

# ENVIRONMENTAL ENGINEERING PROGRAM

## ANNUAL REPORT SUMMARY

### 2002-2003

#### STUDENTS AND GRADUATES

The Environmental Engineering Program presently has 7 M.S. and 20 Ph.D. graduate students, and 17 undergraduate environmental engineering majors. The majority of graduate students is full-time and financially supported. During the year, the program graduated 4 M.S. students and two environmental engineering undergraduates (December 2002 and May 2003). During the past year, the program received 65 full-time graduate applications; of these, 22 were offered admission into the program and 16 have accepted admission, bringing our projected total of graduate students to 38 for fall 2003. In addition, 10 new undergraduate students were admitted as environmental engineering majors for fall 2003.

#### FACULTY

Detailed activities of the Environmental faculty may be found in their annual reports. An indicator of their high level of collective scholarly activity is reflected in their publication of more than 50 refereed journal papers and book chapters. In addition, during the year Professor Dani Or assumed responsibility as Graduate Program Director and Professor Nelly Abboud continued as Director of the Undergraduate Program with primary objectives of program outreach, student recruitment, retention, and undergraduate administration. Three new Civil & Environmental Engineering (CEE) faculty members joined the program:

- Dr. Guiling Wang, Assistant Professor (Ph.D., MIT) – focusing on land-plant-atmosphere interactions
- Dr. Dani Or, NU Foundation Endowed Chair Professor ( Ph.D., Utah State University) – an expert in vadose zone hydrology and environmental physics
- Dr. Amvrossios Bagtzoglou, Associate Professor, (Ph.D., University of California, Irvine) – with expertise in groundwater and pollutant transport modeling and teaching responsibilities at the Stamford campus

During the year, Professor Emmanouil Anagnostou (CEE) was granted tenure, received the School of Engineering Outstanding Junior Faculty Award, and was nominated for the prestigious NSF Waterman Award. He is presently an active candidate for the award for FY 2004. Professor Joseph Helble (CHEG) was promoted to Professor and reappointed to a second term as CHEG Department Head.

Across the program, external research funding continues at an all-time high, with extramural grants totaling more than \$10 million, including prestigious national research awards such as NSF CAREER awards held by Professors Helble (CHEG), Barth Smets (CEE), Britt Holmén (CEE) and Anagnostou (CEE). In addition to holding significant offices within the University – Department Head of CHEG (Helble), Chair of the Microbiology Graduate Field of Study (Noll, MCB) – our faculty hold appointments in various national professional and learned societies. Professor Or is the Chair of the Soil Physics Division and a member of the Rapid Response Team of the Soil Science Society of America; Professor Baki Cetegen is a member of the Combustion Institute's executive board; Professor Smets has been appointed to the National Research Council's Committee on Bioavailability of Contaminants in Soils & Sediments; Professor Michael Cutlip is on the Executive Committee of the Chemical Engineering Division of the American Society of Engineering Education and an Academic Trustee of CACHE Corporation; Professor Helble has several appointments in the American Association for Aerosol

Research; Professor James Fenton (CHEG) serves on numerous committees of the Electrochemical Society; Professor Anagnostou serves on NASA's Tropical Rainfall Measuring Mission peer review and the International Precipitation Conference Steering Committee; Professor Abboud (CEE) is a Board member of the American Arab Engineers and Scientists Society and serves on the National Education Committee for the American Filtration and Separation Society; Professor James Bryers (Center for Biomaterials, UConn Health Center) serves on the National Research Council Committee on Biotechnology Education and the U.S. Department of State Committee on Environmental Biotechnology; and Professor Can Erkey (CHEG) serves on the Green Chemistry Division Committee of the American Chemical Society. Professor Thomas Torgersen (Marine Sciences) is editor-in-chief of *Reviews of Geophysics* and associate editor of *The Geochemical Journal*, and he is on the AGU Board of Journal Editors. Professors C.P. Schulthess (Plant Science), Bryers, Anagnostou, Bagtzoglou, and Or serve as associate editors of *Soil Science Society of America Journal*, *Biotechnology & Bioengineering*, *Journal of Applied Meteorology*, *Water Resources Research*, and *Vadose Zone Journal*, respectively. Additionally, Professors Abboud, George Hoag (CEE), and Smets serve on editorial boards of *Fluid/Particle Separation*, *Soil Contamination*, and *Biodegradation*, respectively.

