

College of Engineering and Computer Science

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Graduate Program Profiles for:

Master of Science in Civil Engineering

Master of Science in Environmental Engineering

Master of Science in Environmental Engineering Science

Doctor of Philosophy in Civil Engineering

Syracuse University

Civil and Environmental Engineering

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PROGRAMS IN CIVIL AND ENVIRONMENTAL ENGINEERING

PROGRAM DESCRIPTION

The Department of Civil and Environmental Engineering (CIE) at Syracuse University (SU) was established by the Board of Trustees in 1876. Graduate degrees have been awarded since the 1920's. Civil and Environmental Engineering is one of four departments within the College of Engineering and Computer Science (ECS). The department has a long tradition of excellence in graduate teaching and research. Graduate students work closely with their faculty advisors on a variety of research projects, and receive individualized attention from the faculty. The CIE faculty has a wide range of research and teaching interests. The graduate programs are divided into four disciplines: Construction Engineering and Management, Environmental Engineering, Geotechnical Engineering, and Structural Engineering.

Enrollment at Syracuse University is approximately 6,000 graduate students and 15,000 undergraduate students. Currently, about 2,000 Masters and 350 Doctoral degrees are awarded by the University each year. The department awards 25-35 M.S. and 1-5 Ph.D. degrees per year.

FACILITIES

The Civil and Environmental Engineering Department office is located in 151 Link Hall on the main campus of Syracuse University. Link Hall is where all major computer and research laboratory facilities of the CIE Department are housed.

Laboratory facilities: The Department of Civil and Environmental Engineering maintains several laboratories for graduate instruction and research. They include a construction engineering lab, an environmental unit operations laboratory, an environmental chemistry and a microbiology laboratory, a geosynthetics laboratory, a geofoam research laboratory, a soil mechanics laboratory, an image analysis laboratory, and a structures/materials laboratory. These facilities are open to all graduate students enrolled in our programs. The construction engineering lab (located on south campus) is a facility used primarily for conducting non-destructive tests and health monitoring of civil infrastructure. It is equipped with a variety of mechanical and electronic field testing equipment. The environmental engineering laboratories are part of the Center for Environmental Systems and Engineering (CESE) at Syracuse University. The Center (<http://eng-cs.syr.edu/?s=center+for+environmental+systems+and+engineering>) is the focal point for research and teaching of the scientific and engineering aspects of environmentally related subjects. These laboratories are equipped with state-of-the-art experimental, analytical and field equipment. The geotechnical engineering laboratories include a soil-mechanics laboratory, a geosynthetics laboratory, a geofoam laboratory (geofoam.syr.edu) and a computer-based image analysis laboratory. These laboratories have extensive in-situ and in-house equipment for testing of both natural and man-made geomaterials. The structures/materials laboratory is equipped with three universal testing machines including a 1.5MN capacity INSTRON 5595-300HVL machine with a computer data acquisition system, and a 3-D reaction frame with an assortment of hydraulic rams and actuators for testing of large-scale structural systems and components.

Computer facilities: Graduate students enrolled in the Department of Civil and Environmental Engineering have access to a wide variety of computer facilities. The College of Engineering and Computer Science maintains several high performance desktop computer clusters in Link Hall. These computer clusters are equipped with advanced desktops that support a variety of general purpose utility programs for word processing, computer graphics, spreadsheet calculations and data analyses as well as a number of discipline-specific software packages for engineering and scientific computations. Additional desktop and workstation clusters are located in Schine, Goldstein, Brockway, Kimmel Halls, and the Center for Science and Technology. These computer clusters are open to all students of Syracuse University.

In addition, the College of Engineering and Computer Science, in partnership with the University's Information Technology Services (ITS), has research computing resources available on campus. This includes the Academic Virtual Hosting Environment (AVHE), Crush and Orange Grid. The virtual machine (VM) or multiple VMs can be used to perform research and moderately intensive computations. AVHE is a cost effective solution because it utilizes hardware that is already in place on campus. VMs can be configured for up to 24 cores. They are typically used for small to moderate computationally intensive research tasks including small to medium sized clusters. Crush is a high bandwidth, low latency solution for larger jobs when more than 24 cores are needed for a specific amount of time. Within this specified time limit, Crush guarantees the users the number of cores and bandwidth. Orange Grid is a distributed, high throughput computing system utilizing idle desktop computers around campus with approximately 10,000 available

cores. It is optimized to perform a large number of smaller parallel jobs (typically less than 24 hours), providing high processing capacity over long periods of time.

The University also maintains and operates several time-sharing UNIX-based computers for advanced scientific and engineering computations. All these computers are connected to a campus-wide network and can be accessed from any public terminal. The computers support a variety of word processing, graphics and mathematics software as well as a number of programming languages. In addition, all computers have internet and electronic mail access that allow users to communicate both inside and outside of the Syracuse University campus. The university maintains the AirOrange wireless network, which provides wireless internet access campus-wide to students, faculty and staff.

PROGRAM REQUIREMENTS

Master of Science Programs

All candidates for the Master of Science (M.S.) programs must have a Bachelor of Science (B.S.) degree in Civil or Environmental Engineering, or a closely-related field from an accredited institution. Candidates with undergraduate degrees in other fields will have their backgrounds evaluated to determine whether additional undergraduate courses are required in their program of study, as a condition for admission to the appropriate M.S. program. These additional courses will not carry credit toward the M.S. degree.

Programs are planned by the students in consultation with their advisors. A series of fundamental courses specified by area (Construction, Environmental, Geotechnical, or Structural) must be satisfactorily completed by each candidate (see Appendix A). At least half of the coursework must be at or above the 600-level. Students who have taken the lower level of a double-numbered course (e.g., a course offered at both the 400 and 600 levels) may not take the higher level of the same course for credit. M.S. candidates may transfer a maximum of six graduate credits from other institutions. Most students complete their degrees in one and a half to two years. All students are expected to complete their program of study within five calendar years. A candidate must maintain a B or better average (3.0 grade point average) in all graduate coursework. Thesis and non-thesis options are available. Students receiving financial aid and/or anticipating further graduate study at the doctoral level are strongly advised to pursue the thesis option. We welcome students who wish to pursue their Master's degrees through part-time study while working full-time.

Master of Science in Civil Engineering

The M.S in Civil Engineering program has three specialties. Students may focus their studies in construction, geotechnical, or structural engineering. Students who receive a Master's in Civil Engineering in one focus area cannot apply for and receive a second Master's in Civil Engineering in a different focus area.

(1) Requirements with Thesis - 30 credit hours. The candidate must complete 24 credit hours of coursework, which include a set of core courses in the student's chosen area of specialization and a cohesive program of elective coursework approved by the student's advisor, as outlined in the attached program study. All M.S. candidates are expected to participate in faculty/student seminar series each year. In addition, the student must register for six credits of CIE 997-Master's Thesis, culminating in the defense of the thesis administered by the student's thesis committee.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete 30 credit hours of coursework, which include a set of core courses in the student's chosen area of specialization and a cohesive program of elective coursework approved by the student's advisor. All M.S. candidates are expected to participate in the faculty/student seminar series each year. To complete the degree requirement, a student must also take CIE 995-Master's Exit Paper for zero credit. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

Master of Science in Environmental Engineering

The M.S. in Environmental Engineering is intended for students with undergraduate engineering degrees.

(1) Requirements with Thesis - 30 credit hours. The candidate must complete a set of core courses in the fundamental environmental engineering areas, which includes CIE 642, CIE 671 and CIE 672. If the student has already taken one or more of these courses at the

undergraduate level, he/she will be expected to take corresponding higher-level courses in these fundamental engineering areas. In addition, the student must complete a cohesive program of elective coursework approved by the student's advisor. All M.S. candidates are expected to participate in faculty/student seminar series each year. Furthermore, the student must register for six credits of CIE 997-Master's Thesis, culminating in the defense of the thesis administered by the student's thesis committee.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete a set of core courses in the fundamental environmental engineering areas, which includes CIE 642, CIE 671 and CIE 672. If the student has already taken one or more of these courses at the undergraduate level, he/she will be expected to take corresponding higher-level courses in these fundamental engineering areas. In addition, the student must complete a cohesive program of elective coursework approved by the student's advisor. All M.S. candidates are expected to participate in faculty/student seminar series each year. Furthermore, the student is required to take CIE 600-Environmental Assessment or another approved course for three credits, and take CIE 995-Master's Exit Paper for zero credit. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

Master of Science in Environmental Engineering Science

The M.S. in environmental engineering science is intended for students with other technical/scientific undergraduate degrees.

(1) Requirements with Thesis - 30 credit hours. The candidate must complete a set of core courses offered by the Department of Civil and Environmental Engineering (Appendix A). In addition, the student must complete a cohesive program of elective coursework approved by the student's advisor. All M.S. candidates are expected to participate in faculty/student seminar series each year. Furthermore, the student must register for six credits of CIE 997-Master's Thesis, culminating in the defense of the thesis administered by the student's thesis committee.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete a set of core courses offered by the Department of Civil and Environmental Engineering (Appendix A). In addition, the student must complete a cohesive program of elective coursework approved by the student's advisor. Furthermore, the student is required to take CIE 600-Environmental Assessment or another approved course for three credits, and take CIE 995-Master's Exit Paper for zero credit. The exit paper must address issues related to their specialty approved by the advisor and have a minimum length of 2000 words.

