



# CIVIL REMARKS

CIVIL AND ENVIRONMENTAL ENGINEERING

A newsletter for alumni and friends of the Department of Civil & Environmental Engineering

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## New Research Center Designed To Make Freight Transport More Secure, Efficient



Left to right, Chair Ali Haghani, Congressman Steny Hoyer and Dean Nairman Farvardin

A new, federally-funded research center designed to make freight transport more secure and efficient has been established at the University of Maryland. The new Center for Intermodal Freight Transportation Mobility and Security will be part of the Maryland Transportation Initiative (MTI) in the College of Engineering, with a primary base in the Department of Civil and Environmental Engineering. Congressman Steny Hoyer secured the \$700,000 in funding for the new center in the federal Omnibus Appropriations Act recently passed by Congress.

“We are very excited,” says Ali Haghani, department chair. “This center will do wonderful things for the transportation activities in Maryland. And, it provides us with recognition for the leading research

that is taking place in transportation here in our department.” The center will be a collaborative effort between the university and the Rensselaer Polytechnic Institute, with the University of Maryland as the lead institution.

“Ever since the September 11 terrorists attacks,” said Hoyer, “the Congress has been working to identify weaknesses in our law enforcement, intelligence, and transportation and immigration infrastructure to secure them so that we can prevent another attack. This funding will allow the [new] center to do critical research in the technologies that can best secure our intermodal freight system while maintaining or improving operational and economic efficiency.” Hoyer represents Maryland’s Fifth Congressional District and is the Democratic Congressional Whip.

Intermodal (ship to truck to train, etc.) freight systems play a central role in the transport of the \$7 trillion worth of freight carried annually by the U.S. transportation system. Intermodal shipping is both economically vital and, because of its numerous transitions, especially vulnerable to disruptive activities.

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## CHAIR'S MESSAGE



I begin my message to our readers with the news that a new Center for Intermodal Freight Transportation Mobility and Security has been established at the University of Maryland. The center will be part of the Maryland Transportation Initiative and under the direction of our own Professor Hanan Mahmassani. This is exciting news for us. And, we look forward to sharing further developments of the center and its research in future issues of this newsletter.

As the news above shows we are eager to share the accomplishments and achievements of our department and faculty, students and alumni through *Civil Remarks*. And, our readers will learn much about us in this issue.

For example, we focus on the research of faculty members Gregory Baecher and Gerald Galloway. Experts in the area of water resource management, the two of them are currently involved with a FEMA project that is re-evaluating the 100-year flood's one-percent standard. It is important work, and we are honored that Drs. Baecher and Galloway will assist in providing a better understanding of the standard and how effectively it is working. We continue to develop here in our department a top-notch program in water resource management and involvement with such projects as this further confirms our commitment to it.

Throughout the history of our program we have seen many students come and go. And, we take great pride and delight in sharing the story of one our success stories. Norine Walker is the project coordination manager for the Woodrow Wilson Bridge Project, the largest construction project on the East Coast. She has experienced great success despite the challenges of being diagnosed with rheumatoid arthritis as a young woman. She is an excellent example of determination and striving for success despite the odds against her. Not only that, but she has remained involved with our program by serving and making herself available to our students. We are grateful to her for this.

In other news, recently, the curriculum here within our program underwent a change. Part of that change involved introducing a new course, ENCE 100. We saw this course as an opportunity to introduce budding civil engineers to all aspects of the profession. And, we have gone to the source to do so. Within the course, we have panels visit, from students preparing to graduate to professional engineers with years of experience, to talk to our students. This has proven to be very successful, as you will hear from the students profiled in our story. Apparently, our panelists enjoy the opportunity as well and the chance to return to a classroom setting and share what they have learned with our students.

Speaking of our students, we profile undergraduate Doug Tilley in this issue. As I am quoted as saying in the introduction of the story, Doug represents all that is best about our students. I think you will enjoy reading and learning about him. He is not only a talented student, but is actively involved with the Chi Epsilon Honor Society and recently coordinated its career fair. As a good student should, he found it to be a real learning experience. And, I hear also a successful one. Well done, Doug.

**“This center provides us with recognition for the leading research that is taking place in transportation here in our department. ”**

**– Ali Haghani, Department chair**

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“The main vision and mission of the new center is to demonstrate how the goal of a secure intermodal freight system can best be met by the same technologies that allow greater operation and economic efficiency,” says MTI director and professor Hani Mahmassani, who holds the Charles Irish Sr. Chair in Transportation Engineering and will be heading up the new center. “The key to meeting these dual objectives is to develop models, processes and systems that utilize the technological resources in novel and creative ways.”

