

CEE *in Focus*

SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING



SUSTAINABILITY: A CALL TO ACTION

CYCLING AND POLITICS IN THE SUMMER OF '70

SUSTAINABLE TRANSPORTATION SYSTEMS

PRODUCTIVE REUSE OF THE BY-PRODUCTS FROM BIOFUEL ENERGY GENERATION

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Dr. Reginald DesRoches talks with government officials of Haiti's Ministry of Justice about structural damage to buildings caused by the January 12th earthquake. DesRoches is co-leading the NSF proposal "Urban Systems Under Stress: Multiscale Decision Support for Resilient and Sustainable Infrastructure – 2100 (USD 2100)" that will effectively adapt educational strategies in urban sustainability fields to attract underrepresented groups in science, technology, engineering, and mathematics. For more information about USD 2100, see page 6.



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LETTER FROM THE CHAIR



The 21st century brings with it new challenges and opportunities for civil and environmental engineers. It is currently estimated that the human population will reach seven billion by 2011. That’s a growth rate of about 1.3%, which represents a doubling time of 54 years. The reality is that world is becoming more crowded, more consuming, more polluting, more connected, and in many ways less diverse than at any time in history.

As a result, engineers of the future must be educated to make intelligent decisions that will protect and enhance the quality of life in new and innovative ways. They must also make and communicate decisions in a professional environment with people from both technical and nontechnical disciplines. Educating engineers to be leaders in global efforts for sustainable development, applying new “appropriate technologies”, and leading socio-economic change represents the greatest challenges faced by the engineering profession today.

As engineers, we have an obligation to meet the basic needs of all humans for water, sanitation, food, health, and energy, as well as to protect cultural and natural diversity. The School of Civil and Environmental Engineering and Georgia Tech are committed to sustainable development and we are meeting this challenge head on.

Go Jackets!

Joseph B. Hughes
Karen and John Huff School Chair and Professor

SUSTAINABILITY: A Call To Action

Sustainability means different things to different people. For some, it is how we live, for others, it is how we do business, and for still others, it is a call to action. A popular definition given by the World Commission on Environment and Development describes sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” This concept has been receiving increased attention over the past decade, for significant reasons, however, it is not a new idea. The rapid rise in population means that there will be greater competition for increasingly scarce resources, while at the same time a diminished capacity to handle waste. We are now at a point in time where more people reside in urban areas rather than in rural ones, putting increasing pressure on municipal infrastructure around the world. In addition, global climate change poses multiple threats, requiring us to develop new ways to provide energy and to reduce our carbon footprint. All of this means that we need to train engineers in new ways to respond to these new challenges. The National Academy of Engineering (NAE) publication *The Engineer of 2020* addresses this issue. Although NAE argues that engineers of the future must still possess strong technical skills, there are several important new attributes such as an emphasis on practical integrity, public service and its place in society, creativity, and the ability to consider issues of a global scale.

Georgia Tech and the School of Civil and Environmental Engineering (CEE) are committed to education and research that make a positive impact on how people think about and use the planet’s raw materials. We are also working to incorporate sustainable development into education and business practices. According to the 2010 Princeton Review, Georgia Tech is one of the nation’s leading universities in sustainable development and green technologies, and CEE contributes to this effort. “Georgia Tech continues to remain a leader in sustainability,” said President G.P. “Bud” Peterson. “We were an early adopter of the LEED standard for buildings, and have implemented numerous water conservation efforts resulting in substantial savings. In addition to winning many environmental awards for our efforts on campus, we are working to make a difference throughout the world. For example, the Georgia Water Resource

Institute (GWRI) is helping to shape local, state and national policy. Georgia Tech is committed to responsible resource management.”

At the forefront of Georgia Tech’s efforts in sustainability is the Brook Byers Institute for Sustainable Systems (BBIS). BBIS is under the direction of CEE Hightower Chair and Georgia Research Alliance Eminent Scholar **John Crittenden**. BBIS is premised on the grand challenge for our species: how do we develop the part of the environment that is made or modified by humans for use in human activities, i.e., the human anthroposphere, to live within the means of nature? In other words, humans must demand no more resources than nature can provide and generate no more wastes than nature can assimilate. BBIS embodies Georgia Tech’s commitment to a sustainable and prosperous future through a comprehensive and innovative systems-based approach to creating technological, management, and policy solutions to societal challenges in the 21st century. In fact, BBIS is really a center of centers that integrates institutions, objectives, and disciplines. Georgia Tech’s Dr. Gary Schuster stated “We continue to take an interdisciplinary approach to learning, providing international experiences for our faculty and students and creating a culture of innovation and entrepreneurship, all while framing our values and principles around concepts of sustainability.”

BBIS integrates education, research, and service in the areas of engineering, science, management, computing, architecture, and liberal arts. It is organized around the intersecting programs of: Sustainable Energy Systems, Climate and Environmental Stewardship, Water, Sustainable Enterprise, and Sustainable Urban Systems. These programs align with the “Grand Challenges” defined by NAE: i) make solar energy economical, ii) manage the nitrogen cycle, and iii) provide access to clean water.

Currently, Georgia Tech has twenty-four centers engaged in sustainable research that fall under the BBIS umbrella, and CEE faculty and students are actively involved. Most recently, Georgia Tech submitted a \$40 million proposal to the National Science Foundation to secure an Engineering Research Center (ERC) entitled, “Urban Systems Under Stress: Multiscale Decision Support for Resilient and Sustainable Infrastructure – 2100 (UDS 2100)”. Led by

Professors John Crittenden and **Reginald DesRoches**, UDS 2100 will create a decision support tool for managing and understanding urban system and urbanization processes to build more sustainable and resilient cities.

CEE Professor **Aris P. Georgakakos** serves as director of GWRI, an institute dedicated to improving water resources management in Georgia, the U.S., and the world through innovative research, education, technology transfer, and information dissemination. Researchers develop information and modeling tools for sustainable water resources planning and management as well as training and technology transfer programs. In Georgia, GWRI is collaborating with the Georgia Environmental Protection Division to develop a sustainable water resources planning and management framework for the state.

Another example is the Air Resources Engineering Center (AREC). AREC is directed by CEE Georgia Power Distinguished Professor of Environmental Engineering **Armistead Russell**. The center is an institute-wide catalyst for research in air quality and its effects, air pollution and its control, as well as climate change and its regional impacts. CEE Associate Professor **Mike Bergen** also works with AREC and is currently studying how particles in the atmosphere directly modify the surface radiation balance of the Earth, which is critical to the planet’s climate.

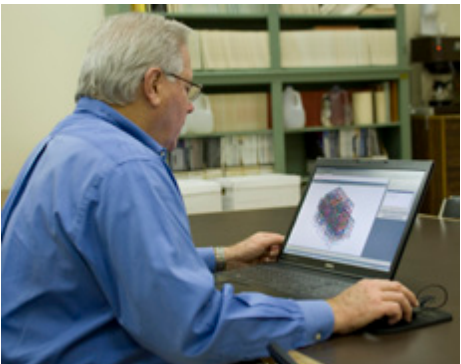
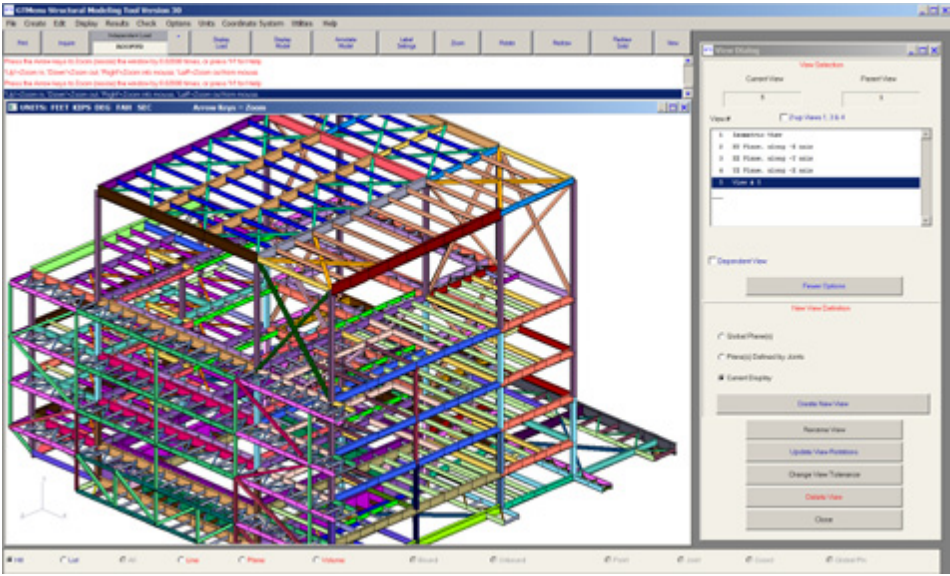
The Center for Geographic Information Systems (CGIS) is another affiliated center made up of researchers from several schools. CGIS serves as a leader and catalyst for the advancement of GIS technology for academic institutions, private industry, and the public sector. CEE Associate Professor **James Tsai** works with CGIS and the Georgia Department of Transportation (GDOT). Dr. Tsai successfully implemented a large-scale GIS-based pavement preservation and management system that helps GDOT effectively preserve and manage its 18,000-centerline miles of highway.

