

CEE OUTLOOK

University of Delaware

Fall 2005

Di Toro Named to National Academy of Engineering

Dominic M. Di Toro, Edward C. Davis Professor of Civil and Environmental Engineering (CEE), has been elected to the National Academy of Engineering. He was recognized for “leadership in the development and application of mathematical models for establishing water-quality criteria and making management decisions.”

In being elected to the National Academy, Di Toro joins fewer than 2200 engineers nationwide. “This is probably the highest honor that a faculty member can achieve in the field of engineering,” said CEE Chair Michael J. Chajes. “Dom is a tremendous asset to the Department, the College, and the University of Delaware.”

Di Toro joined UD in January 2003 after serving on the faculty at Manhattan College for more than 30 years. He has published over 100 technical papers, as well as a book, *Sediment Flux Modeling* (John Wiley & Sons). One reviewer called the book “the definitive text on this subject and deserv[ing of] a place in any respectable environmental library,” and another referred to it as “masterfully done.”

Two areas in which Di Toro’s work has had the greatest impact are water quality and sediment flux modeling, and sediment and water quality criteria development. Early in his career, he developed one of the first dynamic models that was used to predict the consequences of nutrient discharges to the Great Lakes. The results were used in the joint US-Canada agreements to limit discharges to Lake Erie.

In the late 1980s, the EPA embarked on the development of Sediment Quality Criteria, and Di Toro was the technical leader of the effort through the 1990s. The Equilibrium Partitioning model and the SEM/AVS method that were developed are now part of common practice. More recently, he and his colleagues have developed criteria models for mixtures of polynuclear hydrocarbons (PAHs) that have been published by EPA.

Di Toro also led an effort co-sponsored by the EPA and industrial associations to develop toxic metal water quality criteria that explicitly consider the effects of other parameters including pH, Ca, Mg, and DOC concentrations. The effort resulted in the Biotic Ligand Model. It is currently the basis for research being conducted by many groups in the U.S. and around the world. It has been adopted as the basis for the EPA freshwater copper criteria currently under review.

A year before his election to NAE, Di Toro was designated a Highly Cited Researcher by the Institute of Scientific Information (ISI). The basic mission of ISI as a database publishing company is to provide comprehensive coverage of the world’s most important and influential research. Less than one-half of 1 percent of all publishing researchers are honored with this designation. In compiling the list, ISI analyzed some 19 million articles to determine the most highly cited researchers.

Di Toro is one of six UD faculty in the NAE and one of six to be named a Highly Cited Researcher.



▲ *Dominic M. Di Toro, Edward C. Davis Professor of Civil and Environmental Engineering*

He was recently selected to receive the Simon W. Freese Environmental Engineering Award from ASCE. His award situation reads “For over 30 years of specialization in the development and application of mathematical and statistical models to stream, lake, estuarine, and coastal water quality and sediment problems.”

Message from the Chair



▲ Michael J. Chajes

Our story on E.C. Davis is the perfect introduction to the theme of my message for this issue—the value we place on support from alumni and friends of the Department. Davis, our greatest benefactor to date, graduated from Delaware College a century ago. When he died in 1959, he left the bulk of his estate to the University of Delaware to provide scholarships in civil engineering. Since then, Davis’s estate has enabled us to fund not only scholarships but also two named professorships and a number of other initiatives.

The Department has been fortunate to be the recipient of major funding from a number of other benefactors as well, including alumni and interested companies. Gifts provided by alumni Richard and Claire Hangen and the Whiting-Turner Contracting Company have supported establishment of the Intelligent Transportation System (ITS) Laboratory and an undergraduate study room, respectively, while a legacy gift provided by alumnus Donald C. Phillips has funded a named professorship endowment, our bridge engineering lab, and our departmental conference room.

Three other new endowments—the Robertson-

Selinkoff, Francis E. Gardiner Jr., and Walter L. and David P. Hernson funds—are all supporting undergraduate scholarships, thereby enabling us to attract and reward high-caliber students in civil and environmental engineering.

Most recently, three of our newly retired faculty—Robert A. (Tony) Dalrymple, Arnold D. Kerr, and the late Ib A. Svendsen—have been honored with the establishment of endowments in their names to support scholarships and provide travel funds for students to attend professional conferences. These endowments are a way for us to recognize distinguished faculty with a lasting tribute and a tangible way for their former students to thank them for their education and mentoring contributions.