Doctor of Philosophy in Civil Engineering

The Civil and Environmental Engineering Department offers the Ph.D. degree to students interested in research and teaching. The primary focus is on the development of skills to pursue original research in careers in academia, government, or research institutions. Students may focus their studies in environmental, geotechnical, structures, or construction engineering and management. The degree is usually completed within three to five years.

Admission requirements:

- (1) B.S. in civil engineering or other acceptable field from an accredited institution.
- (2) M.S. degree from an accredited institution.
- (3) B+ average in M.S. program coursework.
- (4) Satisfactory scores on all required graduate entrance examinations.
- (5) Demonstrated potential for excellent research work.
- (6) Departmental approval.

Advising:

The candidate, with advice from the department chair and/or the program director, selects a dissertation advisor, whose consent must be obtained. The candidate and the advisor together, with consent from the department chair, select the members of the examination and dissertation committees. The candidate, in consultation with the advisor and dissertation committee, selects a program of coursework appropriate to the research and scholarly interests of the student.

Course requirements:

- (1) Ph.D. students are required to take a minimum of 48 credit hours of coursework beyond the B.S. level, or at least 18 credit hours of coursework beyond the M.S. level.
- (2) For students with an M.S. degree, at least two-thirds of the Ph.D. coursework must be at or above the 600 level, and no more than one-third of the coursework can be independent study (CIE 690).

- (3) Ph.D. students are required to maintain an average GPA of B+ (3.333) in all Ph.D. coursework, and they are required to participate in the faculty/student seminar program (CIE 660).

Examinations:

1. Qualifying Examination: The qualifying examination is to be conducted within the first year of enrollment in the Ph.D. program. The examination is composed of two parts: a written exam followed by an oral examination covering materials from at least three graduate level classes that the student has taken at Syracuse University, as well as relevant materials from undergraduate coursework. The purpose of this examination is to assess the student's background knowledge in his/her primary subject area(s) and his/her preparedness for Ph.D. level research. The exam committee shall consist of at least three faculty members. The majority of the committee membership shall be faculty members from the Department of Civil and Environmental Engineering at Syracuse University. The result of this examination is a decision by the exam committee as to whether or not the student should continue in the Ph.D. program. For the candidate to pass this examination, a majority of the committee must vote favorably. If the student does not pass this examination, he/she can request to retake the examination one more time in the following semester. In the event that the student fails the examination for the second time, he/she will be asked to terminate his/her Ph.D. study.

2. Candidacy Examination: This examination is conducted in the semester after completion of the student's Ph.D. coursework, but no later than the fifth semester after admission into the Ph.D. program. Prior to this examination, the student shall prepare a detailed research proposal that includes but is not limited to a review of relevant literature leading to a statement of objectives (including major questions or hypotheses to be addressed in the dissertation), a description of methods and approaches to be used, and a brief description of the significance of the proposed work. The proposal will often include preliminary results from the student's work to date.

The candidacy examination is an oral exam and is presided over by a dissertation committee comprised of at least five members. The majority of the committee membership shall be faculty members from the Department of Civil and Environmental Engineering at Syracuse University. This committee will follow the student's work through his/her Ph.D. Dissertation Defense. Students are required to deliver their research proposals to all dissertation committee members and notify the Department Graduate Secretary of the examination time and place at least two weeks prior to the exam. Any committee member who receives the dissertation proposal less than 14 calendar days prior to the defense may ask the Department Chair for a postponement of the defense.

The norm for the duration of the examination, which is open to all Department faculty members, is two hours. The oral examination is initiated by a 30-40 minute summary of the dissertation research proposal and progress to date by the student. Following the presentation, the dissertation committee and Department faculty ask the student questions concerning the research proposal. Following the examination, the dissertation committee confers to determine if the student is a suitable Ph.D. candidate based on his/her performance on the candidacy examination, as well as to determine if the student should be required to take additional coursework beyond the minimum required for the degree. If the student successfully completes the candidacy examination by receiving an affirmative vote from the majority of the committee, the advisor notifies the student and the Graduate School and the student is considered a "Ph.D. candidate." If the student does not successfully complete the candidacy examination, the committee determines whether the student will be permitted to retake the examination after a minimum period of six months or whether the student's Ph.D. program should be terminated.

3. Dissertation Defense: The final phase of the Ph.D. program is the dissertation defense. The doctoral dissertation is a summary of all phases of the student's research endeavor. The final stage in the preparation of this dissertation is its distribution to all members of the dissertation committee. The student should not distribute the final draft of the dissertation until the advisor is satisfied with it. Readers should be presented with a polished draft that has been proofread, paginated, and contains professional quality tables and figures with captions. All members of the dissertation committee must be given at least two weeks to review the dissertation before the defense. Any committee member who receives the thesis less than 14 calendar days prior to the defense may ask the Exam Committee Chair for a postponement of the defense.

When the Ph.D. candidate has completed the dissertation that has been approved by his/her advisor, a copy is to be provided to each of the dissertation committee members and a defense date is scheduled. The dissertation defense is an open examination and all members of the University community are invited. This is accomplished by announcements to students and faculty in the Department at least one week in advance of the defense, as well as a notice in the SU Events Calendar.

The dissertation defense is to be conducted in accordance with University Policies and Procedures for Dissertation and Oral Examination. The norm for the duration of the dissertation defense is two hours. The dissertation defense is usually initiated with a 30-40 minute summary of the research conducted. This is followed by open questioning from the audience. When this is completed, the candidate is questioned by the dissertation committee members. For the candidate to pass the dissertation defense, a majority vote on the quality and originality of the research, the quality of the dissertation, and the performance of the candidate at the examination is required.

Certificate of Advanced Study

Civil and environmental engineering graduate students have the opportunity to earn a Certificate of Advanced study in the following programs:

Environmental Health. 12 credits. This program features academic coursework to develop quantitative problem-solving skills in risk analysis, toxicology, and modeling the fate and transport of toxic substances in the environment. The program coursework also covers the key policy, legal and management issues necessary for the development of safe and sustainable strategies for handling toxic substances. For the program overview, http://eng-cs.syr.edu/program/environmental-health/?degree=graduate_certificate.

Sustainable Enterprise. 15 credits. The Certificate of Advanced Study in Sustainable Enterprise integrates business, science, engineering, and environmental science and policy, taking a transdisciplinary approach to sustainable enterprise. The program brings together graduate students in Business, Engineering, and Environmental Sciences. For the program overview, http://eng-cs.syr.edu/program/sustainable-enterprise/?degree=graduate_certificate.

Public Infrastructure Management and Leadership. 15 credits. The program is geared towards mid-career professionals who are interested in focusing on infrastructure planning, engineering, management and administration. For the program overview, http://eng-cs.syr.edu/program/microwave-engineering/?degree=graduate_certificate

• Available to midcareer students apart from any other graduate degree

Public Administration. 12 credits. This certificate for midcareer professionals who cannot leave work to complete the entire EMPA but still desire a rigorous educational experience focusing on significant elements of the public administration. Most individuals taking the certificate state an interest in improving their management and leadership skills or an interest in developing concrete knowledge in a specific policy area. For the program overview, https://www.maxwell.syr.edu/exed/certificates/sa-public_admin/overview/.

• Available to midcareer students apart from any other graduate degree

Recent Theses and Dissertations:

M.S. Theses

Jacqueline Gerson, *"Elevational and Seasonal Patterns in Methylmercury Production Across the Montane Landscape of Whiteface Mountain in the Adirondack Region of New York"* 2016

Weiyao Gu, *"Aluminum is more tightly bound in soil after wollastonite treatment to a forest watershed"*, 2016

Stephen Singh, *"Pressure Reduction on Wide Culverts with EPS Geofoam Backfill.."*, 2016

Linghui Meng, *"Patterns of Total Gaseous Mercury Variation Prior to and After Brownfield Remediation in Syracuse, NY"*, 2017

Ratnayesuraj Chelvarajah Ratnasamy, *"Analytical Modeling, Testing, and Comparison of 1-D, 2-D, and 3-D Dewatering Process"*, 2017

Nuzhath Fatema, *"An Evaluation of Capillary Flow Test for Determining Pore Size Distribution of Geotextiles and Establishing Correlations"*, 2017

Mariah Taylor, *"Temporal Fish Mercury Trends in Relation to Food Web Dynamics in Little Moose Lake, Adirondacks, NY"*, 2017

Engda Temesgen, *"Non Destructive Testing as a Means for Quality Assurance in EPS Geofoam Applications"*, 2017

Sara Alesi, *"Estimating the Rate of Release of Base Cations via Chemical Weathering in Soils in the Catskills Region"*, 2017

Ph.D. Dissertations

Mebrahtom G. Mezgebo, *"Estimation of Earthquake Input Energy, Hysteretic Energy and its Distribution in MDOF Structures"*, 2015.