MTI brings together campuswide resources and activities to conduct leading-edge, cross-disciplinary studies of intelligent transportation systems and the transportation sector. Existing MTI research includes a variety of related efforts in freight tracking and logistics, evacuation planning models, such as for the state of Minnesota and the Washington, D.C. area, and real-time traffic system management during disasters, such as for the Houston Transtar and the Maryland CHART systems.



Hani Mahmassani

The center will focus on mobility and security issues associated with the transport of goods throughout the vital Washington, D.C. to New York to Boston corridor, research intended as a blueprint for the nation. “The Washington-New York-Boston corridor is an excellent test bed for innovative research in information technology and transportation model system development and

application,” says Mahmassani. “With a population nearing 75 million and accounting for about 27 percent of the U.S. population, but only occupying 6.2 percent of its landmass, the corridor represents a significant share of the American economy and generates, attracts and transships a large amount of freight through its infrastructure, distribution centers and terminals.”

The new center’s work will include developing technology to integrate sensing and tracking models of freight distribution as a basis for real-time decisions that result in better transportation management. Advanced methods of urban traffic control will be studied in conjunction with the needs of commercial vehicle traffic. “The work of the center spans a number of different areas and contributes to a number of different fields, such as transportation planning, information technology, transportation economics and large-scale operations,” says Mahmassani.

In many respects the new center is the result of meeting a need and being at the right place at the right time. Says Dean Nariman Farvardin, “The Clark School’s well-established transportation research capabilities, as well as its major role in multiple Homeland Security initiatives, makes it the perfect setting for a new center that focuses on improving the security and efficiency of high-risk intermodal freight.”

“I am proud,” says Congressman Hoyer, “that the University of Maryland will be playing a crucial part in the government’s efforts to make freight traffic and movement secure.”

## **New Master Of Engineering And Public Policy Program Offered**

The A. James Clark School of Engineering announces the ultimate inside-the-Beltway degree program for engineers: the new Master of Engineering and Public Policy program. This practice-oriented degree educates engineers in public policy relating to specializations crossing all disciplines of engineering, including engineering and energy policy, engineering and environmental policy, engineering and national security policy, engineering and infrastructure policy, engineering and development policy, engineering and biotechnology policy, and engineering and manufacturing policy. Visit <http://www.puaf.umd.edu/students/MEPP2.htm> for program information.



**M**ichael Bronson was awarded the Engineering Alumni Award last spring, recognizing his vision and his efforts in setting up the University of Maryland College Park Engineers Without Borders student chapter in spring 2004. Only a year later, the chapter

has expanded both its active membership – which now includes student members from all departments in the College of Engineering - and its ambitions. The chapter completed its first project, constructing a health clinic for the Lisu Hill Tribes of northern Thailand near the Burmese border in June 2004, and the UMCP student team was recognized with an award for their collaborative work. The chapter's next project will be a small wastewater treatment facility on the Pine Ridge Native American Reservation, to be constructed in June 2005. Three other projects are in various stages of development: one in Ecuador; another in northern Thailand; and one in Egypt. The chapter expects to be undertaking reconstruction projects associated with the devastating December 2004 Indian Ocean tsunami, once appropriate reconstruction projects become defined. One student is generating a new project idea for Brazil.



**R**ob Murray was awarded The University of Maryland Alumni Association Engineering Chapter Student Honor Award (at-large award). The award honors the students who have shown keen interest, development and accomplishment in leadership,

academics, teamwork, and active participation in student engineering organizations.



**G**ulsah Akar, Dr. Haghani's Ph.D. student in the transportation graduate program, is the recipient of a scholarship from the Washington, D.C., chapter of Women in Transportation.



**A**ndrew Parker, who is completing a joint major in civil engineering and physics, has been designated as one of only two permitted nominees by the university for the prestigious Churchill Scholarship. These scholarships offer American students of exceptional ability the

opportunity to pursue graduate studies in engineering, mathematics and the sciences at the University of Cambridge, England. Andrew has applied to study in the master of philosophy program in engineering for sustainable development at Cambridge. After that, he plans to keep up his double major even through graduate studies, by pursuing a Ph.D. in physics. Andrew was a founding member of the Engineers Without Borders-UMCP chapter, and is leading a project team to undertake work in Egypt.