But, while these major sources of financial support are critical to our ability to fund students, professorships, and facilities, we benefit from many other types of equally critical contributions from friends and alumni of the Department. These include delivering guest lectures and seminars, teaching classes, sponsoring internships and student awards, providing tours of industrial and government facilities, hiring our graduates, donat-

ing materials and equipment, and serving on our External Advisory Committee and our ABET Constituent Committee.

Perhaps the most unusual contribution we have received within the past few years was the opportunity to destructively test a bridge owned by the Delaware River and Bay Authority. Although DRBA was going to demolish the decommissioned bridge anyway, their employees devoted extra time and labor to working with our faculty and students so that we could add to our knowledge about how bridges fail.

This issue of *CEE Outlook* is filled with stories about the many accomplishments of our faculty, students, and alumni. But it is the support of the larger community in which we operate that enables us to attract and retain top-notch faculty and students. After graduation, those students become alumni who give back to us in many ways. We are grateful for all of your support and invite you to share in our many successes.

Michael Chajes

*Dr. Michael J. Chajes
CEE Department Chair*

To make a donation to one of the newly established faculty endowments, send a check made payable to the University of Delaware, with the memo line indicating that the donation is for the Robert A. Dalrymple Endowment, the Arnold D. Kerr Endowment, or the Ib A. Svendsen Endowment. General donations can also be made to the Department of Civil and Engineering. Checks should be mailed to Deirdre Smith, 102H DuPont Hall, University of Delaware, Newark, DE 19716.

Ib A. Svendsen

(1937 - 2004)

Ib A. Svendsen, 67, Distinguished Professor Emeritus of Ocean Engineering, died December 19, 2004.

A native of Copenhagen, Svendsen earned his master's degree in civil engineering and his doctorate in wave mechanics at Technical University in Denmark in 1960 and 1974, respectively. He completed postgraduate work in fluid mechanics at Colorado State University.

Svendsen held joint appointments in the Department of Civil and Environmental Engineering and the College of Marine Studies until his retirement on Aug. 31, 2004. Upon retirement, he was named Distinguished Professor Emeritus.

"He is credited with making significant contributions to the advancement of coastal engineering," Nobu Kobayashi, director of UD's Center for Applied Coastal Research, said.

He joined the UD faculty in 1987 and served as chairperson of the Department of Civil and Environmental Engineering until 1996, when he was named Distinguished Professor of Ocean Engineering. In 1994, he was a visiting professor at Delft University of Technology.

At a memorial service held for Svendsen on January 26, 2005, Engineering Dean Eric W. Kaler credited the former civil engineering chair with "taking the Department to the next level of academic excellence and national visibility. He recruited many new faculty and transformed the Department into a research-oriented and energetic organization," Kaler said.

Before joining UD, Svendsen was affiliated with the Institute of Hydrodynamics and Hydraulic Engineering at Technical University in Lyngby, Denmark, from 1971-87 and was a visiting associate professor at UD in 1982-83. From 1964-71, he was assistant professor in the Coastal Engineering Laboratory at Technical University in Copenhagen, and he was a research engineer in the Coastal Engineering Laboratory of what is now the Danish Hydraulic Institute.

Svendsen's research interests included the mechanics of nearshore processes, in particular, wave breaking, wave-induced currents, sediment transport and coastal stability. He also studied computational methods for analysis of two- and three-dimensional wave motion in offshore regions and laboratory wave generation.

"He was the first researcher to show the importance of a roller at the steep front of a breaking wave in the prediction of undertow (offshore) currents that cause offshort sediment transport," Kobayashi said. "The roller concept is now widely adopted by other researchers in their nearshore circulation models." According to Kobayashi, Svendsen was also one of a few pioneering researchers who demon-

strated the existence of wave-induced 3-dimensional currents in surf zones. His theoretical analysis solved the puzzle of lateral mixing for regular waves, and his work also shed light on the turbulence induced by breaking waves. Svendsen's other research contributions include the development of a comprehensive numerical model, called SHORECIRC, for the prediction of nearshore currents.

The author of more than 120 papers in scientific journals and refereed conference proceedings, Svendsen also contributed to eight books as a co-author or chapter author. Just a week before his death, he completed work on a book-length manuscript, *Introduction to Nearshore Hydrodynamics*, which he submitted to World Scientific. The book is based on his decades of teaching and research.