Habibollah Fakhraei, *"Modeling the Effects of Acid Deposition and Natural Organic Acids on Surface Waters"*, 2016

Sara Sotoud, *"Effect of Severe Corrosion on Lateral Strength of Square RC Bridge Columns"*, 2016

Haotian Zhang, *"The Economy of Preventive Maintenance of Concrete Bridges Due to Corrosion"*, 2016

Xiaoxia Chen, *"Patterns in the Concentration and Transport of Nutrients and Major Elements in the Watersheds and Embayments of Lake Ontario: A Landscape Perspective"*, 2016

Yang Cheng, *"The Prescribed Burning Impacts on Soil Water Repellency and Soil Hydrological Properties in Sagebrush-Steppe Ecosystem"*, 2016

Mahmoud Khachan, *"Sustainable and Innovative Approaches for Geotextile Tube Dewatering Technology"*, 2016

Carli Flynn, *"Transitioning to Sustainable Civil Infrastructure Systems: Green Stormwater Management and Engineering Design Thinking"*, 2017

Rouzbeh Berton, *"The Interacting Hydrologic Responses to Changing Climate, Watershed Physical Characteristics, River Regulations, and Land Development in the Northeastern United States"*, 2017

Omar El Masri, *"Design and Behavior of Steel Delta Girders"*, 2017

ACADEMIC INTEGRITY

All students in the Department of Civil and Environmental Engineering are expected to abide by the Codes of Academic Integrity and the Codes of Student Conduct in the Syracuse University Student Handbook (<http://www.syr.edu/currentstudents/studenthandbook>). The Handbook is revised each year by the Academic Integrity Office.

The Department of Civil and Environmental Engineering strictly enforces these policies. Students are required to read the policies **on their own** and follow the policies at all times while enrolled at the University. Ignorance of the policies will not be accepted as an excuse. Students are expected to ask questions if they do not understand. Violations of any policy will be reported to the Dean's office and reviewed by the Academic Integrity Office for possible disciplinary action, which may result in suspension or expulsion from the University. **Occurrences of cheating, plagiarism, falsifying records, or other behavior in violation of the University policies will result in penalties following the Academic Integrity Office guidelines** (<http://academicintegrity.syr.edu>).

FINANCIAL SUPPORT

Financial aid awards in the form of tuition scholarships, teaching assistantships, research assistantships, departmental and university fellowships are available on a competitive basis for qualified students. Most assistantships and fellowships provide full tuition for 24 credits over a calendar year. They also carry a stipend and require an average of 20 hours a week of instruction and/or research responsibilities during the academic year. Some summer support may be available. M.S. students receiving financial aid awards are expected to take the thesis option in their program of study.

FACULTY



Full-Time Faculty

Riyad S. Aboutaha

Ph.D. (University of Texas at Austin), Associate Dean and Associate Professor of Civil and Environmental Engineering

Specialty: Structural Engineering

E-mail: rsabouta@syr.edu

Sample Publications:

Jnaid, F., and **Aboutaha, R.** (2016) "Residual Flexural Strength of Corroded Reinforced Concrete Beams," Elsevier, www.sciencedirect.com.

El-Helou, R., and **Aboutaha, R.**, "Analysis of Rectangular Hybrid Steel-GFRP Reinforced Concrete Beam Columns," *Computers and Concrete*, Vol. 16, No. 2 (2015) pp. 245-260.

Shraideh, M.S., and **Aboutaha, R.S.**, "Auxiliary GFRP Bars for Relocating Plastic Hinges in Steel Reinforced Concrete Bridge Columns," *Computer and Concrete Journal*, April 2013.

Huang, Jianwei, and **Aboutaha, R.S.**, "Durability Design of GFRP Bar Reinforced Concrete Members," *ASCE Journal of Composites for Construction*, Volume 14, Issue 5, pp. 479-486. (September/October 2010).

Park, SangDon, and **Aboutaha, R.S.**, "Analysis of CFRP Strengthened Bridge Piers Using the STM Approach," *ASCE Journal of Structural Engineering*, New York, NY, Vol. 135, No. 6, June 2009, pp. 632-643.

Wattanadechachan, P., **Aboutaha, R.S.**, Hag-Elsafi, O., and Alampalli, S., "Thermal Compatibility and Durability of Wearing Surfaces on FRP Bridge Decks," *ASCE Journal of Bridge Engineering*, 11(4), July-August, 2006.

Teaching Interests:

Rehabilitation of Civil Infrastructure, Bridge Engineering, Behavior and Design of Reinforced and Prestressed Concrete Structures, Mechanics of Materials, and Structural Analysis

Research Interests:

Structural Rehabilitation of Civil Infrastructure, Bridge Retrofit with CFRP Composites, Experimental Investigation of Structural Concrete and Steel Systems, FRP Reinforced Concrete Structural Systems, Foundation Strengthening, Cost-Effective Preventive



Shobha K. Bhatia

Ph.D. (University of British Columbia), Professor of Civil and Environmental Engineering, Laura J. and L. Douglas Meredith Professor for Teaching Excellence

Specialty: Geotechnical Engineering

E-mail: skbhatia@syr.edu

Sample Publications:

Khachan, M. M., and **Bhatia, S. K.** (2017). The efficacy and use of small centrifuge for evaluating geotextile tube dewatering performance. *Geotextiles and Geomembranes*, 45(4), 280-293.

Rupakheti, P., and **Bhatia, S.K.** (2017). A study of containment of heavy metals using soils and cellulose materials inside geotextile tubes. *Geosynthetics International*, 24(3), 321-332.

Khachan, M. M. and **Bhatia, S.K.** (2016). Influence of fibers on the shear strength and dewatering performance of geotextile tubes." *Geosynthetics International*, 23 (5), 1-14.

Rupakheti, P., **Bhatia, S.K.** and Jackson, E.K. (2016). Containment and Dewatering of Heavy Metal Contaminated Slurries Using Reactive Minerals and Cellulose Materials in Geotextile Tubes", Specialty Volume in Honor of Professor Robert Koerner, *Geo-Chicago 2016, Sustainability, Energy, and the Geoenvironment*, ASCE, Illinois, August 14-18, 2016 .

Spritzer, J. M., Khachan, M. M., and **Bhatia, S.K.** (2015). Influence of Synthetic and Natural Fibers on Dewatering Rate and Shear Strength of Slurries in Geotextile Tube Applications. *Int. J. of Geosynthetics and Ground Engineering*, July 1:26, 1-14.

Khachan, M. M. ,**Bhatia, S. K.** ,Bader, R. A. ,Cetin, D., and Ramarao, B. V.(2014). Cationic Starch-based Flocculants as an Alternative to Synthetic Polymers in Geotextile Tube Dewatering of Dredged Sediments. *Geosynthetics International*, Volume 21, No 2, April, 119-136.

Bhatia, S.K., Khachan, M. M., Stalling, A.M. and Smith, J.L. (2014). Alternatives for the Detection of Residual Polyacrylamide in Geotextile Tube Dewatering – Streaming Current Detection and China Clay Settling Rate Methods. *Geotechnical Testing Journal*, Volume 37, No. 4, July 1-10.

Teaching Interests:

Designing with Geosynthetics, Seepage and Earth Dams, Ground Improvement, Soil Dynamics and Advanced Soil Mechanics

Research Interests:

Dredged Sediment Dewatering and Containment, Green Polymers and Cellulose Materials, Application of Natural Fibers in Engineering, Soil Erosion, Women in Science and Engineering (WISE)



David G. Chandler

Ph.D. (Cornell University), Associate Professor of Civil and Environmental Engineering

Specialty: Hydrology

E-mail: dgchandl@syr.edu

Sample Publications:

Roodsari, B.K. and **D.G. Chandler**. 2017. Distribution of surface imperviousness in small urban catchments predicts runoff peak flows and stream flashiness. *Hydrologic Processes*. doi: 10.1002/hyp.11230

Shaw, S.B., D.B. Bonville and **D.G. Chandler**. 2017. Combining observations of channel network contraction and spatial discharge variation to inform spatial controls on baseflow in Birch Creek, Catskill Mountains, USA. *Journal of Hydrology: Regional Studies* (in press).

Chandler, D.G., M.S. Seyfried, J.P. McNamara, and K. Hwang. 2017. Inference of soil hydrologic parameters from long term soil moisture records. *Frontiers in Earth Science* 5: 25.

Berton, R., C.T. Driscoll, **D.G. Chandler**. 2016. Changing climate increases discharge and attenuates seasonal distribution in the Northeastern United States. *Journal of Hydrology: Regional Studies*, DOI: 10.1016/j.ejrh.2015.12.057

Teaching Interests:

Hydrology, Water Resources Engineering, Sustainable Water Systems, Environmental Sensing

Research Interests:

Climate and Anthropogenic Impacts on Hydrology, Soil Physics, Alternative Waste Treatment Systems, Green Infrastructure

**Laura E. Condon**

Ph.D. (Colorado School of Mines), Assistant Professor of Civil and Environmental Engineering

Specialty: Environmental Engineering

E-mail: lecondon@syr.edu

Sample Publications:

Condon, Laura E., and Reed M. Maxwell. Systematic shifts in Budyko relationships caused by groundwater storage changes. *Hydrology and Earth System Sciences* 21.2 (2017): 1117.

Maxwell, Reed M., and **Laura E. Condon**. Connections between groundwater flow and transpiration partitioning. *Science* 353.6297 (2016): 377-380.

Condon, L.E., Hering, A.S. and Maxwell, R.M. Quantitative assessment of groundwater controls across major US river basins using a multi-model regression algorithm. *Advances in Water Resources*, 82, 106-123, 2015.

