

L.C. SMITH 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

MASTER OF SCIENCE IN ENVIRONMENTAL ENGINEERING WITH

A SPECIALIZATION IN PUBLIC ADMINISTRATION

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 L.C. Smith College of Engineering and Computer Science (LCS). 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 three disciplines: Environmental Engineering, Geotechnical Engineering, and Structural Engineering. Enrollment at Syracuse University is approximately 6,000 graduate students and 12,000 undergraduate students. Currently, about 1,700 Masters and 150 Doctoral degrees are awarded by the University each year. The department awards 10-15 M.S. and 2-4 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.

Computer facilities: Graduate students enrolled in the Department of Civil and Environmental Engineering have access to a wide variety of computer facilities. The L.C. Smith College of Engineering and Computer Science maintains several microcomputer laboratories in Link Hall. These laboratories are equipped with advanced PCs 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 microcomputer and workstation clusters are located in Schine, Goldstein, Archbold, Brockway, Kimmel Halls, and the Center for Science and Technology. These computer clusters are open to all students of Syracuse University.

The university 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.

Additional computer facilities and computing resources are available in the various department teaching and research labs as described below:

Laboratory facilities: The Department of Civil and Environmental Engineering maintains several laboratories for graduate instruction and research. They include 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 environmental engineering laboratories are part of the Center for Environmental Systems and Engineering (CESE) at Syracuse University. The Center (www.ecs.syr.edu/centers/cese) is the focal point for research and teaching of the scientific and engineering aspects of environmental 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.

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 and/or Environmental Engineering or the equivalent 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 (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 credits 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 (3.00 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.

Master of Science in Civil Engineering

(1) Requirements with Thesis - 30 credit hours. The candidate must complete a set of core courses in the student's chosen area of specialization. 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, six credits of CIE 997-Master's Thesis, must be taken culminating in the defense of the thesis administered by a thesis committee and given by the Civil and Environmental Engineering faculty.

(2) Requirements without Thesis - 30 credit hours. The candidate must complete a set of core courses in the student's chosen area of specialization. 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 the faculty/student seminar series each year. To complete the degree requirement, the student must take CIE 996-Master's Project for 3 credits on a civil engineering topic approved by the advisor and at least one additional reader.

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 671, CIE 672 and CIE 673. If the student has already taken one or more of these courses at the 400 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, six credits of CIE 997-Master's Thesis, must be taken culminating in the defense of the thesis administered by a thesis committee and given by the Civil and Environmental Engineering faculty.

(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 671, CIE 672 and CIE 673. If the student has already taken one or more of these courses at the 400 level, he/she will be expected to take 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 one of the following courses: CIE 600-Environmental Assessment, or CIE 996-Master's Project, for 3 credits. If the student chooses to take CIE 996, the project must address a topic in environmental engineering or environmental science and be approved by the advisor and at least one additional reader.

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 with an emphasis on a major area of specialization. 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, six credits of CIE 997-Masters Thesis, must be taken culminating in the defense of the thesis administered by a thesis committee and given by the Civil and Environmental Engineering faculty.

(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. 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 one of the following courses: CIE 600-Environmental Assessment, or CIE 996-Master's Project, for 3 credits. If the student chooses to take CIE 996, the project must address a topic in environmental engineering or environmental science and be approved by the advisor and at least one additional reader.

Master of Science in Environmental Engineering with a Specialization in Public Administration

(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 671, CIE 672 and CIE 673. If the student has already taken one or more of these courses at the 400 level, he/she will be expected to take corresponding higher level courses in these fundamental engineering areas. In addition, the student must complete four elective courses (12 credits) in public administration, and participate in a noncredit cross-discipline seminar. Furthermore, six credits of CIE 997-Master's Thesis, must be taken culminating in the defense of the thesis administered by a thesis committee and given by the Civil and Environmental Engineering faculty.

(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 671, CIE 672 and CIE 673. If the student has already taken one or more of these courses at the 400 level, he/she will be expected to take higher level courses in these fundamental engineering areas. In addition, the student must complete either five elective courses (15 credits) in public administration, or complete four elective courses (12 credits) in public administration and one (3-credit) course in environmental engineering. The student must also participate in a noncredit cross-discipline seminar. Furthermore, the student is required to take one of the following courses: CIE 600-Environmental Assessment, or CIE 996-Master's Project, for 3 credits. If the student chooses to take CIE 996, the project must address a topic in environmental engineering or environmental science and be approved by the advisor and at least one additional reader.