**S**heila Xiah Kragie has won the University's sole permitted nomination for graduate study supported by the Truman Fellowship in Public Service. Truman Scholars are selected on the basis of leadership potential, commitment to a career in public service, high academic

achievement, and prospects for continuing academic success. Xiah's career plan is to work on the technical side of humanitarian relief, providing clean water and sanitation where there is little functioning infrastructure. She is laying the foundation for her career in international engineering by studying this academic year at the Universidad Politécnica de Valencia, Spain. Xiah was a founding member of the Engineers Without Borders-UMCP chapter and part of the UMCP team that built a health clinic in northern Thailand in June 2004 to serve several Lisu hill tribe villages.

# ENCE 100 Introduces Students To Curriculum And Career Opportunities

## Visiting engineers provide students with real-world view of profession



Jen Markey

Although she is just beginning her college education, freshman Jen Markey, already has a better understanding of what her future might hold as a civil engineer. Thanks to ENCE 100. “After taking this course, I have a better idea of what I can accomplish with my civil engineering degree and the necessary steps I need to take in order to enjoy a successful career,” says Markey.

As part of the new curriculum introduced in the fall of 2003, ENCE 100 provides an introduction and overview of civil and environmental engineering and its role in today’s society. “We’re offering students early on a broad exposure to civil and environmental engineering,” says Ali Haghani, department chair.

The new curriculum consists of three tracks – infrastructure engineering, environmental and water resources engineering, and transportation systems and project management. During the first two years of the program, all the tracks are the same. However, by the time students reach their junior year they are required to choose a track.

In preparation for this, ENCE 100 “covers all of the technical areas and what each is all about,” says Haghani. This includes hearing from the sources themselves. A significant part of ENCE 100 is the panel presentations made by senior- and junior- level engineers, as well as students who are now in their senior year and preparing to graduate. “Each panel brings with them something unique,” says Haghani, who has taught the class. “This includes advice on job hunting from those recently hired to a better understanding of how the professional world works from those engineers with 20-plus years of experience.”

“I thought the panel discussions were extremely helpful,” says Markey. “We were able to hear what it is like to be a civil engineer from those who are living the experience.”

For Gore Bolton, that was the exact reason he was there. Bolton, who received his bachelor’s degree in civil engineering in 1993, is now CEO and president of Bolton and Associates, a civil engineering firm. “It’s important to me to pass along to others what I have learned,” he says. “I feel that it’s an obligation really. We’re helping the next generation of civil engineers have a better idea of how this industry works. We’re telling them, literally, this is how it works.”

Students are listening. “I really paid careful attention to what these panel members said because they had been through everything that I am going to go through,” says Markey.

**“After taking this course, I have a better idea of what I can accomplish with my civil engineering degree and the necessary steps I need to take in order to enjoy a successful career.”**

–Jen Markey, student

Markey was also impressed by the variety of members who participated on the panels. “They covered so many career options,” she says. “They had people from public and private industries. They had people working with environmental issues; people working in forensics; people working as project managers; etc. I thought this was really significant because I was not aware of so many career options.”

Fellow classmate, Liz Gilchrest agrees. “The panels were helpful because each person offered a different perspective depending on their interests and backgrounds,” she says. “This provided us with a broad overview of the numerous occupations and concentrations involved in civil and environmental engineering.”

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## Chi Epsilon Career Fair

**"We're offering students early on a broad exposure to civil and environmental engineering,"**

- Ali Haghani, department chair

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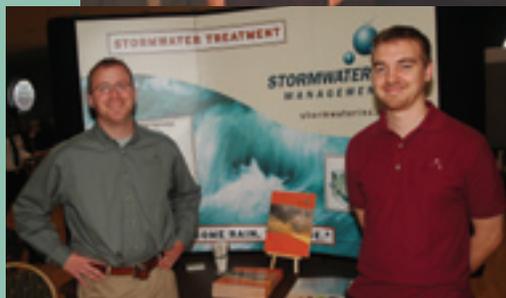
Liz Gilchrest

Gilchrest was especially interested in what the panel of seniors had to say. "They spoke of their very different experiences thus far as students here," she says. "Each student was involved in an extracurricular activity such as ASCE. Also, some students chose to do undergraduate research while others chose to do internships at local engineering firms during their time here."

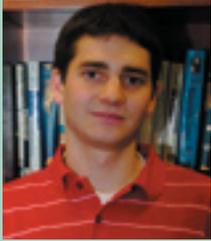
Markey plans to pursue the transportation systems and engineering management track. "Currently, I am thinking that I want to work for the State Highway Administration, planning new roads and improvement to old roads," says Markey. Adding, "I have always been fascinated by roads and how they are designed to be as efficient and organized as possible. In fact, when I was little I loved making roads in the sandbox that were just so and driving trucks on them. I still find myself looking at roads and admiring their organization and asking myself, what were they thinking when they designed this?"