A fourth affiliated center is the Center for Quality Growth and Regional Development (CQGRD), which helps society achieve a sustainable, equitable, superior quality of life through sound planning, policy, and design. CEE Professor **Michael Myers** and CEE Associate Professor **Adjo Amekudzi** have worked with CQGRD Director Catherine Ross and other researchers to develop a strategy for exploring the potential of the megaregion as a value-added structure that will guide national transportation policy and investment, while explicitly addressing the relationships among demographic change, land resources, infrastructure investment, and economic development.

Professor Crittenden describes the importance of collaboration in research and education. “Technology that works well, but isn’t green, will be no more acceptable than technology that is green, but doesn’t work well. We need products and services to be whole – to perform well at their primary intended function, and to fit well into the larger socioeconomic and ecological contexts in which they belong.” BBIS is at the forefront of cross-disciplinary research and education in sustainability, bringing together industry, government, and academia to identify challenges and research solutions for generations to come.

GEORGIA TECH’S SUSTAINABILITY FOOTPRINT:

Georgia Tech is one of the country’s greenest schools according to The Princeton Review and U.S. Green Building Council (USGBC). It is one of fifteen schools to be named to the 2010 Green Honor Roll, a distinction it has earned three years in a row. Environmental sustainability has become a vital component of the Georgia Tech academic experience, with classes, research, and majors addressing various aspects of the topic and stretching across all of the Institute’s colleges and majors. Sustainable practices are integrated in all aspects of campus operations, maintaining a fleet of natural gas powered buses, using local and organic food in the dining halls, recycling, and using non-toxic cleaner in buildings. GT also maintains a rigorous building code for all renovations and new buildings to meet LEED standards.



Above: Dr. Leroy Emkin works with the GT STRUDL software in the CASE Center.
Left: A structure in the STRUDL software.

GT STRUDL and the Nuclear Power Industry

By Dr. Kenneth M. Will

GT STRUDL is one of the most widely used structural design & analysis software programs for Architectural - Engineering - Construction (AEC), Computer-Aided Engineering and Design (CAE/CAD), as well as utilities, offshore, industrial, nuclear and civil projects. The program fully integrates graphical modeling and result display, frame and finite static, dynamic, and nonlinear analysis, finite element analysis, structural frame design, graphical result display, and structural database management into a powerful, menu-driven information processing system that is capable of supplying engineers with accurate and complete technical data for design decision-making. GT STRUDL is used on a regular basis by thousand of engineers in more than thirty countries, and it remains one of the most widely accepted computer-aided engineering and design tools for structural analysts and structural design engineers around the globe.

Today, more than 19% of the nations electricity is created using nuclear power. In Georgia alone, over 22% of the electricity is generated by nuclear power plants. Nuclear power will play a key role in helping the United States and the world not only reduce their dependence on fossil fuel and also reduce carbon dioxide emissions. Currently, there are more than 30 new nuclear power plants under consideration by utilities in the United States.

Since 1983, the School of Civil and Environmental Engineering's Computer-Aided Structural Engineering (CASE) Center directed by Professors **Leroy Emkin** and **Kenneth (Mac) Will** has been providing the nuclear industry with the GT STRUDL structural analysis and design software. In the U.S. alone, more than eighteen utilities, three government agencies, and twenty consultants use GT STRUDL for the analysis and design of existing and future nuclear power plants.

GT STRUDL support and quality assurance standards offered by the CASE Center are among the most rigorous in the industry. GT STRUDL's software certification procedures are in full conformance with the applicable provisions of the U.S. Nuclear Regulatory Commission quality assurance and quality control regulations as well as the more recent ISO9000-3. Support provided by the CASE Center includes software verification and certification, quality control and assurance, program updates, enhancements, performance improvements, and telephone hotline support (providing installation assistance, systems support, and advice on the effective uses of GT STRUDL). For additional information about GT STRUDL, visit: www.gtstrudl.gatech.edu.



The CASE Center team (L-R): Joan Incrocci, Hamid Zand, Michael Swanger, Julian Diaz-Ospina, Robert Abernathy, Marjorie Jorgenson, Leroy Emkin, Stacy Stringer, Kenneth M. Will, and David Key.

Sustainable Transportation Systems



By the year 2030, the population of the greater Atlanta region is projected to grow to close to seven million people, an increase of 65% over the equivalent population in 2000. This will put significant pressures on Atlanta's infrastructure including its transportation systems. It could also lead to large increases in air pollution, carbon emissions, and water and fuel consumption. Globally, projections point to

increased urbanization. While there was only one megacity (a city with a population greater than 10M) in 1950, today there are twenty. By 2030, it is expected that two out of every three individuals will live in urban areas.

School of Civil and Environmental Engineering (CEE) PhD students **Christy Jeon** and **Jhotin Khisty** along with their advisor and Dr. **Adjo Amekudzi** have been working on several projects to incorporate sustainability into planning for transportation systems. In addition, the researchers have developed tools to evaluate and assess progress towards system sustainability. One of their goals has been to develop visual tools that are easy to use in practice by decision makers in government and industry.

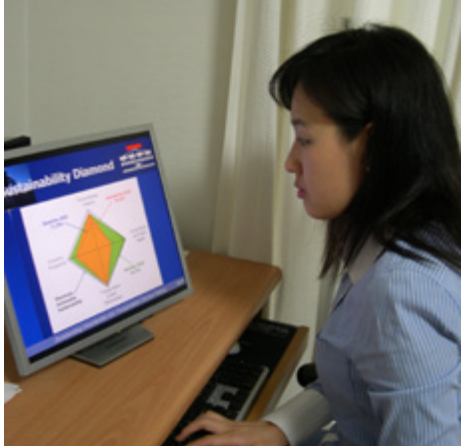
One of the important tools that Jeon and Amekudzi have developed is the sustainability diamond. The tool allows decision makers to visualize sustainability across four dimensions: economic sustainability, environmental sustainability, social sustainability, and transportation systems effectiveness. Decision makers that use this tool can easily identify dominant plans based on the prevailing priorities and objectives. In addition, it allows for assessment of tradeoffs along the different sustainability dimensions. Finally, the tool is dynamic in that it reflects changing sustainability priorities over time.

The researchers have applied their tool to the Atlanta Metropolitan Region, and identified performance measures based on sustainability issues and regional goals. In addition, they were able to evaluate proposed transportation and land use alternatives.