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 usually complete the degree 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 grades on all required graduate entrance examinations.
- (5) Departmental approval.
- (6) Demonstrated potential for excellent research work.

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 exam and dissertation committees.

The candidate is expected to take the proper courses to fulfill the doctoral degree requirements in consultation with his/her advisor

and/or upon recommendations from the candidate's dissertation committee.

Course requirements (pending NYS Education Department approval):

- (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 on independent studies (CIE690).
- (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.

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 3 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 3 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 thesis 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 member 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 Syracuse Record*.

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.

FINANCIAL SUPPORT

Financial aid awards in the form of tuition scholarships, teaching assistantships, research assistantships, department 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 supports 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 Professor of Civil and Environmental Engineering.

Specialty: Structural Engineering.

E-mail: rsabouta@syr.edu

Sample Publications:

Wattanadachachan, 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.

Park SangDon and **Aboutaha, R.S.**, "Finite Element Methodologies for FRP Strengthened RC Members," *Journal of Computers and Concrete*, Korea, October-November issue, 2006.

Kim, SangHun and **Aboutaha, R.S.**, "Ductility of Carbon Fiber-Reinforced Polymer (CFRP) Strengthened Reinforced Concrete Beams: Experimental Research," *Steel and Composite Structures, An International Journal*, Korea, October, 2004.

Chutarat, N. and **Aboutaha, R.S.**, "Cyclic Response of Exterior Reinforced Concrete Beam- Column Joints Reinforced with Headed Bars," American Concrete Institute, *ACI Structural Journal*, 100(2), March-April, 2003, pp. 259-264.

Aboutaha, R.S. and Machado, R. I., "Seismic Resistance of Steel Tubed High Strength Reinforced Concrete Columns," *Journal of Structural Division*, ASCE, 1999.

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, Composite and Hybrid Systems, FRP reinforced concrete structural systems, and Investigation of Structural Failures.

Shobha K. Bhatia

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

Specialty: Geotechnical Engineering.

E-mail: skbhatia@syr.edu

Sample Publications:

Bhatia, S. K. and Smith, J.L. *Bridging the Gap Between Engineering and the Global World: A Case Study of the Coconut (Coir) Fiber Industry in Kerala, India*, Morgan Claypool Publisher, July 15, 2008, ISBN 9781598296259.

Smith, J. L., Davieau, M.R., and **Bhatia, S.K.** "Evaluation of Soil Erosion Using the Rain Splash Technique," *ASCE Geo-Denver 2007 Conference*, ASCE GSP 167-Geotechnics of Soil Erosion, 2007, pp. 1-10.

Smith, J.L., **Bhatia, S.K.**, and Satyamurthy, R. "An Overview of Geosynthetics Rolled Erosion Control Products," Paper published in *Geosynthetics – Recent Developments, In Commemoration of Two Decades of Geosynthetics in India*, Publication No. 298, Edited by G.V. Rao, 2006, pp. 303-327.

Liao, K. and **Bhatia, S. K.** "Geotextile Tube: Filtration Performance of Woven Geotextiles under Pressure," *North American Geosynthetics Conference*, Las Vegas, December 6-8, 2005, pp. 1-15.

Smith, J.L., Bryz-Gornia, C.J., **Bhatia, S.K.** and Walowsky, D. "A Comparative Study of RECPs: Index Properties and

Field Performance,” *Geo-Frontiers 2005*, the American Society of Civil Engineers, Austin, Texas, January 24-26, 2005, pp. 1-10.

Teaching Interests:

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

Research Interests:

Application of Polymeric Materials and Natural Fibers in Engineering, Soil Erosion, Soil Properties, Women in Science and Engineering (WISE).

Samuel P. Clemence

Ph.D. (Georgia Institute of Technology), Professor of Civil and Environmental Engineering, Meredith Professor for Teaching Excellence

Specialty: Geotechnical Engineering.

