Young Lee, Han Chul Cho and Sivasubramanian Somu, won the **Young Researchers Forum Award** from the 2014 IEEE Biosensors and Bioelectronics conference.

The **Engineers Without Borders** student group was featured in The American Surveyor for their efforts in building a water system for Bbanda, Uganda. They were also named the National Premier Student Chapter for 2014 from a pool of over 200 student chapters from around the country.

Julieta Moradei, a fourth year Civil and Environmental Engineering student, received the Brother Austin Barry National Chi Epsilon Scholarship. This \$3,500 award is one of eleven scholarships awarded annually by Chi Epsilon, the national civil engineering honor society.

PhD student **Lizhong Wang** was one of four winners of the national 2015 O.H. Ammann Research Fellowship from the Structural Engineering Institute of the American Society of Civil Engineers.



FACULTY BY RESEARCH AREAS



CIVIL INFRASTRUCTURE SECURITY

George Adams
Joseph Ayers
Dionisio Bernal
Luca Caracoglia
Steven Cranford
Daniel Dulaski
Stephen Flynn
Peter Furth
Auroop Ganguly
Jerome Hajjar
Haris Koutsopoulos
Sinan Müftü
Andrew Myers
Mark Patterson
Mehrdad Sasani
Thomas Sheahan
Michael Silevitch
Ali Touran
Sara Wadia-Fascetti
Ming Wang
Mishac Yegian



ENVIRONMENTAL HEALTH

Akram Alshawabkeh
Edward Beighley
Matthew Eckelman
Loretta Fernandez
Auroop Ganguly
Tarik Gouhier
April Gu
Ferdie Hellweger
Philip Larese-Casanova
Annalisa Onnis-Hayden
Mark Patterson
Matthias Ruth
Thomas Sheahan
Helen Suh MacIntosh
Geoffrey Trussell
Kai-Tak Wan



SUSTAINABLE RESOURCE ENGINEERING

Luca Caracoglia
Daniel Dulaski
Matthew Eckelman
David Fannon
Peter Furth
Tarik Gouhier
Jerome Hajjar
Haris Koutsopoulos
Mark Patterson
Matthias Ruth
Ali Touran
Geoffrey Trussell
Sara Wadia-Fascetti
Ming Wang

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
mie.neu.edu/people/adams-george

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

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

SELECTED PUBLICATIONS

G.G. Adams

Adhesion and Pull-off Force of an Elastic Indenter from an Elastic Half-space, *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 470, 2014, 20140317

G.G. Adams, D.A. Hills

Analytical Representation of the Non-Square-root Singular Stress Field at a Finite Angle Sharp Notch, *International Journal of Solids and Structures*, 51, 2014, 4485-4491

R.P. Basu, Hennessy, G.G. Adams, N.E. McGruer

Hot Switching Damage Mechanisms in MEMS Contacts – Evidence and Understanding, *Journal of Micromechanics and Microengineering*, 24, 2014, 105004

G.G. Adams

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

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

Interfacial Shear Stress Between Single-walled Carbon Nanotubes and Gold Surfaces With and Without an Alkanethiol Monolayer, *Journal of Colloid and Interface Science*, 407, 2013, 133-139

J.R. Parent, G.G. Adams

A Model of a Trapped Particle Under a Plate Adhering to a Rigid Surface, *Journal of Applied Mechanics*, 80, 2013, 051011

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

Adhesive Slip Process Between a Carbon Nanotube and a Substrate, *Journal of Physics D: Applied Physics*, 46, 2013, 175305

R.P. Hennessy, A. Basu, G.G. Adams, N.E. McGruer

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

AKRAM ALSHAWABKEH



George A. Snell Professor of Engineering and Civil and Environmental Engineering; Associate Dean for Research; affiliated faculty, Bioengineering

PhD, Louisiana State University, 1994
civ.neu.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; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

N. Gou, S. Yuan, J. Lan, C. Gao, A.N. Alshawabkeh, A.Z. Gu

A Quantitative Toxicogenomics Assay Reveals the Evolution and Nature of Toxicity During the Transformation of Environmental Pollutants, *Environmental Science and Technology*, 48(15), 2014, 8855-8863

D. Meric, A.N. Alshawabkeh, J.P. Shine, T.C. Sheahan

Bioavailability of Hydrophobic Organic Compounds in Thin-layered Capped Sediments, *Chemosphere*, 103, 2014, 281-289

D. Meric, S. Barbutto, T.C. Sheahan, J.P. Shine, A.N. Alshawabkeh

Benchscale Assessment of the Efficacy of a Reactive Core Mat to Isolate PAH-spiked Aquatic Sediments, *Soil Sediment Contamination*, 23(1), 2014, 1-23

D. Tang, N. Yang, Y. Yang, X. Zhang, W. Xiao, ...A.N. Alshawabkeh

Enhanced Adsorption of Aqueous Perchlorate on Quaternary Ammonium Chloride Surfactant-modified Activated Carbon Fibers, *Desalination and Water Treatment*, 55(2), 2014, 484-495

L. Rajic, N. Fallahpour, S. Yuan, A.N. Alshawabkeh

Electrochemical Transformation of Trichloroethylene in Aqueous Solution by Electrode Polarity Reversal, *Water Research*, 67, 2014, 267-275

M. Tong, S. Yuan, P. Zhang, P. Liao, A.N. Alshawabkeh, X. Xie, Y. Wang

Electrochemically Induced Oxidative Precipitation of Fe(II) for As(III) Oxidation and Removal in Synthetic Groundwater, *Environmental Science and Technology*, 48(9), 2014, 5145-5153

S. Yuan S, Liao P, A.N. Alshawabkeh

Electrolytic Manipulation of Persulfate Reactivity by Iron Electrodes for TCE Degradation in Groundwater, *Environmental Science and Technology*, 48(1), 2014, 656-663

SELECTED RESEARCH PROJECTS

Puerto Rico Testsite for Exploring Contamination Threats (PROTECT), a National Institute of Environmental Health Sciences Superfund Research Center. PROTECT investigates the relationship between environmental contamination and preterm birth

Principal Investigator, National Institutes of Health

Induced Partial Saturation (IPS) Through Transport and Reactivity for Liquefaction Mitigation

Co-Principal Investigator, National Science Foundation

JOSEPH AYERS



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

PhD, University of California at Berkeley, 1975
bioe.neu.edu/people/ayers-joseph

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

SELECTED PUBLICATIONS

- J. Lu, J. Yang, Y.-B. Kim, J. Ayers, K.K. Kim
Implementation of Excitatory CMOS Neuron Oscillator for Robot Motion Control Unit, *Journal of Semiconductor Technology and Science*, 14(4), 2014, 383-390
- J. Ayers, et al.
Special Issue on the 2013 International SoC Design Conference, *Journal of Semiconductor Technology and Science*, 14(4), 2014, 1-2
- L. Lewis, J. Ayers
Temperature Preference and Acclimation in the Jonah Crab, *Cancer Borealis*, *Journal of Experimental Marine Biology and Ecology*, 455, 2014, 7-13
- W. Westphal, D. Blustein, J. Ayers
A Biomimetic Neuronal Network-based Controller for Guided Helicopter Flight, *Biomimetic and Biohybrid*, Springer, 2013, 299-310
- D. Blustein, N. Rosenthal, J. Ayers
Designing and Implementing Nervous System Simulations on LEGO Robots, *Journal of Visualized Experiment*, 75, 2013

SELECTED RESEARCH PROJECTS

- Biomimetics of Jellyfish Tentacles
Principal Investigator, Schlumberger Doll, Inc
- RoboBees: A Convergence of Body, Brain and Colony
Principal Investigator, National Science Foundation
- Modernization and Enhancement of the Seawater System and Research Infrastructure at Northeastern University's Marine Science Center
Co-Principal Investigator, National Science Foundation
- Utilizing Synthetic Biology to Create Programmable Micro-Bio-Robots
Co-Principal Investigator, Office of Naval Research

R. EDWARD BEIGHLEY



Associate Professor, Civil and Environmental Engineering

PhD, University of Maryland, 2001
civ.neu.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

SELECTED PUBLICATIONS

- H. Seyyedi, E.N. Anagnostou, R.E. Beighley, J. McCollum
Hydrologic Evaluation of the Satellite and Re-analysis Precipitation Datasets over Mid-latitude Basins, *Atmospheric Research*, 2015, 164-165, 37-48
- F. Hossain, J. Arnold, A. Mitra, B. Arch, R.E. Beighley, et al.
Local-to-regional Landscape Drivers of Extreme Weather and Climate: Implications for Water Infrastructure Resilience, *ASCE Journal of Hydrologic Engineering*, 20(7), 2015, 02515002
- H. Lee, T. Yuan, H.C. Jung, R.E. Beighley
Mapping Wetland Water Depths Over the Central Congo Basin Using PALSAR SCANSAR Scansar, ENVISAT Altimetry, and MODIS VCF Data, *Remote Sensing of the Environment*, 159, 2015, 70-79
- R.E. Beighley, K. Eggert, C.J. Wilson, J.C. Rowland, H. Lee, 2015.
A Hydrologic Routing Model Suitable for Climate Scale Simulations of Arctic Rivers: Application to the Mackenzie River Basin, *Hydrological Processes*, 29(12), 2015, 2751-2768
- Y. Yoon, R.E. Beighley
Simulating Streamflow on Regulated Rivers Using Characteristic Reservoir Storage Patterns Derived From Remotely Sensed Water Surface Elevations, *Hydrological Processes* 29, 2015, 2014-2026
- T. Pavelsky, M.T. Durand, K.M. Andreadis, R.E. Beighley, et al.
Assessing the Potential Global Impact of SWOT River Observations, *Journal of Hydrology* 519(Part B), 2014, 1516-1525