Internationally, Professor Anagnostou serves as an advisor to the National Observatory of Athens, Athens, Greece; and was awarded an NSF grant to develop a unique continental-scale lightening network to improve rainfall estimation across Africa. Professor Fred Ogden continues his collaboration with the Technical University of Panama and the Canal Authority through funding by the U.S. Army Research Office. The project involves active student participation, including presentations by two students in a symposium on Tropical Hydrology that was held in Panama. Strong involvement in international conferences was evidenced earlier this year in the joint EGS-AGU spring meeting (Nice, France) with presentations by more than nine Environmental Engineering Program faculty and students, including two special sessions organized by Professors Anagnostou and Or. Professor Smets developed several new research proposals with colleagues in Denmark and Belgium, and Professor Or is PI on a research proposal funded by the Bi-national U.S.-Israel program.

### **OUTREACH PROGRAM**

- More than 1,500 packages containing Environmental Engineering and Civil Engineering brochures and related undergraduate information were sent to high schools in Connecticut, Massachusetts, Rhode Island, New Hampshire, Vermont, New York and New Jersey. As a result of this mailing, Professor Abboud has received numerous requests from Connecticut and New York high schools to introduce the program in their schools and during career and college fairs. Additionally, the Environmental Engineering Program organized and supported many outreach events during 2002-2003, including participation in the Connecticut Invention Convention, CPTV Expo, Guidance Counselor Luncheon Workshop, Engineering 2000, YESS Workshop, the Da Vinci Program, the ENGR 100 Environmental Workshop, and career day events in two Connecticut high schools. The program also organized and hosted the "Project Lead the Way" Workshop presented by Mr. Gregory Kane from the Connecticut State Education Department. The program initiated the "UConn CEE Partners in Education Program" in which our Environmental Engineering Program faculty collaborated with Connecticut companies involved in environmental engineering and identified partners who are willing to offer internships and host field trips to Connecticut high school students. Furthermore, the EEP was well represented at the fall and spring open houses at the Storrs, Waterbury and Stamford campuses, and its undergraduate director served as panel speaker at the Society of Women Engineers and awarded merit certificate awards to 61 students from 31 high schools. We initiated a comprehensive revision of the graduate program structure, guided by the expertise of core Environmental Engineering faculty and by our mission to provide a rigorous and highly relevant program in environmental biogeochemistry; air,

water and land pollution; atmospheric-land interactions; water resources; hydraulics; and fluid mechanics. We formed three areas of concentration (tracks) focusing on:

- Atmospheric processes and air-pollution;
- Bio-geochemistry; and
- Hydro-geo sciences and engineering.

These changes require revisions of our web page, brochures and procedures that are well underway.

The expansion of the Environmental Engineering Program necessitated establishment of administrative structures to assist with program guidance and management in a manner that reflects our collective views and objectives. We formed new governance structures, including establishment of a curriculum committee (Smets, chair) and an admissions committee (Holmén, chair), and established regular monthly ENVE forum meetings to discuss academic and research initiatives.

ENVE faculty have been involved in several multi-investigator activities to support research and education in Environmental Engineering. The fellowship award from the U.S. Department of Education, GAANN Program for “A Graduate Fellowship Program in Environmental Biotechnology at the University of Connecticut” entered its third year (Program Participants: Bryers, Noll (co-director), Smets (director), Vinopal and Wood). A group of 16 faculty members were involved in an NSF-IGERT proposal: Human-Land-Atmosphere Interactions – Observability and Predictability of Processes across Scales (the proposal was declined and will be resubmitted). A five-year joint Johns Hopkins-UConn-UMaryland “Center for Hazardous Substances in Urban Environments,” with a total EPA budget of \$6 million entered its second year with participation of Professors Helble, Hoag, Allison MacKay (CEE) and Smets.

Joint collaborations of program participants are supported by the National Science Foundation Division of Undergraduate Education for Courses Curriculum and Laboratory Improvement, “System dynamics of detention/retention ponds” (Torgersen and Ogden) and the Willimantic Water Commission, “Studies of nutrient loading to the Mansfield Hollow Reservoir, Connecticut” (Ogden (CEE), Hoag (CEE), Warner (NRME)). There is growing collaboration with other parts of the Civil & Environmental Engineering faculty, including joint NSF and NASA proposals with faculty specializing in structures and mechanics (Professors Accorsi and Ramesh Malla).