



GRADUATE STUDY *at*



RICE

Environmental Science and Engineering at Rice University was founded in 1967 to study problems related to water supply and water pollution. Today it is widely recognized as one of the nation's leaders in the education of environmental engineers and scientists through a highly interdisciplinary research experience with strong underpinnings in various scientific and engineering disciplines.

The mission of the department is to educate tomorrow's leaders and enable them to define and solve complex problems associated with the management, preservation and remediation of the environment in which we live. Fundamental to solving environmental problems is a sound knowledge of the underlying physical, chemical and biological processes that govern interactions in environmental systems. To this end, the program brings together faculty with complementary backgrounds to provide a multidisciplinary forum for research-based education. For further information, please visit the Web site for the Department of Civil and Environmental Engineering at [www.ceve.rice.edu](http://www.ceve.rice.edu).

## RESEARCH

Research and education in the department is supported by numerous federal, state, private and corporate sources. The overall research theme of the program is the coupling of transport processes with pollutant reactivity. Current thrusts focus on the following areas:

- Environmental applications and implications of nanotechnology
- Environmental biotechnology and bioremediation
- Urban air quality and atmospheric chemistry
- Water resources, flood prediction and disaster mitigation
- Advanced technologies for water purification and waste water reuse
- Aquatic and colloid chemistry
- Transport and fate of contaminants in the environment

## GRADUATE PROGRAMS

Graduate programs include both research degrees and professional degrees. Research programs in environmental science and engineering lead to the degrees of master of science and doctor of philosophy. The nonthesis program leads to the degree of master of civil and environmental engineering, which is a professional degree obtainable in one year.

In the selection of prospective graduate students at Rice, all available material is carefully evaluated, particularly: 1) scores on the Graduate Record Examination; 2) the scholastic record as reflected by courses chosen and the quality of performance; 3) the evaluations of teachers and advisers; and 4) the student's own statement of goals, aspirations and special interests.

## GRADUATE STUDY IN ENVIRONMENTAL SCIENCE AND ENGINEERING RICE UNIVERSITY

DEPARTMENT OF CIVIL  
& ENVIRONMENTAL  
ENGINEERING

[WWW.CEE.RICE.EDU](http://WWW.CEE.RICE.EDU)

FOR ADMISSION  
IN 2015

## DOCTOR OF PHILOSOPHY

Candidates for the doctoral degree must: 1) complete approved courses of study with high standing, 2) pass a comprehensive preliminary written and oral examination to evaluate preparation for doctoral studies in the field of environmental science and engineering, 3) pass a qualifying examination on course work and proposed research, 4) complete an original dissertation and 5) pass a formal public oral examination on the thesis.

Successful completion of at least 90 semester hours of course work and research credits beyond the bachelor's degree, or 60 semester hours beyond the M.S. degree, is required for the Ph.D. Doctoral candidates typically take the written and oral preliminary exams after two semesters of course work in the department. This exam is administered by the faculty. Candidates who pass the preliminary exam will be allowed to form a doctoral committee, which consists of at least three members of the Rice University faculty. The candidate's research adviser chairs the doctoral committee, and at least one member of the committee must be from another department. After the doctoral candidate has formed a committee and developed a proposal for doctoral research, the candidate must pass a qualifying examination administered by the committee. The purpose of the qualifying exam is to evaluate the candidate's preparation for the proposed research and to identify any areas requiring additional course work or study. For more information on core course requirements and the preliminary exam, please visit our Web site, [www.ceve.rice.edu](http://www.ceve.rice.edu).

## MASTER OF SCIENCE

Candidates for the M.S. degree must complete a minimum of 24 hours of approved courses (see website, [www.ceve.rice.edu/degrees.aspx](http://www.ceve.rice.edu/degrees.aspx)) and present and defend a research thesis in oral examination. Usually, two academic years and the intervening summer are sufficient to successfully complete this degree program.



The M.S. advisory committee consists of the candidate's research adviser, one or two additional members of the faculty and at least one member of another department. Individuals from other institutions (academic, business and/or government) may also serve on the thesis advisory committee, but they may not substitute for any of the required Rice faculty members. Students will be permitted to take an oral examination on their thesis only after their thesis advisory committee has determined that the thesis is in an acceptable written format for a public defense.