E-mail: spclemen@syr.edu

Sample Publications:

Seider, G.L., Thorston, R., and **Clemence, S.P.** “Helical Piles with Grouted Shafts – Practical Overview”, *Deep Foundations Institute, Proceedings*, Annual Conference, October 2003, pp. 219-232.

“Performance of Helical Piles with Grouted Shafts,” *Technological and Design Developments in Deep Foundation, Geotechnical Special Publication 100*, ASCE, 2000.

“Pullout Performance of Inclined Helical Screw Anchors in Sand,” *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, 1998.

Use of In Situ Tests in Geotechnical Engineering, Editor, ASCE, 1986.

Uplift Behavior of Anchor Foundations in Soil, Editor, ASCE, 1985.

Teaching Interests:

Geotechnical Engineering, Soils and Foundation Design, History of Civil Engineering

Research Interests:

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

Charles T. Driscoll

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

Specialty: Environmental Engineering.

E-mail: ctdrisco@syr.edu

Sample Publications:

Groffman, P. M., Hardy, J. P., **Driscoll, C. T.**, and Fahey, T. J. “Snow depth, soil freezing, and fluxes of carbon dioxide, nitrous oxide and methane in a northern hardwood forest,” *Global Change Biology*, 12, 2006, pp. 1-13.

Chen, L. and **Driscoll, C. T.** “Regional assessment of the

response of the acid-base status of lake watersheds in the Adirondack region of New York to changes in atmospheric deposition using PnET-BGC,” *Environmental Science and Technology*, 39(3), 2005, pp. 787-794.

Driscoll, C. T., Lambert, K. F., and Chen, L. “Acidic deposition: Sources and effects,” *Encyclopedia of Hydrological Sciences*, M. G. Anderson, ed., John Wiley & Sons, Ltd., Chichester, England, 2005, pp. 1441-1457.

Kamman, N. C., Lorey, P. M., **Driscoll, C. T.**, Estabrook, R., Major, A., Pientka, B., and Glassford, E. “Assessment of mercury in waters, sediments, and biota of New Hampshire and Vermont lakes, USA, sampled using a geographically randomized design,” *Environmental Toxicology and Chemistry*, 23, 2004, pp. 1172-1186.

Teaching Interests:

Environmental Engineering, Environmental Chemistry, Environmental Microbiology, Biogeochemistry, Environmental Systems Modeling.

Research Interests:

Aquatic Chemistry, Biogeochemistry, Soil Chemistry, Water Quality Modeling.

Chris E. Johnson

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

Specialty: Environmental Engineering.

E-mail: cejohns@syr.edu

Sample Publications:

Warby, R.A.F., **Johnson, C.E.**, and Driscoll, C.T. “Continuing acidification of organic soils across the northeastern U.S.A.: 1984-2001,” *Soil Science Society of America Journal*, in progress.

Ussiri, D.A.N. and **Johnson, C.E.** “Forest harvesting effects on soil organic matter composition in a northern hardwood ecosystem,” *Forest Ecology and Management*, 2007.

Warby, R.A.F., **Johnson, C.E.**, and Driscoll, C.T. “Chemical recovery of surface waters across the northeastern U.S. from reduced inputs of acidic deposition: 1984-2001,” *Environmental Science and Technology*, 2005.

Johnson, C.E., Smernik, R.J., Siccama, T.G., Keimle, D.M., Xu, Z., and Vogt, D. J. “Using ¹³C nuclear magnetic resonance spectroscopy for the study of northern hardwood tissues,” *Canadian Journal of Forest Research*, 2005.

Teaching Interests:

Environmental Chemistry, Soil Chemistry, Statistics. Surveying.

Research Interests:

Biogeochemistry, Soil Chemistry, Natural Organic Matter

Raymond D. Letterman

Ph.D. (Northwestern University), Professor of Civil and Environmental Engineering.
Specialty: Environmental Engineering.
E-mail: rdletter@syr.edu

Sample Publications:

Water Quality and Treatment (Editor) American Water Works Association, McGraw-Hill, 1999.

“Coagulation and Flocculation” Chap. 6 in: *Water Quality and Treatment*, American Water Works Association, McGraw-Hill, 1999.