Maxwell, R.M., **Condon, L.E.**, and Kollet, S.J. A high resolution simulation of groundwater and surface water over most of the continental US with the integrated hydrologic model ParFlow v3. *Geoscientific Model Development*, 8, 923-937, 2015.

Condon, L.E., and Maxwell, R.M., Implementation of a linear optimization water allocation algorithm into a fully integrated physical hydrology model. *Advances in Water Resources*, 60, 135-147, 2015.

Condon, L.E., and Maxwell, R.M. Groundwater-fed irrigation impacts spatially distributed temporal scaling behaviour of the water management impacts. *Environmental Research Letters*, 9(3), 034009, 2014.

Condon, L.E., S Gangopadhyay, and T. Pruitt. Climate change and non-stationary flood risk for the Upper Truckee River Basin. *Hydrol. Earth Syst. Sci. Discuss.*, 11, 5077-5114, 2014.

Teaching Interests:

Physical Hydrology, Numerical Modeling, Statistical Methods, Sustainable Water Resources Management

Research Interests:

Large Scale Human Impacts on the Hydrologic Cycle, Groundwater Surface Water Interactions and their Role in Conjunctively Managed Systems, Evaluating Climate Change Vulnerabilities and Incorporating Future Climate Projections into Water Resources Planning, Numerical Modeling and Statistical Analysis of Integrated Dynamic Systems

**Andria Costello Staniec**

Ph.D. (California Institute of Technology), Department Chair, Associate Professor of Civil & Environmental Engineering

Specialty: Environmental Microbiology, Biotechnology, Engineering & STEM Education

E-mail: costello@syr.edu

Sample Publications:

Doerr, H., J. Arleback, and **A. Costello Staniec**. 2014. Design and effectiveness of modeling-based mathematics in a summer bridge program. *J. Env. Educ.* 103(1):92-114.

Murdoch, R.W. and **A. Costello Staniec**. 2013. Diversity and community analysis of ammonia oxidizing bacteria in a streambed surrounding an artificial dam. *J. Env. Mgmt.* 127:237-243.

Fisk, M.C., T.J. Fahey, J.H. Sobieraj, **A. Costello Staniec**, T.O. Crist. 2011. Rhizosphere disturbance influences fungal colonization and community development on dead fine roots. *Plant Soil.* 341:279-293.

Lindner, A.S., A. Pacheco, H.C. Aldrich, **A. Costello Staniec**, I. Uz, A.V. Ogram, and D.J. Hodson. 2007. *Methylocystis hirsuta* sp. nov., a novel methanotroph isolated from a groundwater aquifer. *Intl. J. Sys. Evol. Microbiol.* 57:1891-1900.

Teaching Interests: Environmental Microbiology, Environmental Chemistry, Environmental Engineering, Biotechnology

Research Interests: Environmental Microbiology, Engineering & STEM Education



Joan V. Dannenhoffer

M.S.C.E (University of Connecticut), MBA (Rensselaer Polytechnic Institute), P.E., Associate Professor of Civil and Environmental Engineering

E-mail: jvdannen@syr.edu

Sample Publications:

MacNamara, S. C., & **Dannenhoffer, J. V.**, *Scaling Up: The Design Competition as a Tool for Teaching Statics* Paper presented at 2015 ASEE St. Lawrence Section Conference, Syracuse, NY.

MacNamara, S. C., & **Dannenhoffer, J. V.**, *Hands-On Learning for Statics in the Smaller Classroom and Potential Scale-Up to the Larger Lecture* Paper presented at 2013 ASEE Northeast Section Conference, Norwich, VT.

MacNamara, S.C. and **Dannenhoffer, J.V.**, "First Encounters: Statics as a Gateway to Engineering" *American Society for Engineering Education Annual Conference Proceedings*, Session T553, June 2013.

MacNamara, S.C. and **Dannenhoffer, J.V.**, "Hands-On Learning for Statics in the Smaller Classroom and Potential Scale-Up to the Larger Lecture", *American Society for Engineering Education Northeast Section Conference*, March 2013.

Dannenhoffer, J.F. and **Dannenhoffer, J.V.**, "Development of an Online System to Help Students Successfully Solve Statics Problems," *American Society for Engineering Education Annual Conference Proceedings*, Session 1555, June 2009.

Teaching Interests:

Engineering Mechanics, Engineering Materials

Research Interests:

Engineering Education Assessment and Teaching Methods



Cliff I. Davidson

Ph.D. (California Institute Technology), Program Director of Environmental Engineering, Professor of Civil and Environmental Engineering and Center of Excellence in Environmental and Energy Systems, Thomas C. and Colleen L. Wilmot Chair of Engineering; Director, Center for Sustainable Engineering

Specialty: Environmental Engineering

E-mail: davidson@syr.edu

Sample Publications:

Davidson, C.I., Brad R. Allenby, Liv M. Haselbach, Miriam Heller, and William E. Kelly, Educational materials on sustainable engineering: do we need a repository? *Elementa*, February 23, 2016, DOI 10.12952/journal.elementa.000089.

Rachelle Hollander, Amekudzi-Kennedy, Adjo, Sarah Bell, Frazier Benya, **Cliff I. Davidson**, Craig Farkos, David Fasenfast, Regina Guyer, Angelique Hjarding, Michael Lizotte, Dianne Quigley, Diana Watts, and Kate S. Whitefoot, Network priorities for social sustainability research and education: Memorandum of the Integrated Network on Social Sustainability Research Group, *Sustainability Science, Practice, and Policy*, Vol. 12, Number 1, March 24, 2016.

Flynn, Carli D. and **Cliff I. Davidson**, Adapting the social-ecological system framework for urban stormwater management: The case of green infrastructure adoption, *Ecology and Society*, Vol. 21, Number 4, Article 19, <http://dx.doi.org/10.5751/ES-08756-210419>, 2016.

Squier, Mallory N. and **Cliff I. Davidson**, Heat flux and seasonal thermal performance of an extensive green roof, *Building and Environment*, Vol. 107, pp. 235-244, 2016.

Sengupta, Debalina, Yinlu Huang, Thomas Edgar, **Cliff Davidson**, Mario Eden, Mahmoud El-Halwagi, Using Module-based learning methods to introduce sustainable manufacturing in engineering curriculum, *International Journal of Sustainability in Higher Education*, Vol. 18, Number 4, 2017.

Teaching Interests:

Environmental Engineering, Sustainable Engineering

Research Interests:

Green Infrastructure, Environmental Flows of Chemicals, Air Quality, Sustainable Urban Development, Engineering Education



Charles T. Driscoll

Ph.D. (Cornell University), University Professor of Environmental Systems Engineering, National Academy of Engineering

Specialty: Environmental Engineering, Civil Engineering, Environmental Science

E-mail: ctdrisco@syr.edu

Sample Publications:

Driscoll, C. T., K. F. Lambert, D. Burtraw, J. J. Buonocore, S. B. Reid, and H. Fakhraei. 2015. US power plant carbon standards and clean air and health co-benefits. *Nature Climate Change* 5:535-540.

Gerson, J. R., **C. T. Driscoll**, and K. M. Roy. 2016. Patterns of nutrient dynamics in Adirondack lakes recovering from acid deposition. *Ecological Applications*. doi:10.1890/15-1361.1.

Pourmokhtarian, A., **C. T. Driscoll**, J. Campbell, K. Hayhoe, A. M. K. Stoner, M. B. Adams, D. Burns, I. Fernandez, M. J. Mitchell, J. B. Shanley. 2016. Modeled Ecohydrological responses to climate change at seven small watersheds in the northeastern U.S. *Global Change Biology*. doi:10.1111/gcb.13444

Sunderland, E., **C. T. Driscoll**, J. Hammitt, P. Grandjean, J. Evans, J. D. Blum, C. Chen, D. C. Evers, D. Jaffe, R. Mason, S. Goho, and W. Jacobs. 2016. Benefits of regulating hazardous air pollutants from coal and oil-fired utilities in the United States. *Environmental Science & Technology* 50: 2117 -2120.

Teaching Interests:

Environmental Engineering, Environmental Chemistry, Biogeochemistry, Environmental Systems Modeling

Research Interests:

Aquatic Chemistry, Biogeochemistry, Climate Change Effects on Ecosystems, Green Water Infrastructure, Air Pollution Effects on Ecosystems, Mercury in the Environment, Soil Chemistry, Water Quality Modeling



Chris E. Johnson

Ph.D. (University of Pennsylvania), Professor of Civil and Environmental Engineering

Specialty: Environmental Engineering

E-mail: cejohns@syr.edu

Sample Publications:

Li, W. and **C.E. Johnson**. Relationships among pH, aluminum solubility and aluminum complexation with organic matter in acid forest soils of the northeastern United States. *Geoderma*. 271:234-242. (2016)

Shao, S., C.T. Driscoll, **C.E. Johnson**, T.J. Fahey, J.J. Battles, and J.D. Blum. "Long-term responses in soil solution and streamwater chemistry at Hubbard Brook after experimental addition of wollastonite." *Environmental Chemistry*. 13:528-540. (2016)

Fahey, T.J., A.K. Heinz, J.J. Battles, M.C. Fisk, C.T. Driscoll, J.D. Blum, and **C.E. Johnson**. "Fine root biomass declined in response to restoration of soil calcium in a northern hardwood forest." *Canadian Journal of Forest Research*. 738-744. (2016)

Leys, B., G.E. Likens, **C.E. Johnson**, J.M. Craine, B. Lacroix, and K.K. McLaughlan. "Natural and anthropogenic drivers of calcium depletion in a northern forest during the last millennium." *Proceedings of the National Academy of Sciences*. 113:6934-6938. (2016)

Gianfagna, C.C., **C.E. Johnson**, and D.G. Chandler. "Watershed area ratio accurately predicts daily streamflow in nested catchments in the Catskills, New York." *Journal of Hydrology: Regional Studies* 4:583-594. (2015)

Teaching Interests:

Environmental Chemistry, Soil Chemistry, Statistics

Research Interests:

Biogeochemistry, Soil Chemistry, Natural Organic Matter



Christa Kelleher

Ph.D. (The Pennsylvania State University), Assistant Professor of Earth Sciences and Civil and Environmental Engineering

Specialty: Hydrology

E-mail: ckellehe@syr.edu

Sample Publications:

Christa Kelleher, Brian McGlynn, and Thorsten Wagener, Characterizing and reducing equifinality by constraining a distributed catchment model with regional signatures, local observations, and process understanding, *Hydrology and Earth Systems Sciences*, 21, 3325-3352, <https://doi.org/10.5194/hess-21-3325-2017>, 2017.