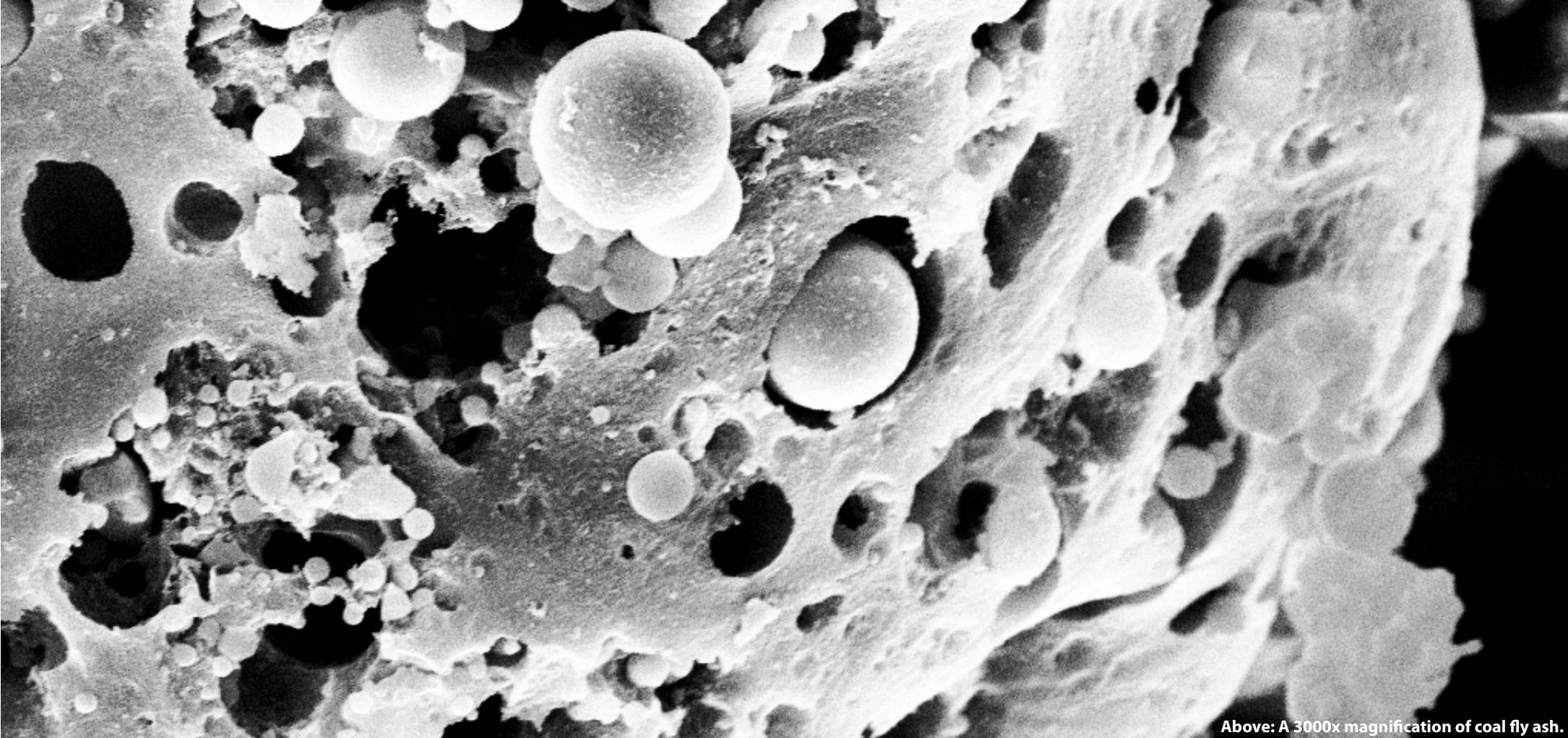
Khisty and Amekudzi developed a visual tool called the Sustainability Footprint. This tool is used to help analyze the impact that transportation and other infrastructure systems have on regional sustainable development. For example, transportation systems impact the quality of life of the population that they serve. It is important to understand how the quality of life changes with the ecological footprint left by these systems in the form of waste generation (such as emissions) and resource usage (such as fossil fuel consumption). The researchers have applied this tool to the Atlanta and Chicago metropolitan areas. One of its real values is its inherent flexibility, which helps stakeholders with very different priorities to reach a consensus for sustainable development.

In addition to developing tools to define and measure sustainable infrastructure and alternative transportation planning, the team has helped to bring these important concepts into the classroom, at both the graduate and undergraduate level. At the undergraduate level, CEE 3000 (Civil Engineering Systems) introduces students to a sustainable engineering approach for planning, design, implementation, operation and renewal of civil engineering systems. At the graduate level, CEE 8813 (Infrastructure, Megacities, and Sustainable Development) is a problem-based learning course that introduces methods for addressing infrastructure systems in urban environments.

Although it appears that rapid growth in urban areas is inevitable, the research results from Jeon, Khisty, and Amekudzi will help planners develop infrastructure such as transportation systems that use less resources and emit less waster, ultimately in a better quality of life for all of us.



Ph.D. student Christy Jeon works with the Sustainability Diamond, a tool that allows decision makers to visualize sustainability across four dimensions.



Above: A 3000x magnification of coal fly ash.

Productive Reuse of the By-products from Biofuel Energy Generation

By Dr. Susan E. Burns and Dr. Kimberly E. Kurtis

Applications of biomass as a renewable fuel source have recently gained interest as supplements to existing energy supplies. Biomass energy, commonly known as biofuel, derives from living organisms (e.g., trees, switchgrass), and is an attractive alternative to traditional fuel sources due to the ability of living organisms to fix CO₂ from atmospheric sources. Carbon dioxide fixation results in carbon cycling, and a zero net output of CO₂ to the atmosphere. Additionally, biofuels are renewable energy sources, in contrast to fossil fuels, making them attractive options for long-term energy supplies.

Recently, Dr. **Susan Burns** and Dr. **Kimberly Kurtis** of the School of Civil and Environmental Engineering at Georgia Tech, with support from the Southern Company, have initiated an investigation of the engineering properties of fly ash produced from the burning of biomass-derived fuel sources. Fly ash is the light weight residual material resulting from the combustion of a fuel source, with coal combustion being the most well known and prevalent source of fly ash. The materials resulting from the high temperature combustion of fuel are highly oxidized and can be reactive components of a variety of construction materials like concrete. Combustion of biomass fuels also produces a biomass-derived fly ash, and the engineering properties of this material are less well-defined when compared to the properties of coal-derived fly ash.

CEE doctoral students **Chris Shearer** and **Nortey Yeboah** are working under

Drs. Burns and Kurtis to quantifying the engineering properties of biomass fly ash which is produced when the biomass is burned as the sole fuel source, or when the biomass is co-fired with coal as the primary energy input. Biomass fly ash is being characterized in terms of type of fuel source (hardwood versus softwood), size of the biomass input (chips versus whole tree), and geographical and environmental characteristics of the biofuel such as rainfall and growing temperature. Understanding of these properties will allow the researchers to identify trends in the fundamental fly ash particle characteristics, including mineralogy, surface area, surface charge, particle size distribution, and carbon characteristics that result from the combustion of biomass and co-fired biomass/coal.

Ultimately, Dr. Burns and Dr. Kurtis will examine applications for the productive reuse of the biofuel-derived waste. Approximately 60% of the fly ash (more than forty million tons) currently produced as a by-product of electricity generation in the U.S. is disposed in landfills, making reuse applications an especially appealing alternative to land disposal.



Fly ash is collected from a power plant outside of Atlanta.



A sample of 5% biomass, 95% coal fly ash.



Concrete bricks made with coal fly ash. Different mixtures are tested for their weight and tensile strength.

Cycling and Politics in the Summer of '70

by J. Paul Oxner, P.E., DEE

J. Paul Oxner, BSCE '74, is managing director for McDaniel, Hunter & Prince, Inc. and serves on the CEE External Advisory Board. While enrolled as a student at Georgia Tech, J. Paul played a pivotal role with regard to the 1970 legislation to create four-foot wide bicycle lanes on key routes throughout in the states of Georgia and Florida. He is truly a visionary in terms of sustainable development, and we are honored to share his inspiring story.



In the summer of 1970, the Atlanta Constitution mentioned draft legislation in both the Georgia and Florida assemblies to provide budget set-asides for their respective state Department of Transportation to construct four-foot wide bicycle lanes on key routes. Georgia's then-Gov. Lester Maddox was well-known for his support of cycling. His regularly held "People's Day" on Wednesdays in the summer at Georgia's gold-domed capitol was a favorite venue for his press stunt of riding his fat-tired cruiser inside the capitol rotunda as he sat backward on the handlebars!

That year, I stayed in Atlanta after my sophomore year at Georgia Tech to earn some cash rather than go back home to south-central Florida. The intermittent odd jobs that I struggled to string together left me with time on my hands, some of which I spent at my fraternity house with the guys attending summer session. As I read the bike lane article in the paper, I thought "What a great idea!" Cycling, which gave me my first real sense of freedom and mobility, had always been important to me.

My fraternity brother, Ron Currans, also from south Florida, suggested that we go to the capitol the next Wednesday. As the governor made his way greeting everyone, Ron and I stepped up to introduce ourselves. When the governor shook my hand, I told him that if he'd write a letter to Florida Governor Claude Kirk supporting this bicycle lane set-aside legislation, that I'd deliver it by bicycle. Still clasping my hand he looked me straight in the eye for a split second, and then, with a grin, told both of us to wait in his office, that he wanted to speak to us with his press secretary.

Fast forward a week to July 31, 1970 and I'm back in the capitol rotunda, now being interviewed by Atlanta's major radio, TV and

print media outlets as I prepared to take the governor's letter to Tallahassee. The owner of a local bike shop had provided me a 10-speed Schwinn road bike, along with a pump, patch kit, spare tube, and one folded spare tire. In the rear deck bag, I had an extra pair of cut-off jeans, two pair of socks and underwear, a couple of tie-dyed t-shirts, and a blue bandana for a headband. I strapped a big, clunky FM radio over the handlebar bag that held my canteen, and the guys at the fraternity tossed in \$40 they had collected.

Governor Maddox and I rode around part of grounds outside the capitol for the press, him on his handlebars and me alongside. We stopped, he shook my hand, I flipped down my Rayban Aviators, and I was off, riding away from downtown at exactly noon.

I made it to Thomaston the first night, where I stopped at the police station to ask where I could find a safe place to camp. Recognizing me from the day's news, they invited me in for a shower, a meal, and a bed in an air-conditioned cell. They had a good time taking "mug shots" and a picture with me and my bike in front of the entire night shift.

Governor Maddox had alerted the Georgia State Patrol of my planned route to Tallahassee, so occasionally a blue and gray cruiser would come alongside and the officer would ask from beneath his brim, "You that boy carrying a letter from the governor down to Tallahassee?" Yes, sir. "You need anything?" Well, I could use some more water, I once replied, whereupon the officer stopped and produced a gallon jug from his trunk and refilled my canteen. We chatted a bit as he escorted me a mile or so before he waived good-bye and moved on.