Gilchrest who has a double major in both civil engineering and physics is interested in the environmental and water resources engineering track. She hopes to "work for either the government or private industry in the planning and protection of the environment with respect to water, such as runoff, flooding and drought," she says.

Since taking ENCE 100 both women feel better prepared as they continue their education and look to the future. "I am not sure where else besides this class, I could have received such valuable advice and information," says Markey.



# Meet Undergraduate Student Doug Tilley



**D**oug Tilley is a senior civil engineering major. A talented student, Tilley is the recipient of several scholarships, including the A. James Clark Engineering Scholarship; University of Maryland Presidential Scholarship; National Merit Scholarship; and the Leonard DiGiulian and Federline Civil Engineering Scholarships.

He has consistently made the dean's list and is a member of the University Honors Program and the Gemstone Team Research Program. This past summer Tilley was an intern with Structural Preservation Systems, working closely with project engineers and managers on a job site. He is currently president of the university's chapter of the Chi Epsilon Civil Engineering Honor Society and has been actively involved with the organization.

"Doug Tilley is an outstanding student with a bright future" says Ali Haghani, department chair. "We take great pride in his accomplishments and feel that he represents what is best about the students we educate." Recently, Tilley spoke with *Civil Remarks* about his experience as an undergraduate student in the program; what he has learned in and out of the classroom; and what the future may hold for him upon graduation.

**Toothpick bridges and physics classes – discovering civil engineering.** "In high school, I was always good at math and the sciences. I really liked physics, and in 12th grade my physics teacher took a couple of students, including myself, to an engineering conference. Engineering seemed like a natural fit for me. I came into college as an undecided engineer. However, I had a special interest in bridges which stemmed from a project in fifth grade, where we had to build a toothpick bridge. After about half a semester of college, I realized I wanted to do bridge design, and thus I declared myself to be civil engineering."

"I've always thought structures and how they work was a fascinating topic. As it turns out, I find doing the structural analysis pretty challenging. It's rewarding to really see how these structures that I admired when I was younger actually work. I really am intrigued about how these massive systems come together. It's simply fascinating."

**"I have always thought structures and how they work was a fascinating topic."**

– Doug Tilley

**Assessing his educational experience so far...** "The program has been great. They recently changed the curriculum, so I've been the benefactor of updated classes, which has been nice. I've had a lot of good experiences, like taking a materials lab and learning about a wide variety of civil engineering aspects. I'm really starting to get into a lot of my classes. They are getting more specialized now. Additionally, one of the great benefits of the program here at Maryland is the faculty. I've been lucky enough to get on good terms with several faculty members, and it's very encouraging. The atmosphere is pleasant and friendly, and is conducive to learning the trade."

**The Chi Epsilon connection.** "Chi Epsilon is a really great organization. It's allowed me to meet several high-achieving civil engineers who share the same passion I do for civil engineering. As president, it's given me much-added responsibility. We host an annual career fair, which requires a lot of work. We also have to organize the initiation process. As the president, I have to oversee a lot of this. Thus, I have been required to take on a great deal of responsibility. I have had to be organized and decisive, traits which I needed to develop. I believe that being involved and being a leader is essential for any engineering student today."

**The recent Chi Epsilon Career Fair and its success.** "The career fair went really well! I was extremely nervous about it. There were a few last-minute issues and concerns. However, everything went very smoothly. We had 28 companies attend. This total was significantly up from the career fair held a year ago. Additionally, I received good feedback from the majority of the attendees. We're hoping to make it twice a year. I believe the students who attended benefited greatly. We had a wide variety of companies who specialized in nearly all of the civil engineering disciplines. I believe that any person who came in would find at least two or three, if not more, companies that specialized in what they were interested in."

**Life after graduation.** "My future plans...well, that changes week to week. Originally, I was anticipating going to work immediately and then going back to get a master's degree. Now, it's looking like I'm going to try and go directly to grad school. One of my plans is to get an MBA and open my own bridge construction firm. A second plan I have is to get a master's in transportation engineering and do consulting/system design work. I'm still considering my options."