During his academic career, Svendsen supervised numerous master's degree students and 16 Ph.D. students, who are now making their own significant contributions to the advancement of coastal engineering. He also taught a wide range of courses in the area of coastal engineering, including port and harbor design, water wave mechanics, offshore design, mathematical methods of structural and ocean engineering, hydrodynamics, and coastal engineering design.

Svendsen served on numerous committees for international scientific conferences and for the Danish government and was a member of several professional and honor societies.

In 1991, he was elected a member of the Danish Research Academy's International Faculty, and in 1992, he was elected a foreign member of the Danish Center for Applied Mathematics and Mechanics.

In 2005, Svendsen will posthumously be honored with the ASCE International Coastal Engineering Award, which is made annually to an individual who has made a significant contribution to the advancement of coastal engineering in engineering design, teaching, professional leadership, construction, research, and/or planning.

The University is also honoring Svendsen through establishment of the Ib A. Svendsen Endowment, which will be used to support international travel for civil engineering graduate students.

Editor's Note: Contributions may be made to the Ib A. Svendsen Endowment, c/o Deirdre Smith, 102H DuPont Hall, University of Delaware, Newark, DE 19716. Checks should be made payable to the University of Delaware, with the memo line indicating that the donation is for the Ib A. Svendsen Endowment.



CEE Honors Day Awards

CIVIL & ENVIRONMENTAL ENGINEERING DAVIS AWARD

Presented to a Senior selected by the Faculty of the Department of Civil & Environmental Engineering on the basis of outstanding scholarly achievement and professional development. The award consists of a certificate and \$200.

Melissa R. Williams

URS CORPORATION AWARD

Presented to a Senior in Civil & Environmental Engineering showing professional promise, leadership, and service. The award consists of a certificate and \$150.

Undine Kipka

CIVIL & ENVIRONMENTAL ENGINEERING ALUMNI AWARD

Presented to the Senior student in Civil & Environmental Engineering who has demonstrated outstanding scholarship. The award consists of a certificate and \$100.

Victoria N. Gallagher

DELAWARE SECTION OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS SENIOR AWARD

Presented to a Senior selected by the Faculty of the Department of Civil & Environmental Engineering on the basis of outstanding scholarly and extracurricular achievement. The award consists of a certificate, \$150, and recognition on the permanent plaque in P.S. DuPont Hall.

Michael J. Zettlemoyer

DELAWARE SECTION OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS JUNIOR AWARD

Presented to a Junior selected by the Faculty of the Department of Civil & Environmental Engineering on the basis of outstanding scholarship. The award consists of a certificate, \$100, and recognition on the permanent plaque in P.S. DuPont Hall.

Matthew A. Millner

DUFFIELD ASSOCIATES AWARD

An award of a certificate and \$200 to a senior Civil & Environmental Engineering major who has shown special promise in Geotechnical Engineering.

Scott A. Berkheimer

TETRA TECH, INC. SOPHOMORE AWARD

Presented by Tetra Tech, Inc. to a Sophomore in the Department of Civil & Environmental Engineering in recognition of outstanding scholarship. The award consists of a certificate and \$250.

John P. Connelly

VAN DEMARK & LYNCH SOPHOMORE AWARD

An award of a certificate and \$500 to a Civil & Environmental Engineering sophomore on the basis of scholarship, leadership, and personality.

Timothy J. Strickland

KCI TECHNOLOGIES, INC. AWARD

An award of \$300 to a Junior or Senior Civil & Environmental Engineering major who has demonstrated outstanding ability and interest in urban planning/civil engineering.

Nicole E. Reader

FRANCIS E. GARDINER, JR. SCHOLARSHIP

Two scholarships of \$1000 awarded to distinguished civil and environmental engineering junior-year students. Selection is on the basis of academic achievement.

Ross A. Bickhart *Michael D. Rakowski*

WASHINGTON AREA RAILWAY ENGINEERS SCHOLARSHIP

Two scholarships of \$1,500 awarded undergraduate students enrolled at the University of Delaware, who has a demonstrated interest in Railroad Engineering, on the basis of academic merit, and without regard to financial need. Will provide assistance to said student who is enrolled in the Department of Civil & Environmental Engineering in the College of Engineering.

Casey D. Hanner *Ryan C. Burk*

FIRST STATE SECTION OF AMERICAN SOCIETY OF HIGHWAY ENGINEERS SCHOLARSHIP

A scholarship to a current University of Delaware sophomore, presently enrolled in the Department of Civil & Environmental Engineering, focusing in the area of Transportation Engineering and maintaining a minimum grade point average of 3.0.