SELECTED RESEARCH PROJECTS

- Decomposing the Water Storage Signal from Basins in Varied Climate Settings with Remote Sensing and Modeling
Principal Investigator, National Aeronautics and Space Administration
- Gravity Recovery and Climate Experiment (GRACE) Mission Science Team Program, Enhancement of GRACE Temporal Gravity Field Solutions to Study Terrestrial Water Dynamics in the Congo Basin
Co-Principal Investigator, National Aeronautics and Space Administration

DIONISIO BERNAL



Professor, Civil and Environmental Engineering

PhD, University of Tennessee, 1979
civ.neu.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
 Complex Eigenvector Scaling from Mass Perturbations, *Mechanical Systems and Signal Processing*, 45(1), 2014, 80-90
- D. Bernal
 Damage Localization and Quantification from the Image of Changes in Flexibility, *Journal of Engineering Mechanics*, ASCE, 140(2), 2014, 279-286
- D. Bernal
 Fixed Base Poles and Eigenvectors from Transmission Zeros, *Mechanical System and Signal Processing*, 45(1), 2014, 68-79
- D. Bernal, A. Ussia
 Sequential Deconvolution Input Reconstruction, *Mechanical Systems and Signal Processing*, 50, 2014, 41-55
- D. Bernal
 The Zero-Order Hold in Time Domain Identification: An Unnecessary Operating Premise, *Structural Control and Health Monitoring*, 18(5), 2010, 510-518
- D. Bernal
 Load Vectors for Damage Location in Systems Identified from Operational Loads, *Journal of Engineering Mechanics*, 136(1), 2010, 31-39
- D. Bernal
 Damage Localization from Transmission Zeros of Delta Systems, *Journal of Engineering Mechanics*, 135(2), 2009, 93-99

SELECTED RESEARCH PROJECTS

Assessment of Seismic Provisions on Effects of Multi-Component Excitation Using Instrumental Data and Adaptive Principal Component Reconstruction Scheme
 Principal Investigator, California Strong Motion Instrumentation Program

LUCA CARACOGLIA



Associate Professor, Civil and Environmental Engineering

PhD, University of Trieste, 2001
civ.neu.edu/people/caracoglia-luca

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

Honors and awards: National Science Foundation Early CAREER Development Award

SELECTED PUBLICATIONS

- P. Egger, L. Caracoglia
 Analytical and Experimental Investigation on a Multiple-Mass-Element Pendulum Impact Damper for Vibration Mitigation, *Journal of Sound and Vibration*, 353, 2015, 38-57
- L. Caracoglia
 Comparison of Reduced-order Models to Analyze the Dynamics of a Tall Building under the Effects of Along-wind Loading Variability, *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 2015, 2376-7642
- F. Moghim, F.T. Xia, L. Caracoglia
 Experimental Analysis of a Stochastic Model for Estimating Wind-borne Compact Debris Trajectory in Turbulent Winds, *Journal of Fluids and Structures*, 54, 2015, 900-992
- D.-W. Seo, L. Caracoglia
 Exploring the Impact of "Climate Change" on Lifetime Replacement Costs for Long-Span Bridges Prone to Torsional Flutter, *Journal of Wind Engineering and Industrial Aerodynamics*, 140, 2015, 1-9
- T.-H. Le, L. Caracoglia
 Reduced-order Wavelet-Galerkin Solution for the Coupled, Nonlinear Stochastic Response of Slender Buildings in Transient Winds, *Journal of Sound and Vibration*, 344, 2015, 179-208
- W. Cui, L. Caracoglia
 Simulation and Analysis of Intervention Costs due to Wind-induced Damage on Tall Buildings, *Engineering Structures*, 87, 2015, 183-197
- P. Pourazam, L. Caracoglia, M. Lackner, Y. Modarres-Sadeghi
 Stochastic Analysis of Flow-Induced Dynamic Instabilities of Wind Turbine Blades, *Journal of Wind Engineering and Industrial Aerodynamics*, 137, 2015, 37-45
- L. Caracoglia
 A Stochastic Model for Examining Along-wind Loading Uncertainty and Intervention Costs due to Wind-induced Damage on Tall Buildings, *Engineering Structures*, 78, 2014, 121-132

SELECTED RESEARCH PROJECTS

Wavelet-Galerkin Analysis Method for the Dynamic Response of Vertical Structures against Transient Winds with a Focus on Tall Buildings and Wind Turbines
 Principal Investigator, National Science Foundation

STEVEN CRANFORD



Assistant Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 2012
civ.neu.edu/people/cranford-steven

Scholarship focus: materiomics and material design; full atomistic molecular modeling of materials; molecular dynamics; multiscale modeling and model development; nanomechanics and molecular mechanics; structural mechanics and engineering

SELECTED PUBLICATIONS

- J. Meng, Y. Zhang, S. Cranford, M. Minus
 Nanotube Dispersion and Polymer Conformational Confinement in a Nano-Composite Fiber: A Joint Computational Experimental Study, *Journal of Physical Chemistry B*, 118(31), 2014, 9476-9485
- A. Kocsis, N.A. Yedama and S. Cranford
 Confinement and Controlling the Effective Compressive Stiffness of Carbyne, *Nanotechnology*, 25(33), 2014, 335709, *IOP Select paper
- K. Kwan, S. Cranford
 'Unsticking' and Exposing the Surface Area of Graphene Bilayers via Randomly Distributed Nanoparticles, *Chemical Physics Letters*, 609, 2014, 65-69
- R. Roman, S. Cranford
 Strength and Toughness of Graphdiyne/Copper Nanocomposites, *Advanced Engineering Materials*, 16(7), 2014, 862-871
- K. Kwan, S. Cranford
 Scaling of the Critical Free Length for Progressive Unfolding of Self-Bonded Graphene, *Applied Physics Letters*, 104, 2014, 1-6
- A. Meyer, N. Pugno, S. Cranford
 Compliant Threads Maximize Spider Silk Connection Strength and Toughness, *Journal of the Royal Society Interface*, 11(98), 2014, 20140561

SELECTED RESEARCH PROJECTS

- Multi-phase Topologically Controlled Structural Fuses Inspired by Nature
 Principal Investigator, Haythornthwaite Research Initiation
- Disease Diagnosis and Monitoring using Breath and Saliva Based Nano-Bio Sensing System
 Co-Principal Investigator, Northeastern University

MATTHEW ECKELMAN



Assistant Professor, Civil and Environmental Engineering; affiliated faculty: Chemical Engineering, Public Policy and Urban Affairs

PhD, Yale University, 2009
civ.neu.edu/people/eckelman-matthew

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

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

SELECTED PUBLICATIONS

- P. Nuss, M.J. Eckelman
 Life Cycle Assessment of Metals: A Scientific Synthesis, *PLoS ONE*, 9(7), 2014, e101298
- M.J. Eckelman, M. Altonji, A. Clark, M. Jenkins, B. Lakin
 Life Cycle Environmental and Economic Assessment of Municipal Water Storage Options: Infrastructure Refurbishment Versus Replacement, *ASCE Journal of Infrastructure Systems*, 20(3), 2014, e05014004
- M. Saha, M.J. Eckelman
 Urban Scale Mapping of Concrete Degradation From Projected Climate Change, *Urban Climate*, 9, 2014, 101-114
- R. Wang, M.J. Eckelman, J.B. Zimmerman
 Consequential Environmental and Economic Life Cycle Assessment of Green and Gray Stormwater Infrastructures for Combined Sewer Systems, *Environmental Science and Technology*, 47(19), 2013, 11189-11198
- M.J. Eckelman
 Life Cycle Assessment in Support of Sustainable Transportation, *Environmental Research Letters*, 8, 2013, 021004
- M.J. Eckelman, M.S. Mauter, J.A. Isaacs, M. Elimelech
 New Perspectives on Nanomaterial Aquatic Ecotoxicity: Production Impacts Exceed Direct Exposure Impacts for Carbon Nanotubes, *Environmental Science and Technology*, 46(5), 2012, 2902-2910

SELECTED RESEARCH PROJECTS

- CAREER: Building Chemical Synthesis Networks for Life Cycle Hazard Modeling
 Principal Investigator, National Science Foundation
- Ethics Education in Life Cycle Design, Engineering, and Management
 Principal Investigator, National Science Foundation
- Designing and Integrating Life Cycle Assessment Methods for Nanomanufacturing Scale-up
 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
civ.neu.edu/people/fannon-david