The trip had its tense moments. I was run off the road several

times, suffering minor cuts and bruises; hit by one of several beer cans thrown at me; and regularly scared witless by tractor trailers passing too close and too fast as I hugged perilously close to edge of the pavement. I even spent one night under a concrete table at a roadside park. But it wasn't all harsh. Once I asked an elderly gentleman sitting on his porch somewhere along Georgia's old Highway 3 if I might fill my canteen from his yard hydrant. As I did, he recognized me from the story that had run two days earlier in his local paper and invited me to "come sit on the porch and rest a bit," out of the August heat. I did, gratefully. Several owners of local restaurants in small towns gave me lunch or dinner when I told them what I was doing. I stayed half-price in a small motel after my longest day of riding – 140 miles! And one morning I crested a hill just as the sun was breaking above the trees, gliding several miles and simply enjoying the ride.

When I reached Tallahassee a local TV station filmed my approach up the hill in traffic along Appalachee Parkway to Florida's capitol. I delivered the letter to Governor Kirk's office (he wasn't in at the time); and two days later, I set off again, finally arriving at my home four days later after logging another 375 miles by myself.

After I returned to Atlanta for school that fall, the Georgia Parks Department invited me to speak of my adventure at a number of events in support of the pending legislation. Ultimately it passed in both states, and soon new bike lanes with their distinctive marking began to appear along highways, giving cyclists a little more room and showing them a little more courtesy and recognition.

The next summer, I worked on a construction crew in Atlanta, building a hotel at 590 West Peachtree within site of Tech's campus, and riding a bike six miles to work each day. Out with some fraternity brothers one weekend in July, a drunk driver ran a red light at 70 miles per hour, plowing straight into the right side of the car. I was sitting in the backseat of the car, and the accident left me with internal injuries, a massive concussion, a broken jaw and left cheekbone, and a right leg broken so badly that the doctors actually considered amputating it. The end of that discussion resulted in a 1/4" diameter pin drilled laterally across my tibia just below the patella that supporting eighty pounds of sand attached via a pulley system as I prayed for the bone to knit sufficiently to allow me to walk again.

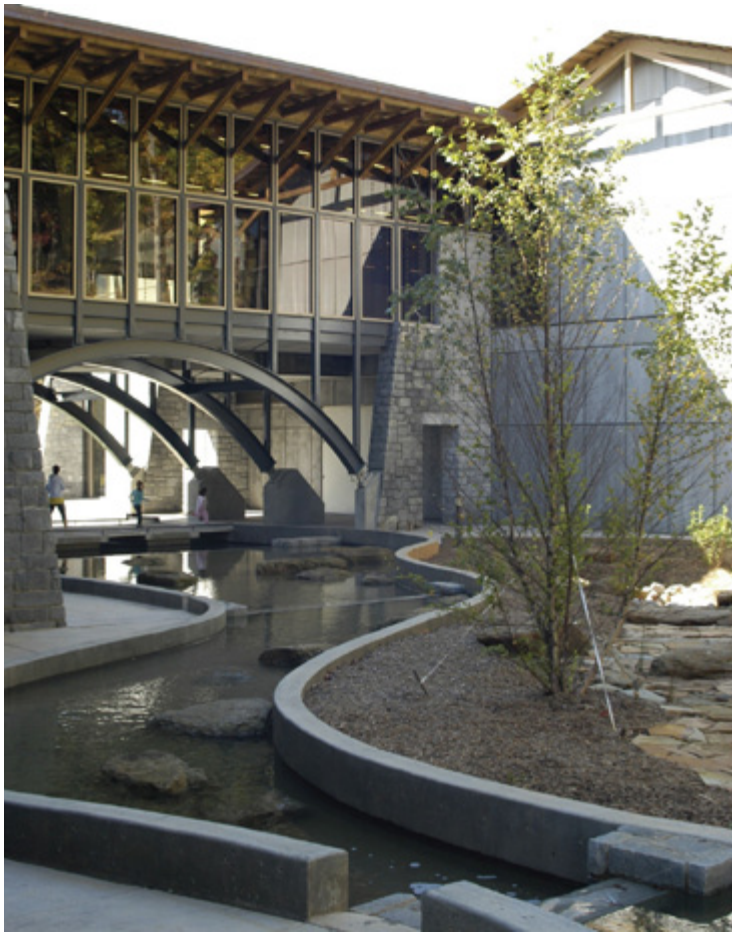
After six weeks in traction, much of it with my jaw wired shut from two major operations to repair the damage, I left the hospital more than sixty pounds lighter, hobbling on crutches with a big, ugly boot-to-hip metal brace holding my right leg in alignment as it continued to heal. I managed to get back in school that fall, taking a minimum full-time load, and scheduling at least an hour between classes to give me time to poke across campus with a cane. Months later, when I could walk unaided again, I got a bike to aid in my rehabilitation. I still remember my first tentative turns on the cranks and how good it felt to be free again.

I'll be 60 this year, 2010, which is the 40th anniversary of my adventure. Cycling is still very important to me. Even now, I get a joyous rush of enthusiasm when I first clip into the pedals and make the first few turns on a ride. After shopping around for a couple of years, I finally bought a custom-built 62-cm Trek Madone 5.2

several years ago during the company's "Tour Sale" in July. It's a pretty bike, one that still draws comments from other participants in the rides for the charities that I support and the occasional Master's competition I can manage. I'm thirty years, thirty pounds, and four knee reconstructions past being anything like competitive, but at least I'm out there hammering away at it, though even now still struggling with the lingering after affects of that accident in 1971. As I write this, the Boys of Summer are preparing for their annual struggle to climb the Alps and the Pyrenees in the Tour de France. Interest in cycling is high and continues to grow, and I'm glad to say that I had a small part in helping to create safer places for all of us to ride in Georgia and Florida.



Adjacent page:
J. Paul with his bike
Above: J. Paul starts
his journey with Gov.
Lester Maddox, and
J. Paul en route to
Florida.



Uzun & Case Engineers Recognized for Gold-level LEED Certification Project in Gwinnett

Uzun & Case Engineers, one of the largest structural engineering firms in Atlanta, has received numerous awards for their past projects. The firm specializes in large commercial buildings, which include the Georgia Aquarium and Atlantic Station, both in Atlanta, Georgia. A recent project that has been recognized by many organizations is the Gwinnett Environmental & Heritage Center (GEHC) in Buford, Georgia. Since Gwinnett County has been one of the fastest growing counties in the US, the GEHC was constructed to help to educate people on the critical role that water plays in all aspects of our lives. This project has won the 2009 Outstanding Project Award by the Structural Engineers Association of Georgia (SEAOG), an association of approximately 170 Professional Engineers practicing structural engineering in the state of Georgia, First Place in 2006 Environmental Category from the Georgia Chapter of the American

Concrete Institute, and the 2008 State Award from the American Council of Engineering Companies of Georgia.

The Center also received gold-level LEED certification. LEED certification was developed by the U.S. Green Building Council (USGBC), and is an internationally recognized green building certification system. The certification ensures that the project was designed and built using strategies aimed at improving performance across the following important metrics: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. GEHC, which includes exhibits on environmental awareness and hands-on science, was recognized for both the sustainability and complexity of the project. It includes a 59,000-square-foot classroom and theater building, which is part of a complex that

includes several miles of trails, a wetlands area, and several outdoor classrooms.

In the submission of the project for SEAOG Award consideration, the firms stated that “the driving force behind this LEED Gold project was environmental education and conservation.” There are several examples of how the Gwinnett project satisfied this mission. For example, a cascading stream that serves as a water feature functions as a heat exchanger and is an integral part of the building’s mechanical system. This feature uses very clean reuse water from a nearby water treatment facility rather than potable water, which saves approximately a million gallons annually of potable water. In addition, a 40,000 square foot vegetated roof was installed to reduce storm water runoff. The native plants used require no irrigation. Pervious pavement is used throughout the site in order to minimize storm water runoff. Any resulting storm

water runoff is directed to a wetlands area to control pollutants. “As a result of the facility’s sustainable design strategies, there will be no additional storm water runoff on the site, a 35% energy use savings and a 50% water use savings for the project.”

The project made creative and sustainable use of wood, steel, and concrete. The previously mentioned roof was constructed of wood due to its sustainability and economy. The weight of the roof was supported by a combination of prefabricated wooden trusses and attached wooden cladding. High strength steel made of recycled materials was used to support the wooden trusses. The thinness of the support columns allowed the day lighting to be maximized. The floor of the bridge structure for the project was designed to make use of steel and concrete in such a way that eliminated the need for ductwork but instead used an in-floor air distribution system. The concrete used in the project was also sustainable in that high-fly ash was used in the mixture.

