The Charles E. Via, Jr. Department of Civil and Environmental Engineering

2013 Via Report • No. 27

Save Our Shores
Coastal Hazards &
Engineering working to
protect our coasts

VirginiaTech
College of Engineering

ON THE COVER:

One of the engineers who traveled to the affected areas of the New Jersey shoreline after Hurricane Sandy hit in the fall of 2012 was Jennifer Irish, associate professor of civil and environmental engineering at Virginia Tech. She made first hand observations to quantify damages. With her previous background as a researcher for seven years at the U.S. Army Corps of Engineers Coastal and Hydraulics Laboratory, and her career path now focusing on society's need to improve and protect coastal infrastructure, Irish has attracted some $3.2 million from mostly government agencies to research coastal hazards. **See story on page 12.**

TABLE OF CONTENTS

Each year the Virginia Tech Steel Bridge Team takes on the challenge of building a scale-sized bridge entirely from structural steel. Team members belong to the Virginia Tech Chapters of the American Society of Civil Engineers and the American Institute of Steel Construction, who sponsor regional and national bridge competitions. Virginia Tech recently hosted the Virginia Regionals, consisting of colleges in Virginia, West Virginia, and Washington, DC. The event includes the annual steel bridge and concrete canoe competitions.

DEPARTMENT HEAD'S MESSAGE

"The times they are a-changin." The words of Bob Dylan's 1964 song speak to the changes and challenges of the times. I believe they can also be viewed through the lens of growth and opportunity as life changes. These words certainly resonate within the Virginia Tech community in general and the Via Department of Civil and Environmental Engineering specifically.

As most Hokies are aware, a search for the next president of Virginia Tech began during the summer following President Steger's announcement of his plans to retire once a successor is identified. The transition in presidential leadership at a university such as ours brings both challenges and opportunities. The fundamental challenge is of course to replace a president that has led the university to levels of success, as well as national and international visibility, the likes of which we've never experienced. With this trepidation, comes the excitement of the opportunity we have to identify an individual that can lead us to even greater accomplishments and visibility. The next president will face major challenges on both the national and state higher education landscape. Identifying a new leader that has both the knowledge of and appreciation for who we are as a university today and the ability to build upon our strengths and capabilities going forward, all within ever changing economical and political landscapes, represents a truly exciting challenge. Stay tuned!

EASTERLING

Within the CEE Department, we too find ourselves in the midst of challenges and opportunities. We have five open faculty positions for which we are conducting searches. These are vacancies within our faculty created by a combination of an untimely passing, two retirements, and two of our faculty moving to other universities as department heads. Certainly anytime you lose the collective expertise and vast experience represented by five faculty members, you are presented with significant challenges. I am inherently an optimist so I prefer, as I mention above, to view these challenges as future opportunities for the department. Bringing talented, enthusiastic new faculty members to our ranks will without a doubt open up new opportunities for instruction, research, collaboration, and outreach.

The cycle of change and opportunity is also reflected in the pages that follow. You'll find a section on New Faculty that once again reminds me how extremely fortunate and proud we are to have been able to attract faculty of such high caliber to our department. There are brief bios included for Dr. Jason He, Dr. Nina Stark and Dr. Denise Simmons. I hope you have an opportunity to interact with each of them in the near future.

I want to call your attention to significant examples of increasing excellence and professional growth within the department. During the most recent promotion and tenure cycle, I'm very happy to report that Drs. Russell Green, Linsey Marr, Amy Pruden and Peter Vikesland were promoted to the rank of professor. Drs. Cris Moen and Pam Murray-Tuite were promoted to the rank of associate professor with tenure. Dr. Joe Dove was promoted to the rank of associate professor of practice. While we are fortunate to attract new faculty to our department, we are equally fortunate to be able to revel in the growth and success of our current colleagues. Please join me when you have a chance and congratulate our colleagues for their deserved and hard-earned promotions!

You'll once again find excellent articles on several of the outstanding research efforts that are in progress within the department. To further expound on the theme of opportunity, I would note for you that Drs. Zach Grasley and Jen Irish were hired in the past two and three years respectively and have brought wonderful new, timely and important teaching and research focus areas to the department. The work of all of the faculty members highlighted is not only supporting students in the department but serving the Commonwealth and society in general. And as I've said before, rest assured that these are but a few of the many great things in progress!

The absolute highlight of the document is the section on our Via Scholars. We as faculty have the privilege of getting to know and work with these outstanding students on a day to day basis. I hope that the student biographical sketches contained in the report help you as alumni and friends to get to know them. Hopefully, you'll have the opportunity to interact with the Via Scholars as well as the many other outstanding students in the department through your on-campus visits, professional activities or as future employers. Each year with the influx of new students, we as a faculty are reminded just how fortunate we are to be part of the Via Department of Civil and Environmental Engineering!

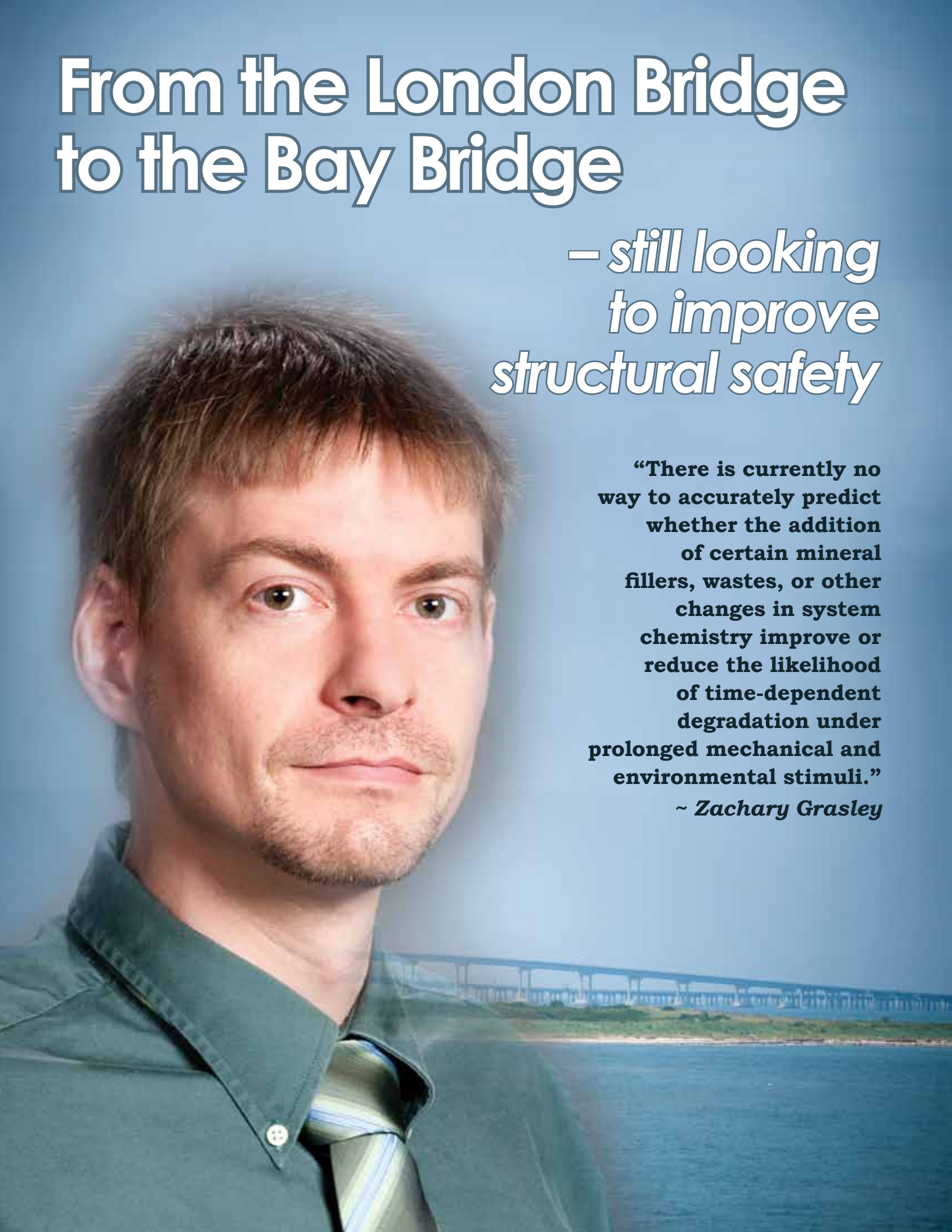
One thing that doesn't change with time is my appreciation for the great work done by members of the department and College of Engineering to bring you this document. There are a number of our staff and faculty that are responsible for pulling together various parts of the Via Report. I want to thank them for the work they do in helping bring this document to reality each year. In particular, I want to acknowledge the efforts of Ms. Shelly Key and Ms. Allie Rubio for their leadership in the process within CEE. I want to close my remarks by thanking Ms. Lynn Nystrom for the exceptional job she does each year as editor and Mr. David Simpkins for his wonderful design work. I know you'll enjoy the results of their exceptional talent and dedication to bringing you the *2013 Via Report*!

With kind regards,

Sam Easterling

From the London Bridge to the Bay Bridge

– still looking to improve structural safety



"There is currently no way to accurately predict whether the addition of certain mineral fillers, wastes, or other changes in system chemistry improve or reduce the likelihood of time-dependent degradation under prolonged mechanical and environmental stimuli."

~ Zachary Grasley

One of the longest spans in the world is the San Francisco–Oakland Bay Bridge, which was severely damaged in the 1989 Loma Prieta earthquake. Final reconstruction of the eastern span did not begin until 2002 and reopened in September 2013. However, during construction of the costly, over budget $6.4 billion bridge, rainfall and water used to cure the concrete entered into the ducts that contained steel tendons in the skyway section of the new span.

Although the effects remain unknown at this time, pitting and stress often accelerate the corrosion of steel in concrete.

In May of 2013 as reports surfaced questioning the integrity of the concrete span, calls were made for a number of independent experts to review the structure's stability, possibly using X-ray examinations to provide clues of any serious corrosion.

The Bay Bridge is a striking and expensive example of what might go wrong when the various effects on a material and its mechanical properties are not understood.

Zachary Grasley, associate professor of civil and environmental engineering at Virginia Tech, is a researcher who is attempting to gain a better understanding of these properties, specifically for mechanical loading effects related to materials made containing cement. The National Science Foundation (NSF) is funding his work.

Grasley selected cement because this commodity is pervasive as a material used in infrastructure. The good news about using cement is the manufacturing "requires much less energy (than other materials) and produces substantially less carbon dioxide emissions," on a mass basis, Grasley said. "However, due to the tremendous amounts of concrete being utilized, its manufacturing instead results in the second most carbon dioxide production in the U.S."

If advances in the properties or performance prediction of materials made of cement can be made, then the overall result, according to Grasley, will have an "enormous societal benefit through reduced energy use and carbon dioxide emissions."

To make these materials more environmentally friendly, Grasley said, "the stress and strain state of the material must be predictable throughout its service life." This determination requires a better understanding of the viscoelastic and viscoplastic properties of the reacting cement paste.

"There is currently no way to accurately predict whether the addition of certain mineral fillers, wastes, or other changes in system chemistry improve or reduce the likelihood of time-dependent degradation under prolonged mechanical and environmental stimuli," Grasley said.

He believes that the material model he is developing, the Thermodynamic, Mechanical, and Microstructural (TM^2) model, used with specific computational methodology, will be able to predict these properties. He will also employ X-ray micro-computed tomography scans to construct three-dimensional maps of the material pastes he uses. From these scans, Grasley said he will be "able to help segment or separate different constituents within a sample.

Grasley's co-principal investigator on this project, Tyler Ley of Oklahoma State University, is a NSF CAREER award recipient and he is well versed in the use of differential X-ray absorption to segment or separate unique constituents within a sample.

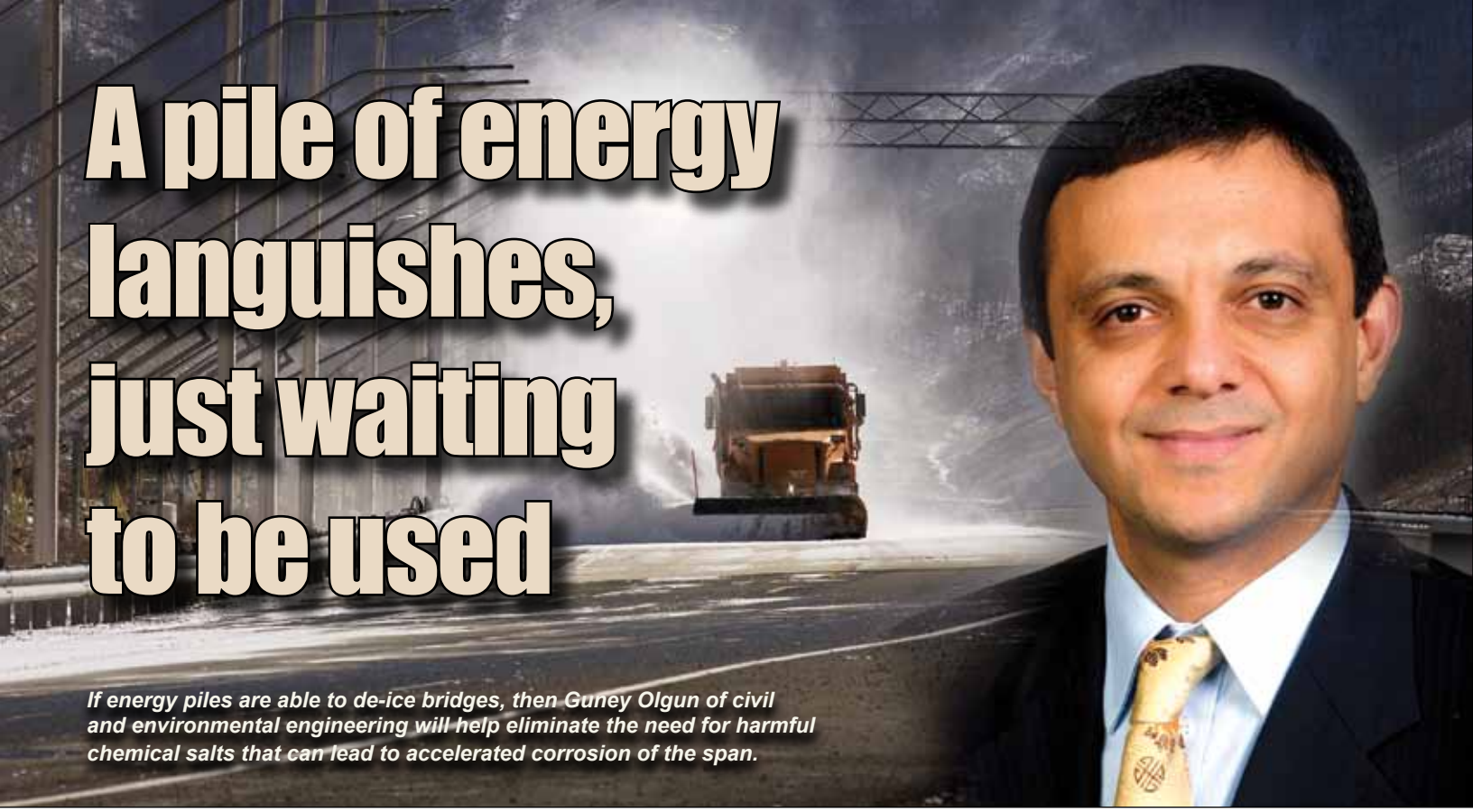
Grasley is also a recipient of an NSF CAREER award that he used to conduct research on viscoelastic and viscoplastic properties of calcium silicate hydrate to predict certain mechanical responses for cement pastes. His new research is a natural extension of this work.

If concrete is under a constant state of stress, it is well-known that it will move or "creep" as engineers prefer to say. "In fact, there is ample evidence that stress induced dissolution is a plausible mechanism of viscoelastic and viscoplastic behavior in materials made with cement," Grasley said.

When this project is completed, Grasley predicted the TM^2 will provide industry with a tool for the a priori prediction of the evolving viscoelastic and viscoplastic constitutive properties of concrete and the effect of stress on an evolving microstructure. "This information is a necessary input for structural models to accurately predict stresses and deformations throughout the entire service life of concrete structures," Grasley said.

by Lynn Nystrom

A pile of energy languishes, just waiting to be used



If energy piles are able to de-ice bridges, then Guney Olgun of civil and environmental engineering will help eliminate the need for harmful chemical salts that can lead to accelerated corrosion of the span.

Wouldn't it be nice to find an untapped "pile of energy?" This idyllic mass would not depend on fossil fuels with the adverse effects of their greenhouse gas emissions. Furthermore, this theoretical goldmine exhibits a potential cost savings of as much as 80 percent over more conventional sources of energy.

Sounds like someone has a vivid imagination?

Actually, Austria started pioneering these efforts on "energy piles" in the 1980s, and several other European countries, including Germany, Switzerland, and the United Kingdom, have followed suit.

Now, Virginia Tech civil and environmental engineering faculty member Guney Olgun is among the first to explore similar efforts in the United States, using multi-year grant money from the National Science Foundation and partnerships formed recently with a number of contractor companies.

The technology is literally called "energy piles". The idea is based on efficiently accessing the shallow geothermal energy stored in the ground for heating and cooling purposes. The technology utilizes a geothermal heat pump that uses the ground as a heat source in the winter and a coolant in the summer.

Olgun explained that

Continued on next page

This picture shows a model-scale of a bridge deck slab used in testing for the ability to de-ice using geothermal energy.

energy piles "make it possible to use shallow geothermal energy at virtually any ground and climatic condition."

The ground maintains an almost constant temperature about 20 feet below the surface since this first 20 feet act as an insulator. Depending on regional climate, this constant temperature varies from a low of 45 degrees to a high of 75 degrees in most U.S. regions.

"This relatively constant temperature and thermal storage capacity of the ground can be exploited for heating and cooling purposes," Olgun said.

"Energy piles are an innovative technology that combines geothermal heat exchange and structural foundation support. In this hybrid system, geothermal loops are integrated into the deep foundation elements, such as piles, piers, or drilled shafts, that are already in place to provide structural support," he explained.

Energy piles are most feasible when they are installed at sites where pile foundations are already required so no additional drilling costs are incurred. They are typically put in with a cast-in-place technology such as a micropile, drilled shaft or continuous flight auger piles.

"Low maintenance, long lifetime, less variation in energy supply compared to solar and wind power, and environmental friendliness are advantages to this form of energy," asserted Olgun who received his doctoral degree in civil engineering from Virginia Tech in 2003.

Olgun, a geotechnical engineer, explained that the characteristics of foundation soils and the level of structural loads "are typically the deciding factors for the selection and dimensioning of pile foundations. The geothermal heat exchange capacity of an energy pile is a key consideration in the design of the system for heating and cooling purposes."

This is one of nine full-scale field tests to learn how various types of soils react when supporting energy piles. This one is in Houston, Texas.

Energy piles have the advantage of being applicable in any climate or region. However, a number of challenges remain in terms of how the various types of soils react when supporting energy piles, and Olgun has nine full-scale field tests at various stages of installation. Seven are in the U.S.: Blacksburg, Va., Gary, In., Baltimore, Md., Houston, Tx., Milwaukee, Wi., Stillwater, Ok., and College Station, Texas. The remaining two are in Turkey and Egypt. Each has different soil and climatic conditions.

"A major obstacle remains in the understanding of the thermal-mechanical behavior of energy piles under repeated cycles of heating and cooling," Olgun said. So his field tests are occurring over a three to seven week period, allowing for several cycles of heating and cooling to occur. He is also conducting concurrent testing, with each set-up using two heat pumps, to ensure reliability in the tests.

Participating industries in the studies are providing in-kind contributions, building full-scale field tests, and donating materials, instrumentation, and heat pumps. Three engineering foundation contractors, Berkel, Thatcher, and Layne GeoConstruction, are installing energy piles and assisting with the field-testing. Mechanical Equipment Sales Inc. (MESI), REHAU, and Geo-Instruments are providing heat pumps, piping for the geothermal loops and instrumentation for the field tests. The U.S. Green Building Council and the Deep Foundations Institute are reviewing the data and providing results to the engineering community.

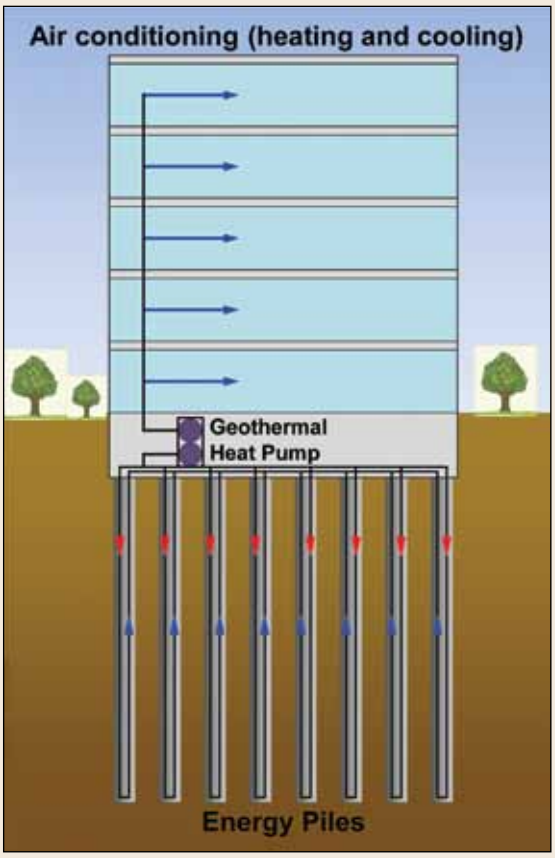
MESI is owned by Charles Elks, Jr., a 1960 CEE Virginia Tech alumnus.

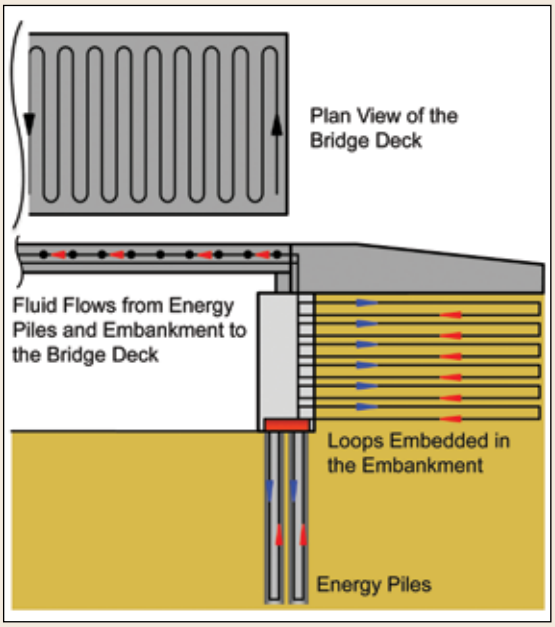
Olgun predicted that the successful use of energy piles could help in the Presidential mandate to reduce the energy use by 30 percent by 2015 in comparison to the 2003 levels at all federal facilities.

In March, Olgun organized an International Workshop on Thermoactive Geotechnical Systems for Near-Surface Geothermal Energy, held in Lausanne, Switzerland. The National Science Foundation was a sponsor of this event. More than 70 researchers from around the world attended this workshop to discuss pressing issues on energy piles.

by Lynn Nystrom

New system eliminates need for the use of harmful chemicals to de-ice concrete bridges





As Guney Olgun began studying energy piles, he realized that they could be used to collect and store heat energy for deicing the nation's bridge decks in the winter.

The piles or drilled shafts used to support the bridge can be used to store the collected heat energy in the summer.

Olgun explained how the process works: "Heat can be collected from the asphalt pavement over the summer and stored in the ground using the deep foundations. During the winter, this stored energy can then be reclaimed to heat and deice the bridge deck."

The stored heat is actually extracted from the ground and can in turn be circulated as warm fluid within a tubing system placed in the bridge deck slab to prevent icing, Olgun, a research assistant professor of civil and environmental engineering, added.

Current practices of deicing concrete bridges using chemical salts can be "harmful to the environment and lead to accelerated corrosion of the bridge deck and reinforcing steel. Energy piles could eliminate the need for deicing salts on many bridges, extending their service life while providing a safe roadway for motorists," Olgun said.

Heating bridges in this manner would also lessen the environmental impacts on water sources, vegetation, and wildlife as they would not be subjected to the saline runoff from the deicing salts.

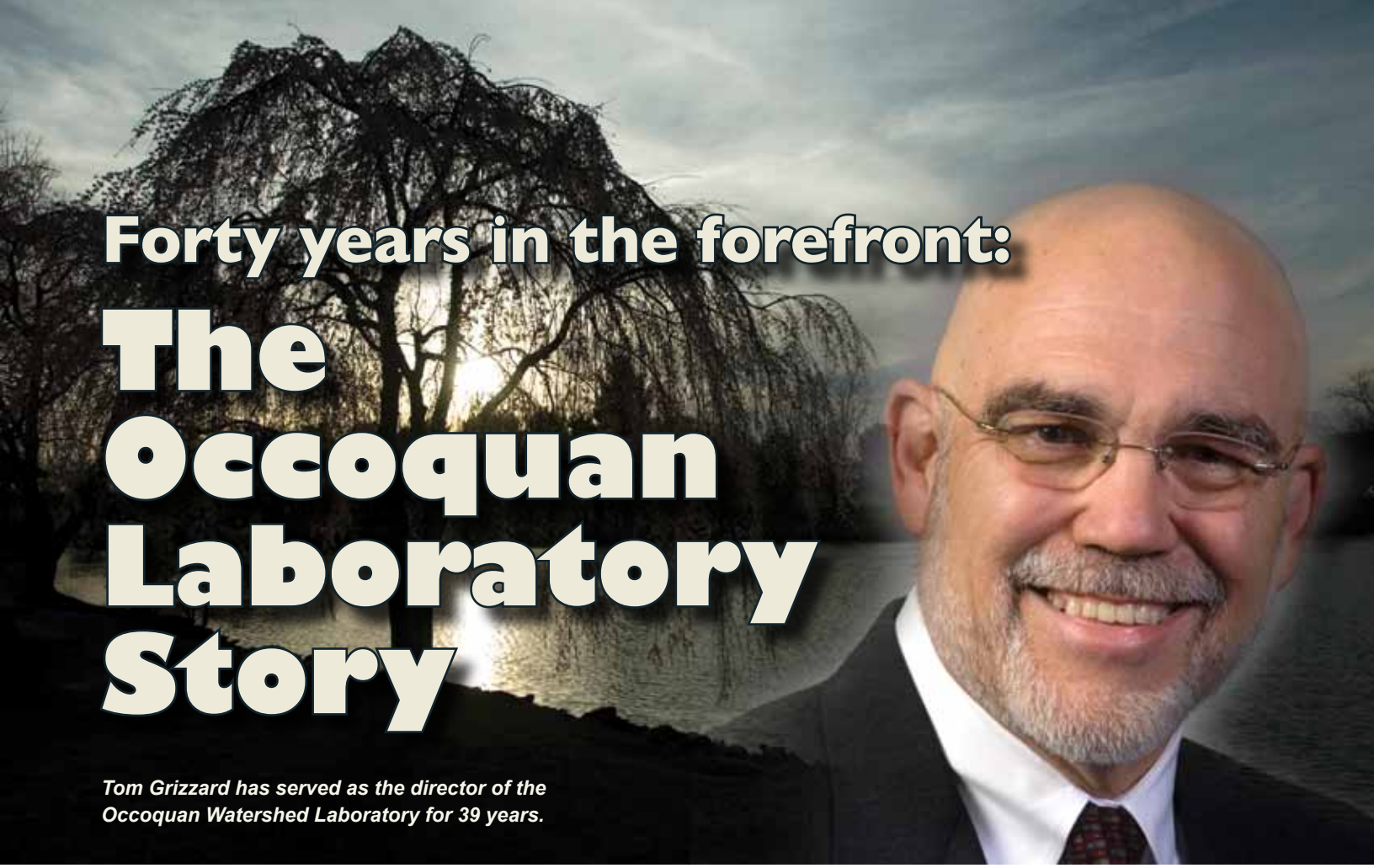
Olgun is working with Cris Moen, associate professor of CEE on this project, and they set up a model bridge deck on the Virginia Tech campus to determine the feasibility of using the energy piles for bridge deck deicing. Allen Bowers, who was an undergraduate in the CEE department when the bridge model was constructed also worked with Olgun and Moen. He became the 2012 class valedictorian, and remains a graduate student in CEE on a National Science Foundation Graduate Research Fellowship.