Scholarship focus: sustainable and high performance building design; development of sustainable building technologies; human

comfort within the built environment

SELECTED RESEARCH PROJECTS

Decision Frameworks for Resilient and Sustainable Buildings

Co-Investigator, National Science Foundation

Building Resilience: A Tool for Adaptability Planning and Decision-Making

Co-Principal Investigator, Northeastern University

Cost-effective Thermal Envelope Retrofits in Wood-frame Residential Buildings

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
civ.neu.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: National Research Council, Research Associateship; National Science Foundation, Graduate Research Fellowship

SELECTED PUBLICATIONS

M.M. Perron, R.M. Burgess, M.G. Cantwell, L. Fernandez
 Evaluating Cost When Selecting Performance Reference Compounds for the Environmental Deployment of Polyethylene Passive Samplers, *Integrated Environmental Assessment and Management*, 11(2), 2015, 256-265

L. Fernandez, P.M. Gschwend
 Predicting Bioaccumulation of Polycyclic Aromatic Hydrocarbons in Soft-shelled Clams (*Mya arenaria*) Using Field Deployments of Polyethylene Passive Samplers, *Environmental Toxicology and Chemistry*, 34(5), 2015, 993-1000

L. Fernandez, W. Lao, K. A. Maruya, R. M. Burgess
 Calculating the Diffusive Flux of Persistent Organic Pollutants Between Sediments and the Water Column on the Palos Verdes Shelf Superfund Site Using Polymeric Passive Samplers, *Environmental Science & Technology*, 48, 2014, 3925-3924

SELECTED RESEARCH PROJECTS

Non-equilibrium Passive Sampling for Quantitative Thermodynamic Exposure Assessment (Q-TEA)

Principal Investigator, US Army Environmental Laboratory

STEPHEN FLYNN



Professor, Political Science; co-Director, George J. Kostas Research Institute for Homeland Security; affiliated faculty, Civil and Environmental Engineering

PhD, Tufts University, 1991
civ.neu.edu/people/flynn-stephen

Scholarship focus: critical infrastructure resilience; public policy

SELECTED PUBLICATIONS

- I. Linkov, D. Eisenberg, M. Bates, D. Chang, M. Convertino, J. Allen, S. Flynn, T. Seager
 Measurable Resilience for Actionable Policy, *Environmental Science & Technology*, 47(18), 2013, 10108-10110
- N. Bakshi, S. Flynn, N. Gans
 Countering the Threat of Nuclear Terrorism at Domestic and Foreign Ports, *Informed Decisions on Catastrophic Risks*, The Wharton School, University of Pennsylvania, 57(1), 2012
- N. Bakshi, S. Flynn, N. Gans
 Estimating the Operational Impact of Container Inspections at International Ports, *Management Science*, 57(1), 2011, 1-20
- L. Wein, Y. Liu, Z. Cao, S. Flynn
 The Optimal Spatiotemporal Deployment of Radiation Portal Monitors can Improve Detection at Overseas Ports, *Science & Global Security*, 15(2), 2008, 211-233
- S. Flynn
 Drug Trafficking, the International System, and Decision Constraints: A Policy-making Simulation, *International Studies Perspectives*, 1(1), 2000, 45-55

SELECTED RESEARCH PROJECTS

- Bolstering Counter-proliferation Efforts with Global Supply Chains
 Principal Investigator, MacArthur Foundation
- Devising Economic Incentives for Advancing Infrastructure Resilience
 Principal Investigator, Department of Homeland Security
- Infrastructure Resilience Metrics for Man-made (explosive) and Natural Hazard Incidents
 Principal Investigator, Department of Homeland Security

PETER FURTH



Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1981
civ.neu.edu/people/furth-peter

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

SELECTED PUBLICATIONS

- P. Furth, T.H. Muller
 Conditional Bus Priority at Signalized Intersections: Better Service with Less Traffic Disruption, *Journal of the Transportation Research Board*, 1731, 2014, 23-30
- P. Furth, A. Rahbee
 Optimal Bus Stop Spacing Through Dynamic Programming and Geographic Modeling, *Journal of the Transportation Research Board*, 1731, 2014, 15-22
- P. Furth, B. Cesme, T.H.J. Muller
 Lost Time and Cycle Length for an Actuated Traffic Signal, *Transportation Research Record: Journal of the Transportation Research Board*, 2009, 2128, 152-160
- S. Altun, P. Furth
 Scheduling Buses to Take Advantage of Transit Signal Priority, *Transportation Research Record: Journal of the Transportation Research Board*, 2111, 2009, 50-59
- T.H.J. Muller, P. Furth
 Transfer Scheduling and Control to Reduce Passenger Waiting Time, *Transportation Research Record: Journal of the Transportation Research Board*, 2112, 2009, 111-118

SELECTED RESEARCH PROJECTS

- Self-organizing Traffic Signals
 Principal Investigator, National Science Foundation
- Bicycle Network Analysis
 Principal Investigator, Delaware Department of Transportation

AUROOP GANGULY



Associate Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 2002
civ.neu.edu/people/ganguly-aurop

Scholarship focus: climate extremes and water sustainability; data sciences for

complex systems

SELECTED PUBLICATIONS

- 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
- E.A. Kodra, A.R. Ganguly
Asymmetry of Projected Increases in Extreme Temperature Distributions, *Scientific Reports*, 4, 2014, 5884
- A.R. Ganguly, E.A. Kodra, et al.
Toward Enhanced Understanding And Projections of Climate Extremes Using Physics-guided Data Mining Techniques, *Nonlinear Processes in Geophysics*, 21, 2014, 777-795
- S. Ghosh, D. Das, S.-C. Kao, A.R. Ganguly
Lack of Uniform Trends but Increasing Spatial Variability in Observed Indian Rainfall Extremes, *Nature Climate Change*, 2, 2012, 86-91
- E. Kodra, K.S. Steinhäuser, A.R. Ganguly
Persisting Cold Spells in the 21st Century Warming Environment, *Geophysical Research Letters*, 38, 2011, L08705
- A.R. Ganguly, K. Steinhäuser, D.J. Erickson, M. Branstetter, E.S. Parish, N. Singh, J.B. Drake, L. Buja
Higher Trends but Larger Uncertainty and Geographic Variability In 21st Century Temperature and Heat Waves, *Proceedings of the National Academy of Sciences of the United States of America*, 106(37), 2009, 15555-15559

SELECTED RESEARCH PROJECTS

- High-dimensional Statistical Machine Learning for Spatio-Temporal Data, with applications to Climate Science
Principal Investigator, National Science Foundation
- Expeditions in Computing: Understanding Climate Change: A Data-driven Approach
Co-Principal Investigator, National Science Foundation
- Spatio-temporal Extremes & Association: Marine Adaptation and Survivability under Climate change and rising Ocean Temperatures
Co-Principal Investigator, National Science Foundation

TARIK GOUHIER



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

PhD, McGill University, 2010
civ.neu.edu/people/gouhier-tarik

Scholarship focus: dynamical models of ecological and environmental processes

for marine species; adaptive management strategies of interconnected coastal ecosystems

SELECTED PUBLICATIONS

- 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
- B. Spiecker, T.C. Gouhier, F. Guichard
Reciprocal Feedbacks Between Spatial Subsidies and Reserve Networks in Coral Reef Meta-ecosystems, *Ecological Applications*, 2015, 1-41
- T.C. Gouhier, F. Guichard
Synchrony: Quantifying Variability in Space and Time, *Methods in Ecology and Evolution*, 5(6), 2014, 524-533
- P. Pillai, T.C. Gouhier, S.V. Vollmer
The Cryptic Role of Biodiversity in the Emergence of Host-microbial Mutualisms, *Ecology Letters*, 17(11), 2014, 1437-1446
- T.C. Gouhier, F. Guichard, B.A. Menge
Designing Effective Reserve Networks for Non-equilibrium Metacommunities, *Ecological Applications*, 23(6), 2013, 1488-1503
- T.C. Gouhier, F. Guichard, B.A. Menge
Ecological Processes Can Synchronize Marine Population Dynamics Over Continental Scales, *Proceedings of the National Academy of Sciences of the United States of America*, 107(18), 2010, 8281-8286

SELECTED RESEARCH PROJECTS

- Coral-microbial Interactions as Determinants of Disease Dynamics
Principal Investigator, National Science Foundation
- Integrating Broad-scale Regional Variation in Environmental Forcing and Benthic-pelagic Coupling
Co-Principal Investigator, National Science Foundation
- Mapping and Modeling Demersal Fish Habitat Suitability and Productivity in the Gulf of Maine
Co-Principal Investigator, The Nature Conservancy
- Spatio-temporal Extremes and Association: Marine Adaptation and Survivability under Climate change and rising Ocean Temperatures
Co-Principal Investigator, National Science Foundation