**P**rofessor **Amde M. Amde** recently presented a keynote paper at the International Conference on Advances in Concrete and Construction (ICACC 2004) in Hyderabad, India. He also participated as part of the U.S. contingent in a National Science Foundation-sponsored

Indo-U.S. Workshop on High Performance Cement-based Concrete Composites in Chennai, India, which was held in January. And, he presented another keynote paper and served on the International Advisory Board of the ICACS 2005 International Conference in Chennai, India, in January 2005. More recently, Amde co-organized and participated in a mini-symposium on "Failure Analysis" as part of the Eleventh International Conference on Fracture, held in Turin, Italy, in March 2005.

He was also quoted in a recent issue of the Federal Highway Administration's newsletter, *Transporter*.



**T**he U.S. Geological Survey (USGS) recently presented the 2004 John Wesley Powell Award to Professor **Gerald Galloway** for industry achievement. The John Wesley Powell Award recognizes an individual or group, not employed by the USGS, whose contributions to the

agency's objectives and mission are noteworthy. John Wesley Powell, the second director of the USGS, was a distinguished scientist responsible for setting the high standards that govern the USGS today. The four categories of the award include: state and local government; educational institution; private citizens/groups/organizations; and industry.

The citation reads: Throughout his career, Dr. Galloway has recognized and supported the role of USGS hydrologic and geographic science and information in managing natural resources and mitigating losses from natural disasters. While on the Mississippi River Commission, Dr. Galloway led the Interagency Floodplain Management Review Committee in assessing the causes of the Mississippi River floods, and proposed a long-term approach to floodplain management. He supported the Interagency Scientific Assessment and

Strategy Team, which applied advance geographic information system analysis to resource management issues on the upper Mississippi and Missouri River Basins. His work, particularly in the areas of floods and the management of floodplains, provided important guidance to water resource managers at all levels of government.



**P**rofessors **Gregory Baecher** and **Gerald Galloway** were selected to make presentations on water resources to the National Academies Corporate Leaders Workshop. This invitation-only event explores how the National Academies may better interact and serve the needs of private-sector leaders.



**A**ssociate Professor **Alba Torents** has been asked to be an Invited Professor at the Universidad del Sur in Argentina.



**P**hilip **Tarnoff**, director of the University of Maryland's Center for Advanced Transportation Technology, recently revealed the decaying underbelly of this country's traffic signal system. His study, titled "*Traffic Signal Timing State of the Practice*," shows what a lack of funding

and proper training can do to a busy urban setting. Tarnoff recently took time out with Transportation Management + Engineering (TM+E) to talk about his findings.



**A**l **Santos** was presented the A. James Clark School of Engineering, University of Maryland's Staff Service Award. This award is given to a staff member whose service to their department, to the school, and the university has been judged outstanding.



**A**. James Clark, who received his degree in civil engineering in 1950 from the engineering school that now bears his name, has been elected to the National Academy of Engineering (NAE) – among the highest professional distinctions accorded an engineer. Clark was

recognized “for the development of project controls and construction equipment, the creation of a major construction firm, and support for engineering education.” Earlier this month, Clark established a \$30 million scholarship endowment for the Clark School, the single largest gift in the school’s history. Membership to the NAE honors those who have made outstanding contributions to the field in research practice, education and literature, as well as those who pioneer new technology.

**F**aisal Awadallah has recently been appointed dean of the Engineering School of Birzeit University, where he has taught since 1987. He earned three degrees in the Department of Civil and Environmental Engineering - a bachelor’s degree in 1978; a master’s degree in 1982; and his Ph.D. in 1987, specializing in transportation. Dr. Everett Carter was his Ph.D. dissertation advisor.

**E**ungcheol Kim, who received a Ph.D. in transportation in 2001, has recently been appointed assistant professor in the Civil Engineering Department of Incheon University, South Korea.

**S**ze-Wei Chang, who received a Ph.D. in transportation in 2001, has recently been promoted to brigadier general in the Taiwan Air Force. He is also an associate professor at the Taiwan Air Force Academy.

**M**iguel Figliozi’s dissertation, titled “Performance and Analysis of Spot Truck-Load Procurement Markets Using Sequential Auctions,” earned an honorable mention in the Dissertation Prize Competition of INFORMS’ Transportation Science and Logistics Section. This is the oldest and most prestigious international dissertation competition in transportation science. Miguel’s dissertation was supervised by Hani Mahmassani and was defended in April 2004. Miguel, who is originally from Argentina, was offered and accepted a faculty position at the University of Sydney, in Australia, which has the most highly regarded transportation program in the Asia-Pacific region.