Melissa R. Williams

BANGALORE T. LAKSHMAN CIVIL & ENVIRONMENTAL ENGINEERING MINORITY SCHOLARSHIP (\$1000)

A scholarship of \$1000 is awarded to a Civil & Environmental Engineering minority student on the basis of outstanding scholarship; financial need is also a consideration.

Donato C. Settanni

MARGARET AND HYLAND P. GEORGE AWARD

Civil & Environmental Engineering scholarship awarded to a Delaware resident on the basis of academic performance and financial need.

Frances N. Achtermann

MALCOLM PIRNIE, INC. OUTSTANDING ENVIRONMENTAL ENGINEERING GRADUATE STUDENT AWARD

An award of \$250 to an outstanding graduate student in the Environmental Engineering program selected on the basis of academic excellence, participation in University and professional groups and activities, and community involvement.

Ahjeong Son

MALCOLM PIRNIE, INC. OUTSTANDING ENVIRONMENTAL ENGINEERING UNDERGRADUATE STUDENT AWARD

An award of \$250 to an outstanding undergraduate student in the Environmental Engineering program selected on the basis of academic excellence, participation in University and professional groups and activities, and community involvement.

Bryan J. Maietta

STATE WATER COORDINATOR'S AWARD

An award of \$500 to a deserving undergraduate student(s) in civil and environmental engineering, who has demonstrated an interest in water resources engineering.

Andrew J. Kaufmann *Laura A. Robinson*

E.C. DAVIS SCHOLARSHIP AWARD

This award is offered to outstanding Delaware residents who choose Civil & Environmental Engineering as a major; are at or near the top of their high school graduating class, and have SAT scores in the upper range of the applicant pool.

Ross A. Bickhart *Brian P. Jones*
Francis J. Bonkowski, III *Christina A. Lindemer*
Lindsey N. Breylinger *Jason L. McClafferty*
Kristen M. Cannatelli *Dana L. Rathfon*
Karen E. Cardinal *Laura B. Sewell*
Thomas J. Cotter *Robert B. Tetrick*
Michael P. Falkowski *Matthew J. Vincent*
Joseph W. C. Faries *Jamie C. Wallace*
Victoria N. Gallagher *Melissa R. Williams*
Betsy S. Hicks

WALTER L. AND DAVID P. HERNSON CIVIL ENGINEERING SCHOLARSHIP (\$5,000)

A scholarship awarded to undergraduate student(s) majoring in civil engineering on the basis of academic merit and financial need.

Nicole S. Sharp
Christi M. DeSisto
Robert J. Natale
Dennis J. Helmstetter
Jamie J. Orensky

(continued on next page →)

ROBERTSON-SELINKOFF SCHOLARSHIP AWARD

This award is offered to outstanding applicants who choose Civil & Environmental Engineering as a major; are at or near the top of their high school graduating class, and have SAT scores in the upper range of the applicant pool.

<i>Evan S. Brodsky</i>	<i>Katie M. Keller</i>
<i>Ryan C. Burk</i>	<i>Andrew M. Malinak</i>
<i>Michael P. Cimino</i>	<i>Anthony F. Manzella</i>
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<i>Matthew B. Jaskot</i>	<i>Michael J. Zettlemoyer</i>

MID-ATLANTIC QAW/DELDOT M&R AWARD

A monetary award presented to a senior-year student majoring in civil engineering, with a concentration in transportation and preferably an interest in highway materials, construction or design. The award consists of a certificate and \$1,500.

Jaime C. Lussi *Jonathan B. Kapust*

CEE Faculty Win ASCE Awards

Three UD-CEE faculty members have been recognized with awards from the American Society of Civil Engineers (ASCE). Nobu Kobayashi is the recipient of the Moffatt-Nichol Harbor and Coastal Engineering Award (*see story below*), Dennis Mertz won the Richard R. Torrens Award, and Dom Di Toro was selected to receive the Simon W. Freese Environmental Engineering Award. (*see story, page 1*)

Mertz, Director of CEE's Center for Innovative Bridge Engineering (CIBrE) won the Torrens Award for his "leadership and tireless efforts in advancing ASCE's *Journal of Bridge Engineering*." The Torrens award is conferred on volunteer editors who make outstanding contributions to ASCE's publications program. The founding editor of the *Journal of Bridge Engineering*, Mertz is an internationally recognized expert in Load and Resistance Factor Design (LRFD) theory and modern bridge design practices.