Adam Ward, **Christa Kelleher**, Seth JK Mason, Thorsten Wagener, Neil McIntyre, Brian McGlynn, Robert L. Runkel, and Robert A. Payn, A software tool to assess uncertainty in transient-storage model parameters using Monte Carlo simulations, *Freshwater Science*, 36(1), 195-217, 2017.

Christa Kelleher, Thorsten Wagener, and Brian McGlynn, Model-based analysis of the influence of catchment properties on hydrologic partitioning across five mountain headwater subcatchments, *Water Resources Research*, 51, 4109-4136, 2015.

Christa Kelleher, Thorsten Wagener, Michael N. Gooseff, Brian McGlynn, Kevin McGuire, and Lucy Marshall, Investigating controls on the thermal sensitivity of Pennsylvania streams, *Hydrological Processes*, 26, 771-785, 2012.

Teaching Interests:

Physical Hydrology, Hydrologic Systems Modeling

Research Interests:

Watershed Hydrology, System Responses to Climate and Land Use Change, Water Quality and Quantity, Environmental Model Diagnostics and Uncertainty, Small Unmanned Aerial Systems, Scientific Visualization



Eric M. Lui

Ph.D. (Purdue University), Laura J. and L. Douglas Meredith Professor for Teaching Excellence, Associate Professor of Civil and Environmental Engineering

Specialty: Structural Engineering

E-mail: emlui@syr.edu

Sample Publications:

Wang, X.-W., Zhu, B., Cui, S.-G., and **Lui, E.M.** "Experimental research on PBL connectors considering the effects of concrete stress state and other connection parameters," *Journal of Bridge Engineering*, ASCE, to appear.

Ataei, H., Mamaghani, M., and **Lui, E.M.** "Proposed framework for performance-based seismic design of highway bridges," *ASCE Structures Congress*, Denver, Colorado, April 6-8, 2017, 14p.

Mezgebo, M. and **Lui, E.M.** "A new methodology for energy-based seismic design of steel moment frames," *Earthquake Engineering and Engineering Vibrations*, 16(1), 2017, 131-152. DOI: 10.1007/s11803-017-0373-1.

Mezgebo, M. and **Lui, E.M.** "Hysteresis and soil site dependent input and hysteretic energy spectra for far-source ground motions," *Advances in Civil Engineering*, Volume 2016, Article ID 1548319, 29p. <http://dx.doi.org/10.1155/2016/1548319>.

Chen, Z.P., Xu, J.J., Chen, Y.L., and **Lui, E.M.** "Recycling and reuse of construction and demolition waste in concrete-filled steel tubes: A review," *Construction & Building Materials*, 126, 2016, 641-660. <http://dx.doi.org/10.1016/j.conbuildmat.2016.09.063>.

Wang F. and **Lui, E.M.** "Behavior of high strength steels under and after high temperature exposure," *Journal of Steel Structures and Construction*, 2016, 2:2, 10p. DOI:10.4172/2472-0437.1000123.

Yao, Z. and **Lui, E.M.** "Experimental and numerical investigation of the seismic performance of an A-frame-truss-column hybrid supporting structure," *Advances in Structural Engineering*, 2016, 22p. DOI: 10.1177/1369433216674951.

Lui, E.M. "Performance based seismic design," editorial, *International Journal of Advance Innovations, Thoughts & Ideas*, 2016. 2p. DOI: 10.4172/2277-1891.1000e101.

Mamaghani, M., Ataei, H., Bhatia, S., and **Lui, E.M.** "Nonlinear finite element analysis of adobe structures strengthened by synthetic nylons," *24th International Congress of Theoretical and Applied Mechanics (ICTAM)*, Montreal, Canada, August 21-26, 2016, 2p.

Tang, W. and **Lui, E.M.** "Hybrid re-centering energy dissipative device for seismic protection," *Journal of Structures*, 2014, Article ID 262409, 17p. <http://dx.doi.org/10.1155/2014/262409>.

Tang, W. and **Lui, E.M.** "Application of shape memory alloys in earthquake-resistant design," *McGraw-Hill Yearbook of Science and Technology*, 2014, 19-24.

Singh, R. and **Lui, E.M.** "Design of PR frames with top and seat angle connections using the direct analysis method," *Advanced Steel Construction*, 10(2), 2014, 116-138.

Teaching Interests:

Structural Analysis and Design, Computer Aided Engineering, Structural Stability, Structural Dynamics, Structural Reliability, Earthquake Engineering, Green Technology and Sustainability

Research Interests:

Nonlinear theories, Numerical Methods, Steel Structures, Damage Identification and Quantification, Structural Dynamics and Earthquake Engineering



Dawit Negussey

Ph.D. (University of British Columbia), Program Director of Civil Engineering, Professor of Civil and Environmental Engineering.

Specialty: Geotechnical Engineering

E-mail: negussey@syr.edu

Sample Publications:

Wall, K., Clinton, D., Sanio, M., Botha, D., Cleland, A., **Negussey, D.** and Lewis, S., "World Federation of Engineering Organisation's Compilation of Capacity Building Good Practice." *Proceedings of the Institution of Civil Engineers*, V 166, Issue MP2, 2013.

Stuedlein, A. and **Negussey, D.** (2013) "Use of EPS Geofoam for Support of a Bridge," *American Society of Civil Engineers, Geotechnical Special Publication No. 230*, 2013.

Bartlett, S., **Negussey, D.**, Farnsworth, C. and Stuedlein, A., "Construction and Long-Term Performance of Transportation Infrastructure Constructed Using EPS Geofoam on Soft Soil Sites in Salt Lake Valley, Utah." *Proceedings of the 4th International EPS Geofoam Conference, Oslo*, 2011.

Huang, X. and **Negussey, D.**, "EPS Geofoam Design Parameters for Pavement Structures." *Proceedings of Geo Frontiers 2011*.

Bansal, M., Kornreich, P., **Negussey, D.**, Flattery, J., Mandel, J. and Drake, R., "Strain and Sonar Detection with Lithium Niobate Coated Core Fiber." *Photonic Microdevices / Microstructures for Sensing II, Proceedings of SPIE*, Volume 7682.

Negussey, D., "Design Parameters for EPS Geofoam," *Soils and Foundations, Journal of the Japanese Society of Soil Mechanics and Foundation Engineering*, 2007.

Teaching Interests:

Geofoam Geotechnics, Soil Mechanics, Geotechnical Engineering Design, Transportation Engineering

Research Interests:

Properties and Applications of Geofoams, Geotechnical Engineering Design, and Forensic Engineering Investigations



Baris Salman

Ph.D. (University of Cincinnati), Professor of Practice Civil and Environmental Engineering

Specialty: Civil Engineering/Construction Engineering and Management

Email: bsalman@syr.edu

Sample Publications:

Salem, O., **Salman, B.** and Ghorai, S. (2017) "Accelerating construction of roadway bridges using alternative techniques and procurement methods." *Transport*, Taylor & Francis.

Salman, B., Salem, O., Garguilo, D. T., and He, S. (2017) "Innovative maintenance, repair, and reconstruction techniques for asphalt roadways: A survey of state departments of transportation." 96th Annual Conference of Transportation Research Board (TRB), Washington, D.C.

Ghorai, S., Salem, O., **Salman, B.** (2016) "Assessment of traffic emission impacts due to rigid pavement repair and rehabilitation activities." Eighth International Conference on Maintenance and Rehabilitation of Pavements (MAIREPAV8), Singapore.

Chen, X., Salem, O., and **Salman, B.** (2016) "Life-cycle benefit/cost analysis framework of ramp metering system deployments." Transportation Research Record: Journal of the Transportation Research Board, Washington, D.C.

Salem, O., Ghorai, S., **Salman, B.**, and Aboutaha, R. (2014) "A decision support framework for accelerated bridge construction." Proc. 93rd Annual Conference of Transportation Research Board, Washington, D.C.

Salem, O., **Salman, B.**, and Najafi, M. (2012) "Culvert asset management practices and deterioration modeling." Transportation Research Record: Journal of the Transportation Research Board No.2285, Transportation Research Board of the National Academies, Washington, D.C., pp. 1-7.