# Threatened With Disability Alumnus Now Thrives In Engineering Career



Norine Walker's early days as an engineering student were challenging. It was the 1970s and Walker was one of only a handful of young women taking engineering courses at the University of Maryland.

"I was very shy," she says now. "Often, I was the only female in class, and I was afraid that I wouldn't meet the expectations I thought people had of me."

If that weren't enough to deal with, around this time Walker began to have health problems. "I would wake up in the morning and not be able to uncurl my fingers or use my toothbrush or brush my hair," she says. "I was almost in constant pain."

No one could tell her what was wrong despite visits to numerous doctors. So, Walker soldiered on. "I would get up in the morning and take several hours to get started and get to my classes," she says.

When she finally did receive a diagnosis, Walker was shocked. She had rheumatoid arthritis.

"Not me," she remembers thinking. "This was an old person's disease. Here I was this young woman in college, just starting her life."

Walker was told by one physician that she would be totally disabled in five years. Walker had different plans. "I have this survivor's instinct," she says.

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Nearly two decades later, Walker has not only survived, but thrived. Today, she is project coordination manager for the Woodrow Wilson Bridge Project, the largest construction project on the East Coast. Not that it has always been easy, she admits. But, "I was determined," says Walker.

**"I feel at this point in my career, I can give back. I want to help students see this career as one that is enjoyable and enables you to make a difference in so many ways and affect so many people."**

– Alum Norine Walker

After receiving her bachelor's degree in civil engineering in 1983, Walker joined the engineering firm of Rummel, Klepper & Kahl in Baltimore. "With that first job interview, I knew that I could not have my illness as something that I was going to hide," she recalls. She didn't. And, it hardly mattered professionally. "In those first years I struggled from a health standpoint," she says. "But I didn't want that to be a crutch. I didn't want people to feel sorry for me. I wanted to achieve things on my technical abilities and by being the best I could be."

During the next 11 years, advancing to project manager, Walker oversaw high-profile projects such as all of the traffic analysis related to Oriole Park at

Camden Yards in Baltimore. In 1994, Walker joined Greiner, Inc., later purchased by URS Corp., as the manager for the Baltimore office's Environmental and Transportation Planning Department. URS is one of the joint-venture partners managing the design and construction for the \$2.43 billion Woodrow Wilson Bridge Project. Walker, having directed the engineering during the planning phase of the project, was named the project coordination manager "to ensure that the commitments made to the environment, community and elected officials in planning would be carried out in design and construction," she says.

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## "I am passionate about my life and how I have chosen to live it."

– Alum Norine Walker

Now a URS vice president, her efforts in managing other aspects of the project have helped keep the Woodrow Wilson Bridge Project on budget and on time. And she has found much satisfaction in doing so. "When I travel, if you're seated next to me you know what I do," she says, grinning.



Ironically, the former self-described "shy student" can now claim among her strongest assets her ability to communicate with others. Walker coordinates with clients, construction managers, design engineers, contractors, the community, elected officials and other stakeholders, providing information and educating students and community groups about the reconstruction of the mile-long bridge and four interchanges through Maryland, Virginia and Washington, D.C.

"While you may not agree with the changes proposed or underway, you will understand what needs to take place and perhaps have a better opinion," she says of the politically and environmentally sensitive project.

She has found her involvement in education outreach especially rewarding. This includes working with students and incorporating the Woodrow Wilson Bridge Project into their school curriculum. Over 600 students from Prince George's County in Maryland and Fairfax County in Virginia have become more familiar with the project in 2004 alone, including the process of transportation planning, design and construction as well as careers available to students in these fields. "Kids ask the greatest questions," says Walker. "It's the fun part of the job."

No doubt, working with young people reminds her of herself at times. Growing up in Laurel, Md., she was an inquisitive child who was "always asking how things worked." Professionally, Walker wanted to do something, "where I could see the fruits of my labors," she says. She decided on a career as an engineer while participating in the university's newly created Women in Engineering Program the summer of her junior year of high school. "I made my decision that summer," she says of choosing to study civil engineering at the University of Maryland.

She remains connected to her alma mater, hoping to provide encouragement and inspiration to the next generation of engineers. In fact, she is the chair of the Department of Civil and Environmental Engineering's Board of Visitors and secretary of the Engineering Alumni Board. By hosting several engineering classes on boat and land tours of the Woodrow Wilson Bridge Project, Walker states, "I want to be a part of the university experience. I feel at this point in my career, I can give back. I want to help students see this career as one that is enjoyable and enables you to make a difference in so many ways and affect so many people."