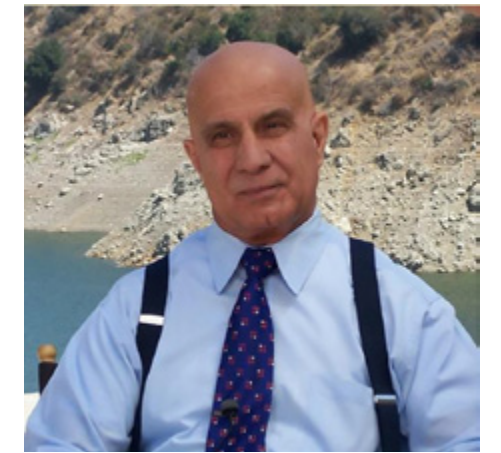
Uzun & Case has a staff of fifty-three engineers, which is more than any other structural engineering office in Atlanta. They are lead by five principals, three of whom are alumni of CEE at Georgia Tech. They include **Tamer Uzun** (MSCE ’70), **Lawrence McDowell** (BSCE ’76), and **George Briglevich** (BSCE ’89, MSCE ’92). A fourth principal, **Martin Cuadra** also attended Georgia Tech for graduate studies.

Hasan Nouri Makes an Impact in Environmental and Humanitarian Efforts

Hasan Nouri (BSCE’67) serves as stormwater engineering manager for URS Corporation in Santa Ana, California. URS offers a broad range of planning, design, environmental review, development programs, and construction management services, including a full range of environmental compliance, urban planning, and entitlement services for various public agency and private sector clients.

Nouri has extensive professional engineering experience in the fields of water resources engineering, wetland restoration, flood control, drainage, and sediment transportation. Prior to joining URS, he founded Rivertech Inc. and served as the company’s president for seventeen years. His areas of expertise include hydraulics, hydrology, water resources, sediment transport, drainage and wetland restoration. He has directed and managed numerous planning and design projects in these areas. Some of his major projects in hydrology, hydraulics and sediment transportation include: Ballona Wetland, Newport Coast Planned Community Development, Central Arizona Water Control Study, Aliso Creek, Santa Ana River, Santa Clara River, San Diego Creek, Trabuco Creek, San Juan Creek and numerous other water courses in Southern California.

He has updated Chapter II of ASCE’s *Sedimentation Engineering Manual 54*, edited by the late Professor Vito Vanoni. He is the winner of six awards by five national engineering societies. In 1996,



ASCE awarded Nouri the Hoover Medal for “great, unselfish civic and humanitarian services.” He is only the fifty-sixth winner of this medal, and other recipients include Herbert Hoover, Dwight Eisenhower and Jimmy Carter. That same year, he was named Engineer of the Year by the ASCE, Los Angeles Section. He is the co-founder of the ASCE/Los Angeles Section, Hydrology & Hydraulics Technical Group as well as the inventor of the Hydraulic Oscillating Diverter, a device that diverts urban runoff to a treatment facility while permitting bypass of clean water and sand to the streams and beaches. He is also an author of many technical papers, and has chaired several professional committees.

Nouri came to Georgia Tech in 1964 from Afghanistan on a scholarship. Although he has lived in the U.S. for many years, he is very active in humanitarian efforts in his homeland. For example, he founded the nonprofit International Medical Corps (IMC) with Dr. Robert Smith. IMC provides health services to war-torn countries such as Afghanistan, where more than fifty M*A*S*H-style medical clinics were erected. Nouri and Smith are listed in the source notes of the book *Charlie Wilson’s War* for providing the author with valuable insight into the Cross Border Humanitarian Aid project. Nouri is also founder and chairman of Board of International Orphan Care, a not-for-profit organization, which provides financial, medicinal and educational assistance to the orphans of Afghanistan.



Left: The Perdido is the deepest offshore development in the world. The platform's three decks include living quarters for 150 people. Above: Sally Jabaley working as a construction engineer for Mobil Exploration Norway in the Stratfjord offshore field.

Deepwater Development: Navigating a Career in the Oil and Gas Industry

Sally Jabaley (BSCE '74) is originally from LaGrange, Georgia and has spent the majority of her career working in the oil and gas industry. It's a business she knows extremely well and she has the expertise to prove it.

After graduating from Georgia Tech, Sally's first job was as a construction engineer with Chevron Oil. She worked offshore in the Louisiana Gulf of Mexico, upgrading facilities on aging offshore structures to comply with new federal regulations. After Chevron, she worked as a project engineer with ARCO Oil & Gas in Dallas, Texas, then moved to Norway in 1979 to work with Mobil Exploration Norway, in the Statfjord offshore field. She worked a rotation, two weeks offshore and two weeks off-duty, which allowed her time to visit Tanzania, climb Mt. Kilimanjaro, trek the Indian Himalayas, as well as most of the countries in Europe, Israel, and Russia.

After Norway, Sally worked as an oil and gas consultant with Gaffney, Cline and Associates (GCA), a system planning engineer for the Mass Rapid Transit Corporation of Singapore, and has worked with inert nitrogen systems for Generon Systems, a joint venture of Dow Chemical and British Oxygen. However in 1994, she returned to the oil and gas industry as a project manager and business unit manager for Production Operators, Inc., later purchased by Schlumberger. In her role, she managed a group of individuals who performed production optimization studies on mature oil and gas fields. Sally joined Shell International Exploration and Production in 2005 as a project assurance manager. She advises a portfolio of Shell projects in the Western Hemisphere, as they proceed to execution and start-up, and says that Shell considers biodiversity very early in its new projects,

developing action plans and collaborating with experts to help protect areas with rich and delicate eco-systems.

Biodiversity conservation has risen rapidly up the environmental and political agenda and it now represents one of the most important challenges of the 21st century. Sally recognizes this challenge and states "In reality, every project must review its greenhouse gas (GHG) emissions and water treatment in order to minimize effects on the environment. Every step of what we do has the potential to create considerable contaminants in the environment, and considerable care is taken for both the safety of personnel and the safety of the environment." Sally's projects at Shell include deepwater developments in the Gulf of Mexico and Brazil and unconventional oil shale and oil sands projects in Canada and the U.S. One of her first projects with Shell was the Perdido located in the Gulf. The Perdido is the deepest offshore development in the world and it just recently started production. During the construction phase, Sally visited this platform many times before it went offshore, assuring proper specifications for safety and quality. She also teaches project management courses for Shell Project Academy at Shell locations around the world and mentors young engineers in the oil and gas industry.

Sally serves on the Boards of the Houston Georgia Tech Club, the Georgia Tech Alumni Board of Trustees, and the School of Civil and Environmental Engineering Advisory Board. She also serves as vice-chair of the Society of Petroleum Engineers, Gulf Coast Section, Projects, Facilities and Construction committee in Houston. She was inducted into the Georgia Tech Academy of Distinguished Engineering Alumni in 2008.

Greg Koch Leads Coca-Cola Global Efforts for Water Conservation

Greg Koch (CEE'90, MSCE'92) is director of Global Water Stewardship in the Environment & Water Resources Department at The Coca-Cola Company (TCCC) in Atlanta, Georgia. He works with TCCC's system of over 300 bottling partners worldwide to advance an integrated global water strategy.

Greg has been instrumental in establishing the Company's commitment to the CEO Water Mandate, a private-public initiative which seeks to build an international movement of companies working to develop strategies and solutions to positively affect the emerging global water crisis. He notes that "water is our business" and is the basis for all the products the company makes. "Of all the environmental issues, water is paramount to us." Between 2002 and 2007, TCCC improved global water efficiency by over 20% while sales volume increased over 21%. They have set a target to improve water efficiency by an additional 20% by 2012.

TCCC has the goal of returning to communities and nature an amount of water equivalent to what they use in all of our beverages and their production through reduction, recycle, and replenishment efforts. Reduction is achieved by setting specific water efficiency targets for global operations. Recycle is achieved by treating wastewater in accordance with applicable laws and regulations. Replenishment is accomplished by expanding support of healthy watersheds and sustainable community water programs to balance the water

used in TCCC's finished beverages. In 2007 Greg formed a partnership with WWF, the world's largest multinational conservation organization, and manages the multi-year, \$20 million project to protect seven key freshwater river basins. With WWF, TCCC developed an interactive, plant-level water efficiency toolkit to harvesting best practices throughout their system. Their objectives with WWF for 2010 include measurably conserving seven key freshwater river basins, decreasing the company's carbon dioxide emissions and energy use, and inspiring a global movement engaging industry and individuals to support conservation of freshwater ecosystems, species and water resources.

Prior to joining The Coca-Cola Company, Greg was an environmental consultant on engineering design. He contributed to design elements related to buildings for the 1996 Atlanta Summer Olympic Games, including the Olympic Stadium, the Centennial Olympic Park and the Coca-Cola Olympic City. Greg has a Bachelor of Science in Mathematics from Columbus College, (now Columbus State University) as well as a Bachelor of Civil Engineering and a Master's of Science in Civil Engineering, both from the Georgia Institute of Technology. He currently serves on the External Advisory Board for the School of Civil and Environmental Engineering at Georgia Tech. He resides in Atlanta, Georgia, with his wife and two children.