Some of the facets they are investigating include: how long it takes to warm and deice the bridge deck; a cost analysis for the installation and operation of these systems; evaluation of long-term savings when using energy piles as an alternative bridge deck deicing system; the development of control systems for feasible, optimal performance during icing conditions; and explore alternatives for enhanced heat storage to increase heat exchange performance.

Studies have already determined that since the bridge deck only needs to be heated to above freezing, passive heating through fluid circulation is sufficient, thus eliminating the need for a heat pump. "Fluid circulation can be performed with a circulation pump that only needs minimal electricity that can be provided with a solar powered battery," Olgun said. "This is critical in overcoming the significant issue of requiring an electrical power source at a bridge site."

Some 60 percent of the approximately 600,000 existing bridges in the U.S. were built with either conventional reinforced concrete or prestressed concrete.

A Federal Highway Administration (FHWA) report estimates the annual repair and replacement cost of corroded concrete bridges in the U.S. to be some $4 billion.



Forty years in the forefront: The Occoquan Laboratory Story

Tom Grizzard has served as the director of the Occoquan Watershed Laboratory for 39 years.

As urban areas grow in population, the provision of safe and plentiful drinking water is among the most important requirements.

Statistics on the availability of safe drinking water can be grim. Fresh surface water, comprised of streams, rivers, and lakes, represents less than one hundredth of one percent of the total water on earth.

Complicating this relative scarcity of fresh water is that some 60 percent of that small amount resides in only three places in the world: Lake Baikal in Asia, Lake Tanganyika in Africa, and the Great Lakes in North America. "The remaining 0.0036 percent is more globally distributed, but even so, there are many examples of disconnects between supply and demand all over the planet," said Tom Grizzard, professor of civil and environmental engineering (CEE) at Virginia Tech and director of the Occoquan Watershed Laboratory.

Globally, human habitation in the last century has been characterized by an increase in growth of, and migration to, urban settings. There are now at least 20 megacities on earth along with hundreds of other examples of cities with human populations exceeding one million each. In fact, in mid-2007, for the first time in human history, half the earth's population resided in cities. This trend is expected to continue through the rest of the current century. One result is that some forecasts project that, by 2050, over half the earth's population will experience chronic water shortages.

"This changing character of human population has created tremendous challenges to engineers of all disciplines working to design, build, operate, and maintain the built environment of the world's cities. It may be safely said, however, that one of the greatest undertakings is the work of civil and environmental engineers involved in providing drinking water to the current and future billions of earth's inhabitants," Grizzard said.

In the eastern United States, population growth around urban centers has created an additional problem: people are increasingly living within the same watersheds from which they draw their drinking water. In the late 1960s, a microcosm of this problem intrigued faculty of the Via CEE Department to start investigating the situation in northern Virginia.

They quickly learned that the Occoquan Reservoir, constructed in the late 1950s, was projected to serve as an important source of drinking water for the Virginia suburbs of Washington, D.C. well into the 21st century.

"Only a few years after the impoundment was completed, however, it was apparent that human activity in the tributary watershed was contributing to a rapid decline in water quality, and was putting the future of the

Continued on page 10

reservoir as a reliable drinking water source at risk," Grizzard explained. Post World War II development in the Manassas – Centreville, Va., area, approximately 20 miles west of Washington, DC, "had resulted in increased discharges of conventionally treated wastewater to tributaries of the reservoir."

Along with significant agricultural activity and growing urban areas elsewhere in the watershed, the organic matter and nutrient pollution entering the reservoir from wastewater discharges had resulted in regular excessive growth of a class of organisms known as cyanobacter, or more commonly, blue-green algae. Like most algal species, excessive cyanobacterial growths can lead to depletion of dissolved oxygen, and can be responsible for fish kills.

"However, unlike most algae, some cyanobacteria can also produce compounds that impart undesirable tastes and odors to water. In addition, some species produce toxins that pose threats to local wildlife, and in some cases, have been shown to have human health impacts," Grizzard added.

Following an intensive water quality study in the late 1960s, local government officials, public service authorities, and representatives of state and federal regulatory agencies decided to adopt a management policy that would protect the reservoir, but would also make unprecedented use of highly treated wastewater.

Authorities designed and built a water reclamation plant to serve the Occoquan Watershed. The plant employed advanced treatment technologies that produced water that was "actually superior in quality to the streams into which it would discharge," Grizzard recalled.

"This unique and innovative use of wastewater was considered such a radical departure from standard treatment practice that officials insisted on the creation of a permanent research facility to provide a scientifically sound assessment of the endeavor," Grizzard said. The resulting project was a milestone in environmental engineering practice, and the Upper Occoquan Service Authority water reclamation plant marked the first intentional reuse of highly reclaimed wastewater to supplement the drinking water yield of a major water supply reservoir.

Michael Gaal, a laboratory specialist, prepares water samples at the Occoquan Watershed Monitoring Laboratory.

In looking for a research team to begin the broad range of studies necessary to evaluate the project, and to develop a research plan for the future, officials contacted the Virginia Tech civil engineering faculty. Beginning in 1972, Cliff Randall, working with Bob Hoehn, both professors of civil engineering, created one of the first major remote research facilities of the College of Engineering. Called the Occoquan Watershed Monitoring Laboratory, the Manassas, Va., facility began operations with a modest technical staff complement of three and a laboratory director.

Randall served as the chair of the Occoquan Watershed Monitoring Subcommittee of the State Water Control Board, and has remained in that post well into his retirement years. He and Hoehn led some of the seminal work done at the laboratory on the removal of nutrients from wastewater and the effects of algae growth on water supply operations.

In 2012, the Occoquan Laboratory marked its 40th year of service to the Commonwealth, the citizens of northern Virginia, and to Virginia Tech. Grizzard, who obtained his doctorate in CEE from Virginia Tech, has served as the laboratory director for more than 39 years, and has led research projects addressing a wide range of applied needs in environmental engineering practice.

The Occoquan Experience

With the advent of advanced wastewater reclamation practice in the

watershed, Grizzard and his colleagues directed much of their research efforts towards understanding the water quality impacts of agricultural and urban stormwater runoff. In studies conducted under the auspices of the Environmental Protection Agency's (EPA) Nationwide Urban Runoff Program, Grizzard, Randall, and Hoehn developed techniques to merge the methods of field hydrology and water chemistry in order to characterize and control the loads of key water pollutants generated in urban runoff. In these studies, and similar ones conducted in agricultural areas, the groundwork was laid for local governments to adopt best management practices and land use management strategies to control stormwater pollution.

"Coupled with the earlier approaches to innovative use of wastewater, the Occoquan experience has been widely viewed as an example of sustainable water quality management in an urbanizing water supply watershed," Grizzard said. "In fact, roots of some of the approaches being taken in the Chesapeake Bay restoration may be seen in the long and successful history of management of the Occoquan Watershed."

Grizzard's knowledge gained from his work with the Occoquan also led him to a long, ongoing association with the Republic of Singapore, where water reuse has played an important role in meeting its own critical water supply needs. Since 2003, Grizzard has served on a scientific panel that advises the island nation on water resources management.

The robust hydrologic and water quality datasets produced by over four decades of work in the Occoquan Watershed continue to serve today in enhancing the understanding of urbanizing systems. Adil Godrej, a research associate professor who also serves as Grizzard's deputy, has done widely-recognized work in the development of complexly-linked modeling tools to predict the impacts of land use change and watershed management practices on water quality in lakes and reservoirs. Godrej and Grizzard have also worked to extend the utility of such complex models to non-expert stakeholders. A recent Ph.D. graduate, Saurav Kumar, whom they co-advised, has developed a system that significantly reduces the barriers for laypersons to interact with such complex simulation systems.

In recent years, Grizzard has returned to one of the themes of his own doctoral research. Lake and reservoir sediments often serve as a massive repository of materials that have been discharged into the system over the life of the water body. Under some conditions, cycling of nitrogen, phosphorus, iron, and manganese from sediments can degrade water quality for decades after external pollution sources have been removed or controlled. Grizzard and his recent Ph.D. student, Franciso Cubas, co-advised with John Novak, professor emeritus of CEE, have explored ways to use oxidized nitrogen from wastewater to maintain conditions in deep impoundments that cause some pollutants to remain bound with the sediments instead cycling to the overlying waters. The work has highlighted another innovative use of a wastewater-derived constituent to improve water quality.

The Future

As Grizzard nears retirement, the department has continued to invest in its principal off-campus research facility. Beginning in 2009, a major renovation and expansion of the facilities of the Occoquan Laboratory took place. When fully completed in 2011, the facility boasted a reconstructed water chemistry laboratory with enhanced research space; new office space for staff as well as local and visiting faculty; and expanded space for graduate student researchers. In order to further facilitate applied environmental research opportunities, the Occoquan Laboratory also became the first academic laboratory in the Commonwealth to be granted certification under the Virginia Environmental Laboratory Accreditation Program. That effort was successfully led by the laboratory supervisor, Dongmei Wang, and was ably accomplished during a period of extraordinary upheaval during lab renovations. The physical facilities are now well-prepared for the next generation of faculty and students to continue to build on what has already been done.

In the nearly 40 years of his service as the director of the Occoquan Laboratory, Grizzard and his colleagues have developed nearly $50 million in external funding. Sponsors have included the EPA, the US Geological Survey, the National Fish and Wildlife Federation, the Metropolitan Washington Council of Governments, the Northern Virginia Regional Commission, several regulatory agencies of the Commonwealth of Virginia, and a variety of local governments and public service authorities.

As Virginia Tech continues to expand its research presence in the National Capital Region (NCR), the Occoquan Laboratory "serves as an excellent example of what can be accomplished with a physical presence. A research facility in the natural urban laboratory of northern Virginia has afforded the department an unparalleled ability to address a variety of problems at the watershed-scale. Over four decades of research, instruction, outreach and service have served the university well, and applied research results from the laboratory have materially contributed to the solution of a range of important water quality management and water supply problems in the National Capital Region," Grizzard said.

In looking back on his nearly four decades of service, Grizzard often jokes about "having been in exile from Blacksburg for his whole career." But today he said that "is no longer the case…Virginia Tech's College of Engineering may be found throughout the region, serving the Commonwealth and realizing the promise of *Ut Prosim* in the NCR."

And back to the original reason for the founding of the laboratory - that grand experiment in water reuse. According to Grizzard, by the middle of this century, "the safe drinking water yield of the Occoquan Reservoir is expected to rise by over 50 percent. In an uncertain hydrologic future in an era of global climate change, realizing the potential of all water sources will be increasingly important." As Grizzard summarized, "Stay tuned."

Two coastal towns, one seawall, and a critical difference in hurricane damage

Jennifer Irish received a National Science Foundation RAPID grant to conduct field studies immediately after Hurricane Sandy hit the Mid-Atlantic coastline.

After Superstorm Sandy demolished parts of the New Jersey and New York shorelines, engineers, politicians, and government entities have struggled with how to protect the coastal regions from major storms. As with most matters, the decisions come down to financial resources.

In June of 2013, outgoing New York City Mayor Michael Bloomberg identified a fiscally ambitious plan, starting at $20 billion, to erect an extensive array of flood walls, levees, and bulkheads along its more than 500 miles of coastline. In making his pitch, Bloomberg alleged that the costs of a storm similar to Sandy in three decades would be a staggering $90 billion in damage and loss of economic activity for the Big Apple. By contrast, the 2012 damage cost was $19 billion.

Climate change is a major factor in Bloomberg's call for immediate action.

His plans evolved with the help of numerous reports and expert opinions after the catastrophic event.

One of the engineers who traveled to the affected areas to make first-hand observations to quantify damages was Jennifer Irish, associate professor of civil and environmental engineering at Virginia Tech. With her previous background as a researcher for seven years at the U.S. Army Corps of Engineers Coastal and Hydraulics Laboratory, and her career path now focusing on society's need to improve and protect coastal infrastructure, Irish has attracted some $3.2 million from mostly government agencies to research coastal hazards.

Irish, with Robert Weiss of Virginia Tech's geosciences department, was on a National Science Foundation RAPID grant to conduct field work immediately after Sandy's devastation. Within two weeks of Sandy's strike, they were on site, gathering critical information. In their first journal paper on Sandy, to appear in Coastal Engineering, they identified a buried relic seawall along the coast of the New Jersey city of Bay Head that appeared to lessen the wave-driven effects of Hurricane Sandy on this community. The researchers compared the difference in the impact upon Bay Head versus its southern neighbor of Mantoloking and noted the reduction in wave-induced forces was lessened significantly – by a factor of two.

"The difference in the impact of Hurricane Sandy between Bay Head and Mantoloking underscores the urgent need for sustainable multi-level protection against natural hazards in order to create resilient coastal communities," Irish and Weiss wrote.

Bloomberg's plan is exactly that – a myriad of protectors to insure the integrity of New York City's massive coastline.

The report by Irish and Weiss, two of their graduate students, Stephanie Smallegan of Collins, Ga., and Wei Cheng of Dongying, Shandong, China, and Patrick Lynett of the University of Southern California at Los Angeles's Department of Civil and Environmental Engineering, spoke of how they sur-

veyed high water marks and assessed damage, overwash, and breaching in both Bay Head and Mantoloking.

"We found that flood elevations were very similar, with oceanfront flood elevations, as measured from water lines in the interiors of homes of 4.6 and 4.2 meters above the mean sea level in Bay Head and Mantoloking, respectively. High water marks on the exterior of the homes, thereby including the effect of individual ocean waves, are between 4.0 and 6.5 meters.

"Erosion and damage to the oceanfront homes, however, were drastically different in the two locales," Irish asserted.

They found that all of the ocean front homes were damaged to some degree. However, by using Google Earth to evaluate aerial imagery several days before the storm and then again, on Oct. 31, immediately after the storm, Irish and her colleagues were able to show that the majority of the homes in Bay Head were flooded, but only one was classified as destroyed. In contrast, more than half of the ocean front homes in Mantoloking were classified as damaged or destroyed.

"Our hypothesis regarding this stark contrast in Hurricane Sandy's impact in these communities is that the relic seawall dampened wave forces and held the shoreline," Irish explained.

As Irish continues to report on her post Hurricane Sandy work, she is simultaneously involved in two other large funded projects related to coastal hazards. One is funded by the National Oceanic and Atmospheric Administration (NOAA) Sea Grant program, focusing on the understanding of the impacts of climate change on future hurricane flooding, damages, and populations at the coast. The second one, with Weiss as a co-principal investigator, is an NSF grant to improve the understanding of tsunami inundation in coastal forests.

Bloomberg's allegation that a storm equivalent to Sandy would cause $90 billion in damages in three decades, mostly due to climate change, again fits Irish's generalized projection models for hurricane flooding.

In her NOAA work, Irish wrote, ""Possible acceleration of sea level rise and intensification of hurricanes as a consequence of long-term global warming trends can lead to increased hurricane flooding, wave action, and damages, which in turn can lead to future population shifts."

To better understand this impact, Irish and her other principal investigators, are developing general mathematical models for the physical and socioeconomic responses to future hurricane conditions, specifically along the Gulf of Mexico.

With their simulations, and the widely held assumption that the sea surface temperature will rise between 0.36°C and 1.38°C by 2030 and 0.96°C and 5.02°C by 2080, damages caused by hurricane flooding in Corpus Christi, Texas "will significantly increase," Irish said.

"Without consideration of damage due to direct wave attack, for the current population and level of urban development, it has been found that with a high rate of greenhouse gas emissions for storms similar to Hurricane Bret, the flooded area, population affected, and economic damages might increase by 19 kilometers, 2500 people, and $30 million by the 2030s, and by 70 kilometers, 11,500 people, and $280 million by the 2080s…We expect these numbers to rise substantially when damages due to direct wave action are also considered."

The estimated numbers for Hurricane Bret ranged from a $5 to $11 million in damages.

Hurricane intensification, sea level rise and increased flooding resulting from global warming will invariably affect the social dynamics of low lying coastal areas in the Gulf of Mexico, Irish asserted. Any failure to form policies to mitigate the economic effects associated with these processes would be costly in both the short and long terms.

The researchers in this NOAA study are using three pilot sites: Corpus Christi, Texas, Gulfport, Miss., and Panama City, Fl., all urban, coastal communities protected by barrier islands.

"The benefit of our studies will be to improve the public understanding of accelerating hurricane hazard as a consequence of global warming and to provide local governments with a tool to evaluate and make decisions in terms of the financial and social costs related to climate change at individual, neighborhood, local, and regional levels," Irish said.

The Journal of Waterway, Port, Coastal and Ocean Engineering, a publication of the American Society of Civil Engineers, published a journal article by Irish and Donald T. Resio, professor of civil engineering at the University of North Florida, on a method for estimating future hurricane flood probabilities and associated uncertainties. http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29WW.1943-5460.0000157

by Lynn Nystrom

Jennifer Irish stands amid some of the destruction at Bradley Beach.

NEW FACULTY

Civil and Environmental Engineering

ZHEN "JASON" HE

From 2009 until he joined the department in 2013, Zhen "Jason" He had worked as an assistant professor of civil engineering and mechanics at the University of Wisconsin at Milwaukee (UWM).

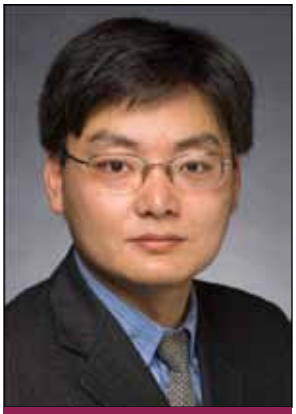
His research interests are in environmental biotechnology, biological wastewater treatment, bioenergy production, microbial fuel cells, sustainable desalination technology, forward osmosis, water softening process, environmental bio-electrochemistry, and sustainable water reuse.

In 2010 he received the Green Talents Award from the Federal Ministry of Education and Research of Germany. That same year he also earned a UWM Graduate School Research Fellowship.

While a postdoctoral research associate at the Mork Family Department of Chemical Engineering and Materials Science and the Department of Earth Sciences, University of Southern California, he received a 2008 first place in a poster competition at the first international symposium on microbial fuel cells.

He has provisional patent applications on an enzymatic water softener, the integration of a microbial fuel cell into an algal bioreactor, microbial desalination cells, and osmotic bioelectrochemical systems. With colleagues, he has provisional patent applications on floating microbial fuel cells and on electricity generation using phototrophic microbial fuel cell technology.

In addition to his almost four dozen journal publications and his more than two dozen conference presentations, He is the co-author of one book chapter on electrochemical impedance spectroscopy in "Bioelectrochemical System: from extracellular electron transfer to biotechnological application."



HE

He has taught courses on the Introduction to Environmental Engineering, Freshwater Engineering, Hazardous Waste Management, and Bioelectrochemical Systems for Environmental Engineering. He is currently the Ph.D. adviser to nine doctoral candidates and two master candidates. His total research funding as a principal investigator exceeds $2.7 million.

He is a member of the Association of Environmental Engineering and Science Professors (AEESP), the Chinese-American Professors in Environmental Engineering and Science, the International Society of Microbial Electrochemistry & Technologies (ISMET), the Chinese Environmental Scholars and Professionals Network, and the International Water Association (IWA).

He served as the session chair of the 2012 IWA Nutrient Removal and Recovery meeting in Harbin, China, the IWA Biofilm Conference 2011 in Shanghai, China, and the 12th World Congress on Anaerobic Digestion, Guadalajara, Mexico in 2010. He was a session moderator at the 2011 AEESP Education and Research Conference in Tampa, Fl. He was a member of the organizing committee of the Second Symposium of Microbial Fuel Cells in Beijing, China in 2009, and is currently a member of the advisory committee of the North America – ISMET Meeting in 2014.

Civil and Environmental Engineering

NINA STARK

Nina Stark earned her master's degree in geophysics from the Department of Physics at Westphalian Wilhelms University of Muenster, Germany in 2007. She also minored in the physics of solids and surfaces, mineralogy, and inorganic chemistry. She obtained her doctorate in marine geotechnics at the MARUM Center for Marine and Environmental Sciences at the University of Bremen, Germany in 2011.

While pursuing her education she served as a research assistant during 2006-07 at the Naval Research Institute for Underwater Acoustics and Geophysics, Kiel, Germany. She worked on the geotechnical investigation of seafloor sediment, developed a windows application for rapid data processing of XBP data, and participated in research cruises with R/V Planet with a focus on mine burial experiments.During the summer of 2007 she was a research assistant at the School of Ocean and Earth Science and Technology at the University of Hawaii, processing REMUS side scan sonar data and seafloor mapping, and joined a research cruise with R/V Kilo Moana.

STARK

From 2007 until 2010, Stark was a research assistant at the MARUM Center for Marine and Environmental Science. She worked on the development, testing and application of the dynamic penetrometer Nimrod

See STARK, next page

Civil and Environmental Engineering

DENISE SIMMONS

Denise R. Simmons started at Virginia Tech in 2012 as a postdoctoral associate in the Department of Engineering Education, working on a National Science Foundation Collaborative Proposal on the "Developing Engineer of 2020 Traits: How do Non-curricular Activities Impact African American Students."

Prior to joining Virginia Tech, she obtained her Ph.D., also in 2012, from Clemson University in civil engineering. While she was working on her doctorate, she also served as the director of the Savannah River Environmental Sciences Field Station at South Carolina State University. As director, she raised more than $2.2 million in grants to support its operations.

From 2004 until 2008, Simmons was an assistant professor of civil engineering technology at South Carolina State University, and she also served as the academic program coordinator for the department for the 2004-05 academic year.

From 2003 until 2008 she was a faculty practitioner at the University of Phoenix Virtual Campus. She also held an adjunct faculty position in 2001 at the Midlands Technical College's Department of Civil Engineering Technology, located at Columbia, S.C. Simmons also held consulting positions with Indus International and Project Management Consultants, both located in S.C.

She earned her bachelor's and master's degree in civil engineering, also from Clemson, in 1990 and in 1995, respectively. Prior to entering graduate school, she started work with Power Generation Group of Charlotte, N.C. She left the company in 1994 to pursue her master's and as a graduate researcher developed a project management plan for Georgia Pacific in 1995.

SIMMONS

After she received her second degree, she spent four years from 1996 until 2000 at SCANA, a utility company based in South Carolina, and the following year at Memphis Light, Gas & Water in Tennessee.

She is the co-author of a book chapter in Environmental Leadership called "The color of climate: Ecology, Environment, Climate Change, and Women of Color – Exploring Environmental Leadership from the Perspective of Women of Color in Science."

Simmons is a member of the American Society of Engineering Education, Women in Engineering ProActive Network, American Association of Blacks in Energy, Project Management Institute, and Chi Epsilon.

Among her awards she has received a 2011 National Science Foundation Study Abroad Fellowship to study the energy industry in Santiago, Chile. She also garnered a 2009 award recognizing dedicated service to the NSF/HBCU-UP/RISC Summer Research Internship Program and she was a 2007 Sloan Fellow.

She has worked on state and national K-12 engineering efforts, directing the 13th annual Summer Transportation Institute that is aimed at work force development by increasing the number and diversity of students pursuing transportation-related fields of study and careers. She was also a member of a team that secured a national high school STEM research and outreach proposal in 2011.

Stark *Continued from previous page*

for the rapid geotechnical testing of the seafloor in areas where there were difficult accesses. She also conducted geotechnical investigations of natural sediment remobilization processes and of sediment remobilization with regard to coastal engineering. She participated in some 20 research cruises and field experiments in the North Sea, Northern and Southern areas of the Pacific Ocean and in different lakes in New Zealand.

As a postdoctoral fellow she continued with the MARUM-Center in 2011. She conducted geotechnical investigations of scour at the foundations of offshore wind energy converters, adapted the dynamic penetrometer Nimrod for deployments from the MIR submersibles in the eLEMO project in Lake Geneva, mentored graduate students, and traveled on research cruises to the offshore windfarm Alpha Ventus and to Lago Villarica in Chile.

In February of 2012 until she joined Virginia Tech she was a postdoctoral fellow at the Dalhousie University's Department of Oceanography in Halifax, Canada. She investigated bedload transport, the impact of grain shape and structure on sediment strength and mobility, pore pressure reaction to the tides in the Bay of Fundy, beach dynamics and erosion at Advocate Beach, Nova Scotia, and the seafloor sediments and strength in Grand Passage, a proposed tidal turbine site. She also conducted field experiments at Advocate Beach and Grand Passage.

A horse enthusiast, Stark holds training licenses in competitive equestrian riding. She has a Certificate in Physical Therapy for animals from the German Association for Physical Therapy for Animals. She was the manager of the State Dressage Cup Series of the German Association for the Protection of Horses, and has worked as a volunteer for this association. She also volunteered with the 808 Horse Rescue group in Hawaii.