Salman, B., and Salem, O. (2012) "Risk assessment of wastewater collection lines based on failure models and criticality." Journal of Pipeline Systems Engineering and Practice, 3(3), pp.68-76.

Salman, B., and Salem, O. (2012) "Modeling failure of wastewater collection lines using various section-level regression models." Journal of Infrastructure Systems, 18(2), pp. 146-154.

Teaching Interests:

Construction Project Management and Scheduling, Construction Equipment, Sustainable Infrastructures and Asset Management, Civil Engineering Materials, Principles of Transportation Engineering

Research Interests:

Infrastructure Asset Management; Risk Assessment and Management; Trenchless Inspection, Repair, and Renewal Methods; Accelerated and Fast Track Construction



Laura J Steinberg

Ph.D. (Duke University), Professor, Special Assistant for Strategy, Office of the Vice Chancellor, Former Dean of the College of Engineering and Computer Science

Specialty: Environmental Engineering, Civil Engineering, Public Policy

E-mail: ljs@syr.edu

Sample Publications:

Basolo, Victoria, **Laura J. Steinberg** and Stephen Gant, "Hurricane Threat in Florida: Examining Household Beliefs, Perceptions, and Actions," Environmental Hazards, published online, January 19, 2017 <http://dx.doi.org/10.1080/17477891.2016.1277968>.

Cupido, Anthony, **Laura J. Steinberg** and Brian Baetz, "Water Conservation: Observations from a Higher Education Facility Management Perspective," Journal of Green Building, Summer 2016, Volume 11, No. 2

Zoli, Corrine and **Laura J. Steinberg**, "Resilience and Critical Infrastructure Security: Emergent Challenges for Transportation and Cyber-Physical Infrastructure," invited book chapter for Securing Transportation Systems, editors Simon Hakim and Yoram Shiftan, Springer Science, New York, 2015.

Sengul, Hatice, Nicholas Santella, **Laura J. Steinberg** and Ana Maria Cruz, "Analysis of Hazardous Material Releases Due to Natural Hazards in the U.S," Disasters: The Journal of Disaster Studies, Policy, and Management, 36 (4), 723-743, 2012.

Santella, Nicholas and **Laura J. Steinberg**, "At the Intersection of Natural, and Technological Hazards: Case Studies of Natech Risk and Relevance to Terrorist Threats at Industrial Facilities," Journal of Homeland Security and Emergency Management, Volume 8, Issue 1, Article 53, 2011.

Santella, Nicholas, **Laura J. Steinberg**, and Corrinne Zoli, "Baton Rouge Post Katrina: The Role of Critical Infrastructure Modeling in Promoting Resilience," Homeland Security Affairs 7, Article 7, 2011.

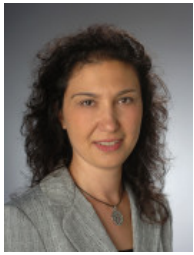
Santella N., **Steinberg L.J.**, Aguirre G.A. Empirical Estimation of the Conditional Probability of Natech Events Within the United States, Risk Analysis, Volume 31, issue 6, pp. 951-968, June 2011.

Teaching Interests:

Infrastructure Management, Environmental Engineering, Resilience, Public Policy

Research

Critical Infrastructure, Smart Cities, Natural Hazards Management, infrastructure and Environmental Policy, Environmental Modeling

**Svetoslava Todorova**

Ph.D. (Syracuse University), Professor of Practice Civil and Environmental Engineering

Specialty: Environmental Engineering

E-mail: stodorov@syr.edu

Sample Publications:

Todorova, S., Driscoll, C.T., Matthews, D.A., and Effler, S.W. 2015. Zooplankton community changes confound the biodilution theory of methylmercury accumulation in a recovering mercury-contaminated lake. *Environmental Science and Technology* 49 (7): 4066-4071.

Todorova, S., Driscoll, C.T., O'Donnell, S., Effler, S. W., Gindlesperger, S. and D. Todorov. 2014. Shifts in the long-term supply of mercury species in the upper mixed waters of a recovering lake, *Environmental Pollution* 185:314-21.

Matthews, D., Babcock, D., Nolan, J., Prestigiacomo, A., Effler, S., Driscoll, C.T., **Todorova, S.**, Kuhr, K. 2013. Whole-lake nitrate addition for control of methylmercury in mercury-contaminated Onondaga Lake, NY, *Environmental Research, special issue on Mercury in Contaminated Sites* 125:52-60.

Blackwell, B., Driscoll, C. T., Spada, M., **Todorova, S.**, Montesdeoca, M. 2013. Evaluation of zebra mussels (*Dreissena polymorpha*) as biomonitors of mercury contamination in aquatic ecosystems, *Environmental Toxicology and Chemistry* 32(3): 638-43.

Todorova, S., Driscoll, C.T., Hines, M., Matthews, D. A., and S. W. Effler. 2009. Evidence for regulation on monomethyl mercury by nitrate in a seasonally-stratified, eutrophic lake, *Environmental Science and Technology* 43(17):6572-6578.

Todorova, S., Siegel, D., and A.M. Costello. 2005. Microbial Fe (III) reduction in a minerotrophic wetland – geochemical controls and involvement in organic matter decomposition. *Applied Geochemistry* 20:1120-1130.

Teaching Interests:

Environmental Engineering, Environmental Chemistry, Sustainable Engineering, Water and Wastewater Treatment, Urban Stormwater Design and Management

Research Interests:

Aquatic Chemistry, Mercury Cycling and Bioaccumulation, Environmental Policy, Sustainable Infrastructure

**Teng Zeng**

Ph.D. (University of Minnesota), Assistant Professor of Civil and Environmental Engineering

Specialty: Environmental Engineering

Email: tezeng@syr.edu

Sample Publications:

Zeng, T.; Glover, C. M. (equal contribution); Marti, E. J.; Woods-Chabane, G. C.; Karanfil, T.; Mitch, W. A.; Dickenson, E. R. V., Relative importance of different water categories as sources of N-nitrosamine precursors. *Environmental Science & Technology*, 2016, 50, 13239–13248.

Zeng, T.; Plewa, M. J.; Mitch, W. A., N-Nitrosamines and halogenated disinfection byproducts in U.S. full advanced treatment trains for potable reuse. *Water Research*, 2016, 101, 176–186.

Zeng, T.; Mitch, W. A., Impact of nitrification on the formation of N-nitrosamines and halogenated disinfection byproducts within distribution system storage facilities. *Environmental Science & Technology*, 2016, 50, 2964–2973.

Zeng, T.; Mitch, W. A., Contribution of N-nitrosamines and their precursors to domestic sewage by greywaters and blackwaters. *Environmental Science & Technology*, 2015, 49, 13158–13167.

Zeng, T.; Arnold, W. A., Clustering chlorine reactivity of haloacetic acid precursors in inland lakes. *Environmental Science & Technology*, 2014, 48, 139–148.

Zeng, T.; Arnold, W. A., Pesticide photolysis in prairie potholes: Probing photosensitized processes. *Environmental Science & Technology*, 2013, 47, 6735–6745.

Zeng, T.; Chin, Y. P.; Arnold, W. A., Potential for abiotic reduction of pesticides in prairie pothole porewaters. *Environmental Science & Technology*, 2012, 46, 3177–3187.

Teaching Interests:

Environmental Organic Chemistry, Environmental Process Engineering, Environmental Mass Spectrometry

Research Interests:

Occurrence and Fate of Organic Contaminants, Formation and Control of Disinfection Byproducts, Photochemistry of Surface Microlayer

Other Faculty

Ruth Chen

Ph.D. (University of Michigan), Part-Time Professor of Practice
Civil and Environmental Engineering

Teaching Interests:

Risk assessment methodology, environmental toxicology, alternative energy, human health impact of exposures to environmental toxins, education in global response to energy and environmental challenges

Research Interests:

Risk Assessment, Environmental Regulation, Injurious Effect of Environmental Chemicals, Aerosol Delivery of Chemo-preventive Agents, Alternative Energy, Environmental Education, Metabolism of Hepatotoxic Aliphatic Halogenated Hydrocarbons

Samuel P. Clemence

Ph.D. (Georgia Institute of Technology), Emeritus Professor, Laura J. and L. Douglas Meredith Professor for Teaching Excellence

Teaching Interests:

Geotechnical Engineering, Soils and Foundation Design, History of Technology, Leonardo da Vinci Artist and Engineer, Engineering History of the Erie Canal

Swiatoslaw W. Kaczmar

Ph.D. (Michigan State University), Adjunct Faculty

Teaching Interests:

Principles of Toxicology, Industrial Hygiene

Research Interests:

Environmental Toxicology and Industrial Hygiene

Lance S. Ketcham

M.S. (Syracuse University), Adjunct Faculty
Principal Environmental/Geotechnical Design Engineer, ARCADIS

Teaching Interests:

Engineering Design, Construction, Site Investigation, Construction Materials, Geotechnical Engineering, Engineering Ethics and Technical Communications.