Left: People washing dishes and clothing at Lake Niassa, Metangula, Mozambique (photograph by Greg Koch). Above: Greg Koch



Left: Zakiya on a recent trip to Puebla, Mexico, funded by the Mundy Global Endowment Fund. Top: Child awaiting his turn at a school latrine in Chikwawa, Malawi. Source: Global Giving.

Decision-support Tools for Sustainable Sanitation Systems in Developing Countries

By Zakiya A. Seymour, E.I.T. and 4th year Ph.D. student in Environmental Engineering

As professionals, civil and environmental engineers represent a small set of individuals that actually know what happens when a toilet is flushed. We are fortunate to live in industrialized countries, as our daily lives are not impacted by the lack of proper sanitation options. Yet, over one-third of the world's population does not have access to adequate sanitation to meet their daily needs.

Insufficient sanitation can lead to poor water quality, public health concerns, and gender disparity. Drinking water sources contaminated with human excreta jeopardizes the quality of the source. In 2000, the World Health Organization estimated that 2.2 million people die annually from diarrheal diseases that could be prevented by providing clean water supplies and adequate sanitation. The United Nations estimates that as of 2002, 2.6 billion people do not have access to adequate sanitation; they primarily live in developing countries, mainly in Africa, Asia and Latin America. At the gender level, women and girls are most impacted by the lack of sanitation. By the time they reach puberty, girls typically drop out of school as a result of the lack of adequate and private sanitation options. Often, women choose to defecate at night to escape harassment and assault concerns as well as to have some privacy.

With efforts to halve this underserved population by 2015, the United Nations established the Millennium Development Goals. As of 2008, it appears that Latin American and Asian countries are on target to increase sanitation coverage to at least 50 percent of their regions; unfortunately, the majority of countries in Sub-Sahara Africa are not. This challenge of providing adequate sanitation presents an opportunity for civil and environmental engineers.

Sanitation, as we know it, is a complex system of collection, treatment, and disposal of human waste. This "conventional" approach works in developed nations, as water – appropriately deemed wastewater – is used as the primary mode of transportation. Combinations of excreta, industrial waste, and commercial waste are aggregated via wastewater

pipelines and transported to a facility where appropriate (and often regulated) physical, biological, and chemical treatments occur. Following treatment, solids left are disposed of properly and treated effluent flows to a receiving body of water.

Several challenges exist when attempting to implement a "conventional" approach to sanitation in developing countries. In most areas, water is too precious of a resource to be used to transport human excreta. Often times, open defecation is the main form of human excretion, making it likely that cross-contamination into drinking efficient excretion, making it likely that cross-contamination into drinking sources will occur. Financing and regulatory mechanisms needed just don't exist in developing countries. Chemical or energy needed for treatment may not be available on an adequate consistent basis. For these reasons, implementations of conventional approaches to sanitation in developing countries often fail. A more "sustainable" approach to sanitation in developing countries is needed.

From a sanitation approach, "sustainable" systems in developing countries are loosely defined. In general, systems should allot for flexibility in scaling and financing mechanisms. As waste is not treated aggregately, complex collection and distribution systems are not necessary. Funding may come from a variety of sources, including governments, nonprofit organizations, financial institutions, and self-pay. Since socio-political conditions and regulatory institutions may not be conducive to sanitation systems, determining appropriate treatment technology can be difficult. My research focuses on the development of decision-support tools that will aide in sustainable sanitation system selection. My hope is that providing this assistance will increase the implementation success rate of sanitation systems. With only five years remaining, achieving the Millennium Development Goal by 2015 is quite a lofty goal. Providing mechanisms that support efficient decision-making is one method to help achieve this goal.

Challenging Projects in Georgia Tech's Chapter of Engineers Without Borders (EwB)

by Alex Stewart, 2nd year Mechanical Engineering Student

The Georgia Chapter of Engineers without Borders is lively this spring semester with multiple projects and events to benefit underdeveloped countries and bring much needed resources to those without. Members are traveling, researching, and donating to assist in this progression and the international community is benefitting significantly from it.

The big news right now is the Mungoangoa project in Cameroon. Instead of partying in Cancun or hitting the sunny beaches of Miami this spring break, four EwB members traveled to the African village of Mungoangoa with faculty advisor, Dr. Gleason, to work with the developing community there. The primary effort for this project was to purify the water and create a mechanism to pump it to the upper one-third of the hillside village. EwB also helped with trash collection, health education, and study ways to implement electricity, and research technology for cooking stove improvements.

The main purpose of the spring break trip was to survey the land so that a plan for the water pump can be designed. The club also looked into the local skills and materials available to implement the future pump. EwB took on this project just one year ago and is already making significant strides towards improvements for the village.

EwB is also travelling to La Lima, Honduras for the end of the semester. This project was developed about five years ago at the forming of GT's chapter of EwB. The project interested EwB students because the current system of purifying and distributing water to the community was developed in the 1940s when the village was a mere one-fifth of its size today. The community is now made up of more than 250 households and the system currently in place has become largely insufficient. Goals of the project include establishing

better community relations, studying the current pump system, and contacting local pipe suppliers to prepare for pump implementation.

A particularly exciting project in terms of sustainability is the solar latrine project headed up by Kevin Caravati with the Georgia Tech Research Institute. The design collects waste from an outhouse and heats it to a high enough temperature as to kill harmful bacteria so it can be used as fertilizer. This project was first implemented in Bolivia several years ago and is now being developed further to reduce cost of manufacturing and implementation, increase the durability of the final product, and research further the optimum temperature for sanitizing the waste.

EwB member and Georgia Tech graduate student, **Tom Wall**, is leading an effort on outreach. He travels with other EwB members to local middle and high schools giving presentations on the club's purpose and promoting international community development as well as sustainability.

Lastly, EwB spends much of its time fundraising for trips and projects. A single plane ticket to Cameroon is about \$3,000 and the budget for the piping plan in Honduras is \$50,000. With numbers as large as these, it's necessary to continue fundraising whenever possible.

If you are interested in making a monetary donation, membership, or simply volunteering for an EwB project, please email Chris Donegia at cdonegia3@gatech.edu.



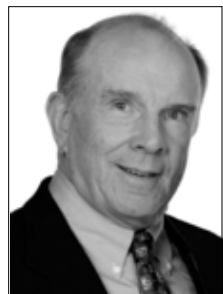
Students in Georgia Tech's chapter of EWB travelled to Cameroon in Spring 2009.

CEE Endowments

Endowed chairs enhance the quality of programs in higher education through the recognition and contributions of the chair holder. The position is among the highest and most prestigious appointments in academe, and honors scholarly achievement and academic excellence. These positions attract the most dynamic individuals in the civil and environmental engineering profession,

enabling the School to maintain and build upon its strong leadership and to sustain its position as one of the world's leading programs. The School of Civil and Environmental Engineering (CEE) at Georgia Tech is pleased to announce the following endowments recently established within the School:

Carlton S. Wilder Junior Faculty Professor in Environmental Engineering



Associate Professor Jaehong Kim was recently named a Carlton S. Wilder Junior Faculty Professor in Environmental Engineering.

The Wilder Junior Faculty Professorships in CEE are awarded to the most promising junior faculty members in environmental engineering who demonstrate excellence in teaching and research focusing on the study of water quality, as well as atmospheric conditions and other environmental media that affect both water quality and quantity. The professorship has a term of 5 years and is awarded at the discretion of the CEE school chair.

Professor Joseph Hughes, the Karen and John Huff School Chair, recognized Dr. Kim for his achievement stating, "Jaehong, this is a significant accolade, and in my opinion, it is well deserved. Congratulations!"

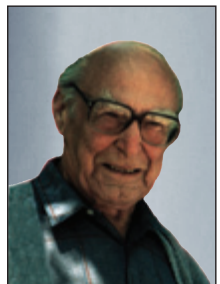
Dr. Kim's research interests are in the area of physicochemical processes in drinking water treatment such as chemical disinfection for pathogen inactivation, membrane filtration for removal of organic and inorganic contaminants, disinfection by-product formation control, reverse osmosis technology of sea water desalination, and application of emulsion-liquid membranes. He earned his B.S. and M.S. in Chemical Technol-

ogy from Seoul National University in Korea and his Ph.D. in civil and environmental engineering at the University of Illinois at Urbana-Champaign. Dr. Kim joined Georgia Tech as an assistant professor in environmental engineering in 2002. He offers courses including Physicochemical Processes, Design of Drinking Water Treatment Facilities, Membrane Process, and Special Topics of Water Science and Engineering.