FACULTY HONORS AND ACHIEVEMENTS

Greg Boardman
- 2012 Enslow-Hedgepeth Award from the Virginia Water Environment Association


BOARDMAN


DE LA GARZA

Chema De la Garza
- Construction Industry Institute Richard L. Tucker Leadership & Service Award
- CII Outstanding Instructor Award 2013

Tom Dingus
- White House Champion of Change
- Grado Department of Industrial and Systems Engineering Academy of Distinguished Alumni


DINGUS


DOVE

Joe Dove
- Promoted to the rank of Associate Professor of Practice

Randy Dymond
- Virginia Tech 2013 XCaliber Certificate of Excellence
- CEE Alumni Board Teaching Excellence Award


DYMOND


EATHERTON

Matthew Eatherton
- College of Engineering Outstanding New Assistant Professor Award

Marc Edwards
- Virginia Tech 2013 XCaliber Certificate of Excellence in technology enriched learning
- Alumni Award for Excellence in Graduate Advising 2012
- 2012 Barus Award for Defending the Public Health and Interest IEEE Social Implications of Technology


EDWARDS


FLINTSCH

Gerardo Flintsch
- Scholar of the Week by the Office of the Vice President for Research at Virginia Tech
- Harter Rupert Award from the Transportation Research Board

Dan Gallagher
- FDA Leveraging/Collaboration Award


GALLAGHER


GARVIN

Mike Garvin
- Myers-Lawson School of Construction Leadership and Service Award

Zachary Grasley
- American Concrete Institute - Walter P. Moore Jr. Faculty Achievement Award


GRASLEY


GRIZZARD

Tom Grizzard
- Virginia Tech Chapter Honor Member for Chi Epsilon

Russell Green
- Promoted to the rank of Professor
- Virginia Tech Alumni Award for Excellence in International Research


GREEN


IRISH

Jen Irish
- Named to the Strategic Sciences Group – Operational Group Sandy, U.S. Department of the Interior

Ioannis Koutromanos
- The Masonry Society Outstanding Dissertation Award


KOUTROMANOS


LEON

Roberto Leon
- 2013 Dennis L. Tewksbury Award for outstanding professional leadership in and service to the Structural Engineering Institute of ASCE
- Outstanding Senior Alumnus, COE University of Massachusetts at Amherst

Linsey Marr
- Promoted to the rank of Professor


MARR


MOEN

Cris Moen
- Promoted to the rank of Associate Professor

Vickie Mouras
- College of Engineering Certificate of Teaching Excellence


MOURAS


MOGLEN

Glenn Moglen
- ASCE Fellow

Tom Murray
- ASCE Structural Engineering Fellow
- University of Kansas Dept of Civil, Environmental and Architectural Engineering Academy of Distinguished Alumni


MURRAY

Pam Murray-Tuite
- Promoted to the rank of Associate Professor


MURRAY-TUITE


NOVAK

John Novak
- 2013 Excellence in Environmental Engineering Education Award from the American Academy of Environmental Engineers and Scientists

Amy Pruden-Bagchi
- Promoted to the rank of Professor


PRUDEN-BAGCHI


RAKHA

Hesham Rakha
- Scholar of the Week by the Office of the Vice President for Research at Virginia Tech

Carin Roberts-Wollmann
- Fellow American Concrete Institute


ROBERTS-WOLLMAN


SCARDINA

Paolo Scardina
- 2013 Certificate of Commendation for his work with the Virginia Tech ASCE student chapter as the chapter advisor.

J.T. Taylor
- College of Engineering Faculty Fellow
- Virginia Tech 2013 XCaliber Award for Excellence
- Deans Faculty Fellow
- CII Distinguished Professor Award


TAYLOR


VIKESLAND

Peter Vikesland
- Promoted to the rank of Professor
- 2012 Richard L. Valentine Distinguished Lecture at University of Iowa

Kevin Young
- 2013 G.V. Loganathan Faculty Achievement Award for Dedication to teaching, advising and the promotion of the Civil Engineering Profession


YOUNG

STUDENT NEWS

UNDERGRADUATE SCHOLARSHIPS

AREMA Scholarship
Gregory Pope

2013 ASCE Virginia Section Scholarship
Robin Willis
Gregory Pope

CE Alumni Board Scholarships
Kaitlin Blackwell
Mark Herman
Kenneth Maben
Derek Petroski
Nicholas Zinck

CEE Alumni Golf Outing Scholarship
Thomas Patchan

Kenneth R. Ayers '80 Memorial Scholarships
Kelly Pettersen
Michael Sullivan

Kelso Baker Scholarships
Jacob Paule
Justin White

Michael Baker Corporation Engineering Scholarship
Paige Emanivong

Balzer & Associates Scholarships
Thomas Frederick
Beau Mackie

James L. Bland Civil Engineering Scholarship
Sharif Abdelrazeq

Charles and Patricia Brown Scholarships
Akram Ahmed
Rachel Wilson

Everett Carter Memorial Scholarship
Dustin Stanley

William A. Caruthers CE Scholarship
Gregory Pope, Jr.

Joseph and Jane Christenbury Memorial Scholarship
Dan Coleman

Civil Engineering Class of '58 Scholarships
Alexandra Boyle
Antonio Candelora
Michael Lakota
Brandon Stinespring

Warren F. Cline Scholarship
Mitch Magee

Stanley and Francis Cohen Scholarships
Zach Barlow
Jordan Enslen
Kenneth Maben

John DeBell Civil Engineering Scholarship
Joseph Whartenby

Dewberry Scholarships
Gregory Schmitt
Haseeb Tahir

Walter and Mary Ruth Duncan Scholarships
Kelsey Abais
Jared Tamulynas

Chelsey A. Godfrey Scholarship
Ross Abbott

Lois Cox and Edna Goodwin Scholarships
Thomas Dacanay
Brendon Woodruff

Ralph P. Hines '59 Scholarship
Vincent Mayberry

Charles S. Hughes Scholarships
Zachary Barlow
Jordan Enslen
Stuart Woodard

Williams A. Joyner Scholarship
Julia Hart

Dennis and Sherry Kamber Scholarship
Wesley Marsh

Lingerfelt Family Foundation Scholarships
Adrian Santiago Tate
Mark Tilashalski
Tyler Weiglein

Hersie B. and Ethel G. McCauley Scholarships
Nicholas Navarro
Ryan Slabachbrubaker

Andrew "Tripp" McDavid Memorial Scholarship
Alexander Cartaya

Kenton and Liliana Meland Scholarship
Ramez Hajj

Newport News Shipbuilding Scholarship
Casey Murray

Pratt Study Abroad Scholarships Summer 2013
Ross Abbott
Sima Azarani
Moises Bobadilla Molina
Samuel Consalvo
Ian Cunningham
Jaclyn Dixon
Robert Grover
Mark Hammert
Natalia Hozdevila
Daniel Karalus
Stephanie Liebau
Aaron Mabee
Chris Sidney
Ryan Slabachbrubaker

John E. Pruitt, Jr. Scholarships
Eric Daly
Lee Matheson

Richard Quarterman '04 Memorial Scholarship
Jacob Williams

Howell and Ann Simmons Land Development Design Scholarship
Niconia Ackerman

Stantec Award for Excellence in Engineering
Heather Todak
Jonathan Woodard

Undergraduate George A. Stewart Scholars
Clinton Martin
Casie Venable
Charles Conran

L.J. Turner and W.S. Dewhirst Scholarships
Dustin Caranci
Ian Cunningham

Vecellio Scholarships
Thomas Boldridge (CEM)
Derek Davis (CEM)
Marcel Dupuis (CEE)
Vincent Mayberry (CEE)
Angela Neiman (CEE)
Alek Leckszas (CEM)
Gregory Pope (CEE)
Kayla Sykes (CEE)
Robin Willis (CEE)
Andres Zelkowicz (CEE)

Virginia-Carolinas Structural Steel Fabricators Association
Andrew Garrison
Gavin Heinly

Virginia Concrete Scholarships
Luis Arango
Eileen Phan
Asis Subedi

Frederick V. Watkins, III Memorial Scholarships
Jennifer Cohill
Jordan Gibson
Thomas McNicol
Derek Petroski

Harry S. and Patsy B. Williams Scholarship
John Young

Williams Industries Scholarship
Kylie Snyder

Verne and Jewel Williamson Scholarship
Philip Smith

STUDENT NEWS

GRADUATE SCHOLARSHIPS AND FELLOWSHIPS

Abel Wolman Doctoral Fellowship
Brandi Clark

American Infrastructure Fellow
Pamela Gerry

ASTM International Fellowship
Bernardo Castellanos

Brian R. Bluhm Memorial Fellowships
Nicole Abramson
Kelsey Brandt

Cambi Fellowship
Trung Le

CMAA National Capital Chapter Scholarship Award
Vahid Balali

Cunningham Fellowship
Jennifer Miller

Raymond and Madeline Curry Fellowships
Andrew Bain
Andrew Stallings
Edwin Gonzalez

Davenport Leadership Scholar
Clayton Hodges

Dean's Diversity Fellowships
Edwin Gonzalez
Marcus Aguilar
Kara Kea
Candace Kea
Marian Alicea

Eisenhower Graduate Fellowship
James Bryce

Environmental Protection Agency STAR Fellowships
Andrea Tiwari
Ronald Kent

Fugro Fellowship
Anthony Metz

Fulbright Fellowships
Nurlayla Arbie
Khalil Benali
Amal Bouraga
Denis DelCid Corrales
Jose Guevara
Alba Taveras Marte
Abraham Lama Soloman

Hampton Roads Sanitation District – Dr. Charles Bott
Dana Fredericks
Stephanie Klaus
Wei Liang
Mark Miller
Jeffrey Nicholson
Ross Varin

Hawkins Fellowships
Benjamin Zolman
Arghavan Amini

IGERT: Interdisciplinary Graduate Education and Research Traineeship: Multistep
Keith Heyde

Interdisciplinary Graduate Education Program (IGEP)
Colin Richards
Katherine Phetxumphou
Paramjeet Pati
Amanda Sain
Marjorie Willner
Xinzhe Zhou
Haoran Wei
Qi (Ryan) Wang

International Municipal Signal Association (IMSA)
Milos Mladenovic

Jeremy Herbstritt Memorial Internship from Sussman Foundation
Caitlin Proctor

Thomas N. Hunnicutt III Fellowship
Ni Zhu

Institute for Critical Technologies and Applied Science (ICTAS)
Daniel Vanden Berge
Craig Shilaber

G.V. Loganathan Fellowships
Walter McDonald
Garrett Menichino

Matthew Gregory Gwaltney Memorial Fellowship
Carlos Mantilla Pena

National Science Foundation (NSF) Fellows
Stephanie Smallegan
G. Allen Bowers, Jr.
Been Ajemera
Elizabeth Godfrey
Elizabeth Lipscomb
Rimas Gulbinas (Summer Fellow)
W. Lake Carter (Summer Fellow)

Pamplin Foundation MBA Fellowship
Douglas Kemp Edwards

Pratt Engineering Fellowships
Georgios Deskos
J. Karim Fadhloun
Jian Li
Jiaxing Zhou

Pratt International Study Abroad Fellowships
Nicole Abramson
Davide Pu
Thomas Spencer

Royal Thai Army
Tanakorn Ngamjarungjit

Edna Bailey Sussman Fellowships
William Baggett
Celso Castro Bolinaga
Benjamin Chambers
Stephanie Countess
Abenezer Nida
Amanda Sain

Sustainable Water Infrastructure Management Fellowship
Pattanun Chanpiwat

Tau Beta Pi Fellowship
Peerawat Charuwat

Terracon Fellowship
Stephen Rossi

Vecellio Fellows
Jose Guevara
Josh Zilke

Vietnam Education Foundation Fellowship
Duc Nguyen

Virginia Lakes and Watersheds Association Fellowship
Stephanie Countess

Walts Graduate Fellowship
Joshua Hogencamp

West Virginia Water Authority
Richard Browne

STUDENT NEWS

PH.D. DEGREES

The following doctoral degrees were awarded to CEE students between July 2012 and June 2013.

Name: **Sherif Lotfy Abdelaziz**
Dissertation Title: Behavior of Energy Piles: Deep Foundations Used as Heat Exchangers
Co-Advisors: **Celal Guney Olgun** / **James Martin**

Name: **Zaeinulabddin Adam**
Dissertation Title: Development and Applications of Multi-Objectives Signal Control Strategy During Oversaturated Conditions
Advisor: **Montasir Abbas**

Name: **Thiti Angkasuwansiri**
Dissertation Title: Development of Wastewater Pipe Performance Index and Performance Prediction Model
Advisor: **Sunil Sinha**

Name: **Ozgur Atlayan**
Dissertation Title: Hybrid Steel Frames
Advisor: **Finley Charney**

Name: **Semra Comu**
Dissertation Title: Examining the Impact of Facilitation on the Performance of Global Project Networks Collaborating in Virtual Workspaces
Advisor: **John Taylor**

Name: **Tian Gao**
Dissertation Title: Direct Strength Method for the Flexural Design of Through-Fastened Metal Building Roof and Wall Systems under Wind Uplift or Suction
Advisor: **Cristopher Moen**

Name: **Leon Gay Alanis**
Dissertation Title: Development of a Resilience Assessment Methodology for Networked Infrastructure Systems using Stochastic Simulation, with Application to Water Distribution Systems
Advisor: **Sunil Sinha**

Name: **Faisal Hameed**
Dissertation Title: Integrated Life Cycle Analysis Approach (ILCA2) for Transportation Project and Program Development
Co-Advisors: **Kathleen Hancock** / **Thomas Grizzard**

Name: **Heejin Jung**
Dissertation Title: Human Driving behavior Pattern: Microscopic Analysis and Classification
Advisor: **Antoine Hobeika**

Name: **Bernard Kassner**
Dissertation Title: Shear Strength of Full-Scale Prestressed Lightweight Concrete Girders with Composite Decks
Co-Advisors: **Carin Roberts-Wollmann** / **Thomas Cousins**

Name: **Marc Maguire**
Dissertation Title: Transverse and Longitudinal Bending of Segmental Concrete Box Girder Bridges
Advisor: **Carin Roberts-Wollmann**

Name: **John Petrie**
Dissertation Title: High Resolution Measurements of the Mean Three-dimensional Flow Field in a Natural River
Co-Advisors: **Panos Diplas** / **Gutierrez**

Name: **Marina Eller Quadros**
Dissertation Title: Assessing the Potential for Human Exposure to Silver from Nanotechnology Consumer Products
Advisor: **Linsey Marr**

Name: **Alison St. Clair**
Dissertation Title: Development of a Novel Performance Index and a Performance Prediction Model for Metallic Drinking Water Pipelines
Advisor: **Sunil Sinha**

Name: **James Stagge**
Dissertation Title: Optimization of Multi-Reservoir Management Rules Subject to Climate and Demand Change in the Potomac River Basin
Advisor: **Glenn Moglen**

Name: **Nestor Suarez Zamrano**
Dissertation Title: Micromechanical Aspects of Aging in Granular Soils
Co-Advisors: **Brandon** / **Mitchell**

Name: **Jia Tang**
Dissertation Title: Risk assessment of Listeria monocytogenes in Ready to Eat meat from plants to consumption
Advisor: **Daniel Gallagher**

Name: **Hong Wang**
Dissertation Title: Critical factors controlling regrowth of opportunistic pathogens in premise plumbing
Advisor: **Amy Pruden-Bagchi**

Name: **Michael Woodworth**
Dissertation Title: Fire Hazard Assessment for Highway Bridges with Thermal Mechanical Modeling
Co-Advisors: **William Wright/Elisa Sotelino**

Name: **WenJing Xue**
Dissertation Title: Integrated Transportation Monitoring System for Both Pavement and Traffic
Advisor: **Linbing Wang**

Name: **Renzun Zhao**
Dissertation Title: Management Strategy of Landfill Leachate and Landfill Gas Condensate
Advisor: **John Novak**

CEE ALUMNI BOARD MEMBERS

Members of the 2013 Civil and Environmental Engineering Advisory Board, as well as past participants, gather for the fall meeting at the Inn at Virginia Tech.

Michael A. Alto, P.E.
Clark Construction Group, LLC – Bethesda, Md.

Bruce R. Bates, P.E.
RISA Technologies, LLC – Foothill Ranch, Calif.

Thomas A. Broderick, P.E.
Loudon Water – Ashburn, Va.

James N. Carter, Jr.
Norfolk Southern Corporation – Atlanta, Ga.

Raymond G. Curry, Jr.
SMC Concrete Construction, Inc. – Annandale, Va.

Stephen DeLoach, P.E., L.S.
Hq. U.S. Army Corps of Engineers – Washington, D.C.

Brian K. Difenderfer, Ph.D., P.E.
Virginia Department of Transportation – Charlottesville, Va.

Richard M. DiSalvo, Jr., P.E.
Draper Aden Associates – Blacksburg, Va.

John R. Hillman, P.E.
HC Bridge Company – Wilmette, Ill.

Young Ho Chang, P.E.
ATC, P.L.C. – Herndon, Va.

Meredith Jones
MJ Services, Inc. – Blacksburg, Va.

Govindan Kannan
Volvo Group North America – Greensboro, N.C.

Eric J. Lundberg
Vesper, Inc. – Reston, Va.

Laura J. Morillo, P.E.
Energy-Nuclear at Five Star Products – Fairfax, Va.

Aaron Muck, P.E.
Terracon Consultants, Inc. – Cincinnati, Ohio

Ann E. Piazza, P.E.
L.A. Fuess Partners, Inc. – Dallas, Tex.

Jonathan R. Porter, Ph.D.
Turner-Fairbank Highway Research Center – McLean, Va.

Brian L. Ramaley, P.E.
CDM Smith – Newport News, Va.

Stephen M. Seay, L.S.
Rinker Design Associates, P.C. – Manassas, Va.

Kord Wissmann, Ph.D., P.E., D.GE
Geopier Foundations – Mooresville, N.C.

FACULTY BY PROGRAM AREA

Vecellio Construction Engineering and Management Program

- **Jesus M. de la Garza**, *Vecellio Professor and Program Coordinator*
- **Michael J. Garvin**, *Associate Professor**
- **Denise Simmons**, *Assistant Professor**
- **Sunil K. Sinha**, *Associate Professor*
- **John E. Taylor**, *Associate Professor*
- **Deborah E. Young-Corbett**, *Assistant Professor**

Environmental and Water Resources Engineering Program

- **Gregory D. Boardman**, *Professor*
- **Andrea M. Dietrich**, *Professor*
- **Randel L. Dymond**, *Associate Professor*
- **Marc A. Edwards**, *Charles Lunsford Professor*
- **Daniel L. Gallagher**, *Associate Professor*
- **Adil N. Godrej**, *Research Associate Professor (NCR)*
- **Thomas J. Grizzard, Jr.**, *Professor (NCR)*
- **Zhen (Jason) He**, *Associate Professor*
- **Erich T. Hester**, *Assistant Professor*
- **Jennifer L. Irish**, *Associate Professor*
- **William R. Knocke**, *W. Curtis English Professor and Program Coordinator*
- **John C. Little**, *Charles E. Via, Jr. Professor*
- **Linsey C. Marr**, *Professor*
- **Glenn E. Moglen**, *Professor (NCR)*
- **Amy J. Pruden**, *Professor*
- **Robert Paolo Scardina**, *Assistant Professor of Practice*
- **Peter J. Vikesland**, *Professor*
- **Mark A. Widdowson**, *Assistant Department Head and Professor*
- **Husen Zhang**, *Research Assistant Professor*

Geotechnical Engineering Program

- **Thomas L. Brandon**, *Associate Professor*
- **Joseph E. Dove**, *Research Assistant Professor*
- **George M. Filz**, *Assistant Department Head and Charles E. Via, Jr. Professor*
- **Russell A. Green**, *Professor*
- **Matthew Mauldon**, *Associate Professor*
- **C. Guney Olgun**, *Research Assistant Professor*
- **Adrian Rodriguez-Marek**, *Associate Professor and Program Coordinator*
- **Nina Stark**, *Assistant Professor*

Structural Engineering and Materials Program

- **Finley A. Charney**, *Professor*
- **Thomas E. Cousins**, *Professor*
- **W. Samuel Easterling**, *Department Head and Montague-Betts Professor of Structural Steel Design*
- **Matthew R. Eatherton**, *Assistant Professor*
- **Zachary C. Grasley**, *Associate Professor*
- **Ioannis Koutromanos**, *Assistant Professor*
- **Roberto T. Leon**, *David H. Burrows Professor*
- **Cristopher D. Moen**, *Associate Professor*
- **Victoria A. Mouras**, *Assistant Professor of Practice*
- **Carin L. Roberts-Wollmann**, *Professor and Program Coordinator*
- **Kamal B. Rojiani**, *Associate Professor*

Transportation Infrastructure and Systems Engineering Program

- **Montasir Abbas**, *Associate Professor*
- **Thomas A. Dingus**, *Newport News Shipbuilding/Tenneco Professor*
- **Gerardo W. Flintsch**, *Professor*
- **Kathleen L. Hancock**, *Associate Professor (NCR)*
- **Antoine G. Hobeika**, *Professor*
- **Pamela M. Murray-Tuite**, *Associate Professor (NCR)*
- **Hesham A. Rakha**, *Professor*
- **Antonio A. Trani**, *Professor and Program Coordinator*
- **Linbing Wang**, *Professor*

Emeritus Faculty

- **William E. Cox** - *EWR*
- **Donald R. Drew** - *TISE*
- **J. Michael Duncan** - *GEO*
- **Robert C. Hoehn** - *EWR*
- **Siegfried M. Holzer** - *SEM*
- **J. Martin Hughes** - *EWR*
- **David F. Kibler** - *EWR*
- **Robert D. Krebs** - *GEO*
- **Thangavelu Kuppusamy** - *GEO*
- **James K. Mitchell** - *GEO*
- **Thomas M. Murray** - *SEM*
- **John T. Novak** - *EWR*
- **Raymond H. Plaut** - *SEM*
- **Clifford W. Randall** - *EWR*
- **Dusan Teodorovic** - *TISE*
- **Michael C. Vorster** - *CEM*
- **Richard D. Walker** - *TISE*
- **Richard E. Weyers** - *SEM*

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The Vecellio Construction Engineering and Management Program

Mike Garvin, associate professor of civil and environmental engineering, received a research award from the Global Research Challenge division of Arup Corporation.

The Vecellio Construction Engineering and Management Program (VCEMP) is mourning the loss of a friend and colleague, **Julio C. Martinez**, who died on June 4, 2013. Martinez was on the VCEMP faculty from 1996 through 2006 when he transferred to Purdue University. He is best known for the high quality of his research program focused on construction operations modeling, visualization and virtual reality. The main research products of his program include algorithms, methods, procedures, computer-interpretable languages, network-based systems, and most importantly, his students.

VCEMP highlights during this year include the 2013 Vecellio Distinguished Lecture presented by Robert Prieto, senior vice-president of Fluor (see sidebar story) and Michael J. Garvin's transfer from the Myers-Lawson School of Construction to VCEMP to fill the position vacated by Mani Golparvar-Fard's departure.

To help bring all the program area initiatives to fruition, **Sandy Simpkins** continues to provide unwavering, essential and extraordinary administrative support to the program, students, and faculty.

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As for news from the VCEMP faculty, the following paragraphs showcase some of their activities.

Jesus M. de la Garza, the Vecellio Professor in Construction Engineering and Management, received from the Construction Industry Institute (CII) its prestigious 2013 Richard L. Tucker Leadership and Service Award and the 2013 Outstanding Instructor Award. He (with Pardis Pishdad from Georgia Tech) was also awarded a new CII research project to develop a framework for the successful execution of Fast Track projects. de la Garza continues to enhance the Construction Control Techniques course by converting it into an online delivery format. In service to the profession, de la Garza is now in his third year as editor-in-chief for the *American Society of Civil Engineers' Journal of Construction Engineering and Management*. He also serves on the board of directors of the Construction Management Association of America, on the executive committee of the National Academy of Construction, on the National Research Council's (NRC) Board on Infrastructure and the Constructed Environment, and on the NRC Committee on Defense Materials, Manufacturing, and Infrastructure.

Michael J. Garvin taught his graduate course Facility Delivery & Financing Strategies where he hosted guest lecturers from ACS Infrastructure Development, Fluor, Skanska Infrastructure Development, and the Polytechnic University of Madrid. Garvin continued work on a grant from the Virginia Department of Transportation (VDOT) to develop case studies and assess procurement processes in public-private partnerships. He also received two new research awards. The first was awarded by the Arup Corporation as part of its Global Research Challenge. This project will analyze how fiscal support mechanisms are employed by governments to bolster projects that have socioeconomic worth but are not self-sufficient

financially. The second was awarded by the Graduate School as part of its Integrative Graduate Education Program (IGEP) grants. This program, dubbed BioBuild, will look toward the regulatory, adaptive, and integrative properties of biological systems and seek to mimic these in building systems, buildings, and communities. Colleagues John E. Taylor and Deborah Young-Corbett are co-principal investigators in this endeavor.

Garvin is serving as an expert on the Eno Transportation Foundation's Public Private Partnership (PPP) Working Group, chaired by former Transportation Secretaries Mary Peters and Norman Mineta; he is also an expert member of a panel working with the Federal Highway Administration (FHWA) on its PPP Toolkit. Garvin wrapped up his service on a National Cooperative Highway Research Program (NCHRP) panel overseeing the development of the Construction Management at Risk Guidebook. He continues to serve on the editorial boards of the *Engineering Project Organization Journal, Journal of Infrastructure Systems and Public Works Management & Policy* and acts as a specialty editor for the *Journal of Construction Engineering & Management*. Finally, he received a Leadership & Service Award from the Myers-Lawson School of Construction for his service as associate director for the school from 2009-2012.

Victoria Mouras, assistant professor of practice, continues to focus her time and energy on the undergraduate program. She established a new Construction Documents Lab to support activities across the VCEMP; students will use this new lab for the first time during the Fall 2013 semester. Based on her practical experience in the design and construction industry, she recently assumed responsibility for the required senior-level course "Professional and Legal Issues." In recognition of her dedication to teaching, Mouras was awarded a College of Engineering Certificate of Teaching Excellence for 2012-2013. Additionally, her role as the director of assessment for the department has kept her busy readying it for the Fall 2013 ABET reaccreditation visit.

John E. Taylor received a 2013 Dean's Award for Faculty Fellow in the College of Engineering and was awarded the *Journal of Management in Engineering*'s 2012 Best Peer-Reviewed Paper Award at the ASCE annual conference. Over the past year, he has published 11 journal articles in leading journals. Taylor was selected to present his globalization research at the ENR Global Construction Summit in New York City in June 2013. Taylor's Global Virtual Design and Construction course is receiving the 2013 XCaliber Award for teaching with technology from the Provost's Office. He is currently developing a new course on Entrepreneurship in Architecture/Engineering/Construction (A/E/C) to acquaint students with the challenges and opportunities facing new A/E/C ventures. In 2012-2013 Taylor became co-advisor of the Engineers Without Borders student organization. He also serves industry and academia as Academic Liaison of the Construction Industry Institute's Globalization Community of Practice and as editorial board member for three ASCE journals.