ARNOLD D. KERR AWARD

An award of \$500 given to a junior civil and environmental engineering student for outstanding achievement in structural engineering and engineering mechanics.

Matthew H. Lambro

LISTON HOUSTON AWARD

Sarah E. Criswell *Dennis Helmstetter*

Kobayashi Honored by Coastal Research Community



▲ *Nobu Kobayashi*

Prof. Nobu Kobayashi of CEE's Center for Applied Coastal Research has been appointed Visiting Distinguished Researcher of Japan's Port and Airport Research Institute (PARI). The five-year appointment will enable Kobayashi to advise strategic and research activities in the institute.

In extending the invitation, PARI President Makoto Owada wrote, "You have greatly contributed to the progress of coastal and harbor engineering in the world by achieving distinguished research, supervising many researchers, and coordinating integrated research." PARI will provide Kobayashi with travel expenses and honoraria for guidance and lectures.

Established in 2001, the institute is charged with the efficient and effective implementation of research and technology development for ports, coasts, and airports. The organization encompasses departments for marine environment and engineering, geotechnical and structural engineering, and construction and control systems. A staff of more than 110 people includes 86 researchers.

"Nobu's appointment as Visiting Distinguished Researcher is evidence of the global impact of the work being done here in our coastal center," said Department Chair Michael Chajes, "and

it recognizes his outstanding research accomplishments."

In 2002, Kobayashi was the recipient of the Moffatt-Nichol Harbor and Coastal Engineering Award, which is given annually by the Coasts, Oceans, Ports, and Rivers Institute of the American Society of Civil Engineers. Kobayashi was recognized for "his service to the harbor and coastal engineering profession through his advancement of techniques for analyzing forces and run-up on coastal structures, for his effective professional leadership, and for his dedication to the training of future coastal engineers."

Kobayashi is credited with developing time-dependent numerical models to improve quantitative understanding of the detailed mechanics of wind waves and design capabilities of armor units that protect harbor structures. He has published more than 200 papers and book chapters, both in English and in Japanese.

Engineer Leaves a Lasting Legacy to CEE

Most civil and environmental engineering students have heard of Edward C. Davis, as his name is attached to scholarships and named professorships in the Department. But to most of these students, the name E. C. Davis is just that—a name.

A century ago, however, Davis was more than just a name. He was a member of the class of 1905 at what was then Delaware College. He was also a baseball player, a football player, and an orator in the “Sussex Club.”

Like many of our current students, Davis was born in '84, but that was 1884. At just 5 ft. 9 in. tall and 175 pounds, Davis played right tackle for the football team and first base for the baseball team. His class totaled 38 students (all men), while the football team comprised 17 players, and the baseball team had 11 and two substitutes. Vintage photos show Davis and his classmates wear-

ing uniforms not only for sports but also to class.

Although information about Davis's own personality is lacking, he was part of a class that was, by its own admission, “unruly” and “noted for causing all noises and disturbances.” As a group, they were “a troublesome child to the faculty,” but also “good, mentally, morally, and physically.”

Originally from Laurel, Delaware, Davis went on to become one of the nation's leading hydraulic engineers and was a principal in Frazier-Davis, a St. Louis-based engineering firm. After selling his interest in the business, he returned to Delaware and lived on the 500-acre Herring Run Farm near Seaford, Del., once the home of Delaware Governor William Henry Harrison Ross. Davis also reportedly owned a great deal of timberland in Sussex County.

Davis died in 1959 at the age of 74 and left the bulk of his estate, valued at some \$600,000—equivalent to \$3.9 million in today's economy—to the University of Delaware to provide scholarships in civil engineering. Upon his death, his family requested that mourners also contribute to the University of Delaware in lieu of flowers.

Two CEE faculty members, James T. Kirby and Dominic M. Di Toro, are currently Edward C. Davis Professors, and a number of CEE students have received scholarships in Davis's name since the fund was established. The Davis funds also support a number of other initiatives in the Department.

“We're very grateful for Davis's generosity to the Department,” said Chair Michael J. Chajes. “His legacy has enabled us to attract and retain top students and faculty.”

Senator Carper Announces Federal Funding

U.S. Senator Thomas B. Carper held a press conference in the Department of Civil and Environmental Engineering on February 22, 2005, to announce \$425,000 in federal funds to the Center for the Study of Metals in the Environment (CSME). Since 2001, over \$3 million has been appropriated to CSME by the federal government, and this new funding will continue the support of ongoing programs.