Research Interests:

Anchor Foundations, Properties of Collapsible Soils, In Situ Testing, Slurry Wall Containment Systems and Movement of Organics in Soil/Rock Systems

Kimberly M. Driscoll

M.S.E.E. (Syracuse University), Research Faculty

Teaching Interests:

Environmental Engineering

Research Interests:

Environmental Systems

Alexander A. Friedman

D. Eng. (University of California-Davis), Emeritus Professor

Teaching Interests:

Environmental Engineering, Water and Wastewater Treatment.

Research Interests:

Water and Wastewater Treatment

Dennis P. Joyce, LS

Joyce Land Surveying, Adjunct Faculty

Teaching Interests:

Surveying and Mapping

Peter W. Plumley

Ph.D. (UC-Santa Cruz), Research Associate Professor

Teaching Interests:

Geology/Tectonics, Renewable Energy, Climate Change, Freshman Engineering

Research Interests:

Science Education, K-12 Outreach

Raymond D. Letterman

Ph.D. (Northwestern University), Emeritus Professor

Teaching Interests:

Environmental Engineering Fundamentals, Water Supply Design, Environmental Chemistry

Research Interests:

Solid-Liquid Separation Processes, Potable Water Supply, Applied Surface Chemistry

James A. Mandel

Ph.D. (Syracuse University), Emeritus/Research Professor

Teaching Interests:

Finite Element Analysis, Plate and Shell Structures

Research Interests:

Composite Materials, Fiber Reinforcement Concrete, Curved Bridge Design, Finite Element Analysis

Sinéad Mac Namara

Ph.D. (Princeton University), Affiliated Faculty

Teaching Interests:

Structural Analysis and Design

Research Interests:

Thin-shell concrete in nuclear containment structures

Suresh Santanam

Sc.D. (Harvard University), Associate Professor, Biomedical and Chemical Engineering Department; Director, Industrial Assessment Center

Teaching Interests:

Air Pollution, Environmental Regulations, Control System Design, Green Engineering, Process Control, Experimental Methods and Statistics, Advanced Chemical Engineering Design, Industrial Toxicology

Research Interests:

Air Quality Monitoring and Control, Indoor Air Quality, Human Performance and IAQ, Energy Efficiency, Green Chemical Processes, Air Pollution Exposure Modeling, Source Apportionment

David S. Wazenkewicz

B.S. (Syracuse University), Adjunct Faculty

Teaching Interests:

Solid Waste Management

Research Interests:

Solid Waste Utilization and Management

Abdallah H. Yabroudi

M.S. (Syracuse University), Adjunct Faculty

CEO and Managing Director, Dubai Contracting Company

Teaching Interests:

Construction Engineering and Project Management

GRADUATE COURSE CATALOG

If you are not on campus, you can download the Syracuse University Course Catalog from <http://coursecatalog.syr.edu/index.php>

CONTACT INFORMATION

For more information about how you can continue your education in the Department of Civil and Environmental Engineering at Syracuse University, please contact:

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APPENDIX A

M.S. PROGRAM OF STUDY FORMS

M.S. in Civil Engineering (with an emphasis on Construction Engineering and Management)

M.S. in Civil Engineering (with an emphasis on Geotechnical Engineering)

M.S. in Civil Engineering (with an emphasis on Structural Engineering)

M.S. in Environmental Engineering

M.S. in Environmental Engineering Science

PROGRAM OF STUDY FORM

M.S. in Civil Engineering **(with an emphasis in Construction Engineering and Management)**

M.S. without Thesis

1. All courses in Group I. (12 credit hours)
2. One course from Group II. (3 credit hours)
3. One course from Group III. (3 credit hours)
4. One course from Group IV. (3 credit hours)
5. Three additional courses from Groups II through V upon advisor's approval; one of which can be CIE 690 - Independent study. (9 credit hours)
6. CIE 995 – Master's Exit Paper (0 credit hour). The exit paper must address a topic relevant to construction engineering. The paper can be original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.

Total number of credit hours = 30

M.S. with Thesis

1. All courses in Group I. (12 credit hours)
2. One course from Group II. (3 credit hours)
3. One course from Group III. (3 credit hours)
4. One course from Group IV. (3 credit hours)
5. One additional course from Groups II through V upon advisor's approval, or CIE 690 - Independent study. (3 credit hours)
6. CIE 997 – Master's Thesis. (6 credit hours)

Total number of credit hours = 30

PROGRAM OF STUDY FORM

M.S. in Civil Engineering (with an emphasis in Construction Engineering and Management)

Group	Course Title	Notes
Group I Core Courses	CIE 601 – Construction Engineering and Project Management* CIE 639/ECS 636 – Sustainable Development and Infrastructure Management CIE 600 – Construction Estimating and Scheduling CIE 500 – Construction Control Systems	All are required in this group
Group II Advanced Fundamentals	CIE 677 – Design of Structural Systems CIE 637 – Advanced Soil Mechanics and Foundation Engineering I CIE 678 – Rehabilitation of Civil Infrastructure* CIE 663 – Introduction to Sustainable Engineering MAE 548 – Engineering Economics and Technology Valuation** MFE 629 – Modeling and Optimization MFE 634 – Productivity and Quality Control CIE 600 – Construction Regulations and Organizational Management	Select at least one course from this group
Group III Design	CIE 535 – Structural Steel Design CIE 536 – Prestressed Concrete Design CIE 545 – Pavement Design CIE 549 – Designing with Geofoam CIE 558 – Solid Wastes-Collection and Disposal CIE 570 – Water and Wastewater Treatment Plant Design* CIE 638 – Advanced Soil Mechanics and Foundation Engineering II CIE 641 – Seepage and Earth Dam Design CIE 643 – Transportation Engineering* CIE 739 – Soil Stabilization	Select at least one course from this group
Group IV Management and Advanced Tools	ECS 526 – Statistics for Engineers BUA 600 – Interpersonal & Group Skills for Managers ECS 650 – Managing Sustainability GEO 683 – Geographic Information Systems LPP 758 – Environmental Law and Public Policy MBC 616 – Operations Management (1.5 credit) and MBC 617 – Supply Chain Management (1.5 credit) PPA 709 – Public Organizations and Management* PPA 734 – Public Budgeting, <u>or</u> PPA 731 - Financial Management in State and Local Governments** PPA 895 – Managerial Leadership** SCM 656 – Project Management SCM 701 – Introduction to Supply Chain Management SCM 702 – Principles of Management	Select at least one course from this group
Group V Some Suggested Elective Courses	Engineering and Computer Science courses not listed above Architecture Construction Management (ESF) Public Administration and Management courses not listed above	CEM Advisor's approval is required before a student can take courses from this group

** These courses are required to complete the Certificate of Public Infrastructure Management and Leadership.

* One of these courses is needed to complete the Certificate of Public Infrastructure Management and Leadership.

PROGRAM OF STUDY FORM

M.S. in Civil Engineering (with an emphasis in Geotechnical Engineering)

M.S. without Thesis

1. Three courses in Group I. (9 credit hours)
2. One course from Group II. (3 credit hours)
3. Two courses from Group III. (6 credit hours)
4. One course from Group IV. (3 credit hours)
5. Three courses from Groups II to V upon advisor's approval; one of which can be CIE690 - Independent study. (9 credit hours)
6. CIE 995 – Master's Exit Paper (0 credit hour). The exit paper must address a topic relevant to geotechnical engineering. The paper can be original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.

Total number of credit hours = 30

M.S. with Thesis

1. Three courses in Group I. (9 credit hours)
2. One course from Group II. (3 credit hours)
3. Two courses from Group III. (6 credit hours)
4. One course from Group IV. (3 credit hours)
5. One course from Groups II to V upon advisor's approval, or CIE 690-Independent Study. (3 credit hours)
6. CIE 997 Master's Thesis (6 credit hours).

Total number of credit hours = 30

PROGRAM OF STUDY FORM

M.S. in Civil Engineering (MSCE) (with an emphasis in Geotechnical Engineering)

Group	Course Title	Notes
Group I Core Courses	CIE 637 - Soil Mechanics and Foundation Engineering I CIE 638 - Soil Mechanics and Foundation Engineering II and either CIE 549 – Designing with Geofoam or CIE 584 – Designing with Geosynthetics	Three courses are required.
Group II Advanced Fundamentals	CIE 538 – Dynamics of Structures CIE 633 – Finite Element Analysis CIE 737 – Applied Soil Mechanics CIE 739 – Soil Stabilization CIE 740 – Soil Dynamics	Select at least one from this group
Group III* Design	CIE 545 - Pavement Design CIE 549 - Designing with Geofoam CIE 584 - Designing with Geosynthetics CIE 641 – Seepage and Earth Dam Design	Select at least two from this group
Group IV Advanced Tools	CIE629 – Reliability of Civil Systems CIE678 – Rehabilitation of Civil Infrastructure EAR 601 Hydrogeology EAR 603 Geomorphology ERE 527 - Storm Water Management ERE 551 – GIS for Engineers ERE 693 – GIS Based Modelling	Select at least one from this group
Group V Suggested Elective Areas	Earth Science Computer Programing Construction Engineering Information Technology Other CIE graduate courses	Advisor’s approval is required before a student can take courses from this group

*Design courses in Group III are required when offered.