Prieto presents 2013 Vecellio Distinguished Lecture


Prieto

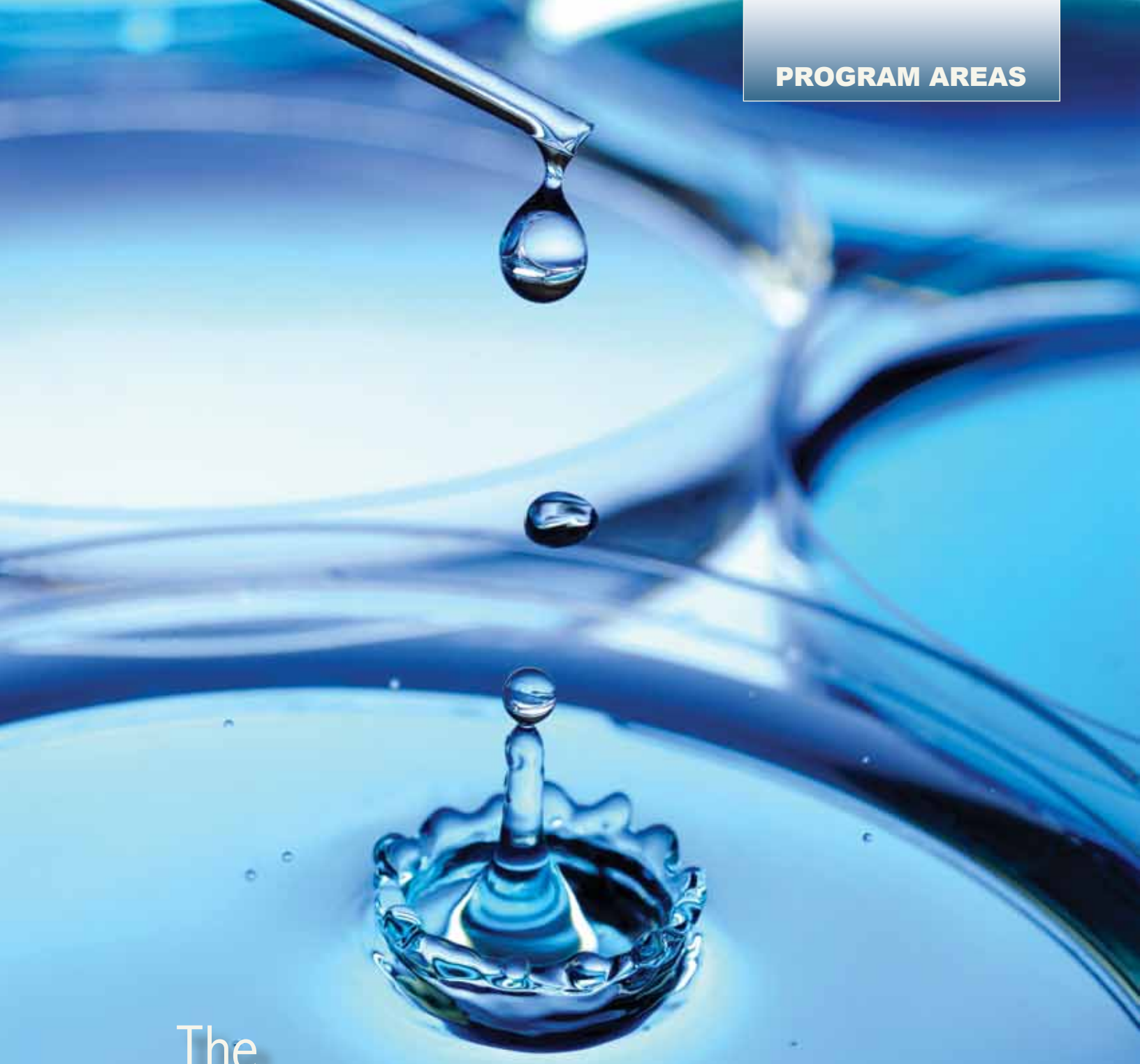
In the Vecellio Lecture, Robert Prieto, a senior vice president of Fluor, presented a world-wind tour of some of the growing challenges in project execution and some of the emerging "arts" that may come to the rescue. Titled "Black Holes, Black Swans, and Black Magic: the emerging Arts of project execution," Prieto looked at three broad challenges represented by black holes, black swans and black magic and suggested how perceptions and tools must change to meet these challenges head on.

In moving through each of the "black" challenges project execution faces, the audience, mostly undergraduate and graduate students, was introduced to: the ESPRIT framework; Kahneman's planning fallacy; reference class forecasting; eigen projects; knowable unknowns; giga projects; cyclomatic complexity analysis; assumption migration; constraint coupling; and inherent resiliency.

Prieto created and explored new territories in the lecture and spoke of opportunities and of challenges for both Virginia Tech and for industry. Prieto told the audience it is part of an "ever-evolving field that needs high quality research, education and well-trained personnel."

He concluded with the assertion that Black Holes, Black Swans and Black Magic are not impediments to the successful art of project execution if one only reaches to the future, embraces today's technologies and creates the new tools and paradigms that tomorrow requires.

At Fluor, Prieto is responsible for strategy for the firm's industrial and infrastructure group. He consults with owners of large engineering and construction capital construction programs across all of the firm's market sectors in the development of programmatic delivery strategies encompassing planning, engineering, procurement, construction and financing. Prior to joining Fluor he served as chair of Parsons Brinckerhoff. He is author of Strategic Program Management; The Giga Factor and Topics in Strategic Program Management as well as over 450 other papers and presentations. He is a member of the ASCE Industry Leaders Council, National Academy of Construction and a Fellow of the Construction Management Association of America.



The Environmental and Water Resources Program

The Environmental and Water Resources (EWR) Program remains well-respected among graduate programs in environmental engineering in the nation, according to the rankings published annually by *U.S. News and World Report.* The superb diligence, commitment, and initiative responsible for this acknowledgement are attributed to the faculty, staff, and students.

The EWR staff, located in both Blacksburg and Northern Virginia, supports a large faculty of approximately 25 individuals and more than 130 graduate students. They help sustain a thriving research program across more than a dozen research labs. Special recognition goes to **Betty Wingate** who completed her 25th year of service at Virginia Tech this year, all within the EWR program. Likewise, the many contributions to the program from **Beth Lucas** and **Merry-Gayle Moeller** merit significant mention as well. Lucas plays an important role in her administrative support to the many off-campus students who are

pursuing MS degrees with an environmental and water resources engineering focus through the Commonwealth Graduate Engineering Program. In the past year the EWR program graduated numerous master's and doctoral students whose acknowledgment section of their thesis or dissertation paid special tribute to EWR's two analytical chemists, **Julie Petruska** and **Jody Smiley**. Their dedication and invaluable expertise enhance greatly the research experiences of many students each year.

The Occoquan Laboratory, the EWR research facility in the National Capital Region (NCR), has 10 staff members who make important contributions to departmental programs. **Barbara Angelotti** and **Alicia Tingen** bring a wealth of years of experience to the overall administrative support of the laboratory, looking after all aspects of fiscal and personnel transactions as well as facilities management. **George Underwood**, **Mark Lucas**, and **Doug Holladay** collectively bring over 75 years of work experience to the field operations of the laboratory. Special recognition is given to **Phil Spellerberg** who retired in the past year after 30 years of service among the field staff of the laboratory. Spellerberg received the 2013 University Staff Career Achievement Award in recognition of his exemplary service. The field staff operates a network of 11 automated stream monitoring stations along with 25 river and reservoir stations that are also regularly monitored. **Joan Wirt**, **Curt Eskridge**, and **Mike Gaal** stay on top of the sample analysis efforts of the laboratory, each year analyzing over 5,000 water samples in support of the laboratory's funded research program. Their efforts help insure that the laboratory maintains its unique accreditation as a university affiliated environmental laboratory. During the past year **Jeanie Taylor** joined the laboratory and has proven to be a welcome addition to the staff. In addition to full-time staff the laboratory is ably supported by shorter-term wage employees, many of whom are students gaining important experience.

Finally, the EWR program is administratively aided in the NCR through the work of **Jeny Beausoliel** who provides administrative support to faculty and students working at the Northern Virginia Center in Falls Church. She provides a welcoming first contact for new EWR graduate students joining the program in the NCR.

Randy Dymond, center, associate professor of civil and environmental engineering, was one of the faculty leaders in getting a new interdisciplinary bachelor's program in real estate approved this year.

The following paragraphs provide information regarding the activities and accomplishments of many of the full-time faculty in the EWR program during the past year.

Gregory D. Boardman received the Enslow-Hedgepeth Award from the Virginia Water Environment Association (VWEA) and gave the opening, keynote address at VWEA's "Wastewater Operations Education Seminar and Operations Challenge Competition." He was elected to the Board of Trustees of the Virginia Section of the American Water Works Association and assigned oversight of the Membership Involvement and Outreach Council, which consists of five committees. He is now working with eight graduate students on seven research projects in the areas of characterizing water and solids from hydraulic fracturing operations, treatment and reuse of industrial wastewater, denitrification of wastewater, removal of siloxanes from digester gas, and digestion of food wastes. He continues to be active in outreach activities: as director of an annual, two-week summer school for operators and as chair of a series of short courses sponsored by the Virginia Department of Health.

Andrea M. Dietrich met with global experts in drinking water quality and aesthetics at a meeting in Taiwan. They are writing the first major book in the 21st century to be published on these topics. Her activities include a successful year of teaching, service, and research. Using both on-campus and distance-learning instruction, she educated students in environmental engineering and chemistry. Through her advisory position with the American Water Works Association student chapter and membership on editorial boards, she actively promotes careers in and advancement of drinking water quality and sustainability. Her research group published 10 articles on diverse topics from stability of drinking water infrastructure to water quality for dairy cows. With her research group, she traveled within the U.S. and globally to give 16 professional presentations related to water quality and safety.

Randy Dymond remains very active in both teaching and research efforts in the areas of land development, urban stormwater modeling, and geospatial information technology. Three of Dymond's nine graduate students

Continued on page 26

finished this year with projects ranging from Blacksburg's urban stormwater modeling to civil information models and visualization. Dymond has five journal papers under review. Besides teaching Hydrology, Land Development Design, and Sustainable Land Development, he worked with Vinod Lohani of engineering education on a project called LabView Enabled Watershed Analysis System (LEWAS), a real-time web-accessible water quantity and data collection system for a stream on the Virginia Tech campus. In an interdisciplinary campus effort, Dymond has been one of the prime movers in getting a new bachelor's program in real estate approved this year. In addition, the Land Development Design Initiative (LDDI) continues to grow with more than 30 sponsoring companies; more information is available at www.lddi.cee.vt.edu

Marc Edwards was an endowed speaker at the Gordon Research Conference on Aqueous Corrosion. Edwards won a faculty advising award from the Association of Environmental Engineering and Science Professors (AEESP) for Simoni Triantafyllidou's Outstanding Dissertation first place award, and from the University Council on Water Resources Competition for Randi Brazeau's Outstanding Dissertation honorable mention citation. Edwards also received the Barus Award for Defending the Public Health and Interest from the Institute of Electrical and Electronic Engineering (IEEE). The institute cited his "demonstrated courage, persistence, and uncompromising dedication to public welfare" over more than a decade of volunteer efforts on lead in water. Edwards is only the 11th recipient of this prestigious award in the last 35 years, which is given to recognize courageous actions to protect the public despite risk to a professional career.

Dan Gallagher and his students continued their risk assessment work on water and food. He was appointed to the executive management team that oversees the $25 million U.S. Department of Agriculture project on E. coli in beef. His teams won two Food and Drug Administration awards this year, one for collaboration and the other for exceptional achievement in developing a cross-contamination model for retail delis. He presented the results of his research at various national and international conferences, and conducted outreach by holding seminars and webinars with industry and consumer groups.

Adil Godrej and his group continued their Occoquan modeling activities by starting work on a model for the 2008-2012 period, using data that was mostly gathered from the monitoring activities at the Occoquan Laboratory. A loading analysis for nitrogen discharges from the Upper Occoquan Service Authority's water reclamation plant will be performed to establish the monthly pattern of loading that they should use to optimize their discharge, keep within their annual limits, and benefit the reservoir by increasing the nitrate content of the discharge in summer. (The nitrate is converted to nitrogen gas in the absence of oxygen in the deep waters of the reservoir in summer, thus preventing the release of phosphorus and other species and aiding in protecting the Chesapeake Bay). Godrej, along with Glenn Moglen, will co-advise a Ph.D. student on an international project that will use the model to examine changes in hydrology and water quality expected under climate change conditions. John Little and Tom Grizzard are the other Virginia Tech collaborators on the project.

Tom Grizzard, director of the Occoquan Laboratory, continues to oversee research programs in Northern Virginia focused on managing critical water resources in urbanizing watersheds. Grizzard works on an expert panel with the Virginia Department of Environmental Quality to develop protocols for assessing the performance of both proprietary and non-proprietary urban stormwater control technologies. Grizzard is also doing research in developing cost-effective ways to retrofit existing stormwater management systems to achieve results that will better support Chesapeake Bay restoration efforts. Along with the other faculty and staff at the Occoquan Lab, Grizzard continues to provide sound scientific information for managing water quality in the Occoquan Reservoir. In 2013, Grizzard marked the 10th anniversary of his service on an international panel working with the Republic of Singapore to manage water resources in one of the world's most densely populated cities.

Erich Hester's research focuses on how stream hydraulics and human actions in watersheds influence ecological health and water quality in streams and river systems. Four graduate students continued to work on core research areas such as the impact of stream restoration practices on water quality and the effect of preferential flow on stream-groundwater interaction funded by the National Science Foundation (NSF) and the Virginia Tech Institute for Critical Technology and Applied Science (ICTAS). Three graduate students matriculated, while two more joined the group. One will work on a grant from Wells Fargo to evaluate the ability of cutting edge geophysical techniques to determine where water pollution originates within coal mine valley fills. Hester and John Little also published an article about measuring environmental sustainability at the watershed level. It was featured on the cover of *Environmental Science & Technology*. Also, Hester supervised four NSF-Research Experience for Undergraduates awardees this summer that assisted with the above projects.

Jennifer L. Irish continued research on coastal hazards via seven grants, including those funded by the NSF. Research activities included Hurricane Sandy field surveys and advances in statistical methods for coastal flooding. Irish was appointed to the U.S. Department of the Interior's Strategic Sciences Group — Operational Group Sandy, whose outcomes were reported directly to the Hurricane Sandy Rebuilding Taskforce established by President Obama. Her group authored three journal papers and one book chapter, and Irish was invited to present her research at the Ameri-

can Geophysical Union's fall meeting. Irish continues to be active with the American Society of Civil Engineers (ASCE) as secretary of the Coasts, Oceans, Ports, and Rivers Institute and as a member of the Academy of Coastal, Ocean, Ports, and Navigation Engineering Board of Trustees. She is co-editor of the forthcoming Springer Handbook on Ocean Engineering, Part C: Coastal Design. This spring, Irish introduced a graduate course on advanced coastal engineering.

William Knocke completed his three-year appointment as the associate vice president for research at Virginia Tech in the summer of 2013, and returned to the EWR program as coordinator in July. He will continue to have certain research leadership duties within the Office of the Vice President for Research, but will focus most of his time on teaching and research within the program area. Knocke continues to emphasize drinking water treatment technologies in his research work, with primary emphasis on iron and manganese control methods. During the past 18 months, he has worked with three co-authors from around the U.S. to prepare a comprehensive guidance manual on manganese control in drinking water treatment situations, written to help utilities and design engineers develop enhanced strategies and processes for implementation.

During the last year, **John Little** gave invited presentations on his research in Basel, Switzerland; Golden, Colorado; Wuhan, China; Kiel, Germany; Tianjin, China; Beijing, China; Cologne, Germany; and Budapest, Hungary. He was invited by the editors of *Atmospheric Environment* to prepare a special issue of the journal that will focus on "Sources and Fates of Semivolatile Organic Compounds (SVOCs) in Indoor Environments." He also served as chair of the Association of Environmental Engineering and Science Professors (AEESP) Ph.D. Dissertation Award Sub-Committee. While continuing to be active in research on emissions of SVOC from building materials as well as on the oxygenation of lakes and reservoirs, Little has begun to broaden his research expertise into the area of environmental sustainability, with a particular emphasis on the various orientors, indicators, and frameworks that are used to evaluate the sustainability of societal systems.

Using both on-campus and distance-learning instruction, Andrea Dietrich, professor of civil and environmental engineering, educates students in environmental engineering and chemistry.

Linsey Marr's research group in air quality engineering addresses the environmental impacts of nanomaterials in the atmosphere, quantification of air pollutant emissions, and transmission of the flu via aerosols. Graduate students and post-doctoral researchers are determining the transformation, transport, and fate of various nanomaterials in incinerators and of fullerenes in the atmosphere. They are also collaborating with a group in electrical and computer engineering on a National Institutes of Health (NIH) funded project to develop a micro-gas-chromatograph for measuring personal exposure to air toxic compounds. In collaboration with a construction

Continued on page 28

A student conducts research in the interdisciplinary Water INTERface lab.

management professor, researchers are benchmarking the carbon footprint of earthmoving operations. The goal of a new project funded by ICTAS is to develop a low-cost sensor for detecting the influenza virus in air. The group's research on the relationship between humidity and influenza virus survival was featured in the *Wall Street Journal*. Marr was promoted to professor this year.

Glenn Moglen continues his research in the areas of land use change, climate change, flooding, and water supply. Moglen is providing input to the Federal Emergency Management Agency (FEMA) map modernization project, developing flood estimates at thousands of design points in several Maryland counties. Further, Moglen has developed a web site to allow tailored geographic information system-based analyses of flooding and nutrient loading behavior under future land use change on the DelMarVa Peninsula. ASCE has accepted his paper related to the DelMarVa research for publication in its *Journal of Hydrologic Engineering*. Also accepted in this journal is a paper forecasting water supply in the Occoquan system under future land use and climate change. Both papers are due out this year in hard copy. Moglen is writing a textbook on Open Channel Flow to be published by the CRC Press in 2015. A full 25 years after earning his Engineer In Training designation, Moglen finally sat for and passed the Professional Engineers' exam. In February 2013, Moglen was elected a Fellow of ASCE. Moglen continues his service to ASCE as secretary and member of the watershed management technical committee.

Amy Pruden, together with Marc Edwards, Annie Pearce, and Anisha Patel, were the recipients of a prestigious Alfred P. Sloan Foundation award, which will enable them to explore the "building plumbing microbiome." This research will open new avenues for understanding why pathogens, such as Legionella, sometimes colonize in drinking water systems and will support new solutions for controlling waterborne disease outbreak.

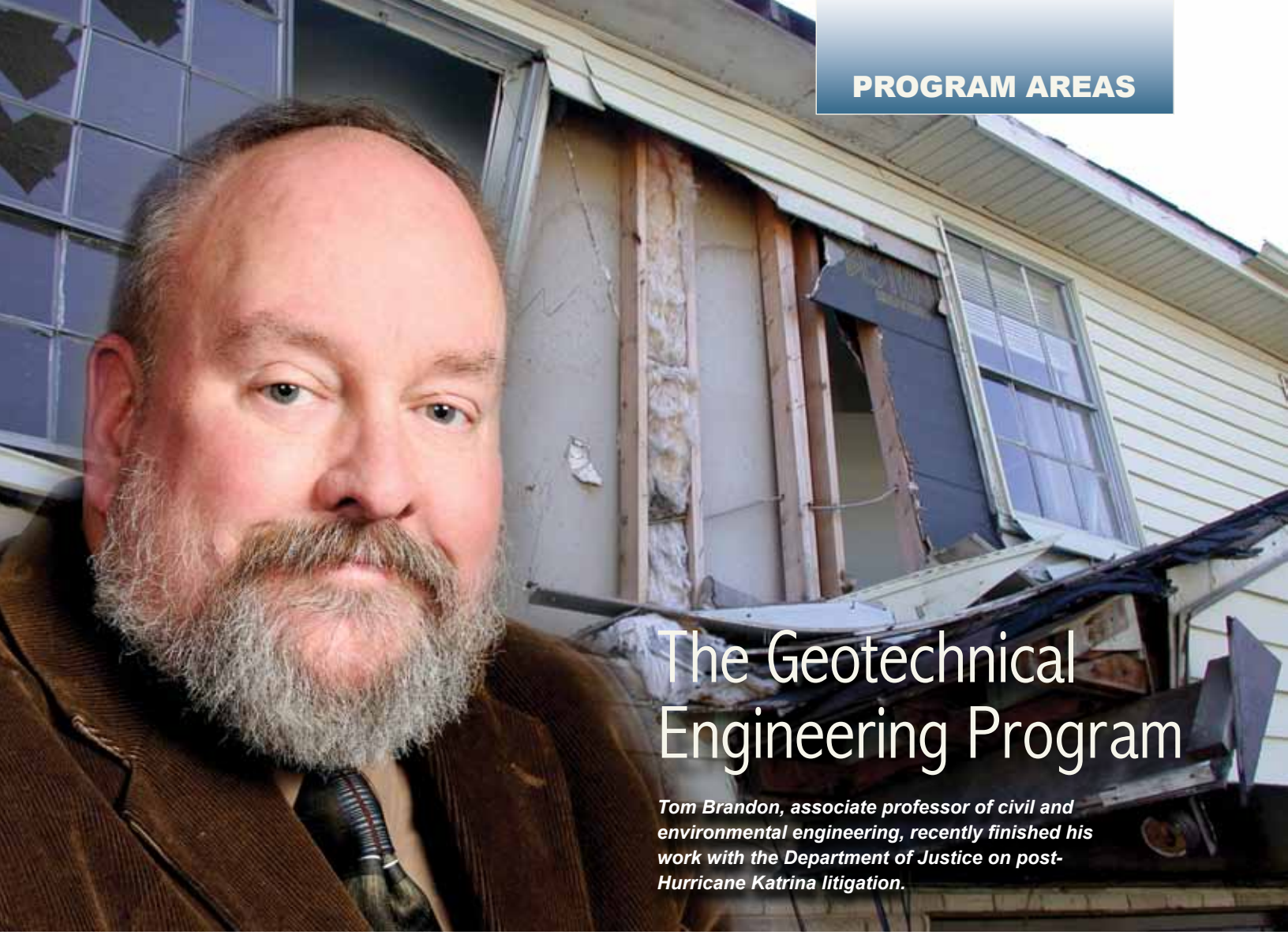
The Environmental and Water Resources (EWR) Program remains well-respected among graduate programs in environmental engineering in the nation, according to the rankings published annually by* U.S. News and World Report. *The superb diligence, commitment, and initiative responsible for this acknowledgement are attributed to the faculty, staff, and students.

Pruden's work on understanding environmental pathways of antibiotic resistance also gained national media attention as her research revealed the presence of antibiotic resistance genes in recycled wastewater and brought to light potential concerns when the water is used for snowmaking at ski resorts. Pruden also enjoyed teaching CEE 5194 Environmental Engineering Microbiology and working together with Peter Vikesland, Joe Falkinham, and Brenda Davy on developing a new course, GRAD 5139, which explores the science and practice of interdisciplinary research.

Paolo Scardina is active in the classroom, instructing a number of environmental water resources courses. To support his classroom instruction, Scardina completed the year-long New Faculty/Early Career Certificate Program administered via the Virginia Tech Center for Instructional Development and Educational Research (CIDER). Scardina is also the faculty adviser for the Virginia Tech ASCE student chapter. He attended the national ASCE Practitioner and Faculty Adviser Training Workshop and was awarded an official 2013 Certificate of Commendation from ASCE national for his efforts as faculty adviser.

Mark Widdowson continued his leadership role in the CEE faculty-led study abroad program in the Punta Cana region of the Dominican Republic, including teaching of a senior/graduate level course called Sustainable Water Supply and Reuse. Widdowson and his colleagues presented papers at the International Symposium on Bioremediation and Sustainable Environmental Technologies and meetings of CUAHSI and the U.S. Geological Survey NAWQA Program. He was an invited participant in the Department of Defense's (DoD) workshop on "Long Term Management of Contaminated Groundwater Sites." Widdowson provided external reviews for the State of California and the U.S. Environmental Protection Agency on policies related to intrusion of vapors into buildings at petroleum-contaminated sites. In addition, Widdowson continued administrative duties as assistant department head, including overseeing the department's graduate program and its efforts to expand international programs.

In 2012, **Husen Zhang** started his research and education activity in the EWR program. He obtained funding from the Virginia Bioinformatics Institute and from the Fralin Life Science Institute Small Grants Program to study cause-and-effect relationship between intestinal microbiota and host immunity. His research team includes Xin Luo, a biologist from the department of biomedical sciences and pathobiology. In 2012, Zhang published a paper "Methanogens in human health and disease" in the *American Journal of Gastroenterology Supplements* with coauthors Mark Pimentel from Cedars-Sinai Medical Center, Robert Gunsalus from UCLA, and Satish Rao from University of Iowa. He started to serve on graduate student thesis committees with Amy Pruden. He also served as a panelist for NSF.



The Geotechnical Engineering Program

Tom Brandon, associate professor of civil and environmental engineering, recently finished his work with the Department of Justice on post-Hurricane Katrina litigation.

The Geotechnical Engineering Program had a very productive year. Its national and international visibility is reflected in the large number of awards conferred to its faculty members. Among these, **Mike Duncan** and **Tom Brandon** gave keynote lectures at the American Society of Civil Engineers' (ASCE) GeoCongress conference in San Diego, Calif.; **Guney Olgun** presented a keynote lecture at the Sowers symposium in Atlanta, Ga.; and **Jim Mitchell** delivered the keynote lecture at the Southeastern Transportation Geotechnical Engineering Conference in Richmond, Va. **Russell Green** received the 2013 Virginia Tech Alumni Award for Excellence in International Research. The geotechnical faculty is also active in important consulting projects at a national and international level.

The Center for Geotechnical Practice and Research (CGPR) continues to serve as an important link between academia and practice. Its annual meeting serves to connect regional and national members to the geotechnical faculty and graduating students, and CGPR-funded research benefits both the academic and professional communities.

Several changes have occurred with the geotechnical engineering faculty. **Jimmy Martin** left the civil and environmental engineering (CEE) department after 28 years at Virginia Tech to become the department chairman of the Glenn Department of Civil Engineering at Clemson University. CEE will miss his contributions to the program and his camaraderie, and it welcomes **Nina Stark** to the program. Her expertise is in marine engineering, and she will be working both with the geotechnical and the water resources faculty.