APRIL GU



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

PhD, University of Washington, 2003
civ.neu.edu/people/gu-april

Scholarship focus: application of biotechnology for water quality improvement; biological treatment processes and

bioremediation; ecotoxicology and toxicity assessment; biosensors for water quality monitoring

Honors and awards: College of Engineering Faculty Fellow; National Science Foundation CAREER Award; National Science Foundation Education BRIGE Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

D. Bello, J. Lan, A.Z. Gu, P. Demokritou P. Gaines, et al.
Evaluation of Cytotoxic Genotoxic and Inflammatory Responses of Nanoparticles from Photocopiers in Three Human Cell Lines, *Particle and Fibre Toxicology*, 10(42), 2014, 1743-8977

S.T. O'Connor, J. Lan, M. North, A. Loguinov, L. Zhang, M. T. Smith, A.Z. Gu, C. Vulpe
Genome-wide Functional and Stress Response Profiling Reveals Toxic Mechanism and Genes Required for Tolerance to Benzo[a]pyrene in *S. cerevisiae*, *Frontiers in Genetics*, 3(316), 2013

N. Gou, A. Onnis-Hayden, A.Z. Gu
Mechanistic Toxicity Assessment of Nanomaterials by Whole-Cell-Array Stress Genes Expression Analysis, *Environmental Science and Technology*, 2010, 44(15), 5964-5970

Yildirim N, Long F, Gao C, He M, Shi HC and Gu AZ
Aptamer-based Optical Biosensor for Rapid and Sensitive Detection of 17-Estradiol in Water Samples, *Environmental Science & Technology*, 2010, 46(6), 3288-3294

A. Onnis-Hayden, H. Weng, M. He, S. Hansen, V. Ilyin, K. Lewis, A. Gu
Prokaryotic Real-time Gene Expression Profiling for Toxicity Assessment, *Environmental Science & Technology*, 2009, 43(12), 4574-4581

SELECTED RESEARCH PROJECTS

Assessment of Potential Ecological and Health Impact of Coal Ash Spill in Dan River North Carolina

Principal Investigator, National Science Foundation

CAREER: Mechanistic Toxicity Assessment Of Emerging Contaminants for Water Quality Monitoring

Principal Investigator, National Science Foundation

Novel S2EBPR Process for Sustainable Phosphorus Removal in Wastewater

Principal Investigator, Water Environment Research Foundation

Mechanistic and Predictive Genotoxicity Assessment of Nanomaterials

Principal Investigator, National Science Foundation

JEROME HAJJAR



CDM Smith Professor and Chair, Civil and Environmental Engineering

PhD, Cornell University, 1988
civ.neu.edu/people/hajjar-jerome

Scholarship focus: steel and composite steel/concrete structures; earthquake engineering; structural stability; large-scale experimental testing of structures; computational 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; 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; BSCES Clemens Hershel Award

SELECTED PUBLICATIONS

J.S. Steelman, E.T. Filipov, L.A. Fahnstock, J.R. Revell, J.M. LaFave, J.F. Hajjar, D.A. Foutch

Experimental Behavior of Steel Fixed Bearings and Implications for Seismic Bridge Response, *Journal of Bridge Engineering*, Special Issue: Recent Advances in Seismic Design, Analysis and Protection of Highway Bridges, ASCE, 19(8), 2014, A4014007

T. Perea, R.T. Leon, J.F. Hajjar, M.D. Denavit
Full-scale Tests of Slender Concrete-filled Steel Tubes: Interaction Behavior, *Journal of Structural Engineering*, ASCE, 140(9), 2014, 04014054

S. Szymszowski, B.H. Smith, J.F. Hajjar, B.W. Schafer, S.R. Arwade
The Mechanical Properties of a Sintered, Hollow Sphere, *Steel Foam*, *Materials and Design*, 54, 2014, 1083-1094

M.R. Eatherton, X. Ma, H. Krawinkler, G.G. Deierlein, J.F. Hajjar
Quasi-static Behavior of Controlled Rocking Steel Frames, *Journal of Structural Engineering*, ASCE, 140(11), 2014, 04014083

S.B. Walsh, D.J. Borello, B. Guldur, J.F. Hajjar
Data Processing of Point Clouds for Object Detection for Structural Engineering Applications, *Computer-aided Civil and Infrastructure Engineering*, 28(7), 2013, 495-508

SELECTED RESEARCH PROJECTS

Deconstructable Systems for Sustainable Design of Steel and Composite Structures

Principal Investigator, National Science Foundation

NRI: Large: Collaborative Research: Fast and Accurate Infrastructure Modeling and Inspection with Low-flying Robots
Principal Investigator, National Science Foundation

Reliability-based Hurricane Risk Assessment for Offshore Wind Farms

Co-Principal Investigator, National Science Foundation

FERDI HELLWEGER



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

ScD, Columbia University, 2004
civ.neu.edu/people/hellweger-ferdinand

Scholarship focus: surface water quality, microbial ecology and systems bioecology (the combination of systems biology and

systems ecology)

Honors and awards: Environmental Merit Award, U.S. Environmental Protection Agency

SELECTED PUBLICATIONS

F.L. Hellweger

100 Years Since Streeter and Phelps: It is Time to Update the Biology in Our Water Quality Models, *Environmental Science and Technology*, 49(11), 2015, 6372-6373

F.L. Hellweger, N. Fredrick, J.A. Berges

Age-correlated Stress Resistance Improves Fitness of Yeast: Support from Agent-based Simulations, *BMC Systems Biology*, 8(18), 2014, 1-10

F.L. Hellweger, E. van Sebille, N.D. Fredrick

Biogeographic Patterns in Ocean Microbes Emerge in a Neutral Agent-based Model, *Science*, 345(6202), 2014, 1346-1349

J.-U. Kreft, C. Plugge, V. Grimm, F. Hellweger, et al.

Mighty Small: Observing and Modeling Individual Microbes Becomes Big Science, *PNAS*, 110(45), 2013, 18027-18028

N. Fredrick, J.A. Berges, B. Twining, D. Nuñez-Milland, F.L. Hellweger

Exploring Mechanisms of Intracellular P Heterogeneity in Cultured Phytoplankton Using Agent Based Modeling, *Applied and Environmental Microbiology*, 79(14), 2013

F.L. Hellweger

Escherichia Coli Adapts to Tetracycline Resistance Plasmid (pBR322) by Mutating Endogenous Potassium Transport: in Silico Hypothesis Testing, *FEMS Microbiology Ecology*, 83(3), 2013, 622-631

SELECTED RESEARCH PROJECTS

Dimensions: Collaborative Research: Anthropogenic Nutrient Input Drives Genetic, Functional and Taxonomic Biodiversity in Hypereutrophic Lake Taihu, China

Principal Investigator, National Science Foundation

Collaborative Research: Causes and Mechanisms of Cell Death in Freshwater Phytoplankton

Principal Investigator, National Science Foundation

Consortium for Ocean Sensing In the Nearshore Environment (COSINE)

Principal Investigator, National Oceanic and Atmospheric Administration

HARIS KOUTSOPOULOS



Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1986

civ.neu.edu/people/koutsopoulos-haris

Scholarship focus: urban transportation networks and informatics, urban mobility, intelligent transportation systems, public

transportation operations

SELECTED PUBLICATIONS

M. Rahmani, E. Jenelius, H.N. Koutsopoulos

Non-parametric Estimation of Route Travel Time Distributions from Low-frequency Floating Car Data, *Transportation Research Part C: Emerging Technologies*, 58(part B), 2015, 343-362

A. Tympakianaki, E. Jenelius, H.N. Koutsopoulos

c-SPSA: Cluster-wise Simultaneous Perturbation Stochastic Approximation Algorithm and its Application to Dynamic Origin-destination Matrix Estimation, *Transportation Research Part C: Emerging Technologies*, 55, 2015, 231-245

E. Jenelius, H.N. Koutsopoulos

Probe Vehicle Data Sampled by Time or Space: Consistent Travel Time Allocation and Estimation, *Transportation Research Part B: Methodological*, 71, 2015, 120-137

E. Kazagli, H.N. Koutsopoulos

Estimation of Arterial Travel Time from Automatic Number Plate Recognition Data, *Journal of the Transportation Research Board*, 2391, 2014, 22-31

H. Farah, H.N. Koutsopoulos

Do Cooperative Systems Make Drivers' Car-following Behavior Safer?, *Transportation Research Part C*, 41, 2014, 61-72

X. Ma, Z. Huang, H.N. Koutsopoulos

Integrated Traffic and Emissions Simulation: a Model Calibration Approach Using Aggregate Information, *Environmental Modeling and Assessment*, 19, 2014, 271-282

C. Antoniou H.N. Koutsopoulos, G. Yannis

Dynamic Data-driven Local Traffic State Estimation and Prediction, *Transportation Research Part C*, 34, 2013, 89-107

SELECTED RESEARCH PROJECTS

Transport for London Research Partnership Extension

Principal Investigator, Transport for London

Automated Data Collection System Research in Chinese Transit Systems

Co-Principal Investigator, Jinan Urban Transport Research Center

Near Capacity Operations

Co-Principal Investigator, MTR, Hong Kong

PHILIP LARESE-CASANOVA



Assistant Professor, Civil and Environmental Engineering

PhD, University of Iowa, 2006
 civ.neu.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