“Modeling Cadmium and Sulfate Adsorption by Fe(OH)₃/SiO₂ Mixed Oxides,” *Water Research*, 1996.

Filtration Strategies to Meet the Surface Water Treatment Rule, American Water Works Association, 1991 (Book).

Teaching Interests:

Environmental Engineering Fundamentals, Water Supply Design, Environmental Chemistry.

Research Interests:

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

Eric M. Lui

Ph.D. (Purdue University), Associate Professor and Chair of Civil and Environmental Engineering. Meredith Professor for Teaching Excellence
Specialty: Structural Engineering.
E-mail: emlui@syr.edu

Sample Publications:

Khanse, A.C. and **Lui, E.M.** “Study of Pulse Effects of NFGM on the Dynamic Response of Bridge Structures,” *Proceedings, 6th National Seismic Conference on Bridges and Highways*, Charleston, S.C., 2008.

Khanse, A.C. and **Lui, E.M.** “Identification and Analysis of Pulse Effects in Near-Fault Ground Motions,” *Proceedings, 14th World Conference on Earthquake Engineering*, Oct. 12-17, Beijing, China, 2008.

Chen, W.F. and **Lui, E.M.** (ed) *Principles of Structural Design*, Taylor and Francis, Boca Raton, FL, 2006.

Chen, W.F., and **Lui, E.M.** (ed) *Earthquake Engineering for Structural Design*, Taylor and Francis, Boca Raton, FL, 2006.

Lui, E.M., Liu, Y. and Oguzmert, M. “Effect of Diaphragm Spacing and Stiffness on the Dynamic Behavior of Curved Steel Bridges,” *Steel Structures*, 6, 2006, pp. 163-174.

Lui, E.M. and Ge, M. “Analysis and Design for Stability in the U.S. – An Overview,” *Steel and Composite Structures*, 5 (2-3), 2005, pp. 103-126.

Ge, M. and **Lui, E.M.**, “Structural Damage Identification using System Dynamic Properties,” *Computers and Structures*, 83, 2005, pp. 2185-2196.

Teaching Interests:

Structural Analysis and Design, Computer Aided Engineering, Engineering Materials, Structural Dynamics, Earthquake Engineering, Sustainability.

Research Interests:

Nonlinear theories, Numerical Methods, Steel Structures, Structural Stability, Structural Dynamics, Earthquake Engineering.

Dawit Negussey

Ph.D. (University of British Columbia), Professor of Civil and Environmental Engineering.
Specialty: Geotechnical Engineering.
E-mail: negussey@syr.edu

Sample Publications:

“Resilient Modulus for EPS Geofoam,” *Proceedings of ASCE GeoDenver*, 2007.

“Design Parameters for EPS Geofoam,” *Soils and Foundations*, Japanese Journal of Soil Mechanics and Foundations, 2006.

“Modulus of Subgrade Reaction for EPS Geofoam,” *Proceeding of GeoShanghai*, American Society of Civil Engineers, 2006.

“A Case History of the Use of Geofoam for Bridge Approach Fills,” *Proceedings of the Fifth International Conference on Case Histories in Geotechnical Engineering*, New York, NY, 2004.

Teaching Interests:

Geofoam Geotechnics, Soil Mechanics, Foundation Design, Transportation Engineering.

Research Interests:

Properties and Applications of Geofoams, Fiber Optic Sensors, Geotechnical Engineering.

Andria Costello Staniec

Ph.D. (California Institute of Technology), Associate Professor of Civil and Environmental Engineering.
Specialty: Environmental Engineering.
E-mail: costello@syr.edu

Sample Publications:

Costello, A.M. “Molecular Methods Used for Evaluating Subsurface Remediation,” *Remediation of Hazardous Waste in the Subsurface*, C.J. Clark II and A.S. Lindner, eds., American Chemical Society, Washington, DC, 2006, pp. 129-149.

Todorova, S.G. and **Costello, A.M.** “Design of *Shewanella*-specific 16S rRNA primers and application to analysis of *Shewanella* in a minerotrophic wetland,” *Environmental Microbiology*, 8(3), 2006, pp. 426-432.