The program has benefited greatly from the administrative support provided by **Lisha Farrier** and **Sandy Simpkins**.

The various activities of the individual Geotechnical Program faculty members are summarized in the paragraphs below.

T.L. Brandon wrapped up his work with the Department of Justice regarding the post-Hurricane Katrina litigation. After several years of effort, the final court case was held in 2012, and the Federal court ruled in favor of the Corps of Engineers. Brandon is on research leave for 2013. He presented one of the keynote lectures at the ASCE GeoCongress conference in San Diego in 2013 on the shear strength of soil. He is spending the bulk of his time at the Corps of Engineers' Engi-

neering Research and Development Center (ERDC) in Vicksburg, Miss., working on levee-related issues. He is also a member of the team rewriting the levee design manual and is teaching short courses for ERDC and the Jacksonville and Vicksburg Districts of the Corps of Engineers during his sabbatical.

Joe Dove continued his collaboration with Patricia Dove, professor of geosciences, and CEE graduate students in developing novel methods to improve the engineering behavior of soils. He is working with Jim Mitchell and Ph.D. student Craig Shillaber in developing a methodology to evaluate energy use and CO_2 release during ground improvement. Other areas of active research include the application of advanced sensing techniques for site investigation, infrastructure assessment, and hazard detection; engineering for sustainability; and, bio-inspired materials. He serves the department as one of the academic advisors for undergraduate majors and as chair of the curriculum committee.

Mike Duncan worked with George Filz as co-director of the CGPR, and supervised CGPR and CEE student research projects. He advised a group of graduate students to plan the renovation of the Ozawa Geotechnical Library in Patton Hall, and the development of a high-tech space in the library for group projects and presentations. He gave the opening keynote lecture at the ASCE GeoCongress in San Diego, Calif., where he also presented a paper on the impacts of time on reinforced slopes, co-authored papers on fully softened shear strength of clay, probability of failure of slopes, and analysis of transient seepage through levees, and served on panels for discussions of slope behavior and design. He co-authored a paper on the use of the finite element method for slope stability analysis presented at the International Conference on Soil Mechanics and Geotechnical Engineering in Paris, France. He and T.L. Brandon developed the second edition of the book, Soil Strength and Slope Stability. During the past year he served on consulting boards for the Panama Canal, for Oconee Dam in South Carolina and Ashton Dam in Idaho, and for the design of a new off-channel reservoir on the Lower Colorado River in Texas.

The Geotechnical Engineering Program had a very productive year. Its national and international visibility is reflected in the large number of awards conferred to its faculty members.

George Filz's research projects and sponsors include an accessible knowledge base for soil improvement technologies for transportation infrastructure renewal from the Strategic Highway Research Program 2 (SCHRP2); foundation support for bridge abutments using mechanically stabilized earth systems with the Virginia Center for Transportation Innovation and Research/Virginia Department of Transportation (VDOT); compilation of deep-mixing case histories and stability of slopes reinforced with various types of columns with CGPR; and design procedures for pile-supported floodwalls with the National Science Foundation and the Army Corps of Engineers). Filz made presentations based on his research at conferences and seminars in Berkeley, Calif.; Brussels, Belgium; Davis, Calif.; Portland, Ore.; San Diego, Calif.; Stockholm, Sweden; and Wollongong, Australia. Filz serves as assistant CEE department head, director of the CGPR, faculty advisor of Virginia Tech's Geotechnical Student Organization, member of VDOT's Geotechnical Research Advisory Committee, member of the ASCE Geo-Institute Soil Improvement Committee, and consultant on geotechnical design and construction projects.

Russell Green is actively working on several continuing research projects. Most notably, Green is continuing his work studying the 2010-2011 Canterbury, New Zealand earthquake sequence. Green spent two months at the University of Canterbury in Christchurch, New Zealand, again this year, giving lectures and performing collaborative earthquake research. In addition to his oldest son Owen, Green was accompanied to Christchurch by one of his master's research students, Lake Carter, a Via Fellow, who received an NSF East Asia and Pacific Summer Institute Fellowship to perform research on the earthquakes. Because of his research efforts in New Zealand, as well as in Iceland, Japan, and Haiti, Green was awarded the 2013 Virginia Tech Alumni Award for Excellence in International Research. He has additionally continued work on a U.S. Geological Survey funded project on paleoliquefaction investigations of sites of recurrent liquefaction, an NSF sponsored project on the development of an energy-based liquefaction evaluation procedure, and a Tennessee Valley Authority project on the dynamic properties of coal combustion products. The latter two projects are in collaboration with Adrian Rodriguez-Marek.

Matthew Mauldon has research underway related to fluvial erosion of fractured rock, with application to stability of high head arch dam spillways and abutments. This work, which includes flume studies with a model fractured rock material, has been carried out with geotechnical engineering graduate students and Panos Diplas of CEE. Mauldon has also begun to investigate the use of underground mines as a resource for thermal energy storage, and as a potential ground source for geothermal recovery loops coupled to heat pumps. Mauldon serves on the editorial boards of *Rock Mechanics and Rock Engineering* and the *Korean Journal of Civil Engineering*.

Jimmy Martin led three engineering research projects related to recent earthquakes in Japan, New Zealand, and Washington D.C., and one in-

Continued on page 32

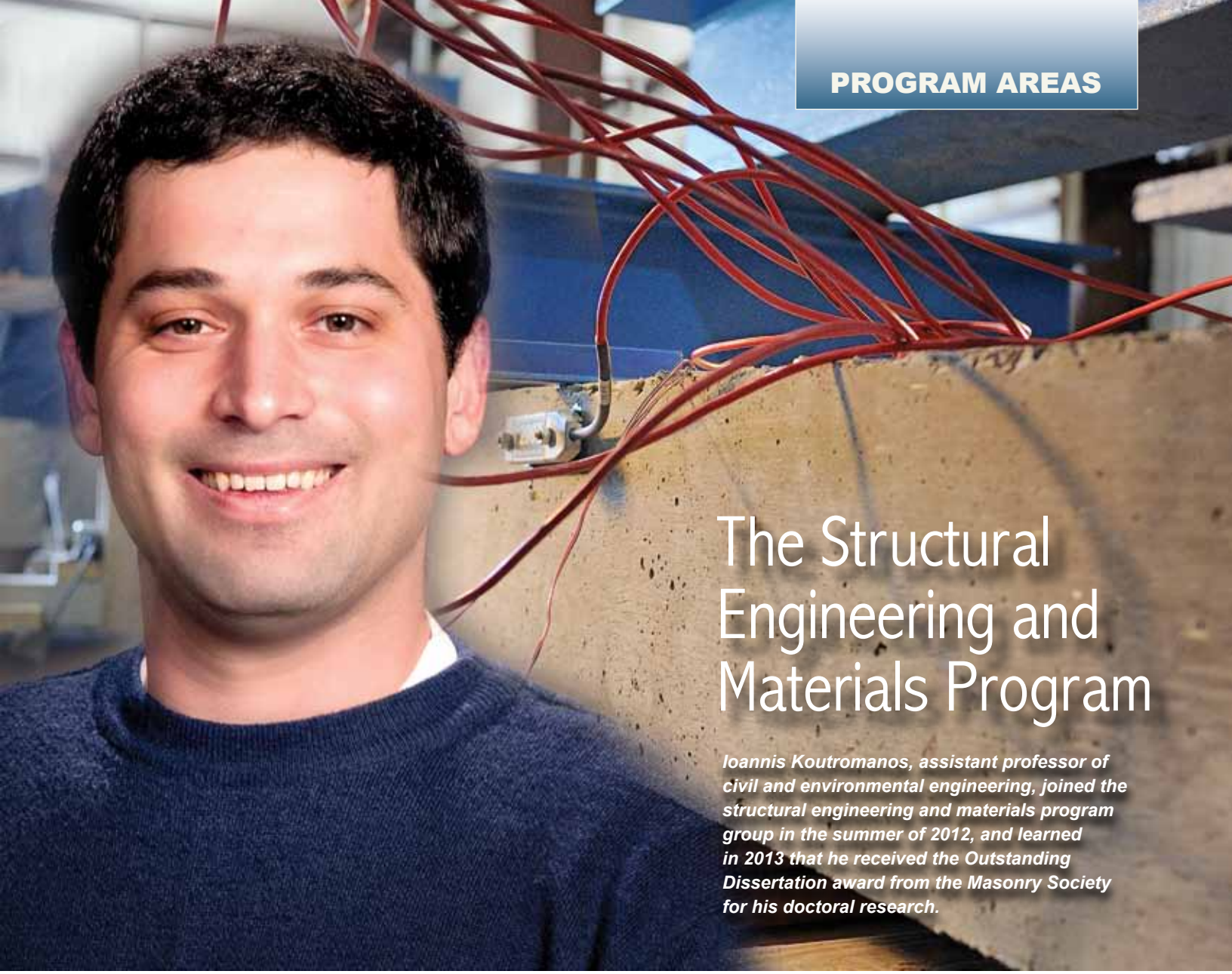
volving the use of energy piles for the Middle East. He led efforts to instrument the Washington Monument for dynamic structural assessment, and organized a regional earthquake engineering workshop for regional stakeholders at the Smithsonian Institution. He presented a state-of-the-art lecture on soil improvement for seismic mitigation for the Los Angeles GeoInstitute (Queen Mary series), and a lecture series for the Virginia Engineers Conference. Much of his efforts were related to the interdisciplinary university Disaster Risk Management (DRM) center that he directed. In the past year, DRM developed a new graduate program supported by the Virginia Tech graduate school, acquired a large project from the World Bank to develop disaster mitigation strategies for 57 Islamic countries, and helped lead a new regional land-grant university initiative between Virginia Tech and three other institutions. In related DRM work, he co-organized and co-sponsored an international disaster resilience conference in Portugal. He serves as one of three co-editors of the special journal issue on disaster resilience under development from that event. Martin recently accepted the chair position at the Glenn Department of Civil Engineering and Clemson, and has been appointed adjunct professor in civil and environment engineering and will maintain close ties to Virginia Tech.

Emeritus Professor **Jim Mitchell** co-authored a CGPR report on "The Future of Geotechnical Engineering." He is co-advising Ph.D. research on methods for incorporating sustainability considerations in ground improvement projects. He presented a one-day short course on ground improvement in Toronto in January. He was the keynote speaker at the annual meeting of the Southeastern Transportation Geotechnical Engineering Conference in Richmond, Va., in October, participated as a speaker and workshop chair at the 4th International Conference on Site Characterization in Porto de Galinhas, Brazil in September, and chaired the session commemorating the legacy of Ralph Peck at the 7th International Conference on Case Histories in Geotechnical Engineering in Chicago in May. Mitchell's consulting activities included the design review board for a large copper tailings storage facility in Utah, a review board for ground movement evaluation and stabilization of the I-20 Mississippi River Bridge at Vicksburg, Miss., a technical peer review panel for the Elliot Bay Seawall Replacement project in Seattle, Wash., and the peer review panel for research on soft zones at depth beneath the Savannah River Site in South Carolina. He was elected an honorary member of the inaugural class of the Academy of Distinguished Alumni of the Department of Civil and Environmental Engineering, University of California, Berkeley.

Guney Olgun is continuing his research and outreach efforts on energy geotechnology, spanning a wide range of areas from energy piles to energy geostorage. He organized an international workshop in Lausanne, Switzerland, focusing on pressing issues on energy foundations. He gave several invited lectures on energy piles across the country, including the state-of-the-art lecture during the Sowers Symposium in Atlanta organized by the Georgia Chapter of the Geo-Institute. He also developed and presented an ASCE webinar on energy piles. He is currently leading an NSF funded project to study the performance of energy piles through full-scale field tests. As an extension of this project he is also investigating the use of ground-source heating for deicing of bridge decks in collaboration with Cris Moen from the Structural Engineering and Materials program. Olgun is also leading another NSF funded project to study the use of soil-mix panels for ground reinforcement during earthquakes. This study is led by Virginia Tech and it also involves three other universities where shake table tests, dynamic centrifuge testing and full-scale field testing are conducted.

Adrian Rodriguez-Marek's research includes a project focused on the characterization of the dynamic behavior of coal combustion residuals funded by the TVA and an NSF-funded project studying an energy-based methodology for liquefaction assessment. These two projects are in collaboration with his colleague Russell Green. In addition, Rodriguez-Marek is the lead in a multi-institutional project that studied the effects of surface topography on strong ground motions using physical modeling in a geotechnical centrifuge along with numerical modeling and empirical analyses of recorded data. This project will lead to an improvement in hazard assessment for regions with irregular topography. He has also received funding from the French national power company to conduct research on seismic hazard assessment for nuclear power plants. He has also actively participated in various seismic hazard assessment projects for nuclear power plants in South Africa and various locations in the United States.

Nina Stark is investigating changes and variations of geotechnical properties of coastal sediments with regard to subaqueous sediment dynamics and coastal engineering. In the last year, she worked on gravel beach dynamics including a large field experiment in Advocate Harbour, Nova Scotia, site characterizations for tidal energy converters in the Bay of Fundy, the deepening of the navigation channel in Sydney Harbour, Nova Scotia, and an experiment in collaboration with MARUM of Bremen, Germany, and dotOcean of Zeebruegge, Belgium to test and assess the performance of dynamic penetrometers suitable for coastal and marine deployments. She presented results at the annual meetings of the Canadian Meteorological and Oceanographic Society and the American Geophysical Union, as well as at the Nova Scotian Symposium for Tidal Energy and the International Symposium for River, Coastal and Estuarine Morphodynamics. Also, she gave seminars at Dalhousie University, Halifax, and Cape Breton University, Sydney. Furthermore, she is collaborating with Blue C Designs in Halifax to develop and commercialize a new dynamic penetrometer for geotechnical investigations in coastal zones with difficult access.



The Structural Engineering and Materials Program

Ioannis Koutromanos, assistant professor of civil and environmental engineering, joined the structural engineering and materials program group in the summer of 2012, and learned in 2013 that he received the Outstanding Dissertation award from the Masonry Society for his doctoral research.

The faculty in the Structural Engineering and Materials (SEM) Program continued to excel in teaching, research, and outreach, and they were recognized with many prestigious awards.

Roberto Leon received the 2013 Tewksbury Award from the American Society of Civil Engineers/Structrual Engineering Institute (ASCE/SEI) for his contributions to the organization. **Carin Roberts-Wollmann** was named a Fellow of the American Concrete Institute (ACI) and the Precast/Prestressed Concrete Institute (PCI). In recognition of her dedication to teaching **Vickie Mouras** was awarded a College of Engineering Certificate of Teaching Excellence for 2012-2013. For his efforts in research, teaching, and outreach, **Matt Eatherton** received the 2013 Outstanding Assistant Professor award from the College of Engineering. And in recognition of his innovative teaching techniques, his involvement of undergraduate students in research and publication, and his commitment to K-12 outreach, **Zach Grasley** received the Walter P. Moore Jr. Faculty Achievement Award from ACI.

The SEM graduate program has almost 100 new and continuing graduate students, with more than 50 of these students participating in research. The Thomas M. Murray Structural Engineering Laboratory is busy with a large number of projects, involving more than 30 graduate and undergraduate students. Over the past year, the lab has acquired several new MTS actuators and several new data acquisition systems, which will allow even more projects to be underway simultaneously on the lab floor. The busy lab runs smoothly thanks to the efforts of **Brett Farmer**, **Dennis Huffman**, and **David Mokarem**.

The following paragraphs provide more detail about the faculty members' activities over the past year:

Finley Charney has continued his research on Performance Based Earthquake Engineering, funded by a variety of entities including the National Institute of Standards and Technology (NIST), the American Institute of Steel Construction (AISC), and the Depart-

Continued on page 34

ment of Agriculture's Wood Council. He is active in technical committee work and other activities for ASCE, AISC, the Federal Emergency Management Agency (FEMA), and the Building Seismic Safety Council (BSSC). In particular, Charney has worked with a variety of groups on updating and improving the linear and nonlinear seismic structural analysis provisions for the ASCE 7 Standard. He teaches professional seminars in earthquake engineering, most recently for ASCE, FEMA, and Bechtel Engineering. He has also completed the second edition of his book, Guide to the ASCE 7 Seismic Load Provisions. During the spring semester of 2013, Charney offered a new CEE graduate course "Advanced Topics in Earthquake Engineering." Over the past year he worked with the Virginia Tech International Programs group to establish a dual Ph.D. program with Catholic University in Santiago, Chile. One Virginia Tech Ph.D. student is already enrolled in this program, and Charney will spend the first half of 2014 as a Visiting Scholar at Catholic University.

Tommy Cousins offers prestressed concrete and bridge design courses and focuses his research efforts on challenges associated with bridge performance and longevity. He is involved in two Virginia Department of Transportation (VDOT)-sponsored multi-year bridge innovation implementation projects. For the first, he is partnering with Carin Roberts-Wollmann and two graduate students to help VDOT bridge engineers develop and implement inverted T-beams topped with a cast-in-place deck on a bridge near Richmond, Va. This style bridge is an alternative to the traditional adjacent box beam or voided slab bridges used in short to medium spans. The second project is investigating improved connection details for adjacent box beam and voided slab bridges. Ultra High Performance Concrete (UHPC) is being considered for use as a more durable connection filler material. Cousins and Roberts-Wollmann are part of a USDOT University Transportation Center located at Rutgers University. Currently three projects are underway, with one project in collaboration with researchers at Utah State University. This project's focus is the development and implementation of a rapid bridge condition assessment system.

Matthew Eatherton's research group is focusing on developing new structural systems with enhanced earthquake performance and improved seismic resilience. Two ongoing research projects include developing steel plate shear walls that resist buckling and a self-centering moment frame that will not require repair after most earthquakes. His group is also improving the seismic performance of existing types of structures. They recently concluded a set of full-scale tests on moment frame connections to investigate the effect of defects on the seismic performance of moment frames. Other active research projects include experimentally evaluating and characterizing the seismic behavior of cold-formed steel members and connections, developing procedures for tightening super high tension bolts, and developing a new spectral matching algorithm using wavelet transforms and a nonlinear solution scheme. Eatherton's research group is also active in outreach activities and professional service. They hosted learning activities at C-Tech^2 summer camp, Engineering Open House, Blacksburg High School, and elsewhere. He hosted two international visiting scholars from prestigious universities in China. Eatherton is a member of five professional committees and contributed to the structural engineering profession this past year by authoring two steel plate shear wall design examples to be used by practicing structural engineers.

Zachary Grasley joined the SEM group in August 2012, teaching the undergraduate civil engineering materials course and a graduate course on constitutive behavior of cement-based materials. He is advising the department's concrete canoe team, and off-campus he is secretary of ACI Committee 236 – Materials Science of Concrete. Grasley's research has focused on fundamental behavior of cement-based materials that relates to improving the sustainability of our nation's infrastructure. He has several ongoing funded projects. The National Science Foundation (NSF) supports Grasley's work on modeling the viscoelastic properties of concrete through a CAREER award, along with two new projects that started in 2013. One of these new projects focuses on developing a model that couples chemical reactions, microstructure evolution, and mechanical properties of cement-based materials. Grasley also has two ongoing projects funded by the Qatar National Research Fund. One concentrates on evaluating the ability of concrete to be used as the sole containment material for liquefied natural gas storage, which, if feasible, could save around $100 million on a typical storage tank. His other Qatar National Research Fund project emphasizes the utilization of carbon nanofibers and nanotubes in cementitious materials, with the goal to improve the durability and mechanical properties.

Ioannis Koutromanos, who also joined the group in the summer of 2012, continues his research work on masonry-infilled reinforced concrete (RC) frames. More specifically, he has developed, calibrated, and used refined finite element models to investigate the effectiveness of a retrofit method based on overlays of Engineered Cementitious Composite (ECC). His refined analyses have allowed the establishment of simplified design equations for an ECC-retrofitted infilled frame. Earlier this year, he received the Outstanding Dissertation award from the Masonry Society (TMS) for his doctoral research, which combined large-scale experimentation and refined analysis to shed light on the performance of old, non-ductile, infilled frame construction. Koutromanos is developing simulation tools for the analysis of RC and masonry structures under multi-directional earthquake excitations, based on nonlinear shell analysis. He is working on the use of the nonlinear truss analogy for the seismic collapse assessment of low-rise, reinforced masonry shear wall structures. Two

graduate students have been recruited and work under his supervision in the aforementioned areas.

Roberto Leon is conducting research in three principal areas. The first area centers on the deflection behavior of composite floors, with the results being submitted to the AISC for possible inclusion in its 2016 specifications. The second area is connections to concrete-filled tube (CFT) columns, with emphasis on the use of diaphragms and shape memory alloy materials; the goal is to increase the use of CFT columns in buildings of low to moderate heights. The third area is the role of floor diaphragms in distributing seismic loads to lateral force resisting systems; current analyses programs often use an assumption of a rigid diaphragm but the limitations of this approach to horizontally and vertically irregular buildings is unknown. Leon also works on issues related to passive wireless antenna sensors for building and bridge monitoring, retrofit of older reinforced concrete buildings and progressive collapse of bridges. Last spring, Leon developed and taught a new course on failures in civil engineering structures that included an introduction to forensic engineering based on both a large number of case studies and a broad conception of failure, its origins, and formal approaches to its investigation. The course also delved into the role of building codes, ethical standards, government, and legal issues as related to forensic engineering. He serves on numerous technical committees of ACI, ASCE/SEI and AISC and on the boards of the ASCE/SEI, the Earthquake Engineering Institute (EERI), and the Applied Technology Council (ATC).

Cris Moen and his research group are working towards a goal of advancing infrastructure safety, efficiency, and durability. His team collaborates closely with the steel industry with a specific focus on light steel framed buildings. Moen and his students recently validated a new hurricane design method for metal buildings that engineers nationwide are being trained to use. His group, including co-principal investigator (PI) Eatherton, is wrapping up a multi-year study on the seismic performance of thin-walled cold-formed steel members and connections for the American Iron and Steel Institute (AISI), This work will soon be integrated into a new AISI code specification for light-framed building earthquake design. Moen also recently kicked off a new three year NSF project in collaboration with University of Massachusetts at Amherst and Johns Hopkins University that will provide practicing engineers advanced tools for considering system reliability in building and bridge design. On the transportation infrastructure and materials front, Moen and his group are collaborating with Northwestern University on an NSF project to validate a computational tool that simulates cracking and failure of reinforced, prestressed, and ultra high performance fiber reinforced concrete (UHP-FRC) columns and beams. His team is also closing in on revamped bridge deck design method for the Virginia Department of Transportation which has the potential to double service life with corrosion resistant reinforcing bars and new design details that limit cracking.

The SEM graduate program has almost 100 new and continuing graduate students, with more than 50 of these students participating in research.

Victoria Mouras, assistant professor of practice, continues to focus her time and energy on the undergraduate program by teaching fundamental structural design courses. Based on her practical experience in the design and construction industry, she recently assumed responsibility for the required senior-level course "Professional and Legal Issues." Additionally, as the department's Director of Assessment, she led the preparations for the Fall 2013 ABET reaccreditation visit.

Ray Plaut, who retired in 2008, is a full-time voluntary teacher's aide in a local kindergarten class. He continues to conduct research, and collaborates with Cris Moen. Papers on lifting of curved girders were published in 2012, and a paper on the stability of curved girders resting on bridge piers is under review at a journal. Plaut published papers on geotextile tubes used to dewater mine tailings slurry in a journal and in the proceedings of GeoAmericas 2012, a conference held in Peru. He also published papers on the stability of carbon nanotubes, the response of structures to dynamic loads, mathematical models of the motion of a woman's ponytail during walking and running, and large deflections of circular elastic plates. He is working with faculty and students in the Department of Engineering Science and Mechanics on mathematical models of the Slinky, and on dielectric-elastomer valves to control flows of microfluids.

Carin Roberts-Wollmann has several new and ongoing bridge related research projects funded by USDOT, FHWA and Virginia Center for Transportation Innovation and Research (VCTIR). In addition to the projects noted by Cousins previously in this report, she also worked with him to perform live load tests and long term monitoring of the Varina-Enon Bridge for VCTIR to investigate the influence of long-term prestress losses, in combination with temperature effects, on the behavior of the joints in this segmental box girder bridge. She participates in committee activities of the ACI, where she is the chair of Committee 423 – Prestressed Concrete and serves as a member of Sub-Committee 318G working on reorganization of the ACI 318 Building Code and Commentary. She is also active in PCI and the Transportation Research Board, where she chairs the committee on concrete bridges. She works with the "Concrete for Kids" outreach program, which was presented to over 120 middle and high school students at C-Tech^2 and Imagination camps during the summer of 2013.