Above left: Dr. Carl S. Wilder. Left: Dr. Jaehong Kim, Carlton S. Wilder Junior Faculty Professor.

Frederick R. Dickerson Chair in Urban Transportation Systems



Dr. Michael D. Meyer has been appointed to the Frederick R. Dickerson Chair in Urban Transportation Systems.

This distinguished gift serves as a foundation for major interdisciplinary research, education, and service initiatives to advance the technological sophistication of urban transportation systems, particularly the use of advanced communications and computing to facilitate congestion

reduction and energy efficiency.

Dr. Meyer is considered one of the world's foremost experts in transportation systems. He has written more than 180 technical articles and authored or co-authored multiple texts on transportation planning and policy. He is the recipient of numerous awards including the 2009 Transportation Research Board's W.N. Carey Jr. Award for Distinguished Service, the 2006 Wilbur Smith Distinguished Educator award from the Institute of Transportation Engineers, the 2000 Theodore M. Matson Memorial Award in recognition of outstanding contributions in the field of transportation engineering, the 1995 Pyke Johnson Award of the Transportation Research Board, and the 1988 Harland Bartholomew Award of the American Society of Civil Engineers. Dr. Meyer earned a B.S. in civil engineering from the University of Wisconsin, an M.S. in civil engineering from Northwestern University and a Ph.D. in civil engineering from M.I.T. He is a registered professional engineer in the state of Georgia.

The Dickerson Chair was established in 2006 through the generosity of Georgia Tech Emeritus Professor Stephen L. Dickerson and his wife, Jane. It is the first endowed chair to reside in CEE, named in honor of Dr. Dickerson's late father. Steve Dickerson was a member of the Mechanical Engineering faculty (1965-1996) who worked in the area of transportation planning. He also spent a year with the office of the Secretary for the U.S. Department of

Transportation, started a successful bus and vanpool service in metro Atlanta in 1975, and taught a graduate course in urban transportation in CEE. Steve's father, Frederick R. Dickerson, was born in 1915 in Rockford, Illinois. He and his wife Margaret Alice Nelson had five sons, all but one of whom are connected to Georgia Tech. Fred Dickerson's entire career was with Roper Industries in Rockford and Commerce, Georgia. He retired as Chairman in 1980, and passed away in 1998.



Previous page: Dr. Frederick R. Dickerson. Left: Dr. Michael Meyer, Frederick R. Dickerson Chair in Urban Transportation Systems.

Karen and John Huff School Chair in Civil and Environmental Engineering



Dr. Joseph B. Hughes has been named the initial holder of the Karen and John Huff School Chair in Civil and Environmental Engineering. The prestigious

endowment will have a profound, long-term effect on the School, the College, and the Institute. Hughes states, "For CEE to sustain and advance its role as one of the world's leading programs, effective, strong, and visionary leadership is essential. The establishment of this chair is a testament to the Karen and John's commitment to Georgia Tech, and also to their recognition of the importance of leadership in successful organizations."

Dr. Hughes is a recognized leader in the treatment and remediation of hazardous wastes and has served as chair of CEE since 2003. He earned his Ph.D. and M.S. degrees in Civil and Environmental Engineering from the University of Iowa and a B.A. from Cornell College in Chemistry. His esteemed career includes being elected to the American Academy of Environmental Engineering as a Diplomat by Eminence in the field; the Jack Edward McKee Medal from the Water Environment Federation for achievement in groundwater protection, restoration, and sustainable use; the CH2MHill Outstanding Doctoral Dissertation Award from the Association of Environmental Engineering and Science Professors; and an invitation to Yale University as the John McClanahan Henske Distinguished Lecturer to discuss his work in environmental nanotechnology; and the ASCE 2005 Walter L. Huber Civil Engineering Research Prize given to members for notable achievements in civil engineering research. In addition, he serves as chair of the Science Advisory Board for the EPA's West Coast Hazardous Substances Research Center, a member of the U.S. EPA standing science advisory committee on Environmental Engineering, and holds an adjunct faculty appointment at Nankai University in Tianjin, China.



Above left: Karen & John Huff stand with the Rambling Wreck. Left: Karen and John Huff School Chair Joseph B. Hughes



School of Civil & Environmental Engineering External Advisory Board, Fall 2009

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TAKE NOTE: Academic Year 2009-2010

Students

Chris Shearer, a Ph.D. student in the Structural Engineering, Mechanic and Materials program is the recipient of the 2010 Department of Energy Fellowship and the 2010 American Concrete Institute (ACI) President’s Fellowship. Both of these awards are nationally competitive and very prestigious.

Four Ph.D. students in the CEE Transportation Engineering program were individually awarded 2010 National Science Foundation (NSF) Graduate Research Fellowships. **J.P. O’Har, Brittany Luken, Donny Katz, and Brent Weigel** are among the 2000 national awardees recently published by NSF. In addition, Josie Kressner and Tom Wall received Honorable Mentions. According to Dr. **Michael Meyer**, the Frederick R. Dickerson Chair and Director of the Georgia Transportation Institute, “In the collective memory of transportation faculty, we cannot recall where one transportation program has received this many NSF Fellowships in one year. It is truly unprecedented.”

Tom Wall, a doctoral student in Transportation Engineering, and **Hunter Causey**, a master’s student in Environmental Fluid Mechanics and Water Resources, have been named 2010-2011 Fulbright Scholars. Each was selected for this honor by the J. William Fulbright Foreign Scholarship Board, composed of twelve educational and public leaders appointed by the President of the United States. Out of the record number of applicants this year, three Georgia Tech students in all were awarded Fulbright grants for international research, and two of them are in CEE.

Elise Barella, Josie Kressner and **Tom Wall**, Ph.D. students in the Transportation Engineering program, were awarded nationally competitive Eisenhower Fellowships to conduct transportation research.

Georgia Tech’s **ASCE Student Chapter** competed in the 2010 Carolinas Conference, taking 3rd place overall. The GT team won 1st place in the Balsawood Bridge, Construction Management, and T-shirt Design competitions, and 2nd or 3rd place in the Earthquake Challenge, Quiz Bowl,

and Tug-of-war. The Concrete Canoe team placed second, the highest finish ever for Georgia Tech. As a result, the Concrete Canoe team will be invited to the national championship at UC Berkeley.

Yiwei Cheng, a third year doctoral student in the Environmental Fluid Mechanics and Water Resources program was awarded a Fellowship from the Everglades Foundation for his proposed research “How Natural and Anthropogenic Perturbations Impact the Ridge and Slough System of the Everglades”.

An aviation research group from CEE put concepts into practice at Air Canada’s North American headquarters in Quebec. Undergraduate student **Susan Hotle**, doctoral students **Donald Katz, Brittany Luken, Stacey Mumbower, Tom Wall**, and post-doctoral researcher **Misuk Lee** discussed how Air Canada is making decisions in the areas of route planning, pricing, and resource allocation, gaining an understanding of how the airline functions.

CEE graduate student **Brittany Bruder** at the Georgia Tech Savannah (GTS) campus was admitted to the Summer Program in Earth System Science offered by the NASA Goddard Space Flight Center’s (GSFC) Earth Sciences Division. She will work at the NASA Wallops Flight Facility (WFF) on a Regional Earth Modeling System (REMS) to simulate coastal processes to better understand them and predict their behavior in the face of human interventions. Her primary research involves novel sustainable devices to harness energy from tidal streams in coastal Georgia.

Seventy-nine undergraduate students in CEE were extended an invitation to the prestigious 2010 Georgia Tech Women in Engineering Excellence Awards Banquet. Invitations to the event are only distributed to female earning an overall GPA of 3.35 or higher. The following students were also recognized with scholarships at the event: **Melissa Allardyce** (Wilmer), **Christina Barry** (StreetSmarts), **Christine Beazley** (Wilmer), **Emma Bones** (CH2MHill), **Lindsey Bray** (StreetSmarts), **Emily Cadic** (StreetSmarts), **Meredith Freeman** (StreetSmarts), **Heather Hill** (Halliburton),

Tessi Ludena (Shell), **Alyson Pigford** (Halliburton), **Katelyn Randall** (Shell), **Laura Schultz** (Halliburton), **Amanda Wall** (StreetSmarts), and **Stephanie Zinner** (Alcoa).

Joseph Thomas was selected by the College of Engineering as a 2010 Outstanding Undergraduate Researcher. He is enrolled in the BS/MS program in CEE and completed his BSCE in December 2009 while working with Ph.D. candidate **Joan Larrahondo**. As an undergraduate researcher, Joseph performed many tests for Joan’s research in the effects of chemical weathering on soil properties (specifically, the presence of iron-oxide coatings), and the soils underneath the Savannah River site.

Amal Jayapalan, third year doctoral student in the Structural Engineering, Mechanics, and Materials program, received the 2010 Robert H. Kuhlman Memorial Scholarship from the Georgia Chapter of the American Concrete Institute (ACI).