Besides her involvement with the university and her busy professional life, Walker is deeply committed to the cause of arthritis. She has been an active volunteer for nearly 20 years with the Arthritis Foundation, including more recently serving as vice chair of the national organization. Quite fittingly, she has been frequently honored for both her professional and volunteer work. She was recognized as one of Maryland's Top 100 women in 2000 by *The Daily Record* and the Metropolitan Washington, D.C. Area's 50 Women Who Mean Business in 2004 by the *Washington Business Journal*. And, she has also received the national service citation from the Arthritis Foundation.

These days, as she looks to the completion of the Wilson Bridge Project and what her plans are next, Walker counts herself as fortunate. Her disease she says for now is "under control." "I have pain every day. Some days are better than others," she says. Yet, she has few regrets, adding, "I am passionate about my life and how I have chosen to live it."

# Researchers Working with FEMA to Re-Evaluate 100-Year Flood Standard



**M**ore than three decades after establishing the 100-year flood standard, the Federal Emergency Management Agency or FEMA is now taking a second look at the standard and determining whether it is working as intended or if changes need to be made. And, the agency is doing so with the help of researchers from the Department of Civil and Environmental Engineering – professors, Gerald Galloway and Gregory Baecher.

The 100-year flood standard establishes flood plains as those areas having one chance in a hundred each year of being flooded. The standard is used by most federal and state agencies and the National Flood Insurance Program (NFIP) for floodplain management and to determine the need for flood insurance.

“This standard has been used since the mid-1970s and obviously questions have arisen since then, such as is this right standard to have? Is it meeting expectations and what are the unintended consequences of this program?” says Galloway, who is the project’s team leader. “FEMA felt that it was important at this time to conduct a detailed review of the program and selected American Institutes of Research (AIR) to conduct a broad review. In turn, AIR selected the Maryland team to focus on the one-percent standard.”

12 “We’re examining the scientific, social and political aspects of flood plain regulatory standards in general and the one-percent standard in particular,” says Baecher. “We want to see how such standards influence behavior and as a result the costs of flooding to the nation, and in particular, the benefits or costs, if any, might accrue from changes in the standard.”

Besides Galloway and Baecher, who have both worked on water resource management issues for many years, the team consists of Doug Plasencia, who is a technical director for water resources with AMEC Earth and Environmental in Phoenix, Arizona, and Kevin Coulton, who is the Oregon water resources program manager for HDR Engineering, Inc. Each brings over 20 years of experience in floodplain management.

The research team will not only be gathering and analyzing existing data related to the floodplain standard, but will be gathering additional data as needed from local, state, national and international organizations. The team will also be working with models such as HAZUS, the loss-risk estimator developed by FEMA. “There is an enormous amount of data that we’re discovering exists,” says Galloway. Adds Baecher, “We’re mining data from the national flood claims database and a variety of other sources, such as the Army Corps of Engineers.”

The research team will be addressing such questions as what are the implications of making the one-percent flood standard a threshold for mandatory purchase of insurance, how does the standard influence flood management ordinances, and is the standard adequate for reducing risks of flood losses? In other words, says Galloway, “From the perspective of the individual, do claims data suggest that we are building to a one-percent standard? From the perspective of the Flood Insurance Fund, is the risk spread sufficiently to allow premiums to be reasonable?”

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# Galloway and Baecher Bring Expertise and Experience to FEMA Project

Faculty members **Gerald Galloway** and **Gregory Baecher** are highly regarded experts in the area of water resource management development and will be bringing with them to the FEMA flood plain one-percent standard re-evaluation project a high-level of expertise. In fact, the University of Maryland at College Park is the only academic institution that has been chosen to participate in this broad re-evaluation project.

“Water resource management research here at the university is rapidly growing in importance,” says Baecher. And, no doubt, will continue to do so with researchers such as Baecher and Galloway leading the way.

Gerald Galloway, who is the project’s team leader, recently joined the Department of Civil and Environmental Engineering as the Glenn L. Martin Institute Professor of Engineering. He is a member of the Academy of Engineering and vice president of Geospatial Strategies ES3 Sector of the Titan Corporation. Galloway has served as executive director of the International Joint Commission, an independent bi-national organization established by the Boundary Waters Treaty of 1909 and with the mission to help prevent and resolve disputes relating to the use and quality of boundary waters between Canada and the United States.