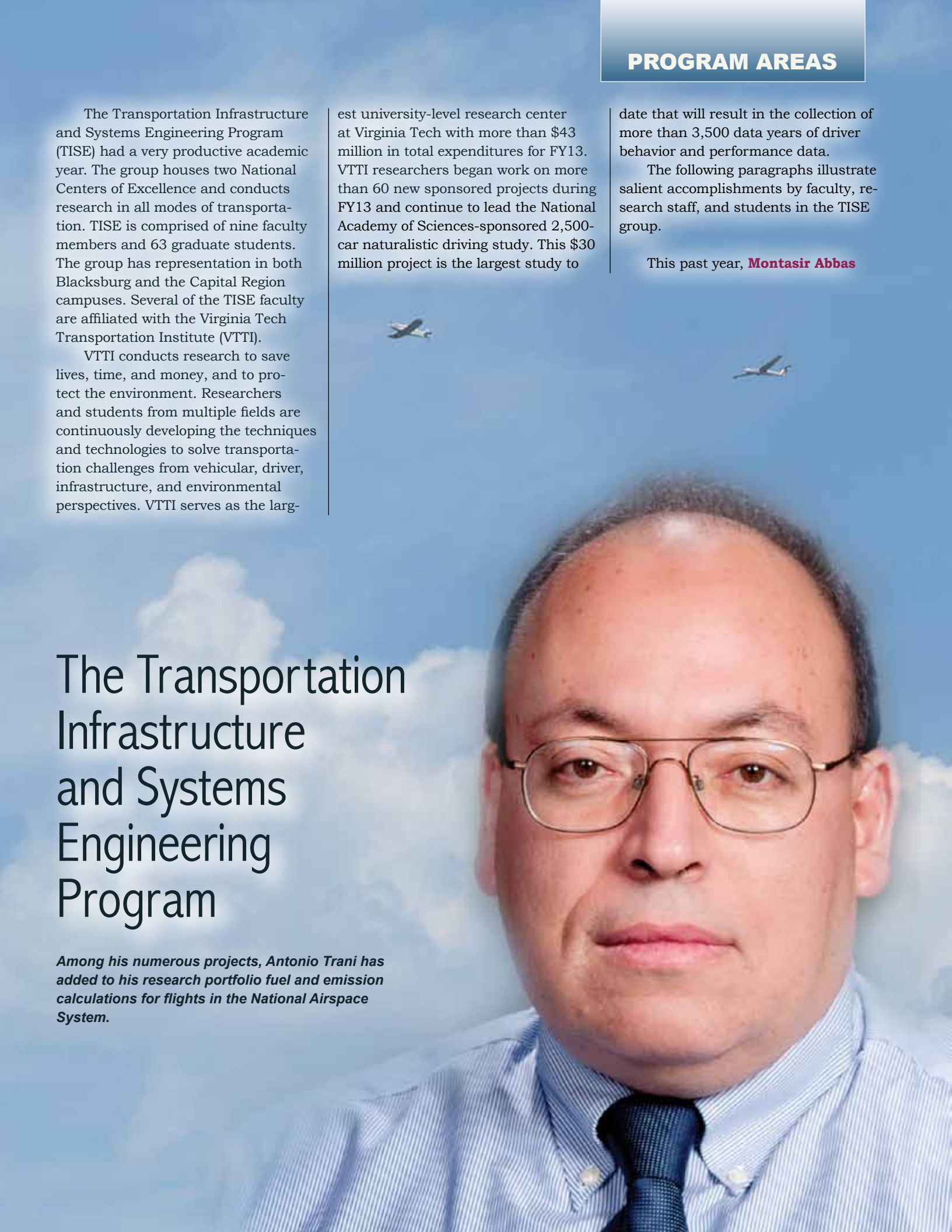
The Transportation Infrastructure and Systems Engineering Program

The Transportation Infrastructure and Systems Engineering Program (TISE) had a very productive academic year. The group houses two National Centers of Excellence and conducts research in all modes of transportation. TISE is comprised of nine faculty members and 63 graduate students. The group has representation in both Blacksburg and the Capital Region campuses. Several of the TISE faculty are affiliated with the Virginia Tech Transportation Institute (VTTI).

VTTI conducts research to save lives, time, and money, and to protect the environment. Researchers and students from multiple fields are continuously developing the techniques and technologies to solve transportation challenges from vehicular, driver, infrastructure, and environmental perspectives. VTTI serves as the largest university-level research center at Virginia Tech with more than $43 million in total expenditures for FY13. VTTI researchers began work on more than 60 new sponsored projects during FY13 and continue to lead the National Academy of Sciences-sponsored 2,500-car naturalistic driving study. This $30 million project is the largest study to date that will result in the collection of more than 3,500 data years of driver behavior and performance data.

The following paragraphs illustrate salient accomplishments by faculty, research staff, and students in the TISE group.

This past year, **Montasir Abbas**



Among his numerous projects, Antonio Trani has added to his research portfolio fuel and emission calculations for flights in the National Airspace System.

taught the Computer Applications in CEE and the Traffic Characteristics and Flow courses. Two of his graduate students matriculated. Abbas and his students published three peer-reviewed journal papers and 10 peer-reviewed conference proceedings. He currently supervises eight graduate students and serves as a member of several Transportation Research Board (TRB) committees. He is working on two research projects and has recently won a National Science Foundation (NSF) grant after completing a research assignment at University of California-Berkeley.

Thomas Dingus is the director of the VTTI and is the Newport News Shipbuilding Professor of Civil and Environmental Engineering. A human factors and safety transportation researcher, he is a current member of the board of directors for the Intelligent Transportation Society of America (ITSA). Dingus recently had the honor of being named a White House Champion of Change in transportation safety. He also serves as director of the Connected Vehicle/Infrastructure University Transportation Center (CVI-UTC), focused on conducting research that will impact future vehicle and roadway technology and improve the safety of drivers. As part of the CVI-UTC, the Virginia Connected Test Bed was opened during June 2013 with attendance by Gov. Bob McDonnell. This initiative is spearheaded by VTTI as a public-private partnership and involves vehicles equipped with connected wireless technology that enables communication via wireless sensors installed along the highway infrastructure.

Gerardo Flintsch, professor and director of the Center for Sustainable Transportation Infrastructure (CSTI) at VTTI, and his research group participated in several research projects in infrastructure asset management and pavement engineering. Among other projects, Flintsch, and research associates Edgar de León Izeppi and Samer Katicha, have received a contract to lead a National Sustainable Pavement Consortium and are working with VDOT to establish a long-term accelerated pavement testing program at Virginia Tech. Flintsch advised six students to graduation, including the first dual Ph.D. student with the Politecnico di Milano, Italy, published 36 peer-reviewed manuscripts, including 17 journal papers and 19 peer-reviewed conference papers, and collaborated with several universities to deliver the second intensive for-credit summer course (Boot Camp) on Advanced Infrastructure Management in Atlanta, Ga. He has also continued to grow the research collaboration with existing international partners, initiated new collaborations with IFSTAR of France and hosted a visit of 15 European scientists as part of a scanning tour of the Forum of European Highway Research Laboratories (FEHRL). Flintsch organized the 7th International Symposium on Pavement Surfaces Characteristics - Smooth, Safe, Quiet, and Sustainable Travel through Innovative Technologies (SURF 2012), for the World Road Association (PIARC) in Norfolk, Va., and is chairing the Pavement Evaluation 2014 Conference in Blacksburg, Va., and the 9th International Conference on Managing Pavement Assets (ICMPA9), Moving Pavement Management beyond the Short-Term: Embracing Innovation and Addressing Sustainability, Accountability, and Improved Performance in 2015 in Alexandria, Va.

Kathleen Hancock, associate professor and co-director for the Center for Geospatial Information Technology in the National Capital Region, performs research in both transportation engineering and geospatially enabling decision-making and problem solving. In transportation, she performs research in freight transportation and planning, highway safety, and traffic analysis. She is working with the Virginia Department of Motor Vehicles to geospatially locate every police-reported crash in Virginia with the goal of improving the Commonwealth's ability to more effectively allocate resources for enforcement, education, and engineering for highway safety. She is also expanding her work into connected vehicle technology with a transit project through VTTI's Connected Vehicle/Infrastructure University Transportation Center. She continues to explore improved technologies and methodologies for delivering on-line education with a small grant to develop a new graduate course in Critical Issues in Transportation that will be offered in the spring of 2014.

Antoine Hobeika, professor, continued his research work in testing and improving various Federal Highway Administration (FHWA) transportation planning software including TRANSIMS. He taught classes on transportation planning and land use and Intelligent Transportation Systems (ITS) and Introduction to Transportation Engineering.

Bryan Katz was promoted to Professor of Practice in the Civil and Environmental Engineering Department supporting the TISE program. Katz teaches Introduction to Transportation Engineering and Geometric Design of Highways. Katz began a second year of a pilot program to teach the Introduction to Transportation Engineering course as an online course. He continues to bring research experience into the classroom through his role as a transportation researcher with Science Applications International Corporation (SAIC). He is currently managing research activities in the Saxton Transportation Operations Laboratory of the Turner-Fairbank Highway Research Center in McLean, Va., where his team is researching innovative solutions to decrease congestion on our nation's roadways.

Pamela Murray-Tuite was promoted to associate professor. She continued her work in evacuation, disruptive events, transportation resilience, risk, and network analysis. She received funding from NSF for ephemeral data collection on commuter responses to the transportation disruptions caused by Hurricane Sandy; from the Mid-Atlantic University Transportation Center (MAUTC) to study winter weather travel demand; from MAUTC to study the effects of major transportation disruptive events; and from the Connected Vehicle/Infrastructure University Transportation Center to study

Continued on page 38

emergency vehicle-to-vehicle communication. For these projects, she, her students, and colleagues developed surveys and models of travel behavior, analyzed detector data, and are currently developing optimization models and conducting simulation experiments. Murray-Tuite has continued and expanded her collaborations with social scientists specializing in disaster behavior. She also supervised a high school intern this past spring, who will continue in the fall. She was appointed to the editorial board for Transportation Research – Part C and continues to review papers for multiple journals and conferences.

Hesham Rakha, together with the research faculty and students at the Center for Sustainable Mobility (CSM), worked on various national-level projects sponsored by the FHWA, NAVTEQ Inc., the Virginia Department of Transportation (VDOT), SAIC, the Federal Transit Association, and Harmonia Inc. totaling over $1.5 million in research expenditures. In collaboration with CSM research faculty and students, Rakha published 18 peer-reviewed journal publications and 23 peer-reviewed conference publications. He made 31 conference presentations, and published five federal reports. One of Rakha's papers received the Best Scientific Paper Award at the ITS World Congress in Vienna, Austria. In terms of student supervising, one of Rakha's master's students graduated this year and he is currently advising/co-advising 17 more students at Virginia Tech and three students at other universities. Rakha continues to serve as an associate editor for the *IEEE Transactions on Intelligent Transportation Systems* and the *Journal of Intelligent Transportation Systems*. He is a member of the editorial board of the *Transportation Letters: The International Journal of Transportation Research*, the *IET Intelligent Transport Systems*, and a member of various Transportation Research Board committees.

Antonio Trani, together with the research faculty and students at Federal Aviation Administration (FAA) National Center of Excellence for Aviation Operations Research (NEXTOR 2) are involved in four projects sponsored by the Federal Aviation Administration and two by NASA Langley and Ames Research Centers. These projects include: studying the impacts of high oil prices in the aviation industry; developing models to predict cost-benefits of using satellite-navigation and surveillance to air navigation service providers and airlines' managed flights across the North Atlantic; and validating three FAA-developed computer models that predict airport capacity and delays. Trani and his group at the Air Transportation Systems Laboratory continue development of the TSAM model for NASA Langley Research Center. This past year they added improved prediction of high-speed rail long-distance users, fuel and emission calculations for flights in the National Airspace System (NAS) and a feature to predict the number of commuters taking innovative small aircraft called ZIP aircraft developed as a concept by NASA Langley Research Center. Trani and senior research associates Nick Hinze and Howard Swingle completed a model to estimate airspace scheduling and airspace training requirements for the Joint Strike Fighter (JSF) to be stationed at Eglin Air Force Base. Trani and Julio Roa taught a summer course in Airport Planning and Design at Virginia Tech's Punta Cana campus in the Dominican Republic. The course was attended by 20 undergraduate and graduate students as part of a study-abroad program.

Linbing Wang completed a year-long sabbatical in China. He is very active in research related to high performance materials; materials modeling and simulation and pavement testing and mechanistic pavement design.

Virginia Tech Transportation Institute (VTTI) Director Tom Dingus speaks at the ribbon cutting ceremony for the new I-66 test bed at VDOT in Fairfax, Va.

MEET THE VIA SCHOLARS

The following pages highlight some of the country's most exceptional students and alumni, the Via Scholars. The motivation and aspirations of this group reflect a profound curiosity and desire to improve the quality of life around the world — from helping municipalities manage growth, to the aesthetics of structures, the quality of water, and international development.

The Via scholarships are made possible through the generosity of the late Mrs. Marion Bradley Via of Roanoke, Va., and her family. In 1987, Mrs. Via contributed $5 million each to the Departments of Electrical and Computer Engineering and Civil and Environmental Engineering. Virginia Tech's Board of Visitors subsequently named the ECE department in honor of Mrs. Via's deceased father, Harry Lynde Bradley, and the CEE department in honor of her late husband, Charles E. Via, Jr. Mrs. Via died in 1993.

Both departments use a portion of the endowment to award scholarships to qualifying students. These scholarships are among the most competitive in the country. Since the Via endowment was created in 1987, the department has awarded more than $16 million in scholarships and fellowships.

William G. Ayers

Hometown: Warrenton, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Salutatorian, Virginia Tech Civil & Environmental Engineering Class of 2012; Pacific Crest Trail Thru Hiker Class of 2007

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Water quality technician, U.S. Geological Survey; quality control technician, STG Inc.; land development intern, Bowman Engineering

Career Goals: My initial goal after graduating is to complete the requirements for becoming a licensed professional engineer. I plan to work in private industry to acquire the skills and experience necessary for becoming an integral player in the land development and environmental engineering fields. Ultimately, I aim to use my skills and experience to pursue business ownership and entrepreneurial ventures.

Phillip R. Bellis

Hometown: Roseto, Pa.

Location of Undergraduate Studies: Lafayette College

Awards/Recognitions: Graduated Summa Cum Laude, Dean's List all semesters, Carroll Phillips Bassett Prize in Civil Engineering (2013), Lafayette Alumni of the Lehigh Valley Scholarship Award (2013), Lafayette Alumni of the Lehigh Valley Performing Arts Award (2013), Russell C. Brinker Prize in Civil Engineering (2012), Lehigh Valley Section of the ASM Award (2011), Marquis Scholar (2009 - 2013), Tau Beta Pi - Executive Board of PAE Chapter, ASCE NSSBC 2013 Mid-Atlantic Regional - First Place Overall - Captain, 3x Lip Sync/Air Band Champion

Primary Area of Interest: Structures

Outside Work Experience: Structural engineering intern, Spillman Farmer Architects (2013); civil engineering intern, Alfred Benesch & Company (2012-2013); research assistant, NEESR project investigating the significance of panel zone strength in steel moment frame buildings under seismic conditions (2011); engineering, scientific, and technical intern, Pennsylvania Department of Transportation (2010)

Career Goals: My career goals are rooted in a desire to provide the structural engineering solutions that will best enhance the ability of the global infrastructure to serve the ever-growing needs of society. Beyond structural engineering, I plan on forming a moderately successful rock band that will one day open for a band with much greater talent.

Nathaniel Bradley

Hometown: Norwood, Maine

Location of Undergraduate Studies: University of New Hampshire

Awards/Recognitions: Graduated Summa Cum Laude with University Honors, Hamel Scholar, Presidential Scholar, member of Tau Beta Pi, Pedro de Alba Memorial Scholarship.

Primary Area of Interest: Geotechnical

Outside Work Experience: Researcher with UNH Contaminated Sediments Center; intern with UNH Stormwater Center; and intern with CCR Associates, Land Surveyors and Civil Engineers

Career Goals: Whether I decide to pursue a career in academia or industry, I will pursue professional licensure. I hope to make useful contributions to the field through my work and by inspiring the next generation of civil engineers.

David Burchnall

Hometown: West Chester, Ohio

Location of Undergraduate Studies: The Ohio State University

Awards/Recognitions: Graduated Summa Cum Laude; member of Chi Epsilon, Tau Beta Pi, and ASCE; Dean's List, all quarters; OSU William D. Apple Scholar; OSU Robert H. Simpson Scholar; OSU Mount Leadership and Service Scholar Program Graduate

Primary Area of Interest: Structures

Outside Work Experience: Engineering intern at Duke Energy's McGuire Nuclear Station in Huntersville, N.C., first summer with civil design/modification team, second summer with plant-side support team evaluating buried pipes; OSU undergraduate teaching assistant in civil engineering

Career Goals: Upon receiving my master's degree, I plan on working for a structural analysis and design firm that uses the latest technology to develop innovative and efficient solutions to meet a large depth and breadth of diverse clients' needs. I plan on completing the professional engineering requirements. My ultimate goal is to become a principal engineer, fellow or partner in an innovative consulting engineering firm or engineering department of a larger company/bureau.

Jacob A. Buttz

Hometown: St. Johns, Fla.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Dean's list all semesters at Virginia Tech; graduated top 25 in the civil engineering undergraduate class; Warren F. Cline Scholar; member of Tau Beta Pi and Theta Tau

Primary Area of Interest: Geotechnical

Outside Work Experience: Project manager intern with Kroger Facility Engineering

Career Goals: Upon graduating with my master's, I plan on obtaining my P.E. and working for a firm that deals primarily with earthquake engineering design and testing. Eventually I want to return to complete my Ph.D. to perform research and teach.

W. Lake Carter

Hometown: Newport News, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Graduated Summa Cum Laude; Dean's list all eight semesters; recipient of Lingerfelt Family Foundation Scholarship (2011-2012), Vecellio Scholarship (2010-2011), V.C. & J.N. Williamson Scholarship (2009-2010)

Primary Area of Interest: Geotechnical

Outside Work Experience: Summer internship with Geopier Foundation Company; internship with U.S Army Corps of Engineers

Career Goals: I want to obtain my master's degree and subsequently pursue a career as a licensed professional engineer. I hope to contribute my knowledge and experience to the innovation of the geotechnical industry.

Austin A. Cox

Hometown: Princeton, W.Va.

Location of Undergraduate Studies: Marshall University

Awards/Recognitions: Graduated Summa Cum Laude; graduated with highest GPA in civil engineering class; selected as the Outstanding Engineering Senior; Dean's list all eight semesters; Massey Energy Scholarship; Marshall University Presidential Scholarship; George M. Cruise Foundation Scholarship; Charles and Elzada Thompson Memorial Scholarship

Primary Area of Interest: Geotechnical

Outside Work Experience: Engineering internship with Consol Energy/Matney Construction Company; undergraduate research assistant; civil engineering co-op with the West Virginia Division of Highways; teaching assistant; engineering internship at Conn-Weld Industries

Career Goals: Following completion of my master's degree, I plan to pursue my professional engineering license and a job with a geotechnical engineering firm. I possibly will consider pursing my Ph.D. in the future.

Michael Gangi

Hometown: North Branford, Ct.

Location of Undergraduate Studies: University of Connecticut

Awards/Recognitions: Graduated Summa Cum Laude; honors scholar; Dean's List all semesters; Babbidge Scholar; Transportation Undergraduate Research Fellowship; Harold P. Farrington Engineering Scholarship; New England Scholar; Dr. John T. and Susan B. DeWolf Engineering Scholarship

Primary Area of Interest: Structures

Outside Work Experience: Research intern at the UConn Center for Transportation and Livable Systems

Career Goals: After obtaining my master's, I hope to work for a structural engineering firm where I can help in the rehabilitation of the nation's infrastructure. I plan to obtain my professional engineering license and afterwards return to school for my MBA. Ultimately, I plan to start and run my own successful engineering consulting firm.

Betsy Godfrey

Hometown: Norfolk, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: National Science Foundation Graduate Research Fellow; selected to present research at Posters on the Hill in Washington, DC, 2013; 3rd place in CEE research day for undergraduates, 2013; presented research at Eastern Section of Seismological Society of America annual meeting in Fall 2012; presented research at CGPR meeting at Virginia Tech Spring 2013; Civil Engineering Class of '58 Scholarship; Harry Bramhall Gilbert Meritor Scholarship, 2012-2013; graduated Magna Cum Laude 2013

Primary Area of Interest: Geotechnical

Outside Work Experience: Internship at Whitman, Requardt and Associates, LLP summer of 2013 in geotechnical engineering department; earthquake engineering research at Virginia Tech summers of 2012 and 2011.

Career Goals: After graduating with a master's in geotechnical engineering, I plan to obtain my professional engineering license while gaining work experience at a geotechnical engineering firm. I would like to learn as much as I can about my field, both from academia and the industry, while investigating ways to improve current techniques and methods.

Jessica Hekl

Hometown: Oakton, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Summa Cum Laude graduate, President of Sustainable Land Development Club, Northern Virginia Build Association Scholarship, Dean's List with Distinction, EIT

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Land development intern at Gordon Associates

Career Goals: After obtaining my master's, I hope to work at an engineering firm focused in sustainable land development and/or environmental engineering. My goal is to be able to play an important role in ensuring that communities and infrastructure are designed to be environmentally sensitive and resilient through generations. Furthermore, I will work toward obtaining my professional engineering license.

Gary Hinds

Hometown: Andover, Mass.

Location of Undergraduate Studies: University of Massachusetts Amherst

Awards/Recognitions: Graduated Summa Cum Laude with departmental Honors; Dean's List recognition all semesters; member of Commonwealth Honors College; Chi Epsilon Honors Society; recipient of Engineering Achon Scholarship

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Land surveying instrument operator/field crew member; undergraduate researcher at the University of Massachusetts Amherst working with water treatment plant in Springfield, Mass.

Career Goals: After graduating I plan to work as a consultant, ideally designing and upgrading potable water treatment systems. I hope to obtain my professional engineering license after some time working in the field.

Nicholas Izzo

Hometown: Edison, N.J.

Location of Undergraduate Studies: The College of New Jersey

Awards/Recognitions: Tau Beta Pi Engineering Honor Society; Golden Key Honor Society

Primary Area of Interest: Geotechnical

Outside Work Experience: Kaiser Building (carpentry); Conti Construction field engineer

Career Goals: I would like to work for a company that works on challenging and interesting projects around the world and eventually own my own consulting company. I would like to become a part time professor eventually as well.

Patrick Joyce

Hometown: Ashland, Penn.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Graduated Summa Cum Laude; Dean's List, all semesters; Engineer-In-Training Certification; ASCE member; Virginia Transportation Construction Alliance Scholarship 2012, 2011; Simpson Strong Tie Structural Scholarship 2012, 2011; National Asphalt Paving Association Scholarship 2011, 2010

Primary Area of Interest: Structures

Outside Work Experience: Internship with HNTB Corporation (May 2012-Aug. 2012); internship with Pennsylvania Department of Transportation (May 2011-Aug. 2011, May 2009-Aug. 2009); internship with Gannett Fleming (Dec. 2011-Jan. 2012, May 2010-Aug. 2010)

Career Goals: After I obtain my master's degree, I plan to work for a structural engineering firm where I hope to design large and innovative structures. I also want to become a professional engineer in hopes of being the lead design engineer on structural projects.

Dale Paul Miller

Hometown: Ottawa, Ill.

Location of Undergraduate Studies: Illinois Valley Community College; Missouri University of Science and Technology

Awards/Recognitions: Graduated Summa Cum Laude; Engineer in Training (EIT); Order of the Engineer; Eagle Scout

Primary Area of Interest: Geotechnical

Outside Work Experience: McCleary Engineering, Peru Illinois (slope stability, bearing capacity, settlement, soil improvement, spread footings, drilled shafts, driven piles, retaining walls, geotechnical analysis of bridge foundations for Illinois Department of Transportation); Engineers Without Borders; MS&T; Tarija Bolivia (constructed Gabion walls to divert flood waters and protect community water tower)

Career Goals: My goals are to become a professional engineer and start my own geotechnical consulting company focusing on challenging projects while employing and contributing to cutting edge advancements in the field of geotechnical engineering. I hope to use my engineering abilities to improve the lives of those less fortunate and stay involved with Engineers Without Borders. As an engineer I will stand by the oath of keeping the safety of the public at the forefront of my efforts and conduct business in an ethical manner.

Caitlin Proctor

Hometown: Stafford, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Via Stewart Scholarship, full undergraduate tuition coverage (2008-2012); Ralph & William Hodges Memorial Scholarship (2011-2012); Byron M. and Helen S. Brumback Scholarship (2010-2011); Pamplin Leadership Award (2008-2009); Pauly Scholarship for General Engineering (2008-2009); Presidential Alumni Scholarship (2008-2011); National Foundation of Ectodermal Dysplasia Scholarship (2008); Dean's List (2008-2011)

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Undergraduate research under Dr. Amy Pruden (2012); grader for AutoCad class, Virginia Tech (2010-2012); undergraduate research under Matt Hull; intern, research assistant, Mastel-Da LLC, Environmental Consulting Firm, Fredericksburg, Va.

Career Goals: I will likely pursue my Ph.D. after my master's degree and perhaps get into water/wastewater consulting.

Brandon Quinn

Hometown: Schoharie, N.Y.

Location of Undergraduate Studies: Missouri University of Science and Technology

Awards/Recognitions: Graduated Summa Cum Laude; Dean's list all semesters at Missouri S&T; Engineer In Training; recipient of the highest merit-based scholarship at Missouri S&T; the Geological Engineering Scholarship (2011 and 2012).

Primary Area of Interest: Geotechnical

Outside Work Experience: Geotechnical engineer with CHA Companies in Albany, N.Y.; engineering intern with CHA Companies; project leader for Engineers Without Borders, worked on project to mitigate river bank erosion in Tacachia, Bolivia

Career Goals: Upon graduating with a master's degree, I will pursue a career as a professional engineer. I plan to utilize my experience and education to work for an innovative engineering firm or governmental agency involved with development or implementation of progressive foundation design and ground improvement methods. As a student member of the Association of State Dam Safety Officials (ASDSO), I am particularly interested in applying geotechnical principles for the design, construction, and rehabilitation of dam and levee systems.

Rachel M. Sellaro

Hometown: Morgantown, W.Va.

Location of Undergraduate Studies: West Virginia University

Awards/Recognitions: BS in Civil Engineering and Mining Engineering; Summa Cum Laude; Mining Engineering Department valedictorian; Tau Beta Pi; associate editor of Chi Epsilon; Dean's List all semesters; WAAIME Scholarship; WVU Engineering Science and Technology Scholarship; WVU Foundation Scholarship; Best Leadership Award for Chi Omega Sorority; Treasurer of Chi Omega; treasurer of Society of Mining Engineers

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Internship with the U.S. Department of Energy at the National Energy Technology Laboratory; internship with CONSOL Energy for two summers at Blacksville No. 2 Mine; environmental engineering co-op with Patriot Coal

Career Goals: After completing my master's degree, I would like to work within the coal industry as an environmental engineer. I will also work toward obtaining my Professional Engineering license, and consider furthering my education by pursuing a Ph.D.

Nicholas Taylor

Hometown: San Antonio, Texas

Location of Undergraduate Studies: University of Texas, San Antonio

Awards/Recognitions: Graduated Summa Cum Laude; 2011; ASCE Outstanding Civil Engineering Student; Tau Beta Pi member

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Student assistant, UTSA Admissions Office; engineering intern, Arkwood Engineering Inc.

Career Goals: I intend to work as a water resources engineer after graduation, either in research or as a project engineer. Additionally, I plan to obtain my P.E. license and LEED certification.

Julie Trumpoldt

Hometown: Yorktown, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Graduated Magna Cum Laude; Dean's List all semesters; ASCE Virginia Section Scholarship; Women's Transportation Seminar Leadership Legacy Virginia Chapter Scholarship; American Society of Highway Engineers Scholarship; Howell & Ann Simmons Land Development Design Scholarship; Marching Virginians Outstanding Rank Member Award (2009, 2011); Engineer-In-Training; Sustainable Land Development Club, vice president

Primary Area of Interest: Transportation and Infrastructure Systems

Outside Work Experience: Transportation engineering intern, Whitman, Requardt & Associates, LLP (WR&A); undergraduate teaching assistant, Virginia Tech; engineer technician, Science Applications International Corporation (SAIC); research assistant, Virginia Tech Transportation Institute

Career Goals: After completing my master's degree, I plan to attain a job at a consulting firm specializing in transportation engineering. My main passion lies in geometric design so I hope to be a project engineer who is in charge of designing safe roadways. I eventually want to work my way up the ranks and become a vice president or regional manager. I also plan to obtain my Professional Engineering license.