N. Cai, P. Larese-Casanova

Factors Influencing Natural Organic Matter Sorption onto Commercial Graphene Oxides, *Chemical Engineering Journal*, 273, 2015, 568-579

A.E.P. Schellenger, P. Larese-Casanova

Oxygen Isotope Indicators of Selenate Reaction with Fe(II) and Fe(III) Hydroxides, *Environmental Science and Technology*, 47(12), 2013, 6254-6262

P. Larese-Casanova, R.E. Blake

Measurement of δ^{180} Values in Arsenic and Selenium Oxyanions, *Rapid Communications in Mass Spectrometry*, 27(1), 2013, 117-126

N. Cai, P. Larese-Casanova

Sorption of Carbamazepine by Commercial Graphene Oxides: A Comparative Study with Granular Activated Carbon and Multiwalled Carbon Nanotubes, *Journal of Colloid and Interface Science*, 426, 2014, 152-161

P. Larese-Casanova, S. Haderlein, A. Kappler

Biomineralization of Lepidocrocite and Goethite by Nitrate-Reducing Fe(II)-oxidizing Bacteria: Effect of pH, Bicarbonate, Phosphate, and Humic Acids, *Geochimica et Cosmochimica Acta*, 74(13), 2010, 3721-3734

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

SINAN MÜFTÜ



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

PhD, University of Rochester, 1994
 mie.neu.edu/people/muftu-sinan

Scholarship focus: mechanics and tribology of axially moving materials, webs; numerical

simulation of tissue healing and bone remodeling; high velocity impact of micron scale particles

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

SELECTED PUBLICATIONS

H. Yang, J. B. C. Engelen, A. Pantazi, S. Müftü, et al.

Mechanics of Lateral Positioning of a Translating Tape due to Tilted Rollers: Theory and Experiments, *International Journal of Solids and Structures*, 66, 2015, 88-97

S. Müftü, W. Meleis, R.H. Moore, D. Kopans, K.T. Wan, et al.

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

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

A Method for the Estimation of Interface Temperature in Ultrasonic Joining, *Metallurgical and Materials Transactions A*, 45(5), 2014, 2545-2552

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

The Effect of Different Implant-abutment Connection on Screw Joint Stability, *Journal of Oral Implantology*, 40(2), 2014, 146-152

J. Aguirrebeitia, S. Müftü, M. Abasolo, J. Vallejo

Experimental Study of the Removal Force in Conical Implant-abutment Interfaces, *Journal of Prosthetic Dentistry*, 111(4), 2014, 293-300

J. Shi, S. Müftü, A.Z. Gu, K.T. Wan

Adhesion of a Cylindrical Shell in the Presence of DLVO Surface Potential, *Journal of Applied Mechanics*, 80(6), 2013, e061007

B. Yildirim, S. Müftü

Impact of High Velocity Particles onto a Rough Surface, *International Journal of Solids and Structures*, 49(11-12), 2012, 1375-1386

SELECTED RESEARCH PROJECTS

A Novel Biomechanical Model of Bacterial Adhesion and Aggregation

Co-Principal Investigator, National Science Foundation

Collaborative Research: Mechano-Lipidomics and Mechano-Cytosis of Drug Delivery Liposomes

Co-Principal Investigator, National Science Foundation

Fundamentals of Bonding and Kinetic Consolidation Processes,

Co-Principal Investigator, National Science Foundation

Improving Theoretical Models of Advanced Tape Transport Systems

Principal Investigator, Oracle Corporation

ANDREW MYERS



Assistant Professor, Civil and Environmental Engineering

PhD, Stanford University, 2009
cive.neu.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: Civil and Environmental Engineering Excellence in Teaching Award

SELECTED PUBLICATIONS

- J. Johansson, F. Løvholt, S.R. Arwade, A.T. Myers, et al.
Foundation Damping and the Dynamics of Offshore Wind Turbine Monopiles, *Renewable Energy*, 80, 2015, 724-736
- V. Valamanesh, A.T. Myers, S.R. Arwade
Multivariate Analysis of Extreme Metocean Conditions for Offshore Wind Turbines, *Structural Safety*, 55, 2015, 60-69
- A.T. Myers, S. Arwade, V. Valamanesh, S. Hallowell, W. Carswell
Strength, Stiffness, Resonance and the Design of Offshore Wind Turbine Monopiles, *Engineering Structures*, 100, 2015, 332-341
- S. Hallowell, A. T. Myers, S.R. Arwade
Variability of Breaking Wave Characteristics and Impact Loads on Offshore Wind Turbines Supported by Monopiles, *Wind Energy*, 2015, 1-12
- V. Valamanesh, A.T. Myers
Aerodynamic Damping and Seismic Response of Horizontal Axis Wind Turbine Towers, *Journal of Structural Engineering*, 140(11), 2014, e04014090
- K.Wei, S.R. Arwade, A.T. Myers
Incremental Wind-wave Analysis of the Structural Capacity of Offshore Wind Turbine Support Structures Under Extreme Loading, *Engineering Structures*, 79, 2014, 58-69

SELECTED RESEARCH PROJECTS

- Collaborative Research: Reliability-based Hurricane Risk Assessment for Offshore Wind Farms
Principal Investigator, National Science Foundation
- Reliability-based Hurricane Risk Assessment for Offshore Wind Farms
Principal Investigator, National Science Foundation
- Coll. Research: GOALI: Enabling Advanced Wind Turbine Tower Manufacturing with Reliability-based Design
Principal Investigator, National Science Foundation
- Risk and Decision-making for the Hurricane Threat to Offshore Wind Farms
Principal Investigator, Massachusetts Clean Energy Center
- Keystone Tower Systems – Wind Tower Demonstration Project
Co-Principal Investigator, Massachusetts Clean Energy Center

ANNALISA ONNIS-HAYDEN



Associate Teaching Professor, Civil and Environmental Engineering

PhD, University of Cagliari, Italy, 2004
civ.neu.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

SELECTED PUBLICATIONS

- Y. Li, X. Wang, A. Onnis-Hayden, K.T. Wan, A.Z. Gu
Universal Quantifier Derived from AFM Analysis Links Cellular Mechanical Properties and Cell-Surface Integration Forces with Microbial Deposition and Transport Behavior, *Environmental Science and Technology*, 48(3), 2014, 1769-1778
- A. Onnis-Hayden, N. Majed, A.Z. Gu
Decoupling the Microbial Populations for Phosphorus and Nitrogen Removal in Integrated Fixed-Film Activated Sludge Enhanced Biological Phosphorus Removal (IFAS-EBPR) System, *Water Research*, 45, 2011, 3845-3854
- N. Gou, A. Onnis-Hayden, A.Z. Gu
Mechanistic Toxicity Evaluation of Nanomaterials via Prokaryotic Gene Expression Profiling, *Environmental Science and Technology*, 44, 2010, 5964-5970
- A. Onnis-Hayden, A.Z. Gu
Implication of Using Different Carbon Sources for Denitrification in Wastewater Treatments, *Water Environment Research*, 81(8), 2009, 788-799
- A. Onnis-Hayden, H. Weng, M. He, S. Hansen, V. Ilyin, et al.
Prokaryotic Real-Time Gene Expression Profiling for Toxicity Assessment, *Environmental Science and Technology*, 43(12), 2009, 4574-4581

SELECTED RESEARCH PROJECTS

- Insights to Selenium Cycling and Remediation Revealed by Stable Oxygen Isotopes
Co-Principal Investigator, National Science Foundation
- Investigate Mechanisms for Optimization and Design of Sidestream EBPR Processes as a Sustainable Approach for Achieving Stable and Efficient P Removal
Co-Principal Investigator, Water Environment Research Foundation
- Sustainability Evaluation of Nutrient Removal Technologies Using Comprehensive Life Cycle Assessment-Economical, Ecological and Regulation Implications
Co-Principal Investigator, Water Environment Research Foundation

MARK PATTERSON



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

PhD, Harvard University, 1985
civ.neu.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

E.C. Edson, M.R. Patterson

MantaRay: A Novel Autonomous Sampling Instrument for In Situ Measurements of Environmental Microplastic Particle Concentrations, *Proceedings of the IEEE/Marine Technology Society OCEANS* 2015, 2015, 6

J. Elliott, M. Patterson, E. Vitry, N. Summers, C. Mitermque
 Morphological Plasticity allows Coral to Actively Overgrow the Aggressive Sponge *Terpios hoshinota* (Mauritius, Southwestern Indian Ocean), *Marine Biodiversity*, 2015, 1-5

S. Mukhopadhyay, C. Wang, M. Patterson, M. Malisoff, F. Zhang
 Collaborative Autonomous Surveys in Marine Environments Affected by Oil Spills, *Cooperative Robots and Sensor Networks 2014 (Second Edition)*, (Editors, A. Koubaa and A. Khelil), Special edition in the "Studies in Computational Intelligence" Springer Book Series, 554, 2014, 87-113

K.P. Sebens, G. Bernardi, M.R. Patterson, D. Burkepile
 Saturation Diving and Underwater Laboratories: How Underwater Technology has Aided Research on Coral Biology and Reef Ecology, *Research and Discoveries: The Revolution of Science through Scuba*, Smithsonian Contributions to the Marine Sciences, 39, 2013, 39-52

SELECTED RESEARCH PROJECTS

How does the Gastrovascular System in Perforate and Imperforate Corals Affect Physiological Response to Environmental Stress?