## NONTHESIS PROGRAMS

The M.C.E.E. degree is a professional nonthesis degree typically requiring two semesters of study and a final project. Applicants must have obtained a bachelor of arts or bachelor of science in the natural or physical sciences or from a field of engineering. Students pursuing the M.C.E.E. as a terminal degree are not eligible for financial aid from Rice University.

## FACULTY/CURRENT RESEARCH

**Pedro J. J. Alvarez** — Chair, George R. Brown Professor, Civil and Environmental Engineering. B.Eng., Civil Engineering, McGill University, 1982; M.S.E., Environmental Engineering, University of Michigan, 1989; Ph.D., Environmental Engineering, University of Michigan, 1992. Research interests: environmental biotechnology, bioremediation, phytoremediation, water footprint of biofuels, fate and transport of toxic chemicals and environmental nanotechnology, water treatment and reuse for the oil and gas industry.

**Philip B. Bedient** — Herman Brown Chair of Engineering, Civil and Environmental Engineering. B.S., Physics, University of Florida, 1969; M.S., Environmental Engineering, University of Florida, 1972; Ph.D., Environmental Engineering Sciences, University of Florida, 1975. Research interests: surface and groundwater hydrology, contaminant transport in groundwater, aquifer remediation strategies and modeling, geographical information and decision support systems, flood control and water resource strategies and flood alert systems.

**Daniel S. Cohan** — Associate Professor, Civil and Environmental Engineering. B.A., Applied Mathematics, Harvard University, 1998; Ph.D., Atmospheric Science, Georgia Institute of Technology, 2004. Research interests: photochemical modeling, satellite data, air quality management, uncertainty analysis and the impacts of energy use on the environment.

**Robert J. Griffin** — Professor, Civil and Environmental Engineering. B.S., Chemical Engineering, Tufts University, 1993; M.S. Chemical Engineering, California Institute of Technology, 1997; Ph.D., Chemical Engineering with minor in Environmental Engineering Science, California Institute of Technology, 2000. Research interests: air quality modeling, atmospheric chemistry, aerosol thermodynamics and chemistry, urban air pollution.

**Qilin Li** — Associate Professor, Civil and Environmental Engineering. B.S., Environmental Engineering, Tsinghua University, 1995; M.S., Environmental Engineering, University of Illinois at Urbana-Champaign, 1999; Ph.D., Environmental Engineering, University of Illinois at Urbana-Champaign, 2002. Research interests: advanced technologies for drinking water purification and wastewater reuse, desalination colloidal processes and interfacial phenomena in the aqueous environment, applications and implications of nanotechnology.



**Mason B. Tomson** — Professor, Civil and Environmental Engineering. B.S., Chemistry and Mathematics, Southwestern State University, 1967; Ph.D., Chemistry, Oklahoma State University, 1972. Research interests: application of basic chemical principles to environmental science and engineering issues, specifically fate and transport of chemicals and nanoparticles in nature and all aspects of water and treatment related to energy and the environment.

**Calvin H. (Herb) Ward** — Foyt Family Chair of Engineering. B.S., Biology, New Mexico State University, 1955; M.S., Plant Pathology, Genetics, Cornell University, 1958; Ph.D., Plant Pathology, Genetics, Plant Physiology, Cornell University, 1960; MPH, Environmental Health Science, University of Texas, 1978. Research interests: environmental microbiology, in-situ bioremediation of the subsurface and technology development for environmental remediation.