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

Costello, A.M., Auman, A.J., Macalady, J.L., Scow, K.M.,

and Lidstrom, M.E. "Estimation of methanotroph abundance in a freshwater lake sediment," *Environmental Microbiology*," 4(8), 2002, pp. 443-450.

Teaching Interests:

Environmental Engineering, Environmental Microbiology, Bioremediation, Biotechnology.

PART-TIME AND EMERITUS FACULTY

Lisa Cleckner

Ph.D. (University of Michigan), Research Faculty

Teaching Interests:

Environmental Engineering

Research Interests:

Environmental Health Sciences

Kimberly M. Driscoll

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

Teaching Interests:

Environmental Engineering

Research Interests:

Environmental Systems

Kimberley M. Fabend

B.S.C.E. (Syracuse University), Adjunct Faculty

Teaching Interests:

Transportation Engineering

Research Interests:

Highway and Traffic Engineering

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.

Swiatoslav W. Kaczmar

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

Teaching Interests:

Principles of Toxicology, Industrial Hygiene.

Research Interests:

Environmental Toxicology and Industrial Hygiene.

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:

Research Interests:

Applied Environmental Microbiology, Bioremediation, Global Biogeochemical Cycles, Changes in Microbial Communities in Response to Anthropogenic Disturbance, Applications of Molecular Biology to Environmental Engineering.

Structural Analysis and Design.

Research Interests:

Thin-shell concrete in nuclear containment structures.

Belal Mousa

Ph.D. (Syracuse University), Adjunct Faculty

Teaching Interests:

Structural Analysis and Design, Reinforced Concrete, Mechanics of Solids.

Research Interests:

Fiber Reinforced Concrete.

Emmet M. Owens, Jr.

M.S.C.E. (Colorado State University), Adjunct Faculty

Teaching Interests:

Fluid Mechanics, Hydraulic Engineering, Pollutant Transport in the Environment.

Research Interests:

Transport Processes, Water Quality Modeling, Transport and Mixing in Lake Systems.

Steven C. Pack

Ph.D. (Syracuse University), Adjunct Faculty

Teaching Interests:

Mechanics of Solids, Structural Mechanics and Structural Analysis.

Research Interests:

Finite Element Analysis.

Peter W. Plumley

Ph.D. (UC-Santa Cruz), Research Faculty

Teaching Interests:

Geology, Computing, Freshman Engineering

Research Interests:

Science Education, K-12 Outreach

Suresh Santanam

Sc.D. (Harvard University), Adjunct Faculty

Teaching Interests:

Air Pollution, Environmental Regulations, Control System Design, Industrial Toxicology.

Research Interests:

Air Quality Monitoring and Control, Indoor Air Quality, 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.

GRADUATE COURSE CATALOG

If you are on campus, you can pick up a copy of the Graduate Course Catalog from the L.C. Smith College of Engineering and Computer Science (LCS) Deans' Office in 223 Link, or from the Civil and Environmental Engineering (CIE) Department Office in 151 Link.

If you are not on campus, you can download the Graduate Course Catalog from <http://www.syr.edu/publications/gradcat/>

CONTACT INFORMATION

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

Eric M. Lui

Chair, Department of Civil and Environmental Engineering
151B Link Hall
Syracuse University
Syracuse, NY 13244-1240
Tel: 315-443-3394/Fax: 315-443-1243
E-mail: emlui@syr.edu

Appendix A

M.S. Program of Study Form

PROGRAM OF STUDY FORM

M.S. in Environmental Engineering (MSEE)

All MSEE students are required to take the courses listed in this Program of Study Form.