Scott Williams

Hometown: Auburn, Wash.

Location of Undergraduate Studies: Washington State University, Pacific Lutheran University

Awards/Recognitions: Engineer In Training; member of Tau Beta Pi Engineering Honors Society, inducted December 2010; WSU President's Honor Roll: Spring 2012, Fall/Summer/Spring 2011, Fall 2012; PLU Dean's List Spring 2010, Fall/Spring 2009; Graduated Summa Cum Laude; Eagle Scout

Primary Area of Interest: Structures

Outside Work Experience: Structural intern at Pacific Northwest Engineering, summer 2012, summer 2011

Career Goals: I dream of becoming an influential designer of complex structures, going beyond common architecture by having a complete understanding of applied loads and how the transfer through building, while optimizing the strengths and weakness of each structural material.

Katie Young

Hometown: Rochester, N.Y.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Virginia Tech Dean's List (Fall 2008, Spring 2009, Fall 2009, Spring 2010, Fall 2010); ITT Industries Scholarship (2008-2012); Civil Engineering Alumni Advisory Board Scholarship (2010); Joseph & Jane Christenbury Scholarship (2010); Kenneth R. Ayers '80 Memorial Scholarship (2010); William Industries Scholarship (2009); Gilbert L & Lucille Seay Scholarship (2009); First Union Employees Scholarship (2008); Richard C Mack Memorial Scholarship (2008)

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Virginia Tech, assisted with research projects on Hyporheic Exchange in Streams (Spring 2011-present) and Wastewater Treatment (Fall 2009-Summer 2011); NSF Research Experience for Undergraduates at University of Kentucky, researched Appalachian Headwaters (Summer 2010)

Career Goals: It is my personal and professional goal to assist in fixing U.S. and world water quantity, water quality, and water transportation issues so that everyone can have access to safe and plentiful sources of fresh water.

Joshua Zilke

Hometown: Winchester, Va.

Location of Undergraduate Studies: Virginia Tech (dual degree Construction Engineering Management and CEE)

Awards/Recognitions: 2013 VCEMP Outstanding Graduate Student; 2013 CII Conference research presenter; 2012 MLSOC Outstanding Senior; 2012 Vecellio Fellow; 2012 ASCE Hardy Cross Competition first place winner; 2012 MLSOC Capstone Course Team, first place winner; 2011 ASC Region II Heavy Civil Competition team leader, first place winner; 2011 Vecellio Scholar; Eagle Scout

Primary Area of Interest: Construction

Outside Work Experience: Fluor, field engineer, the new N.Y. Bridge (Tappan Zee Bridge replacement); Clark Construction, field engineer, African American Museum; Pierce Associates, field engineer, Kaiser Permanente Renovation; Kiewit Infrastructure, field engineer, LPV 145; Forrester Construction, project management intern, National Zoo Renovation; Branch and Associates, winter intern

Career Goals: I plan to pursue a career in the engineering and construction industry in the area of large transportation projects and infrastructure development. I would also like to obtain my Professional Engineering license and a CCM certification.

Marcus F. Aguilar

Hometown: Houston, Texas

Location of Undergraduate Studies: University of Alabama

Awards/Recognitions: Environmental and Water Resources Institute/Coasts Oceans Ports and Rivers Institute at Virginia Tech, president (2012), treasurer (2011); recipient, Brian Bluhm Fellowship (2011)

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Three years of summer internship experience with AECOM Water; 1.5 years EIT experience at AECOM Water

Career Goals: I plan to use my experience in research for innovation in the management of non-point source pollution and surface water hydrology. Pursuant with this goal is the notion of improved quality of life as a result of well-managed water. Since water is at the nexus of other natural resources (i.e. food, energy), I hope to extend my abilities into other, more diverse disciplines.

Beena Ajmera

Hometown: Ontario, Calif.

Location of Undergraduate Studies: California State University, Fullerton

Awards/Recognitions: Graduated Magma Cum Laude; NSF Graduate Research Fellow; Dwight Eisenhower Transportation Fellow (2009-2010, 2010-2011); CSUF Civil Engineering Fellow; Outstanding Junior (2008-2009), Senior (2009-2010) and Graduating Senior (2010-2011) for CSUF civil engineering department; Orange Country Engineering Council 2010 Outstanding Engineering Student; recipient of 2010 Orange Country ASCE Branch Scholarship, Jeffery Gordon Scholarship, and Los Angeles Section Geotechnical Engineering Group Scholarship; California Pre-Doctoral Scholarship Program honorable mention; first place (2010) and third place (2013) in GI GeoPoster Competition; first place (2010) and second place (2012) in CSU Wide Student Research Competition; third place in GI GeoPrediction Competition (2011, 2012); first place in Orange County Graduate Women in Science Conference (2011, 2012); second place in ASCE PSWC Geotechnical Event; first place in Earth Week Poster Competition (2011); second place in CSUF Student Research Competition (2012); third place in 2012 Google Mapping Content; co-authored 11 technical papers; licensed in California as Fundamental Engineer

Primary Area of Interest: Geotechnical

Outside Work Experience: Teaching assistant, graduate teaching associate and research assistant at CSUF

Career Goals: I plan on obtaining my professional and geotechnical engineering licenses. After graduation, I would like to pursue a career in academia.

G. Allen Bowers, Jr.

Hometown: Woodstock, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: National Science Foundation Graduate Research Fellowship; Virginia Tech College of Engineering first in class, 2012; Civil Engineering Outstanding Senior, 2012; civil engineering valedictorian, 2012; member, Phi Beta Kappa; Byron and Helen Brumback Scholarship

Primary Area of Interest: Geotechnical

Outside Work Experience: Research assistant working on integrating geothermal energy and deep foundations supported by the NSF, REHAU, Berkel, and the Deep Foundations Institute

Career Goals: Upon graduation I hope to enter practice and obtain my Professional Engineering license. I have a passion for interdisciplinary work, especially in developing sustainable and economic infrastructure systems that can be used in developing nations. I dream of touching lives through my engineering work. Ultimately, my desire is to use my education to glorify God and serve others as a missionary, practicing engineer, and/or an academic professor.

James M. Bryce

Hometown: Springfield, Mo.

Location of Undergraduate Studies: University of Missouri – Columbia

Location of Masters Studies: Virginia Tech

Awards/Recognitions: 2011/2012 and 2012/2013 Dwight D. Eisenhower Fellow, Via Fellow for Master's Degree at Virginia Tech, graduated Magna Cum Laude and Honors Scholar from the University of Missouri, member of Tau Beta Pi and Chi Epsilon Honors Societies, selected to the WISE internship in 2008

Primary Area of Interest: Transportation and Infrastructure Systems

Outside Work Experience: Midwest Environmental Consultants intern; WISE intern, worked with policy makers in the field of sustainable transportation infrastructure; Mettemeyer Engineering LLC as a structural design engineer on small to midsize structures (hospitals, retail, etc.)

Career Goals: I plan to continue a research track either through an academic position, or a position in industry with the goal of continuing the development of sustainable and cost effective means for managing infrastructure. I have a strong desire to work with agencies in developing countries to help them better manage their transportation assets, as well as a strong interest in teaching undergraduate and graduate students at the university level.

Brandi Clark

Hometown: Westervelt, Ill.

Location of Undergraduate Studies: Missouri University of Science and Technology

Location of Master's Studies: Virginia Tech

Awards/Recognitions: NSF Graduate Research Fellowship, EPA GRO Fellow; Barry M. Goldwater Scholar; EWRI Undergraduate Technical Paper Contest, first place; American Chemical Society (ACS) Student Affiliates Leadership Award; OURE Fellow; Missouri S&T Writing Contest, first place, technical writing, first place, research paper; Missouri S&T Excellence Scholarship; Missouri S&T Excellence Scholarship II; Alumni Scholarship; Missouri S&T Grant; Robert C. Byrd Scholarship; Missouri S&T Chemistry Department Scholarship; Outstanding Freshman, Sophomore, Junior, Senior Chemistry Student; Dean's List; Academic Scholars

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: EPA GRO Fellowship; EPA internship at Andrew W. Breidenbach Environmental Research Center in Cincinnati, Ohio (NRMRL/WSWRD); Missouri S&T OURE fellows program; Virginia Tech laboratory assistant; Missouri S&T Opportunities for Undergraduate Research Experience (OURE)

William Norfleet Collins

Hometown: Chesterfield, Va.

Location of Undergraduate Studies: Virginia Tech

Location of Master's Studies: Virginia Tech

Awards/Recognitions: James R. Reeves Scholarship; Civil Engineering Alumni Advisory Board Scholarship; William A. Caruthers, Jr. Scholarship; Big East Academic All Star Team; Virginia Tech Track and Field Coach's Award; Virginia Tech Athletic Director's Honor Roll, 2012 Graduate Student Service Award

Primary Area of Interest: Structures

Outside Work Experience: Construction superintendent, Prospect Homes of Richmond; construction management, James River Construction, LLC; timber framer, Blue Ridge Timberwrights

Career Goals: I plan to become a professor in civil engineering involved in teaching, research, and community outreach. I hope to educate and inspire students, teaching them the importance of structural engineering and the great responsibility they will undertake in this profession. Through my research I intend to promote safety, longevity, and economy of civil structures. I hope to have a positive impact on those around me by organizing and being involved with community outreach and service projects.

Maha El-Metwally

Hometown: Cairo, Egypt

Location of Undergraduate Studies: Cairo University, Giza, Egypt

Awards/Recognitions: WTS Central Virginia Chapter Graduate Scholarship Award, 2011; Ken Wilkinson Continued Engineering Studies Scholarship of the Virginia Section Institute of Transportation Engineers (VASITE), 2009; International Road Federation (IRF) Student Essay Competition, sustainability category, 2009; Civil Engineering Award of the Faculty of Engineering at Cairo University, 2003-2005

Primary Area of Interest: Transportation and Infrastructure Systems

Outside Work Experience: Event coordinator and group leader in the Egypt Friends at Virginia Tech student organization, planning and organizing the group participation in different social events and cultural nights and won the Best Booth Award in the International Street Fair 2010, with the group; participating in the activities of the Alliance of Transportation Engineering Students (ATES) at Virginia Tech, helping in organizing the new students' welcome events, other social events, and many field trips

Career Goals: My objective is to pursue my Ph.D. degree in the field of transportation engineering at Virginia Tech. This conforms to my vision of my future career as a successful researcher and investigator for transportation engineering projects.

Rimas Gulbinas

Hometown: Winfield, Ill.

Location of Undergraduate Studies: University of Illinois - Urbana

Location of Master's Studies: Columbia University - NYC

Awards/Recognitions: Graduated Univ. of Illinois-Urbana with Highest Honors; Accenture Outstanding Junior Award; Shell Scholarship; Campus Honors Program

Primary Area of Interest: Construction

Outside Work Experience: Worked as a software and mechanical design engineer at ARPAC; as a part-time consultant for Overseas Strategies; and finally as my own boss for an online marketing software company. In between school and work, I also managed to trek through Africa for five months and many other 'off the beaten track' places — experiences that I highly value and that have contributed to my growth as an individual

Career Goals: My ultimate goal is to create a more proactive society regarding energy and resource conservation. We must connect the dots between awareness and action and instill a sense of responsibility among us all. I plan to approach this through studies of various consumption feedback mechanisms enabled by extensive sensor networks.

Kathryn A. Gunberg

Hometown: Ada, Mich.

Location of Undergraduate Studies: University of Michigan

Location of Master's Studies: University of Michigan

Awards/Recognitions: Chi Epsilon, F.E. Richart Fellowship, UM; Greene Fellowship, UM.

Primary Area of Interest: Geotechnical

Outside Work Experience: Soils & Structures, Inc.; City of Ann Arbor

Career Goals: Whether in academia or industry, I hope to teach others about geotechnical engineering and to continue to broaden my knowledge and experience in the field.

Rebecca A. Halvorson

Hometown: Whitewater, Wisc.

Location of Undergraduate Studies: University of Wisconsin-La Crosse

Awards/Recognitions: EPA STAR; EAPSI Fellowship; Ray Heath Scholarship in Chemistry; UW-La Crosse Undergraduate Research Grant

Primary Area of Interest: Environmental & Water Resources

Outside Work Experience: REU summer intern, Mercury research lab at UW-La Crosse

Career Goals: Following graduation from Virginia Tech, I will seek out a position at a research institution, a consulting firm, or possibly an international service organization. Whether as a career or an annual summer vacation, I also hope to use my understanding of water quality engineering in developing nations to improve their basic quality of life through their source of water.

Andrew B. Hardyniec

Hometown: Bringhurst, Ind.

Location of Undergraduate Studies: Michigan Technological University

Location of Master's Studies: Virginia Tech

Awards/Recognitions: Summa Cum Laude; Michigan Tech Civil and Environmental Engineering Outstanding Achievement Award; MTU Alumni Legacy Award; Class of '49 Endowed Scholarship; Presidential Excellence Scholarship; Dean's List for all semesters at Michigan Tech; MTU Research Scholar; Valedictorian of High School class

Primary Area of Interest: Structures

Outside Work Experience: Federal Highway Administration, California Division, investigated soil retaining structures built in response to landslides and presented my work at the First North American Landslide Conference in Vail, Colo.; California Department of Transportation, investigated bridge support structures and was involved in bridge inspections; resident assistant, three years; research assistant at Michigan Tech

Career Goals: I hope to obtain a research position, preferably at an academic institution. I foresee myself teaching one day so I can share my knowledge of engineering with others.

Jordan A. Jarrett

Hometown: Littleton, Colo.

Location of Undergraduate Studies: Colorado State University

Awards/Recognitions: Chi Epsilon Secretary; Colorado State University CEE Structural Engineering Scholarship; Colorado Distinguished Scholars Award; Back–to–back Intern of the Year Award, S A. Miro, Inc.

Primary Area of Interest: Structures

Outside Work Experience: Structural intern at S. A. Miro, Inc. in Denver, Col.; research and teaching assistantships at Colorado State University

Career Goals: My goal is to become a practicing engineer who designs interesting and unique buildings with a focus on seismic design. After gaining many years of engineering experience, I would also be interested in teaching engineering classes at a small teaching – focused university.

Johnn P. Judd

Hometown: Watsonville, Calif.

Location of Undergraduate Studies: Brigham Young University

Location of Master's Studies: Brigham Young University

Awards/Recognitions: Research published in *Journal of Structural Engineering, Journal of Composites for Construction*, and *Forest Products Journal;* Brigham Young University Research Presentation Award; Civil and Environmental Engineering Department Scholarship; Lee and Connie Wimmer Scholarship; College of Engineering and Technology Scholarship; Office of Research and Creative Activities Undergraduate Mentoring Grant; and B.S. Cum Laude

Primary Area of Interest: Structures

Outside Work Experience: Licensed structural engineer, Utah; professional engineer, Pennsylvania; senior structural engineer, Acute Engineering, Inc.; consultant engineer for IntegriCo Composite, Recycle Technologies International, and Karren & Associates, Civil/Structural Engineers

Career Goals: My goal is to perform meaningful research that advances the way we construct and protect our built environment. I find it rewarding to apply academic concepts in real-life situations. I also enjoy teaching students and helping them to develop forward-thinking skills.

Ronald D. Kent

Hometown: Omaha, Neb.

Location of Undergraduate Studies: Brigham Young University

Location of Master's Studies: Virginia Tech

Awards/Recognitions: Member of Tau Beta Pi; Edwin S. Hinckley Scholar; recipient of Brigham Young Scholarship three years in a row; graduated Magna Cum Laude

Primary Area of Interest: Environmental & Water Resources

Outside Work Experience: Aquaveo, LLC, provided technical support for users of the Watershed Modeling System (WMS), Groundwater Modeling System (GMS), and Surface Water Modeling System (SMS); Brigham Young University, worked as a research assistant on a water quality study of Deer Creek Reservoir in Utah

Career Goals: After I graduate, I am going to obtain my professional engineer license and work for a consulting firm in the water/wastewater industry.

Samuel Lasley

Hometown: Chillicothe, Iowa

Location of Undergraduate Studies: Brigham Young University, Provo, Utah

Location of Master's Studies: Virginia Tech

Awards/Recognitions: BYU Heritage Scholar, Tau Beta Pi, BYU Cum Laude

Primary Area of Interest: Geotechnical

Outside Work Experience: Internship with Terracon Consultants, Inc.

Career Goals: I want to practice sound engineering, serve the greater good, contribute to the knowledge in my field, be an inspiring mentor for younger engineers, become a trusted and valuable source of advice for my colleagues, and have an office I rarely inhabit.

Emily Dawn Lipscomb

Hometown: Swanton, Md.

Location of Undergraduate Studies: West Virginia University

Awards/Recognitions: National Science Foundation Graduate Research Fellowship; Summa Cum Laude graduate of WVU; WVU Foundation Outstanding Senior

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Undergraduate research intern at West Virginia University; engineering intern, City of Morgantown, W.Va.; intern, Highland Engineering & Surveying, Inc., Oakland, Md.

Career Goals: Upon completion of my degree, I would like to use my acquired knowledge and skills in environmental engineering applications to pursue research opportunities either in academia or industry.

Brett Mauer

Hometown: Geneva, N.Y.

Location of Undergraduate Studies: Syracuse University

Location of Master's Studies: Syracuse University

Awards/Recognitions: National Science Foundation EAPSI Fellow, first place poster, ASCE Geo-Congress; International Association of Foundation Drilling (ADSC) Industry Advancement Scholar; Outstanding Teaching Assistant Award; Most Outstanding Graduate Student in Civil and Environmental Engineering; SU Chancellors Scholar; first place poster, Nunan Poster Symposium; Summa Cum Laude graduate; SU Golden Transit Award; Chi Epsilon President; Tau Beta Pi

Primary Area of Interest: Geotechnical

Outside Work Experience: Staff engineer, Passero Associates, Rochester N.Y.; teaching assistant, research assistant, and lecturer, Syracuse University

Career Goals: I would like to continue to be active in academia as a researcher, educator, and mentor. I am particularly interested in addressing geotechnical issues pertaining to energy, emerging materials, and the environment.

Jennifer H. Miller

Hometown: Sayre, Penn.; Tucson, Ariz.

Location of Undergraduate Studies: Bucknell University

Location of Master's Studies: University of Arizona

Awards/Recognitions: Licensed Professional Engineer (State of Arizona)

Primary Area of Interest: Environmental & Water Resources

Outside Work Experience: Project engineer, Malcolm Pirnie, Inc., Tucson, Arizona; Water/Wastewater project engineer, MWH New Zealand, Ltd., Wanganui, New Zealand

Career Goals: I envision that an academic career will offer the opportunity to generate interest and aid in the development of future industry professionals, pursue my own research and professional development, and influence and contribute to applied projects in the public or private water/wastewater sectors. Upon completion of the Ph.D. degree, my preliminary thoughts are that I would like to continue in academics (research and teaching in a faculty position) and consult within my research area.

Maria E. Nieves-Meléndez

Hometown: Arecibo, Puerto Rico

Location of Undergraduate Studies: University of Puerto Rico at Mayagüez

Awards/Recognitions: Etienne Totti Graduation Award for the most outstanding student in the civil engineering department, 2012

Primary Area of Interest: Construction

Outside Work Experience: Summer internship with The Boeing Company, Everett, Wash., 2009; summer undergraduate research in engineering program (SURE) at Georgia Tech, Atlanta, Ga., 2011; summer internship with Nieves & Nieves, Engineers and Contractors, Inc., Lares, Puerto Rico, 2013

Career Goals: I want to become a professional engineer to help find solutions to the problems of everyday related to engineering. I would like to become a college professor to inspire young generations in their development as new engineers.

Adam Phillips

Hometown: Chesapeake, Va.

Location of Undergraduate Studies: Virginia Tech

Awards/Recognitions: Graduated Magna Cum Laude; Virginias-Carolinas Structural Steel Fabricators Association Scholarship; Garst-Walker Academic Scholarship

Primary Area of Interest: Structures

Outside Work Experience: Intern with Retanaur Design Associates, summers of 2007 and 2008; engineering intern with Waterway Surveys & Engineering, summer, 2009; engineering intern with Collins Engineers, summers of 2010, 2011, and 2012

Career Goals: After graduation, I plan to work for a top tall building structural design firm doing advanced analysis. I would like to continue publishing work that furthers the structural engineering profession. My long term goal is to one day be a lead design engineer on a building over 300m tall.

Ross Powers

Hometown: Fairfax, Va.

Location of Undergraduate Studies: University of Virginia

Awards/Recognitions: Graduated from UVA with distinction, Dean's List

Primary Area of Interest: Transportation and Infrastructure Systems

Outside Work Experience: Graduate research assistant, Virginia Center for Transportation Innovation and Research; intern, U.S. Nuclear Regulatory Commission, three consecutive summers, helped manage design certifications and license application reviews for new nuclear plants, helped support the agency's program of physical security inspections of existing nuclear plants

Career Goals: The possibilities abound. My primary interest within transportation and infrastructure systems is air transportation. I am exploring options such as remaining in academia and becoming a professor, working for an aviation consulting firm, and doing more general consulting. Most importantly, I always want to be doing meaningful work that leads to positive results beyond the workplace, and I hope to become a trusted source of advice for younger students and colleagues.

Alexander Reeb

Hometown: North Wales, Penn.

Location of Undergraduate Studies: University of Rhode Island

Location of Master's Studies: Virginia Tech

Awards/Recognitions: EIGER Fellow; Graduated Summa Cum Laude with BS in civil engineering and BA in German from the International Engineering Program, minor in mathematics; DAAD Scholar; Nelson C. White Award; member of Chi Epsilon and Tau Beta Pi

Primary Area of Interest: Geotechnical

Outside Work Experience: Private consulting; Ed. Züblin AG, Stuttgart, Germany; Institute für Grund und Bodenmechanik (Geotechnical Research Institute), Technical University of Braunschweig, Germany; Schnabel Engineering, West Chester, Pa.; U.S. Army Evaluation Center, APG, Md.

Career Goals: I plan to obtain my professional engineer status. I would like to work for an international firm on cutting edge geotechnical projects worldwide.

William Joseph Rhoads

Hometown: Joplin, Mo.

Location of Undergraduate Studies: Purdue University

Awards/Recognitions: Undergraduate University Honors; Undergraduate Civil Engineering Honors; Dean's List, all semesters at Purdue; president of the Virginia section of the American Water Works Association at Virginia Tech

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Undergraduate research on green roofs; intern at Olsson Associates in Joplin, Mo.; civil engineering ambassador at Purdue University

Career Goals: After earning my doctorate, I would like to gain practical experience before pursuing my desire to teach at the college level.

Colin Richards

Hometown: Tucson, Ariz.

Location of Undergraduate Studies: University of Arizona

Awards/Recognitions: Arizona Board of Regents High Honors Endorsement Award, Dean's List every semester, award for best chemical engineering senior design project, Tau Beta Pi

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Undergraduate research assistant at the University of Arizona on contaminants of emerging concern; Advanced Functional Membranes REU at Clemson University; Center for Energy and Sustainability REU at Cal State - Los Angeles

Career Goals: I plan to pursue a career at a national research institution or as a consultant in the field of potable water or wastewater treatment.

Craig M. Shillaber

Hometown: Deerfield, N.H.

Location of Undergraduate Studies: University of New Hampshire

Location of Master's Studies: Virginia Tech

Awards/Recognitions: Graduated Summa Cum Laude from the University of New Hampshire; University of New Hampshire Presidential Scholar; University of New Hampshire Alumni Association Legacy Scholar; University of New Hampshire Civil Engineering Graduate Achievement Award; Tau Beta Pi

Primary Area of Interest: Geotechnical

Outside Work Experience: Staff geotechnical engineer, Parsons Brinckerhoff, Inc. New York, N.Y.; intern at Appledore Engineering, Inc. Portsmouth, N.H.; lab assistant at the University of New Hampshire

Career Goals: After completion of my doctorate, I plan to obtain professional licensure. I also hope to hold a position in academia so I can pass my knowledge of geotechnical engineering on to the next generation of civil engineers, and continue to conduct research.

Stephanie Smallegan

Hometown: Savannah, Ga.

Location of Undergraduate Studies: Georgia Tech, Savannah

Location of Master's Studies: Georgia Tech, Savannah

Awards/Recognitions: NSF GRFP Fellow, Summa Cum Laude graduate, CREATE program mentor, member Tau Beta Pi, ASCE, and SAME

Primary Area of Interest: Environmental and Water Resources

Outside Work Experience: Lead teams of students in research projects involving renewable tidal energy, heavy metals assessment, and hydrodynamic measurements using remote sensing and in situ instrumentation

Career Goals: I want to become an independent and successful researcher and teacher in the field of coastal engineering.

Daniel R. Vanden Berge

Hometown: Ada, Michigan; Wickliffe, Ohio

Location of Undergraduate Studies: Michigan Technological University

Location of Master's Studies: Michigan Technological University

Awards/Recognitions: Summa Cum Laude at MTU; Dean's list all semesters at MTU; Outstanding Achievement Award from MTU CEE department; member ASTM and ASCE; registered Professional Engineer – Ohio and Pennsylvania

Primary Area of Interest: Geotechnical

Outside Work Experience: Project engineer, EDP Consultants, Inc., Kirtland, Ohio; part-time faculty, Lakeland Community College, Kirtland, Ohio; graduate teaching assistant, Michigan Technological University

Career Goals: After completing my doctoral degree, I hope to teach at a research university and share my love and knowledge of geotechnical engineering with the next generation of civil engineers. I plan to carry out research in the fields of slope stability and shear strength and also pursue applications of geotechnical engineering and geohazard mitigation in the developing world.

VIA ALUMNI: WHERE ARE THEY NOW?

UNDERGRADUATES

Suzanne Ayres Angelo
Year Graduated: 2003; Master's 2006, Virginia Tech
Employer: Unknown

Doran J. Bosso
Year Graduated: 2006; Master's 2008, Virginia Tech
Employer: Skanska Infrastructure Development, Alexandria, Va.

Chris English
Year Graduated: 1994; Master's 1996, University of Illinois, Urbana
Employer: CH2M Hill, St. Louis, Mo.
Previous Employer: 1996-97, Patrick Engineering, Springfield, Il.

Brian P. Felker
Year Graduated: 2001
Current Status: Unknown

Kathryn Firich
Year Graduated: 2007
Employer: Brown and Caldwell, Alexandria, Va.

R. Andrew Goodwin
Year Graduated: 1996
Current Status: U.S. Army Engineer R&D Center, Portland, Ore.

Chris Kaldahl
Year Graduated: 1995
Employer: Appalachian Mountain Club, Gorham, N.H.