### PROFESSORS OF THE PRACTICE

**James B. Blackburn** — Blackburn Carter P.C., Houston, TX

**Joseph Cibor** — President, Fugro, Inc., Houston, TX

**Ed Segner** — Former President and Chief of Staff, EOG Resources, Inc., Houston, TX

### LECTURERS

**Philip deBlanc** — Groundwater Services, Houston, TX

**David Gornet**, Executive Director—The Grand parkway Association,

**Moyeen Haque**, Principal—Matrix Structural Engineers, Houston, TX

**Nadathur Varadarajan**, Engineer—J. Ray McDermott

**Steve Wilkerson**, Engineer—Haynes Whaley and Associates

### PROFESSORS EMERITI

**Dr. Calvin H. (Herb) Ward, Professor Emeritus** — Rice University, Houston, TX

### ADJUNCT PROFESSORS

**Jean-Yves Bottero** — Director, Le Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement (CEREGE, European Geosciences and Environment Lab)

**Wei Chen** — Professor, Nankai University, Tianjin, China

**Matt Fraser** — Associate Professor, Arizona State University

**Joseph B. Hughes** — Professor and Chair, Georgia Tech, Atlanta, GA

**Charles J. Newell** — Vice President, GSI Environmental, Houston, TX

**Carroll Oubre** — Former Director, Environmental R&D, Shell Oil Company, Rice University, Houston, TX

**Baxter Vieux** — Professor, Civil and Environmental Engineering, University of Oklahoma, Norman, OK; Vieux and Associates, Norman, OK

### FACILITIES

The laboratories of the environmental science and engineering program at Rice University have several wet labs for environmental research and additional computational space. These labs are well equipped for research in the areas of environmental microbiology, molecular biology, organic pollutant analysis, colloid and nanoparticle characterization, and atmospheric and water chemistry. In addition, the modern facilities of the Rice Shared Equipment Authority are available for research. A list of equipment shared can be found at [sea.rice.edu](http://sea.rice.edu).

Rice University has a large nanotechnology community with well-equipped surface analysis equipment available on a shared basis. Major surface analysis instrumentation includes: FEI XL-30 Environmental Scanning Electron Microscope (ESEM), JEOL 2010 Transmission Electron Microscope (TEM), AFMs, Polarizing Optical Microscope, X-ray Diffractometer, Raman Microscope, FTIR Infrared Microscope, X-ray photoelectron spectroscopy and scanning tunneling microscopy.

Other common laboratory equipment available to this research group include GC, GC/MS, ICP, ICP/MS, several UV/Vis spectrophotometers, HPLCs, centrifuges, LC/MS, microscopes, an

autoclave, a Beckman liquid scintillation counter, a TOC analyzer and photon correlation spectrometry. Additional instruments located in other departments of Rice University are available for use with a nominal usage fee. The X-ray adsorption fine structure (XAFS) is available to us via Dr. Barrera of the Department of Mechanical Engineering and Materials Science at Rice.

Civil and environmental engineering acquired a Geographical Information System (GIS) laboratory in 2001 consisting of 10 computers to conduct research in the GIS field and to educate students in the use of GIS. Eight student laboratory computers are installed with following software relating to GIS as well as hydraulic and hydrologic themes: ArcView 3.2a, ArcView 8.1, 3D Analyst, Spatial Analyst, GMS 4.0, Groundwater Vistas 3.0, HEC GEO-HMS, HEC GEO-RAS, HEC-HMS 2.2.2 and HEC-RAS 3.1.1.

The Ken Kennedy Institute for Information Technology (K2I), together with the Office of the Vice Provost for Information Technology (IT), provides faculty, staff, and students access to a shared research cyberinfrastructure (computing, storage and visualization infrastructure), application and software support, data management services, and user training, all at minimal cost. Rice currently owns and operates several large-scale computational resources built around x86, Power7, Power8 and BlueGene technology capable of delivering about 90 million computing hours per year (see <http://rcsg.rice.edu>), and a display wall with more than 33 million pixels (see <http://viz.rice.edu>).

## FINANCIAL ASSISTANCE

Most graduate students receive financial support throughout the 12-month year. Incoming students who request financial support and do not hold external fellowships may be awarded Rice University Fellowships, which carry competitive stipends, in addition to a further grant to cover tuition.

The Alliances for Graduate Education and the Professoriate at Rice (AGEP) encourages diversity in our student population by providing scholarships to qualified, underrepresented students who intend to pursue a Ph.D. in science, mathematics or engineering.

Financial support beyond the first year will depend on satisfactory performance in course work and the availability of funds. No graduate student in good standing in this program has ever been denied continuing support.

Graduate research assistantships also are supported by numerous faculty research grants awarded by the National Science Foundation (NSF), the Environmental Protection Agency (EPA), the Eleanor and Mills Bennett Fellowship, NASA and other funding agencies.