M.S. without Thesis

1. All the 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. 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 996 – Master's Project , or CIE 600 – Environmental Assessment (3 credit hours)

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 (6 credit hours)
4. One course from Group IV (3 credit hours)
5. One additional course from Groups II through V, or CIE690 – Independent Study, upon advisor's approval (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 Environmental Engineering (MSEE)

| Group | Course Title | Notes |
|---|---|--|
| Group I Core Courses | CIE 671 – Environmental Chemistry and Analysis CIE 672 – Applied Environmental Microbiology CIE 642 – Treatment Processes in Environmental Engineering | All are required in this group for MSEE students |
| Group II Advanced Fundamentals | CIE 565/CEN565 – Bioremediation CIE 567/CEN567 – Biotechnology CIE 651 – Physical-Chemical Processes CIE 652 – Biological Processes CIE 653 – Applied Aquatic Chemistry CIE 657 – Biogeochemistry CIE 662 – Chemistry of Soils and Natural Surfaces CIE 673 – Transport Processes in Environmental Engineering | 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 I (or SUNY ESF equivalent by petition) CIE 570 – Water and Wastewater Treatment Plant Design CEN 551 – Biochemical Engineering | Select at least two from this group |
| Group IV Advanced Tools | CIE 500 – Water Quality Modeling CIE 600 – 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 Advanced Hydrology 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 (MSEES)

All MSEES students are required to take the courses listed in this Program of Study Form.

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 to 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. CIE 996 – Master's Project , or CIE 600 – Environmental Assessment (3 credit hours)

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 to 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 (MSEES)

| 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 565/CEN565 – Bioremediation CIE 567/CEN567 – Biotechnology CIE 653 – Applied Aquatic Chemistry CIE 657 – Biogeochemistry CIE 662 – Chemistry of Soils and Natural Surfaces CIE 673 – Transport Processes in Environmental Engineering | Select at least two courses from this group |
| Group III Advanced Tools | CIE 500 – Water Quality Modeling CIE 600 – 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 | Advanced Hydrology 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 Civil Engineering (MSCE) (with an emphasis in Geotechnical Engineering)

All MSCE students interested in Geotechnical Engineering are required to take the courses listed in this Program of Study Form.

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 (6 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 996 – Master's Project (3 credit hours)

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 (6 credit hours)
4. One course from Group IV (3 credit hours)
5. One additional course from Groups II through V, or CIE 690 – Independent Study, upon advisor's approval (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 – Advanced Soil Mechanics and Foundation Engineering I CIE 638 – Advanced Soil Mechanics and Foundation Engineering II CIE 641 – Seepage and Earth Dam Design | All are required in this group |
| Group II Advanced Fundamentals | CIE 740 – Soil Dynamics CIE 737 – Applied Soil Mechanics CIE 739 – Soil Stabilization CIE 662 – Chemistry of Soils and Natural Surfaces | Select at least one course from this group |
| Group III Design | CIE 500 – Geofoam Properties and Application CIE 545 – Pavement Design CIE 584 – Designing with Geosynthetics ERE 596 – Storm Water Management (SUNY ESF) | Select at least two from this group |
| Group IV Advanced Tools | CIE 633 – Finite Element Analysis ERE 550 – Intro/Geo Info Systems CIE 600 – 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 Advanced Hydrology 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 Civil Engineering (with an emphasis in Structural Engineering)

All MSCE students interested in Structural Engineering are required to take the courses listed in this Program of Study Form.

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 - One of which 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. 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 996 – Master's Project (3 credit hours)

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 - One of which 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, or CIE 690 – Independent Study, upon advisor's approval (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 600 – Design of Structural Systems CIE 633 – Finite Element Analysis MAE 635 – Advanced Mechanics of Materials | All are required in this group |
| Group II Structural Analysis | CIE 631 – Structural Analysis I (offered once every two years) CIE 634 – Stability Analysis of Structural Systems (offered irregularly) CIE 678 – Rehabilitation of Civil Infrastructure (offered yearly) | Select at least one course from this group |
| Group III Structural Design | CIE 535 – Structural Steel Design (offered once every two years) CIE 536 – Prestressed Concrete Design (offered once every three years) CIE 635 – Advanced RC Design (offered once every three years) CIE 636 – Plastic Design of Steel Structures (offered irregularly) CIE 666 – Design of Concrete Bridges (offered once every three years) | Select at least one course on steel design AND one course on concrete design or bridge engineering from this group |
| Group IV Dynamics/Earthquake Engineering | CIE 538 – Dynamics of Structures (offered every four years, alternate with CIE 632) CIE 632 – Structural Analysis II (offered every four years, alternate with CIE 538) CIE 740 – Soil Dynamics (offered irregularly, required CIE 637 as prerequisite) | 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 |

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. | | | | |