Principal Investigator, National Science Foundation
 Autonomous Sensors and Smart Analytics for Wetlands in Urban Areas

Co-Principal Investigator, Northeastern University

MATTHIAS RUTH



Professor, Public Policy and Urban Affairs; jointly appointed, Civil and Environmental Engineering

PhD, University of Illinois, 1992
civ.neu.edu/people/ruth-matthias

Scholarship focus: dynamic modeling of social, economic and environmental systems, and their interactions; urban infrastructure systems analysis and modeling; urban climate impacts and adaptation; energy and resources economics and policy

SELECTED PUBLICATIONS

M. Ruth, O. Özgün, J. Wachsmuth, S. Gößling-Reisemann
 Dynamics of Energy Transitions Under Changing Socioeconomic, Technological and Climate Conditions in Northwest Germany, *Ecological Economics*, 111, 2015, 29-47

S. Qiu, M. Ruth, S. Ghosh
 Evacuated Tube Collectors: A Notable Driver Behind the Solar Water Heater Industry in China, *Renewable and Sustainable Energy Reviews*, 47, 2015, 580-588

M. Ruth, R.S. Franklin
 Livability for all? Conceptual Limits and Practical Implications, *Applied Geography*, 49, 2014, 18-23

J. Zhu, M. Ruth
 The Development of Regional Collaboration for Resource Efficiency: a Network Perspective on Industrial Symbiosis, *Computers, Environment and Urban Systems*, 44, 2014, 37-46

J. Wachsmuth, A. Blohm, S. Gößling-Reisemann, T. Eickemeier, M. Ruth, R. Gasper, S. Stürmann
 How Will Renewable Power Generation be Affected by Climate Change?, *The Case of a Metropolitan Region in Northwest Germany*, *Energy*, 58, 2013, 192-201

J. Zhu, M. Ruth
 Exploring the Resilience of Industrial Ecosystems, *Journal of Environmental Management*, 122, 2013, 65-75

E. Douglas, P. Kirshen, M. Paolisso, C. Watson, J. Wiggin, M. Ruth
 Coastal Flooding, Climate Change, and Environmental Justice: Identifying Obstacles and Incentives for Adaptation in Two Metropolitan Boston Massachusetts Communities, *Mitigation & Adaptation Strategies for Global Change*, 17(5), 2012, 537-562

SELECTED RESEARCH PROJECTS

The Effect of Energy-saving Regulations on the Location of Manufacturing

Principal Investigator, National Science Foundation

MEHRDAD SASANI



Associate Professor, Civil and Environmental Engineering

PhD, University of California at Berkeley, 2001
civ.neu.edu/people/sasani-mehrdad

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

Honors and awards: Fellow, American Society of Civil Engineers; Fellow, Structural Engineering Institute; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

- L. Keyvani, M. Sasani
 Analytical and Experimental Evaluation of Progressive Collapse Resistance of a Flat-slab Posttensioned Parking Garage, *Journal of Structural Engineering*, ASCE, 2015, 04015030
- E. Livingston, M. Sasani, M. Bazan, S. Sagioglu
 Progressive Collapse Resistance of RC Beams, *Engineering Structures*, 959, 2015, 61-70
- S. Sagioglu, M. Sasani
 Progressive Collapse Resisting Mechanisms of Reinforced Concrete Structures and Effects of Initial Damage Locations, *Journal of Structural Engineering*, ASCE, 140(3), 2014, 1-12
- J.A. Murray, M. Sasani
 Seismic Shear-axial Failure of Reinforced Concrete Columns Versus System Level Structural Collapse, *Journal of Engineering Failure Analysis*, 32, 2013, 382-401
- M. Sasani, S. Sagioglu
 Gravity Load Redistribution and Progressive Collapse Resistance of a 20-story RC Structure Following Loss of an Interior Column, *Structural Journal*, ACI, 107(6), 2010, 636-644
- M. Sasani, J. Kropelnicki
 Progressive Collapse Analysis of an RC Structure, *The Structural Design of Tall and Special Buildings*, 17(4), 2008, 757-772

SELECTED RESEARCH PROJECTS

- NEESR: Near Collapse Performance of Existing RC Concrete Frame Buildings
 Principal Investigator, National Science Foundation
- RSB: A Decision and Design Framework for Multi-hazard Resilient and Sustainable Buildings
 Principal Investigator, National Science Foundation

THOMAS SHEAHAN



Professor, Civil and Environmental Engineering;
 Sr. Associate Dean for Academic Affairs

ScD, Massachusetts Institute of Technology, 1991
civ.neu.edu/people/sheahan-thomas

Scholarship focus: rate effects in soils; offshore geohazards; sampling disturbance effects; laboratory instrumentation

Honors and awards: Fellow, American Society of Civil Engineers

SELECTED PUBLICATIONS

- S. Barbuto, T.C. Sheahan, J.P. Shine, A. Alshawabkeh, et al.
 Benchscale Assessment of the Efficacy of a Reactive Core Mat to Isolate PAH-Spiked Aquatic Sediments, Soil and Sediment Contamination: An International Journal, 23(1), 2014
- D. Meric, A.N. Alshawabkeh, J.P. Shine, T.C. Sheahan
 Bioavailability of Hydrophobic Organic Compounds in Thin-layered Sediments, *Chemosphere*, 103, 2014, 281-289
- D. Cheney, L. Rajicb, E. Sly, D.Meric, T.C. Sheahan
 Uptake of PCBs Contained in Marine Sediments by the Green Macroalga *Ulva Rigida*, *Marine Pollution Bulletin*, 88(1-2), 2014, 207-214
- K. Santora, E.J. Mason, T.C. Sheahan
 A Model for Progressive Mentoring in Science and Engineering Education and Research, *Innovative Higher Education*, 38(5), 2013, 427-440
- F. Hellweger, N. Rahbar, A.N. Alshawabkeh, T.C. Sheahan, et al.
 Model Prediction of Long-term Reactive Core Mat Efficacy for Capping Contaminated Aquatic Sediments, *ASCE Journal of Environmental Engineering*, 139(4), 2013, 564-575

SELECTED RESEARCH PROJECTS

- Sustainable Adaptive Gradients in the Coastal Environment: Reconceptualizing the Role of Infrastructure in Resilience
 Co-Principal Investigator, National Science Foundation
- Puerto Rico Testsite for Exploring Contamination Threats (PROTECT)**, a National Institute of Environmental Health Sciences Superfund Research Center. PROTECT investigates the relationship between environmental contamination and preterm birth
 Training Core Leader, National Institutes of Health

MICHAEL B. SILEVITCH



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

PhD, Northeastern University, 1971
ece.neu.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 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

HELEN SUH



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

ScD, Harvard University, 1993
civ.neu.edu/people/suh-macintosh-helen

Scholarship focus: air pollution; environmental epidemiology; exposure assessment

Honors and awards: Member, Charter Clean Air Scientific Advisory Committee, US EPA; Yaglou Award, International Academy of Indoor Air Sciences

SELECTED PUBLICATIONS

M.A. Kioumourtoglou, D. Spiegelman, H.H. Suh, et al.
Exposure Measurement Error in PM_{2.5} Health Effects Studies: A Pooled Analysis of Eight Personal Exposure Validation Studies, *Environmental Health*, 13(2), 2014, 1-11

J.D. Yanosky, C. Paciorek, F. Laden, J. Hart, R. Puett, D. Liao, H.H. Suh
Spatio-temporal Modeling of Particulate Air Pollution in the Conterminous United States Using Geographic and Meteorological Predictors, *Environmental Health*, 13(63), 2014, 1-15

E.S. Baja, J.D. Schwartz, B.A. Coull, H.H. Suh, et al.
Structural Equation Modeling of Parasympathetic and Sympathetic Response to Traffic Air Pollution in a Repeated Measures Study, *Environmental Health*, 12(81), 2013, 1-13

H.H. Suh, A. Zanobetti, J. Schwartz, B. Coull
Chemical Properties of Air Pollutants and Cause-specific Hospital Admissions among the Elderly in Atlanta, GA, *EHP*, 119(10), 2011, 1421-1428

E.S. Baja, J.D. Schwartz, G.A. Wellenius, B. Coull, H.H. Suh, et al.
Traffic-related Air Pollution and QT Interval: Modification by Diabetes, Obesity, and Oxidative Stress Gene Polymorphisms in the Normative Aging Study, *EHP*, 118(6), 2010, 840-846