Previously, Galloway was the dean of faculty and academic programs at the Industrial College of the Armed Forces, National Defense University, in Washington, D.C. He has served as a consultant to the Executive Office of the President, and has assisted the U.S. Water Resources Council, World Bank, the Organization of American States, Tennessee Valley Authority, U.S. Army Corps of Engineers, and other agencies in water resources- related activities. He also led a 1994 White House study of the causes and consequences of the 1993 Mississippi River flood.

Galloway graduated from the U.S. Military Academy with a bachelor’s degree and spent 38 years in the U.S. Army Corps of Engineers, rising to the rank of brigadier general, and serving as the ninth dean of the Academic Board of the U.S. Military Academy at West Point. He retired from active duty in 1995. Galloway holds a master's degree in civil engineering from Princeton, a master's in public administration from Pennsylvania State University, a master's in Military Art and Science from the U.S. Army Command and General Staff College, and a Ph.D. in geography (water resources) from the University of North Carolina.

Gregory Baecher is a professor and former chairman of the Department of Civil and Environmental Engineering, and is an active consultant to government and industry on risk and reliability of civil infrastructure, especially in water resources development. He is a member of the Water Science and Technology Board, and former member of the Board on Infrastructure and the Constructed Environment of the National Research Council (NRC). He chaired the NRC committee to review the current Corps of Engineering risk-based flood hazard damage methodology, and the Section 216 panel to review the Corps’ analytical methods of project evaluation. He has also served on the Committee on Water Security Planning for the Environmental Protection Agency, and the Building and Infrastructure Panel for Making the Nation Safer: The Role of Science and Technology in Countering Terrorism.

Baecher is co-author with John T. Christian of *Reliability and Statistics in Geotechnical Engineering* (John Wiley & Sons); with Desmond Hartford of *Risk and Uncertainty in Dam Safety* (Thos. Telford); and is co-editor with Konstantin Frolov of *Protection of Civil Infrastructure from Acts of Terrorism* (Kluwer). Baecher holds a bachelor’s degree from the University of California Berkeley, and a master’s and a Ph.D degree in civil engineering from MIT.

**"This standard has been used since the mid-1970s and obviously questions have arisen since then, such as is this right standard to have? Is it meeting expectations and what are the unintended consequences of this program?"**

– Professor Gerald Galloway

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Says Beacher, "In reality, higher than normal claims focused in a narrow area should result in an across-the-board premium increase. The establishment of the one percent threshold created a dividing line between losses suffered in areas below and above the threshold and this can be seen in claims from policies written on pre-and post-Flood Insurance Rate Mapping (FIRM) properties. We are analyzing claims data obtained from the Flood Insurance and Mitigation Administration to provide indications of the impact that the NFIP, with a standard set at one percent, has had on losses over the period since enactment."

The team will also examine the potential deterioration of the level of protection under the one- percent standard and what actions can be reasonably taken to prevent it. "At this junction," says Beacher, "we believe that there are two primary influences supporting this degradation. The first includes floodplain management facets that do not consider future watershed development or that do not consider the creation and transfer of adverse flooding impacts. The second is climate change associated with global warming."

Another significant element of the study will be the problem associated with FEMA's approval of the 'worthiness' of levees and the removal of structures behind such levees from the mandatory insurance requirement. "We will answer the question, does one- percent levee protection provide the same protection as elevation to the one-percent flood level, and if not, what should FEMA be doing about it?" says Galloway.

Other issues the study is looking at include: the need for a higher standard for critical facilities; the relationship between the standard and support of natural and beneficial sites of the flood plain; and assessing adequacy of the standard in reducing risks; among others.

If it is determined that the standard needs to be changed, the team is looking to assess how that change would affect flood loss avoided, property values, NFIP loss, map modernization efforts, map revision and amendment costs, insurance sales, insurance rates, and federal flood disaster expenses in areas that face flood hazards below the one- percent annual probability threshold.

However, if it is found that the one-percent standard is the most suitable, the team will address whether there are ways that its use or the restrictions of its use can be improved. "Initially," says Galloway, "we will be looking at improving public understanding of the minimum standard; improving hazard definitions within the one-percent annual change flood plain; improving the definition of the floodway; and improving the utilization of existing NFIP provisions and new FEMA initiatives".

"Throughout the study," says Galloway, "we will be seeking to identify additional approaches and will consult with flood plain professionals to gather their ideas."

The results of the overall project could be significant and the implications long-reaching, say Galloway and Baecher. But, as proven by the recent winter flooding in such states as Ohio and California and the tsunami in Asia, extremely important. "Unfortunately, this is a very timely project," says Baecher.

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