Joining the Senator for the announcement were University President David P. Roselle, Dean Eric W. Kaler, Center Director Herbert E. Allen, and CEE Department Chair Michael J. Chajes.

“We're very grateful for the continued support of the federal government for our multidisciplinary, collaborative research programs,” says Allen. “Our work is enabling government, industry, and the research community to work together on developing standards for sound science in this critical environmental area.”

According to Chajes, CSME, along with the Department's three other research centers—one each in transportation, coastal engineering, and bridge engineering—is “working hard to develop engineering solutions for important societal problems.” The coastal center is developing models to better predict the behavior of tsunamis, the bridge center is investigating

technologies for more durable bridges, and the transportation center is looking at ways to utilize fuel cell buses to reduce harmful emissions.

And, with this continued federal funding and other sources of support, CSME is leading the effort to develop a better understanding of the behavior of, and the risks posed by, metals in the environment.

Carper's announcement was followed by a tour of Professor Allen's laboratories in DuPont Hall.



CEE Alumnus Honored for Outstanding Achievement

Carolann D. Wicks '82, '90M, chief engineer/director, Delaware Department of Transportation (DelDOT), was one of seven alumni to receive the Presidential Citation for Outstanding Achievement during a ceremony that ushered in Homecoming Weekend on Friday, October 1, 2004, in Bayard Sharp Hall.

UD President David P. Roselle and Robert Davis, vice president for development and alumni relations, presented the awards to the UD graduates of the last 20 years who "exhibit great promise in their professional and public service activities."

In 2002, Wicks became the first female chief engineer/director for DelDOT. Managing a budget of almost one-quarter of a billion dollars, Wicks oversees a state transportation depart-

ment that is atypical in that it has responsibility for almost all of the roads in the state. During her 19 years with DelDOT, Wicks has been in charge of some of the state's most complex and challenging transportation projects.

"There were many unexpected correlations between my experiences working for government and the courses I took for my master's," Wicks said. "Although I knew a master's in public administration would in general complement my engineering education, I was pleasantly surprised at the degree to which it did. The courses were intellectually stimulating because I could easily correlate the subject matter to real-world situations or examples at DelDOT. The courses were therefore very relevant, enjoyable and provided me knowledge that I could apply to my career goals for years to come."



▲ Carolann D. Wicks

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National Oceanographic Partnership Program Supports Development of Predictive Models

What effect will a hurricane have on the beaches along the Atlantic coast? Are rip currents expected during the July 4 holiday weekend? Will winter nor'easters cause beach erosion or accretion? A comprehensive model being developed by a partnership led by Prof. James T. Kirby in the Center for Applied Research at the University of Delaware may provide information that helps to answer questions like these and others about physical processes in the nearshore ocean.

This recently completed project was supported by the National Oceanographic Partnership Program (NOPP), an umbrella program that draws funding from several federal agencies. Funds for the UD-led project were provided by the National Science Foundation and the Office of Naval Research. Total funding for the project was \$5 million over five years. The project participants have developed an open source modeling system, NearCoM (Nearshore Community Model), which utilizes many of the historical, publicly available software development efforts of the Center.

In addition to the University of Delaware, the partnership includes the Naval Postgraduate School, Oregon State University, the University of California–San Diego, Woods Hole Oceanographic Institution, the University of Florida, Georgia Institute of Technology, North Carolina State University, the Naval Research Laboratory, and Princeton University.

“Our goal is to develop a public-domain program that predicts waves, currents, sediment transport, and depth changes,” says Kirby. “We’ve set up a framework with a suite of tools that can be coupled in a variety of ways. The model basically consists of a backbone to handle data input and output as well as internal storage, together with a suite of modules, each of which handles a focused subset of the physical processes we’re studying. With multiple versions of the model, the user will be able to select one tailored to his or her specific problem.”

Although the project is primarily targeted at model development, it also supports extensions to the science

base associated with each module as well as the use of existing field and laboratory data sets to define significant tests of the modules.

Validation of the model is ongoing, and Kirby emphasizes that future work must address a significant gap in current predictive capabilities: “A lot of what we’re testing the model against right now is data available from existing field studies, which are generally very simple—for example, conditions on a uniform, open beach,” he says. “There’s very little in the available datasets that lets us address questions about behavior in more complicated environments, particularly in inlets such as Indian River Inlet on the Delaware coast.” The next few years should see a much more intense concentration of research on regions which differ from simple, sandy coastlines.



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