PROGRAM OF STUDY FORM

M.S. in Civil Engineering (with an emphasis in Structural Engineering)

M.S. without Thesis

1. All courses in Group I. (9 credit hours)
2. One course from Group II. (3 credit hours)
3. Two courses from Group III, of which one must be steel design and the other must be concrete design or bridge engineering. (6 credit hours)
4. One course from Group IV. (3 credit hours)
5. Three additional courses from Groups II through V upon advisor's approval; one of which can be CIE 690 - Independent study. (9 credit hours)
6. CIE 995 – Master's Exit Paper (0 credit hour). The exit paper must address a topic relevant to structural engineering. The paper can be original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.

Total number of credit hours = 30

M.S. with Thesis

1. All courses in Group I. (9 credit hours)
2. One course from Group II. (3 credit hours)
3. Two courses from Group III, of which one must be steel design and the other must be concrete design or bridge engineering. (6 credit hours)
4. One course from Group IV. (3 credit hours)
5. One additional course from Groups II through V upon advisor's approval, or CIE 690 – Independent Study. (3 credit hours)
6. CIE 997 – Master's Thesis. (6 credit hours)

Total number of credit hours = 30

PROGRAM OF STUDY FORM

M.S. in Civil Engineering (with an emphasis in Structural Engineering)

Group	Course Title	Notes
Group I Core Courses	CIE 633 – Finite Element Analysis CIE 678 – Rehabilitation of Civil Infrastructure MAE 635 – Advanced Mechanics of Materials	All are required in this group
Group II Structural Analysis	CIE 629 – Reliability of Civil Systems CIE 631 – Classical and Matrix Structural Analysis CIE 634 – Stability Analysis of Structural Systems CIE 677 – Design of Structural Systems CIE 733 – Plate and Shell Structures	Select at least one course from this group
*Group III Structural Design	CIE 535 – Structural Steel Design CIE 536 – Prestressed Concrete Design CIE 635 – Advanced RC Design CIE 636 – Plastic Design of Steel Structures CIE 666 – Design of Concrete Bridges	Select at least one course on <u>steel design</u> AND one course on <u>concrete design or bridge engineering</u> from this group
Group IV Dynamics/Earthquake Engineering	CIE 538 – Dynamics of Structures CIE 632 – Structural Dynamics and Earthquake Engineering CIE 740 – Soil Dynamics MAE 626 – Vibration of Mechanical Systems	Select at least one course from this group
Group V Some Suggested Elective Areas	Architecture Construction Management Political Science Engineering and Computer Science Information Studies Management Public Communications Other CIE graduate courses not listed above	Advisor’s approval is required before a student can take courses from this group

*Structural Design courses are required when offered to satisfy the minimum requirements of Group (III): “one course on steel design,” and “one course on concrete design or bridge engineering”.

PROGRAM OF STUDY FORM
M.S. in Environmental Engineering

M.S. without Thesis

1. All the courses in Group I. (9 credit hours)
2. One course from Group II. (3 credit hours)
3. One course from Group III. (3 credit hours)
4. One course from Group IV. (3 credit hours)
5. Three additional courses from Groups II through V upon advisor's approval; one of which can be CIE 690 - Independent Study. (9 credit hours)
6. One of the following options:
 - a. CIE 600 – Environmental Assessment (3 credit hours)
 - b. CIE 995 – Master's Exit Paper (0 credit hour) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to environmental engineering. The paper can be original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.

Total number of credit hours = 30

M.S. with Thesis

1. All courses in Group I. (9 credit hours)
2. One course from Group II. (3 credit hours)
3. One course from Group III. (3 credit hours)
4. One course from Group IV. (3 credit hours)
5. Two additional courses from Groups II through V upon advisor's approval; one of which can be CIE 690 – Independent Study. (6 credit hours)
6. CIE 997–Master's Thesis. (6 credit hours)

Total number of credit hours = 30

PROGRAM OF STUDY FORM
M.S. in Environmental Engineering

Group	Course Title	Notes
Group I Core Courses	CIE 642 – Treatment Processes in Environmental Engineering CIE 671 – Environmental Chemistry and Analysis CIE 672 – Applied Environmental Microbiology	All are required in this group for MSEE students
Group II Advanced Fundamentals	CIE 554 – Principles of Environmental Toxicology CIE 565/CEN 565 – Bioremediation CIE 567/CEN 567 – Biotechnology CIE 600 – Environmental Data Analysis CIE 600 – Environmental Organic Chemistry CIE/EAR 600 – Physical Hydrology CIE 663 – Introduction to Sustainable Engineering CIE 651 – Physical-Chemical Processes CIE 652 – Biological Processes CIE 653 – Applied Aquatic Chemistry CIE 657 – Biogeochemistry CIE 659 – Advanced Hydrology CIE 662 – Chemistry of Soils and Natural Surfaces CIE 673 – Transport Processes in Environmental Engineering CIE 764 – Industrial Hygiene Engineering and Radiological Health	Select at least one course from this group
Group III Design	CIE 555 – Hazardous Waste Management CIE 558 – Solid Wastes-Collection and Disposal CIE 561 – Air Resources (or SUNY ESF equivalent by petition: GNE 661) CIE 570 – Water and Wastewater Treatment Plant Design CEN 551 – Biochemical Engineering	Select at least one from this group
Group IV Advanced Tools	CIE 529 – Risk Analysis in Civil Engineering CIE 571 – Water Quality Modeling CIE 600 – Groundwater Modeling CIE/EAR 600 – Earth Systems Modeling CIE 687 – Environmental Geostatistics GEO 683 – Geographic Information Systems Course in probability and statistics and/or regression analysis	Select at least one course from this group
Group V Some Suggested Elective Areas	Construction Management Law and Public Policy Management Computer Programming Other CIE graduate courses not listed above	Advisor’s approval is required before a student can take courses from this group

PROGRAM OF STUDY FORM

M.S. in Environmental Engineering Science

M.S. without Thesis

1. Both courses in Group I. (6 credit hours)
2. Two courses from Group II. (6 credit hours)
3. Two courses from Group III. (6 credit hours)
4. Three additional courses from Groups II through IV upon advisor's approval. Courses from the suggested areas in Group IV are recommended. One of these courses can be CIE 690 - Independent Study. (9 credit hours)
5. One of the following options:
 - a. CIE 600 – Environmental Assessment. (3 credit hours)
 - b. CIE 995 – Master's Exit Paper (0 credit hour) and one additional course from Groups II through V (3 credit hours). The exit paper must address a topic relevant to environmental engineering science. The paper can be original work or it can be a critical review of a published journal article. The paper has a minimum length requirement of 2000 words and requires approval of the student's advisor.

Total number of credit hours = 30

M.S. with Thesis

1. Both courses in Group I. (6 credit hours)
2. Two courses from Group II. (6 credit hours)
3. Two courses from Group III. (6 credit hours)
4. Two additional courses from Groups II through IV upon advisor's approval. Courses from the suggested areas in Group IV are recommended. One of these courses can be CIE 690 - Independent Study. (6 credit hours)
5. CIE 997–Master's Thesis. (6 credit hours)

Total number of credit hours = 30

PROGRAM OF STUDY FORM
M.S. in Environmental Engineering Science

Group	Course Title	Notes
Group I Core Courses	CIE 671 – Environmental Chemistry and Analysis CIE 672 – Applied Environmental Microbiology	Both courses in this group are required for MSEES students
Group II Advanced Fundamentals	CIE 554 – Principles of Environmental Toxicology CIE 565/CEN565 – Bioremediation CIE 567/CEN567 – Biotechnology CIE 600 – Environmental Data Analysis CIE 600 – Environmental Organic Chemistry CIE/EAR 600 – Physical Hydrology CIE 663 – Introduction to Sustainable Engineering CIE 653 – Applied Aquatic Chemistry CIE 657 – Biogeochemistry CIE 659 – Advanced Hydrology CIE 662 – Chemistry of Soils and Natural Surfaces CIE 673 – Transport Processes in Environmental Engineering CIE 764 – Industrial Hygiene Engineering and Radiological Health	Select at least two courses from this group
Group III Advanced Tools	CIE 529 – Risk Analysis in Civil Engineering CIE 571 – Water Quality Modeling CIE 600 – Groundwater Modeling CIE/EAR 600 – Earth Systems Modeling CIE 687 – Environmental Geostatistics GEO 683 – Geographic Information Systems Course in probability and statistics and/or regression analysis	Select at least two courses from this group
Group IV Some Suggested Elective Areas	Law and Public Policy Management Computer Programming Other CIE graduate courses not listed above	Advisor’s approval is required before a student can take courses from this group

M.S. GRADUATE ADVISING FORM

SYRACUSE UNIVERSITY
Department of Civil and Environmental Engineering

Student's Name: _____

E-Mail: _____

Advisor's Name: _____

E-Mail: _____

Program: _____

FIRST SEMESTER:

Subject & Catalog Number	Course Title	Class Number	Group Number	Date:
1.				Student Signature
2.				
3.				Advisor Signature
4.				

SECOND SEMESTER:

Subject & Catalog Number	Course Title	Class Number	Group Number	Date:
1.				Student Signature
2.				
3.				Advisor Signature
4.				

THIRD SEMESTER:

Subject & Catalog Number	Course Title	Class Number	Group Number	Date:
1.				Student Signature
2.				
3.				Advisor Signature
4.				

FOURTH SEMESTER:

Subject & Catalog Number	Course Title	Class Number	Group Number	Date:
1.				Student Signature
2.				
3.				Advisor Signature
4.				