SELECTED RESEARCH PROJECTS

Impact of Air Pollution, Weather, and Lifestyle on Health in Older Americans
Principal Investigator, National Institute of Environmental Health Sciences

Development of a Medicare Cohort Dataset for use in Air Pollution
Principal Investigator, EPRI

Research Opportunities for Undergraduates: Training in Environmental Health Sciences (ROUTES)
Principal Investigator, National Institute of Environmental Health Sciences

Examination of Dose-response Curves for Low Chronic Ambient Fine Particulate Concentrations and Mortality using the Medicare Cohort Dataset

Principal Investigator, Electric Power Research Institute
Using Novel Big Data Approaches to Improve Public Health
Principal Investigator, Northeastern University

ALI TOURAN



Professor, Civil and Environmental Engineering

PhD, Stanford University, 1980
civ.neu.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

A.P. Gurgun, A. Touran

Public-private Partnership Experience in the International
 Arena: Case of Turkey, *Journal of Management in Engineering*,
 30(6), 2014

A.P. Gurgun, Y. Zhang, A. Touran

Schedule Contingency Analysis for Transit Projects Using
 a Simulation Approach, *Journal of Civil Engineering &
 Management*, 19(4), 2013, 465-475

P. Bakhshi, A. Touran

A Method for Calculating Cost Correlation among Construction
 Projects in a Portfolio, *International Journal of Architecture,
 Engineering and Construction*, 1(3), 2012, 134-141

P. Bakhshi, A. Touran

A New Approach for Contingency Determination in a Portfolio
 of Construction Projects, *Journal of Risk Analysis and Crisis
 Response*, 2(4), 2012, 223-232

SELECTED RESEARCH PROJECTS

Managing a portfolio of projects – Metrics for improvement
 Principal Investigator, Construction Industry Institute

GEOFFREY C. TRUSSELL



Professor and Chair, Marine and Environmental
 Sciences; Director, Marine Science Center;
 affiliated faculty, Civil and Environmental
 Engineering

PhD, College of William & Mary, 1998
civ.neu.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

C.M. Matassa, G.C. Trussell

Effects of Predation Risk Across a Latitudinal Temperature
 Gradient, *Oecologia*, 177, 2015, 775-784

S.M. Donelan, G.C. Trussell

Parental Effects Enhance Risk Tolerance and Performance in
 Offspring, *Ecology*, 96(8), 2015, 2049-2055

C.M. Matassa, G.C. Trussell

Prey State Affects the Ecological Consequences of Temporal
 Variation in Predation Risk, *Proceedings of the Royal Society B*,
 281, 2015, 1796

E.S. Bryson, G.C. Trussell, P.J. Ewanchuk

Broad-scale Geographic Variation in the Organization of
 Rocky Intertidal Communities in the Gulf of Maine, *Ecological
 Monographs*, 84, 2014, 579-597 (cover article)

L.P. Miller, C.M. Matassa, G.C. Trussell

Climate Change Enhances the Negative Effects of Predation Risk
 on an Intermediate Consumer, *Global Change Biology*, 20, 2014,
 3834-3844

N.D. Chu, S.T. Kaluziak, G.C. Trussell, S.V. Vollmer

Phylogenomic Analyses Reveal Latitudinal Population Structure
 And Polymorphisms in Heat Stress Genes in the North Atlantic
 Snail *Nucella Lapillus*, *Molecular Ecology*, 23, 2014, 1863-1873

N.D. Chu, S.T. Kaluziak, G.C. Trussell, S.V. Vollmer

Thermal Stress and Predation Risk Trigger Distinct
 Transcriptomic Response in the Intertidal Snail, *Nucella lapillus*,
Molecular Ecology, 23, 2014, 6104-6113

J.L. Orrock, E.L. Preisser, J.H. Grabowski, G.C. Trussell

The Cost of Safety: Refuges Increase the Impact of Predation
 Risk in Aquatic Systems, *Ecology*, 94(3), 2013, 573-579

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

SARAH WADIA-FASCETTI



Professor, Civil and Environmental Engineering;
Associate Dean, Graduate Studies

PhD, Stanford University, 1994
civ.neu.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

- A. Ganguli, C.M. Rappaport, D. Abramo, S. Wadia-Fascetti
Synthetic Aperture Imaging for Flaw Detection in a Concrete Medium, *NDT & E International*, 45(1), 2012, 79-90
- K. Belli, S. Wadia-Fascetti, C. Rappaport
Integrated Sensor and Media Modeling Environment Developed and Applied to Ground-Penetrating Radar Investigation of Bridge Decks, *Journal of Computing in Civil Engineering*, 25(1), 2011, 10-20
- K. Belli, C. Rappaport, S. Wadia-Fascetti
A Time Domain Equivalent Source Model of an Impulse GPR Antenna Based on Measured Radiation Field, *Research in Nondestructive Evaluation*, 22(4), 2011, 197-207

SELECTED RESEARCH PROJECTS

Northeastern ADVANCE

Principal Investigator, National Science Foundation

IGERT: Intelligent Diagnostics for Aging Civil Infrastructure

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
mie.neu.edu/people/wan-kai-tak

Scholarship focus: cellular biomechanics; water filtration; thin film adhesion and characterization; subsurface mechano-sensing; shell adhesion; fundamental intersurface forces

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

SELECTED PUBLICATIONS

- M. Robitaille, N. Belisle, S. Dang, E. Faigle, C. Morck, P. Uth, K.-T. Wan
An Optical Topographic Technique to Map the 3-D Deformed Profile of a Convex Lens under External Loading, *Experimental Mechanics*, 55, 2015, 641-646
- L. Sallaway, S. Magee, J. Shi, F. Quivira, K. Tgavalekos, D.H. Brooks, S. Muftu, W. Meleis, R.H. Moore, D. Kopans, K.-T. Wan
Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, *Experimental Mechanics*, 54, 2014, 935-942
- Y. Li, X. Wang, A. Onnis-Hayden, K.-T. Wan, A.Z. Gu
Universal Quantifier Derived from AFM Analysis Links Cellular Mechanic Properties and Cell-surface Integration Forces with Microbial Deposition and Transport Behavior, *Environmental Science and Technology*, 48, 2014, 1769-1778
- G. Li, K.-T. Wan
Adhesion Map for Thin Membranes, *Journal of Applied Mechanics* 81(12), 2013, 021018
- G. Li, C. Yilmaz, X. An, S. Somu, S. Kar, Y. Jung, A. Busnaina, K.-T. Wan
Adhesion of Graphene Sheet on Nano-patterned Substrates with Nano-Pillar Array, *Journal of Applied Physics*, 113, 2013, 244303
- M. Robitaille, J. Shi, S. McBride, K.-T. Wan
Mechanical Performance of Hydrogel Contact Lenses with a Range of Power Under Parallel Plate Compression and Central Load, *Journal of the Mechanical Behavior of Biomedical Materials*, 22, 2013, 59-64

SELECTED RESEARCH PROJECTS

A Novel Biomechanical Model of Bacterial Adhesion and Aggregation

Principal Investigator, National Science Foundation

Mechano-lipidomics and Mechano-cytosis of Drug Delivery Liposomes

Principal Investigator, National Science Foundation

Mechanical Integrity and Long Term Reliability of Photovoltaic Panels

Principal Investigator, National Institute of Standards and Technology

MING WANG



Professor, Civil and Environmental Engineering

PhD, University of New Mexico, 1983
civ.neu.edu/people/wang-ming

Scholarship focus: structural health monitoring; structural damage assessment; sensor technology for infrastructure; experimental mechanics; fiber reinforced

composites; construction materials; recycled waste materials; structural dynamics; earthquake engineering

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

SELECTED PUBLICATIONS

- S. Cho, J. Yim, S. Shin, H. Jung, C. Yun, M. Wang
Comparative Field Study of Cable Tension Measurement for a Cable-Stayed Bridge, *Journal of Bridge Engineering*, 18(8), 2013, 748-757
- W. Zhang, Y. Liu, M. Wang
Highly Efficient DNA-functionalized Carbon Nanotube Sensor Array for Gas Monitoring, *Journal of Smart Structures and Systems*, 11(8), 2013, 89-93
- V.V. Saykin, Y. Zhang, Y. Cao, M. Wang, J. McDaniel
Pavement Macrottexture Monitoring through Sound Generated by Tire-Pavement Interaction, *Journal of Engineering Mechanics*, 139(3), 2013, 264-271
- Y. Liu, C.-L. Chen, Y. Zhang, S. Sonkusale, M. Wang, M. Dokmeci
SWNT-Based Nanosensors for Wireless Detection of Explosives and Chemical Warfare Agents by Remote Single Chips SWNT Sensors, *IEEE Sensor*, 13(1), 2013, 202-209
- Q. Wang, G. McDaniel, M. Wang
Dynamic Tire Pressure Sensor for Measuring Ground Vibration, *Sensors*, 12, 2012, 15192-15205

SELECTED RESEARCH PROJECTS

VOTERS: Versatile Onboard Traffic Embedded Roaming Sensors

Principal Investigator, National Institute of Standards and Technology

Breath and Saliva Based Nano-bio Sensing System for Disease Diagnosis and Monitoring