Stipend levels are reviewed annually and adjusted periodically to maintain competitiveness with comparable institutions.

## ADMISSION

To encourage close contact between students and faculty and to maintain the highest-quality student body possible, the program is limited to approximately six to 10 entering thesis master's and Ph.D. candidates per year. Faculty encourages students pursuing the master's degree to continue to the Ph.D. Nonthesis master's degree candidates comprise approximately 10 percent of our student base.

Three basic criteria are used in the selection of prospective graduate students:

- (1) academic record (quality of previous education, including courses and grades)
- (2) academic potential evaluated by the faculty
- (3) GRE scores (and TOEFL scores for foreign applicants)

## HOW TO APPLY

Applicants are encouraged to utilize the online application, which can be accessed at <http://cevegradapps.rice.edu>. For more information, visit our website at [www.cce.rice.edu/graduate](http://www.cce.rice.edu/graduate).

The completed application forms must include the following:

- transcripts of grades from all undergraduate and graduate schools attended
- at least three letters of recommendation from teachers or advisers
- GRE scores, including verbal, quantitative, and analytical (subject test not required)
- TOEFL scores if the applicant's native language is not English (A minimal TOEFL score of 90 on iBT, 600 on paper-based or 250 on computer-based is required for admission to Rice.)
- an application fee of \$85

The application deadline for fall admission is February 1.



## ABOUT RICE AND HOUSTON

Rice is a leading American research university—small, private and highly selective—distinguished by a collaborative, interdisciplinary culture and a global perspective. Only a few miles from downtown Houston, it occupies an architecturally distinctive, 285-acre campus shaded by nearly 4,000 trees. State-of-the-art facilities and laboratories, internationally renowned centers and institutes and one of the country's largest endowments support an ideal learning and living environment.

The university attracts a diverse group of highly talented students and faculty with outstanding graduate and professional programs in the humanities, social sciences, natural sciences, engineering, architecture, music and business. With just 2,275 graduate students and 3,485 undergraduates, it offers an unusual opportunity to forge close relationships with eminent faculty scholars and researchers and the option to tailor graduate programs to specific interests.

Houston offers all the expected educational, cultural and commercial advantages of a large urban center, and more. It's home of the Texas Medical Center, the largest concentration of medical schools, hospitals and research facilities in the world, as well as several other universities. Rice has cooperative programs with the University of Houston, Baylor College of Medicine, the University of Texas Health Science Center and Texas Southern University. Houston is one of the few U.S. cities with resident companies in all four major performing arts—drama, ballet, opera and symphony. It also boasts a museum district featuring exhibits of national and international prominence.

As urban as it is, Houston also is a surprisingly green city. Houstonians enjoy the outdoors in more than 300 municipal parks and 120 open spaces, and many frequent the beach at Galveston Island, only a 45-minute drive away. Other short trips include Austin, the state's capital, and historic San Antonio, both of which are a little more than three hours away.

### CAMPUS VISIT

We encourage you to visit Rice at any time for a firsthand look at the department and the beautiful, tree-lined campus near the heart of historic Houston. If you apply and are admitted, you will be invited to visit the campus later at departmental expense. During your time here, you will not only visit with faculty, but usually you'll be hosted by current graduate students from whom you can learn more about graduate life and lifestyles in Houston. In the meantime, feel free to contact the department with any questions you may have.

### FOR ADDITIONAL INFORMATION:

Rice University homepage:  
[www.rice.edu](http://www.rice.edu)  
Rice University Office of Graduate and Postdoctoral Studies homepage:  
[graduate.rice.edu](http://graduate.rice.edu)  
Graduate Student Association homepage:  
[gsa.rice.edu](http://gsa.rice.edu)  
City of Houston homepage: [www.houstontx.gov](http://www.houstontx.gov)  
Houston information from the *Houston Chronicle*:  
[www.chron.com](http://www.chron.com)  
Houston information from the Greater Houston Partnership:  
[www.houston.org](http://www.houston.org)  
Houston information from Citysearch:  
[houston.citysearch.com](http://houston.citysearch.com)