Stephen O. Meininger
Year Graduated: 1991
Employer: CH2M Hill - OMI, Clarksville, Md.

Joshua Mouras
Year Graduated: 2006
Employer: Magnusson Klemencic Associates, Seattle, Wash.

Joseph Schmitt
Year Graduated: 2001
Current Status: Unknown

Paul Taylor
Year Graduated: 2004
Current Status: ExxonMobil, Houston, Texas

Henry J. Theiss
Year Graduated: 1994
Employer: Unknown

Jennifer Verwest
Year Graduated: 2001
Current Status: Currently pursuing a graduate degree at Texas A&M University, College Station, Texas

Elliott Robert Wheeler
Year Graduated: 1996
Employer: Operations Management International, Inc., Englewood, Colo.

Ryan Willey
Year Graduated: 2000
Employer: Unknown

The following students also received their undergraduate degrees while on a Via Scholarship and elected to pursue their master's degrees at Virginia Tech, also as Via Scholarship recipients. Their complete listings can be found in the alumni student section of this publication. These students are: **Randall Boe, William Scott Dewhirst, II, Charles M. Dietz, Jr., Greg Hensley, Peter D. Kauffmann, Jeffrey Kuttesch, Matthew Moore, John D. Riley, John Stephen Siczka, Jeffrey Snow, and Marcia Votour Prowell, Claire McKenzie White**

GRADUATES

CONSTRUCTION

Frank Arcuri
Year Graduated: 2007
Degree Awarded: Master's
Employer: Fluor Corporation, New York, N.Y.

Mary Jane Contos Bartlett
Year Graduated: 1992
Degree Awarded: Master's
Employer: O'Brien & Gere Engineering, Morrisville, N.C.

Janet Sparks Chandler
Year Graduated: 2000
Degree Awarded: Master's
Employer: Full-time mother

Allan D. Chasey
Year Graduated: 1995
Degree Awarded: Ph.D.
Employer: Del E. Webb School of Construction, Arizona State University, Tempe, Ariz.

Kirsten Davis
Year Graduated: 2004
Degree Awarded: Ph.D.
Employer: Boise State University, Boise, Idaho

Martha Gross
Year Graduated: 2010
Degree Awarded: Ph.D.
Employer: Arup Transaction Advice, Washington, D.C.

Shannon P. Hapuarachy
Year Graduated: 2009
Degree Awarded: Master's
Employer: S.M.H. Construction, Bradley, W.Va.

Benjamin Hays
Year Graduated: 2002
Degree Awarded: Master's
Employer: L.A. Dept. of Public Works, Los Angeles, Calif.

John Hildreth
Year Graduated: 2003
Degree Awarded: Ph.D.
Employer: University of North Carolina, Charlotte, N.C.

Angel Ho
Year Graduated: 1993
Degree Awarded: Master's
Employer: Norfolk Naval Shipyard, Portsmouth, Va.

Jennifer Firman McConnell
Year Graduated: 2002
Degree Awarded: Master's
Employer: Schoor DePalma, Kulpsville, Pa.

Joshua P. Middleton
Year Graduated: 2004
Degree Awarded: Master's
Employer: American Infrastructure, Worcester, Pa.

Francis Pesce
Year Graduated: 2012
Degree Awarded: Master's
Employer: Ulliman Schutte Construction, Roanoke, Va.

Juan C. Piñero
Year Graduated: 2004
Degree Awarded: Ph.D.
Employer: Barrett Hale& Alamo, Consulting Engineers, San Juan, Puerto Rico

Jeffrey Snow
Years Graduated: 2000 and 2002
Degrees Awarded: Undergraduate and Master's
Employer: American Infrastructure, Worcester, Pa.

Robert C. Williams
Year Graduated: 2006 and 2008
Degree Awarded: Master's and Ph.D.
Employer: Vecellio and Grogan Inc., Beckley, W.Va.

Terry L. Williams
Year Graduated: 1998
Degree Awarded: Master's
Employer: Alan A. Meyers, Inc.

ENVIRONMENTAL & WATER RESOURCES

Nancy Lade Anderson
Year Graduated: 1999
Degree Awarded: Master's
Employer: Full-time mother

David Azinheira
Year Graduated: 2013
Degree Awarded: Master's
Employer: Living in Maryland

Jason L. Beck
Year Graduated: 2008
Degree Awarded: Master's
Employer: Camp Dresser and McKee (CDM), Charlotte, N.C.

Randall Boe
Years Graduated: 1991 and 1993
Degrees Awarded: Undergraduate and Master's
Employer: CH2M Hill, Gainesville, Fla.

Elizabeth Claire Booth
Year Graduated: 2005
Degree Awarded: Master's
Employer: Arcadis, Lakewood, Colo.

Charles B. Bott
Year Graduated: 2001
Degree Awarded: Ph.D.
Employer: Hampton Roads Sanitation District, Virginia Beach, Va. and Adjunct Professor, Civil & Environmental Engineering, Virginia Tech

J. Steven Brauner
Year Graduated: 2000
Degree Awarded: Ph.D.
Employer: Parsons Engineering, Denver, Colo.

Randi Lieberman Brazeau
Year Graduated: 2012
Degree Awarded: Ph.D.
Employer: Metropolitan State University of Denver

Lee Davis Bryant
Year Graduated: 2010
Degree Awarded: Ph.D.
Employer: Living in Germany

Suzanne Ciavola
Year Graduated: 2011
Degree Awarded: Master's
Employer: Advanced Geoservices, West Chester, Pa.

Bradley M. Coffey
Year Graduated: 1990
Degree Awarded: Master's
Employer: Metropolitan Water District of Southern California, Water Quality Division

Joel Cohn
Year Graduated: 1993
Degree Awarded: Master's
Employer: Malcolm Pirnie, Norfolk, Va.

Cynthia Crane
Year Graduated: 1999
Degree Awarded: Ph.D.
Employer: Hydro Geologic, Herndon, Va.

Andrea Crowe Hargette
Year Graduated: 1997
Degree Awarded: Master's
Employer: Black & Veatch, Inc., Greenville, S.C.

Christina Clarkson Davis
Year Graduated: 2000
Degree Awarded: Master's
Employer: Ph.D. pending

Jason Davis
Year Graduated: 2000
Degree Awarded: Master's
Employer: Carollo, Eagle, Idaho

William Scott Dewhirst, II
Years Graduated: 1993 and 1997
Degrees Awarded: Undergraduate and Master's
Employer: Newport News Water Works, Newport News, Va.

Charles (Chuck) Dietz, Jr.
Years Graduated: 1989 and 1993
Degrees Awarded: Undergraduate and Master's
Employer: Virginia Tech, Blacksburg, Va.

Daniel Dorsel
Year Graduated: 1998
Degree Awarded: Master's, ENE
Employer: Cardinal Newman School, Columbia, S.C.

Mark Dougherty
Year Graduated: 2004
Degree Awarded: Ph.D.
Employer: Auburn University, Auburn, Ala.

Laura Duncan
Year Graduated: 2007
Degree Awarded: Master's
Employer: Arcadis, Knoxville, Tenn.

Mary Facciolo
Year Graduated: 1994
Degree Awarded: Master's
Employer: Raleigh, N.C., consulting firm

Ryan M. Fedak
Year Graduated: 1999
Degree Awarded: Master's
Employer: AECOM, Roanoke, Va.

Jamie Fettig
Year Graduated: 1998
Degree Awarded: Master's, ENE
Employer: Parson Engr. Sci., N.Y.

Scott A. Forsling
Year Graduated: 1994
Degree Awarded: Master's
Employer: Bowen, Collins and Associates, Draper, Utah

John Fripp
Year Graduated: 1991
Degree Awarded: Master's
Employer: U.S. Dept. of Agriculture, National Resources Conservation Service, Ft. Worth, Texas

Wesley Geertsema
Year Graduated: 1992
Degree Awarded: Master's
Employer: Unknown

Kevin R. Gilmore
Year Graduated: 2008
Degree Awarded: Ph.D.
Employer: Bucknell University, Lewisburg, Pa.

Aimee E. Greyshock
Year Graduated: 2004
Degree Awarded: Master's
Employer: Virginia Department of Health-Office of Drinking Water, Culpepper, Va.

Matthew Gwaltney
Year Graduated: 2007 (posthumously)
Degree Awarded: Master's
Deceased

Orrick (Rick) Haney
Year Graduated: 1994
Degree Awarded: Master's
Employer: Haney Associates, Inc., Anderson, S.C.

David Holbrook
Year Graduated: 2003
Degree Awarded: Ph.D.
Employer: National Institute of Standards and Technology, Gaithersburg, Md.

Edward Brian Houston
Year Graduated: 2006
Degree Awarded: Master's
Employer: Black & Veatch, Gaithersburg, Md.

Victoria Wheaton Hoyland
Year Graduated: 2012
Degree Awarded: Master's
Employer: CHA Consulting, Inc., Blacksburg, Va.

Kari Husovitz Foy
Year Graduated: 1999
Degree Awarded: Master's
Employer: B.P. Barber and Associates, Inc., N. Charleston, S.C.

Angela Iatrou Simon
Year Graduated: 1991
Degree Awarded: Master's
Employer: Tutor Perini, Framingham, Mass.

Joshua A. Joseph, Jr.
Year Graduated: 2008
Degree Awarded: Ph.D.
Employer: CH2M Hill, Baton Rouge, LA.

Richard T. Kelly, II
Year Graduated: 2005
Degree Awarded: Ph.D.
Employer: Brown & Caldwell, Seattle, Wash.

Wendell O. Khunjar
Year Graduated: 2009
Degree Awarded: Ph.D.
Employer: Hazen and Sawyer, P.C., Fairfax, Va.

Lashun K. King Thomas
Year Graduated: 2011
Degree Awarded: Ph.D.
Employer: Syracuse University, Syracuse, N.Y.

William J. Kingston
Year Graduated: 2012
Degree Awarded: Master's
Employer: Gannet Flemming, Camp Hill, Penn.

Rebecca Lattyak
Year Graduated: 2007
Degree Awarded: Master's
Employer: Malcolm Pirnie, West Lafayette, Ind.

Katherine Linares
Year Graduated: 2004
Degree Awarded: Master's
Employer: HDR Engineering, Inc., Norfolk, Va.

Erika Lubkowitz Bailey
Year Graduated: 1996
Degree Awarded: Master's
Employer: HDR, Inc., Raleigh, N.C.

Donald C. Marickovich
Year Graduated: 1990
Degree Awarded: Master's
Employer: Draper Aden & Associates, Blacksburg, Va.

Becki Marshall Rosenfeldt
Year Graduated: 2004
Degree Awarded: Master's
Employer: Hazen & Sawyer, Fairfax, Va.

Katherine McArthur Leitch
Year Graduated: 1998
Degree Awarded: Master's
Employer: Merck & Co., Inc., Raleigh-Durham, NC.

Colleen McCloskey Rossmeisl
Year Graduated: 1995
Degree Awarded: Master's
Employer: Companion Animal Clinic, Blacksburg, Va.

Brian McCormick
Year Graduated: 2003
Degree Awarded: Master's
Employer: Colorado Springs Utilities, Colorado Springs, CO.

Laurie S. McNeill
Year Graduated: 2000
Degree Awarded: Ph.D.
Employer: Utah State University, Logan, Utah

Eduardo Mendez, III
Year Graduated: 2008
Degree Awarded: Ph.D.
Employer: U.S. Army

Peter B. Merkle
Year Graduated: 1995
Degree Awarded: Ph.D.
Employer: Sandia National Labs, Albuquerque, N.M.

Matthew C. Moore
Year Graduated: 1992 and 1994
Degree Awarded: Undergraduate and Master's
Employer: Sikland Engineering Associates, Van Nuys, Calif.

Christopher D. Muller
Year Graduated: 2006
Degree Awarded: Ph.D.
Employer: Brown and Caldwell, Seattle, Wash.

Jocelyn Fraga Muller
Year Graduated: 2006
Degree Awarded: Ph.D.
Employer: Unknown

Caroline Nguyen
Years Graduated: 2005 and 2010
Degree Awarded: Master's and Ph.D.
Employer: Washington Suburban Sanitary Commission, Laurel, Md.

Julia Novak
Year Graduated: 2005
Degree Awarded: Master's
Deceased

Jeff Parks
Year Graduated: 2005
Degree Awarded: Ph.D.
Employer: Virginia Tech, Blacksburg, Va.

John E. Petrie
Year Graduated: 2013
Degree Awarded: Ph.D.
Employer: Washington State University, Pullman, Wash.

Kristina Perri
Year Graduated: 1997
Degree Awarded: Master's
Employer: GHD, Inc., Bowie, Md.

Carrie Adam Phipps
Year Graduated: 2001
Degree Awarded: Master's
Employer: Full-time mother

Noreen Poor
Year Graduated: 1996
Degree Awarded: Ph.D.
Employer: Kiymetrics, LLC, Melbourne, Fl.

Diana Rashash
Year Graduated: 1994
Degree Awarded: Ph.D.
Employer: North Carolina State University, Raleigh, N.C.

Heather Veith Rectanus
Year Graduated: 2006
Degree Awarded: Ph.D.
Employer: Battelle, Columbus, Ohio

Sandra Robinson
Year Graduated: 2001
Degree Awarded: Master's
Employer: CH2M Hill, Redding, Calif.

Jason Rushing
Year Graduated: 2002
Degree Awarded: Master's
Employer: Malcolm Pirnie, Fairfax, Va.

Mary Rust Sadler
Year Graduated: 1998
Degree Awarded: Master's
Employer: Arcadis, Raleigh, N.C.

Emily A. Sarver
Year Graduated: 2010
Degree Awarded: Ph.D.
Employer: Virginia Tech, Blacksburg, Va.

Paolo Scardina
Year Graduated: 2004
Degree Awarded: Ph.D.
Employer: Virginia Tech, Blacksburg, Va.

Dipankar Sen
Year Graduated: 1995
Degree Awarded: Ph.D.
Employer: Santa Clara Valley Water District, San Jose, Calif.

Vickie L. Singleton
Year Graduated: 2008
Degree Awarded: Ph.D.
Employer: Full-time mother, New Bern, N.C.

Brad Shearer
Year Graduated: 2001
Degree Awarded: Master's
Employer: CH2M Hill, Redding, Calif.

Holly Shorney-Darby
Year Graduated: February 1992
Degree Awarded: Master's
Employer: Black & Veatch, Inc., Kansas City, Mo.

John S. Siczka
Years Graduated: 1994 and 1997
Degrees Awarded: Undergraduate and Master's
Employer: CH2M Hill, Brown Deer, Wis.

Aaron B. Small
Year Graduated: 1993
Degree Awarded: Master's
Employer: AES Consulting Engineers, Williamsburg, Va.

Sheryl D. Smith
Year Graduated: 2001
Degree Awarded: Master's
Employer: Camp, Dresser and McKee, Raleigh, N.C.

Jeffrey A. Sparks
Year Graduated: 2008
Degree Awarded: Master's
Employer: Hampton Roads Sanitation District, Virginia Beach, Va.

Justin St. Clair
Year Graduated: 2012
Degree Awarded: Master's
Employer: Blazer & Associates, Inc., Blacksburg, Va.

James H. Stagge
Year Graduated: 2012
Degree Awarded: Ph.D.
Employer: Postdoctoral Researcher, University of Oslo, Oslo, Norway

Jonathan Stathis
Year Graduated: 1998
Degree Awarded: Master's
Employer: Cedar City Corp., Cedar City, Utah

Melissa Stewart
Year Graduated: 2011
Degree Awarded: Master's
Employer: ProChem, Inc., Elliston, Va.

Amanda E. Strickhouser
Year Graduated: 2008
Degree Awarded: Master's
Employer: Watson Wyatt, San Francisco, Calif.

Chris Tadanier
Year Graduated: 1997
Degree Awarded: Ph.D.
Employer: Black & Veatch, Denver, Colo.

Dan Waddill
Year Graduated: 1998
Degree Awarded: Ph.D.
Employer: Dept. of the Navy, Norfolk, Va.

Diane Waters
Year Graduated: 2002
Degree Awarded: Master's
Employer: City of Miami, Public Works Dept., Miami, Fla.

Edwin W. Watkins
Year Graduated: 1993
Degree Awarded: Master's
Employer: Ogden Environmental and Energy Services, Nashville, Tenn.

Katherine L. Weidner
Year Graduated: 2012
Degree Awarded: Master's
Employer: Black & Veatch, Charlotte, N.C.

David Whichard
Year Graduated: 2001
Degree Awarded: Master's
Employer: International Paper, S.C.

Claire McKenzie White
Year Graduated: 2011
Degree Awarded: Master's
Employer: Kimley-Horn and Associates, Virginia Beach, Va.

Krista Rule Wigginton
Year Graduated: 2008
Degree Awarded: Ph.D.
Employer: University of Michigan, Ann Arbor, MI.

Christopher A. Wilson
Year Graduated: 2009
Degree Awarded: Ph.D.
Employer: Greeley and Hansen Engineers, Inc., Richmond, Va.

Christopher Wolfe
Year Graduated: 1993
Degree Awarded: Master's
Employer: Semcor, Washington, D.C.

Jennifer Wright
Year Graduated: 2006
Degree Awarded: Master's
Employer: Department of Environmental Quality (DEQ), Richmond, Va.

Kevin D. Young
Year Graduated: 2006
Degree Awarded: Master's
Employer: Virginia Tech, Blacksburg, Va.

Anna Zaklikowski
Year Graduated: 2006
Degree Awarded: Master's
Employer: HDR Engineering, Portland, Ore.

Lauren Zuravnsky-Wilson
Year Graduated: 2006
Degree Awarded: Master's
Employer: Greeley and Hansen, Richmond, Va.

GEOTECHNICAL

Tiffany E. Adams
Year Graduated: 2011
Degree Awarded: Ph.D.
Employer: URS Corp., Denver, Colo.

Amanda Barngrover
Year Graduated: 2010
Degree Awarded: Master's
Employer: URS Corp., Denver, Colo.

William Bassett
Year Graduated: 1990
Employer: Federal Highway Administration, Washington, D.C.

Diane Yamane Baxter
Year Graduated: 2000
Degree Awarded: Ph.D.
Employer: GZA GeoEnvironmental Inc., Providence, R.I.

Craig Benedict
Year Graduated: 1997
Degree Awarded: Master's
Employer: Gannet-Flemming, King of Prussia, Pa.

David Bentler
Year Graduated: 1993 and 1998
Degrees Awarded: Master's and Ph.D.
Employer: CH2M Hill, Englewood, Colo.

Kyle Blakley
Year Graduated: 2009
Degree Awarded: Master's
Employer: Stantec Consulting, Cincinnati, Ohio

G. Allen Bowers
Year Graduated: 2013
Degree Awarded: Master's
Employer: Continuing Via Scholar Ph.D.

Jeremy Britton
Year Graduated: 2001
Degree Awarded: Ph.D.
Employer: U.S. Army Corps of Engineers, Portland, Ore.

Pete Chenevey
Year Graduated: 1994
Degree Awarded: Master's
Employer: Dames & Moore, Cincinnati, Ohio

Jaime Colby
Year Graduated: 2006
Degree Awarded: Master's
Employer: Sanborn, Head & Associates, Inc., Westford, Mass.

Megan Cole
Year Graduated: 2001
Degree Awarded: Master's
Employer: GEI Consultants, Winchester, Mass.

Jeramy Bruyn Decker
Year Graduated: 2007
Degree Awarded: Ph.D.
Employer: Kiewit Construction Co., Pacifica, Calif.

Adam DePoy
Year Graduated: 2012
Degree Awarded: Master's
Employer: Unknown

Patricia (Trish) M. Gallagher
Year Graduated: December 2000
Degree Awarded: Ph.D.
Employer: Drexel University, Philadelphia, Pa.

Russell Green
Year Graduated: 2001
Degree Awarded: Ph.D.
Employer: Virginia Tech, Blacksburg, Va.

George Filz
Year Graduated: 1992
Degree Awarded: Ph.D.
Employer: Virginia Tech, Blacksburg, Va.

Rachel T. Finch
Year Graduated: 2009
Degree Awarded: Master's
Employer: S&ME, Huntsville, Ala.

Brendan Fitzpatrick
Year Graduated: 2001
Degree Awarded: Master's
Employer: GEOPIER Foundation Co., Inc., Mooresville, N.C.

Laura Henry
Year Graduated: 1999
Degree Awarded: Master's
Employer: Haley & Aldrich, N.J.

Wayne Herring
Year Graduated: 2000
Degree Awarded: Master's
Employer: ARM Group, Hershey, Pa.

Randall Hickman
Year Graduated: 2004
Degree Awarded: Ph.D.
Employer: BP American, Inc., Houston, Texas

Michelle Hoy
Year Graduated: 1997
Degree Awarded: Master's
Employer: Oregon Dept. of Environmental Quality, Portland, Ore.

Kenneth A. Huber
Year Graduated: 1997
Degree Awarded: Master's
Employer: Senior Pastor at Calvary Baptist Church, Riverhead, N.Y.

Laura M. Kosoglu
Year Graduated: 2011
Degree Awarded: Ph.D.
Employer: George Mason University, Fairfax, Va.

Andrew Kost
Year Graduated: 2013
Degree Awarded: Master's
Employer: Cornforth Consultants, Portland, Ore.

Samuel Lasley
Year Graduated: 2010
Degree Awarded: Master's
Employer: Ph.D. candidate, Virginia Tech

Scott Mackey
Year Graduated: 1993
Degree Awarded: Master's
Employer: Central Connecticut State University, New Britain, Conn.

Jessica R. Marshall
Year Graduated: 1990
Degree Awarded: Master's
Employer: Colorado Public Works Authority

Michael P. McGuire
Year Graduated: 2011
Degree Awarded: Ph.D.
Employer: Lafayette College, Easton, Pa.

Christopher L. Meehan
Year Graduated: 2006
Degree Awarded: Ph.D.
Employer: University of Delaware, Newark, Del.

Clark Morrison
Year Graduated: 1995
Degree Awarded: Ph.D.
Employer: North Carolina Dept. of Transportation, Raleigh, N.C.

Bob Mokwa
Year Graduated: 1999
Degree Awarded: Ph.D.
Employer: Montana State University, Bozeman, Mont.

Michael Navin
Year Graduated: 2005
Degree Awarded: Ph.D.
Employer: U.S. Army Corps of Engineers, St. Louis, Mo.

David Nevius
Year Graduated: 2001
Degree Awarded: Master's
Employer: Terra Costa Consulting, San Diego, Calif.

Michael Nolden
Year Graduated: 2012
Degree Awarded: Master's
Employer: Unknown

James Parkes
Year Graduated: 1999
Degree Awarded: Master's
Employer: Gannett Fleming, Harrisburg, Pa.

Maysill G. Pascal
Year Graduated: 2003
Degree Awarded: Master's
Employer: Haley and Aldrich Inc., Parsippany, N.J.

Craig Petranka
Year Graduated: 1997
Degree Awarded: Master's
Employer: Unknown

Michael Pockoski
Year Graduated: 2001
Degree Awarded: Master's
Employer: Geopier Foundation Company, Inc., Mooresville, N.C.

Jonathan Porter
Years Graduated: 1991 and 1998
Degrees Awarded: Master's and Ph.D.
Employer: U.S. Government, McLean, Va.

Marcia Votour Prowell
Years Graduated: 1992 and 1993
Degrees Awarded: Undergraduate and Master's
Employer: Virginia Geotechnical Services, PC, Richmond, Va.

Susan Rafalko
Year Graduated: 2006
Degree Awarded: Master's
Employer: Reinforced Earth Co.

Alan Rauch
Year Graduated: 1997
Degree Awarded: Ph.D.
Employer: Fuller, Stantec, Lexington, Ky.

Alexander Reeb
Year Graduated: 2011
Degree Awarded: Master's
Employer: Ph.D. candidate, Virginia Tech

Nathan Reeves
Year Graduated: 2000
Degree Awarded: Master's
Employer: S&ME, Inc., Raleigh, N.C.

John D. Rice
Year Graduated: 2008
Degree Awarded: Ph.D.
Employer: Utah State University, Logan, Utah

Andrew T. Rose
Year Graduated: 1995
Degree Awarded: Ph.D.
Employer: University of Pittsburgh, Johnstown, Pa.

Jennifer A. Schaeffer
Year Graduated: 1997
Degree Awarded: Master's
Employer: CH2M Hill, Seattle, Wash.

Kurt J. Schimpke
Year Graduated: 2009
Degree Awarded: Master's
Employer: Barr Engineering Company, Minneapolis, Minn.

Craig M. Shillaber
Year Graduated: 2009
Degree Awarded: Master's
Employer: Ph.D. Candidate, Virginia Tech

Matthew Sleep
Years Graduated: 2006 and 2011
Degrees Awarded: Master's and Ph.D.
Employer: Oregon Institute of Technology, Klamath Falls, Ore.

Joel A. Sloan
Year Graduated: 2011
Degree Awarded: Ph.D.
Employer: U.S. Air Force, Kunsan Air Base, Republic of Korea

Edward R. Ware III
Year Graduated: 2007
Degree Awarded: Master's
Employer: Wurster Engineering, Greenville, S.C.

Kord Wissman
Year Graduated: 1995
Degree Awarded: Ph.D.
Employer: GEOPIER Foundation Co., Inc., Mooresville, N.C.

STRUCTURES

Mary Sue Mouchka Abel
Year Graduated: 1993
Degree Awarded: Master's
Employer: EMCS Design Group, Milwaukee, Wis.

Shainur Ahsan
Year Graduated: 2012
Degree Awarded: Master's
Employer: Bechtel Power Corporation

Chad C. Alander
Year Graduated: 1998
Degree Awarded: Master's
Employer: Gannett Fleming, Harrisburg, Pa.

Nick Amico
Year Graduated: 2005
Degree Awarded: Master's
Employer: Figg Engineering, Tallahassee, Fla.

Kevin Aswegan
Year Graduated: 2013
Degree Awarded: Master's
Employer: MKA, Seattle, Wash.

Sasha Bajzek
Year Graduated: 2013
Degree Awarded: Master's
Employer: Exp. Global Inc.

Kirsten A. Baldwin Metzger
Year Graduated: 2006
Degree Awarded: Master's
Employer: Laurene & Rickher, P.C., Charlotte, N.C.

Anthony Barrett, Major, USAF
Year Graduated: 2006
Degree Awarded: Ph.D.
Employer: United States Air Force Academy, Colorado Springs, Colo.

James Wescott (Wess) Bott
Year Graduated: 2005
Degree Awarded: Master's
Employer: HDR Alaska, Inc., Eagle River, Ark.

Susan Bowers
Year Graduated: 2007
Degree Awarded: Master's
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