Principal Investigator, Northeastern University

Salivary Glucose Sensors

Principal Investigator, NanoBio Systems

MISHAC YEGIAN



COE Distinguished Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1976
civ.neu.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

SELECTED PUBLICATIONS

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

SELECTED RESEARCH PROJECTS

NEESR: Induced Partial Saturation (IPS) Through Transport and Reactivity for Liquefaction Mitigation

Principal Investigator, National Science Foundation

Nan Cai

PhD 2015, Environmental Engineering; Advisor, Phillip Larese-Casanova

NOVEL GRAPHENE BASED MATERIALS FOR SORPTION PROCESSES IN WATER TREATMENT AND PURIFICATION APPLICATIONS

This study first examines some of the mechanistic interactions between commercial graphene oxides and endocrine disrupting compounds, pharmaceuticals, and natural organic matter in order to determine which physicochemical properties should be considered when choosing a graphene material. In addition, two more graphene based nano composites including ethylenediamine functionalized graphene (ED-G) and black carbon magnetite (BC-Mag) was synthesized in the lab and tested for their sorption performance on targeted contaminants. Graphene oxides of varied particle sizes, specific surface areas, and surface chemistries were evaluated within batch reactors. Specific surface area (SSA), surface charge, and phenolic content of graphene oxides was determined to have the greatest control on sorption extent of carbamazepine, an anticonvulsant used as a probe compound.

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

Seda Gokyer

PhD 2015, Civil Engineering; Advisor, Mishac Yegian

NUMERICAL SIMULATION OF PARTIAL SATURATION IN SANDS INDUCED BY FLOW AND CHEMICAL REACTIVITY

This research develops the theoretical basis of IPS and implements a numerical solution for modeling partial saturation in sand induced by transport and reactivity of a chemical solution within the pores of the sand. The model is based on coupled differential equations describing three-dimensional, transient, hydraulic flow and non-linear, advective-dispersive transport of the reactive chemical; coupled with algebraic equations describing the kinetics of the chemical, formation of oxygen gas, and associated decrease in saturation. To simulate partial saturation in sands through transport and reactivity, the computer program SUTRA, developed by the US Geological Survey, was adopted and modified. The new model "SUTRA-Bubble" is a modified version that simulates transient partial saturation created by IPS below the water table. SUTRA-Bubble models partial saturation in soil as a function of chemical reactivity of a solution which is transported through the pores of soil. SUTRA-Bubble also accounts for decrease in permeability of soil as degree of saturation in soil decreases.

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

Burcu Guldur

PhD 2014, Civil Engineering; Advisor, Jerome F. Hajjar

LASER-BASED STRUCTURAL SENSING AND SURFACE DAMAGE DETECTION

This dissertation investigates the use of high resolution three-dimensional terrestrial laser scanners with image capturing abilities as tools to capture geometric range data of complex scenes for structural engineering applications. Laser scanning technology is continuously improving, with commonly available scanners now capturing over 1,000,000 texture-mapped points per second with an accuracy of ~2 mm. However, automatically extracting meaningful information from point clouds remains a challenge, and the current state-of-the-art requires significant user interaction. The first objective of this research is to use widely accepted point cloud processing steps such as registration, feature extraction, segmentation, surface fitting and object detection to divide laser scanner data into meaningful object clusters and then apply several damage detection methods to these clusters. This requires establishing a process for extracting important information from raw laser-scanned data sets such as the location, orientation and size of objects in a scanned region, and location of damaged regions on a structure.

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

Leila Keyvani

PhD 2015, Civil Engineering; Advisor, Mehrdad Sasaki

PROGRESSIVE COLLAPSE RESISTANCE OF REINFORCED AND POST-TENSIONED CONCRETE FLAT PLATE STRUCTURES

In the first part of this dissertation a wireless data acquisition system capable of peer-to-peer and multi-hop communication is developed that would replace and overcome the constraints and drawbacks of wired systems. Using field data, the progressive collapse resistance of an actual post-tensioned flat plate parking garage is analytically evaluated after an interior column is dynamically removed. The tendons and the interaction of the tendons and floor are modeled explicitly. The slab had no bottom bars yet successfully redistributed the gravity load to the adjacent columns without failure. Compressive membrane forces developed as a result of growth tendency contributed to an increase of the gravity load carrying capacity of slab. Use of total moments developed in post-tensioned slab sections were found to be misleading in identifying the contribution of different portions of the post-tensioned slab to collapse resistance.

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

Nicole Martino

PhD 2014, Structural Engineering; Advisor, Ming Wang

QUANTIFYING REINFORCED CONCRETE BRIDGE DECK DETERIORATION USING GROUND PENETRATING RADAR

The beginning of this research determines that not only is the relationship between GPR and rebar corrosion stronger than the relationship between GPR and delaminations, but that the two are exceptionally correlated (90.2% and 86.6%). Next, multiple bridge decks were assessed with GPR and half-cell potential (HCP). Statistical parameters like the mean and skewness were computed for the GPR amplitudes of each deck, and coupled with actual corrosion quantities based on the HCP measurements to form a future bridge deck model that can be used to assess any deck with GPR alone. Finally, in order to understand exactly which component of rebar corrosion (rust, cracking or chloride) attenuates the GPR data, computational modeling was carried out to isolate each variable. The results indicate that chloride is the major contributor to the rebar reflection attenuation, and that computational modeling can be used to accurately simulate GPR attenuation due to chloride.

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

Farid Moghim

PhD 2014, Civil Engineering; Advisor, Luca Caracoglia

WIND-BORNE DEBRIS TRAJECTORY IN HIGH WINDS: APPLICATION TO THE PROTECTION OF TALL BUILDING FAÇADES

This dissertation describes the development of a probability-based framework for the analysis of debris trajectory in simulated boundary layer winds and for the prediction of the probability of impact against the vertical façade of these buildings. The work focuses on compact debris, i.e., objects of small dimensions and negligible mass moment of inertia (e.g., roof ballast elements, gravel, “bluff” shingles, etc.) The trajectories were computed for three different wind fields: (i) uniform wind field with constant horizontal velocity and no turbulence, (ii) “sudden” vertical gust superimposed to the uniform wind field and (iii) fully turbulent wind field.

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

Xiaodan Ruan

PhD 2015, Civil Engineering; Advisor, Ferdi L. Hellweger

EFFECT OF LAKE N FIXATION ON WATERSHED EXPORT UNDER N LOADING REDUCTION SCENARIOS

The hypothesis of this research is that lake and watershed N export is not reduced proportionally when N loading is reduced, because N fixation will counteract the reduction. The objective is to evaluate and quantify this effect. The hypothesis is tested by analysis of data from three approaches: microcosm lab experiments, lake field observations/budgets and lake ecosystem model applications. A simple model (Fixation and Export of Nitrogen from Lakes, FENL) is developed based on a steady-state mass balance with loading, output, loss/retention, and N fixation, where the amount fixed is a function of the N/P ratio of the loading. The FENL model is then implemented into a Chesapeake Bay watershed model and applied to predict watershed N export under three scenarios (baseline, 60% N reduction and balanced N+P reduction). The results suggest that lake and watershed N export will not be reduced proportionally with N loading.

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

Vitaliy Victorovich Saykin

PhD 2014, Civil Engineering; Advisor, Jerome F. Hajjar

A VALIDATED APPROACH FOR MODELING COLLAPSE OF STEEL STRUCTURES

This dissertation discusses the goal of the creation of an element deletion strategy based on fracture models for use in validated prediction of collapse of steel structures. The current work reviews the state-of-the-art of finite element deletion strategies for use in collapse modeling of structures. It is shown that current approaches to element deletion in collapse modeling do not take into account stress triaxiality in vulnerable areas of the structure, which is important for proper fracture and element deletion modeling. The report then reviews triaxiality and its role in fracture prediction. It is shown that fracture in ductile materials is a function of triaxiality. It is also shown that, depending on the triaxiality range, different fracture mechanisms are active and should be accounted for. An approach using semi-empirical fracture models as a function of triaxiality are employed.

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

Yiying Zhang

PhD 2014, Civil Engineering; Advisor, Ming Wang

USE OF VEHICLE NOISE FOR ROADWAY DISTRESS DETECTION AND ASSESSMENT

This work evaluates the pavement surface condition and detects the pavement subsurface delamination through vehicle noise collected by microphones mounted underneath a moving vehicle. Such measurements will include tire-generated sound, which carries much information about the road condition, as well as noise generated by the environment and vehicle. A careful frequency analysis of the vehicle noise is carried out to localize the frequency range for surface characteristics and subsurface delamination respectively. The Principal Component Analysis (PCA) method is applied to differentiate important information about the road condition from noisy data contributions collected while the vehicle is moving. The analysis begins with acoustic pressure measurements made over constant and known road conditions. Fourier transforms are taken over various time windows and a PCA is performed over the resulting vectors, yielding a set of principal component vectors for the road condition.

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

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