EnvE undergrad **Bailey Wright** attended an ASCE international conference in Mumbai, India with the help of the Joe S. Mundy International Experience Fund. The conference focused on the following topics: “Water Resources Planning & Management,” “Water and Wastewater and Waste Management,” and “Global Water Issues and Hydrology & Hydraulics.”

Lokesh Padhye, a fifth year graduate student in Environmental Engineering, was recognized by the Environmental Chemistry Division of ACS as one of the organization’s 2010 Graduate Student Award winners.

CEE master’s student **Rachel Landcaster** was recently awarded the 2009 SEAOG Scholarship from the Structural Engineering Association of Georgia (SEAOG). The SEAOG scholarship is awarded to structural engineering master’s students who have demonstrated an aptitude and passion for the practice of structural engineering.

CEE undergrad **Katherine D’Ambrosio** attended the European Transport Conference (ETC) through the Joe S. Mundy Global Learning Experience Fund.

(Take Note continues on page 24)

TAKE NOTE (Continued)

Stacey Mumbower, a second year graduate student in civil engineering was selected as a 2009 Eno Transportation Foundation Fellow and participated in the Annual Leadership Development Program in Washington, D.C.

Laurel Paget-Seekins, a second year Ph.D. student, received a three-year Eisenhower Fellowship and a Presidential Fellowship from Georgia Tech. She is examining design and operation characteristics of public transit systems that increase social and environmental sustainability.

Elise Barrella, a Ph.D. candidate in Georgia Tech's Transportation Systems group, was the recipient of a 2009 Georgia Department of Transportation scholarship.

Brent Weigel, a Ph.D. student in the Transportation Systems Engineering group, received the 2009 Georgia Power Energy Fellowship.

Franklin Gbologah, received the National Society of Black Engineer's Board of Corporate Affiliates \$3,000 scholarship.

Brittany Luken received a \$10,000 Airport Corporative Research Program (ACRP) of the Transportation Research Board.

Elise Barrella, Brittany Luken, Alek Pochowski and **Nick Wood** were awarded scholarships from the Georgia Department of Transportation.

Carlos Campo, and **Yi Lin Pei** were awarded scholarships from the Georgia Intelligent Transportation Systems (ITS) chapter.

Yanzhi (Ann) Xu was awarded scholarships from the Georgia ITS chapter and the 2009 Women's Transportation Seminar (WTS) Overly Scholarship with the Atlanta Chapter.

Chris Barrow, a senior in CEE, was awarded the "Transportation Engineer of the Future" scholarship from the Georgia Department of Transportation (GDOT).

Stephen A. (Alex) Crotty, master's student in the Structural Engineering, Mechanics and Materials research group, was awarded

the Clayford T. Grimm, P.E. Student Scholarship by The Masonry Society. Alex's research topic is "Creating Brick from Savannah River Dredge Materials". The focus of his project is to determine whether the material dredged from the Savannah River can be used to produce brick conforming to ASTM C62 or ASTM C 216.

Graduate student **Jamie M. Fischer** traveled to Kenya for one week in October with the help of the Joe S. Mundy Global Learning Experience Endowment Fund to attend the 8th International Conference on Urban Health (ICUH). It covered a wide range of themes related to Urban Health, including "infrastructure systems and urban health," which relates directly to Jamie's research.

Doctoral student **Juan Manual Jimenez Chong** recently finished fifth in a photo contest specifically for structures. His photo of the New River Gorge Bridge was recognized by the International Association of Bridge and Structural Engineers in its structures photo contest.

The American Institute of Steel Construction (AISC) recognized CEE graduate students **Roger Mock** and **Laura Schultz**. Roger received with the AISC/W&W AFCO Steel Scholarship for \$5000 and Laura received the AISC/Southern Association of Steel Fabricators Scholarship for \$2500.

CEE graduate students competed in the Student Poster Competition at the 2009 Review of Progress in Quantitative Non-destructive Evaluation (QNDE) conference held at the University of Rhode Island. **Martin Mueller** won first prize for his poster entitled "On the Excitability of Second Harmonic Lamb Waves in Isotropic Plates". **Natalie Darraugh** was awarded second place for her poster "Air Void Characterization in Cement Paste through Ultrasonic Attenuation using an Immersion Procedure".

Ph.D. student **Shandra Justicia Leon** was selected to receive the prestigious American Society for Microbiology (ASM) Robert D. Watkins Graduate Fellowship.

Faculty

The American Society of Civil Engineers (ASCE) recognized the accomplishments of **Bruce R. Ellingwood**, Ph.D., P.E., N.A.E., by electing him as a Distinguished Member of ASCE. Professor Ellingwood is internationally recognized as an authority on structural load modeling and load combination analysis, structural reliability and risk analysis of engineered facilities, and as a leader in the technical development and implementation of probability-based codified design standards for building structures. He deserves significant credit for the progress made in the past thirty years in bridging the gap between research and practice in implementing novel concepts from the new and rapidly evolving field of structural reliability theory into engineering practice.

Dr. **Paul Mayne** and his former student **Alec McGillivray** have been granted a U.S. Patent No. 7, 650, 962 for a device they developed called "Rotary Actuated Seismic Source and Methods for Continuous direct-Push downhole Seismic Testing". The invention is a remotely operated device for generating horizontally polarized vertically propagating shear waves for use in down-hole shear wave velocity measurement systems.

Dr. **James Tsai** is one of five recipients of the National Research Demonstration awards from the US DOT Research and Innovative Technology Administration (RITA). RITA is designed to promote and validate new sensing methods, tools and systems for monitoring the quality of construction and condition of the physical infrastructure cost effectively.

Dr. **Leroy Emkin** has been named the 2010 Engineering of the Year in Education by the Georgia Engineering Alliance. Dr. Emkin's nomination for this honor was selected by engineers representing various engineering organizations and educational institutions. In fact, this is the second year in a row Professor Emkin has held this title.

Dr. **Armistead (Ted) G. Russell** was elected a Fellow of the American Association of the Advancement of Science (AAAS). Dr. Russell serves as the Georgia Power Distinguished

Professor in Environmental Engineering. His area of expertise is air quality engineering, with particular emphasis in air quality modeling, and air quality monitoring and analysis.

Associate Professor **Kimberly E. Kurtis** has been named a 2010 Fellow of the American Concrete Institute (ACI). She is a member of the Structural Engineering, Mechanics, and Materials research group, and her research and teaching interests are in construction materials, with a strong emphasis on microstructure and durability of cement-based materials.

Professor **Donald W. White** was selected to receive the 2010 Raymond C. Reese Research Prize from ASCE for his paper entitled "Unified Flexural Resistance Equations for Stability Design of Steel I-Section Members: Overview" which appeared in the September 2008 issue of Journal of Structural Engineering. In selecting Dr. White for this award, the ASCE committee particularly noted the paper's unified approach for the design of both buildings and bridges in a format that can be readily adopted into specifications.

Associate Chair and Professor **Reginald DesRoches** was recently appointed to the Disasters Roundtable of the National Academies. He is one of four new members approved by the National Academies in October. Professor **Terry Sturm** was recently named editor of the Journal of Hydraulic Engineering (JHE) by the ASCE Environmental and Water Resources Institute.

Dr. **Reginald DesRoches** was one of four young engineers from the U.S. selected to co-chair and organize the first National Academy of Engineering (NAE) China-America Frontiers of Engineering program. This first-time event brought together 40 young engineers (between the ages of 30-45) who perform exceptional research and technical work in a variety of engineering disciplines.

Dr. **Adjo Amekudzi**, associate professor, has been elected to serve on the Leadership Committee of the American Public Works Association Center for Sustainability. Formed in 2008, the Center for Sustain-

ability addresses sustainability challenges of public works organizations across the United States and Canada.

Dr. **Jaehong Kim** was awarded the 2009 Paul L. Busch Award from the Water Environment Research Foundation WERF). Through the award, the Endowment recognizes outstanding individuals or teams whose ongoing efforts contribute significantly to water quality research and its practical application in the water environment.

Dr. **Ioannis Brilakis**, assistant professor, was named the recipient of the 2009 American Society of Civil Engineers (ASCE) Associate Editor Award. Dr. Brilakis currently serves as associate editor of the Journal of Computing in Civil Engineering and the Journal of Construction Engineering and Management.

Professor **Roberto Leon** is the newly appointed president of the Board of Governors of the Structural Engineering Institute (SEI). SEI is one of seven Institutes within the American Society of Civil Engineers (ASCE) charged with coordinating all ASCE activities related to the establishment, use, or discontinuance of standards in the area of buildings.

Dr. **Reginald DesRoches** was elected to chair the Executive Committee of the American Society of Civil Engineering's Technical Council for Lifeline Earthquake Engineering (TCLEE). The purpose of the council is to advance the field of lifeline earthquake engineering, including the development of standards for the field, prioritizing research needs, serving as a key resource for associated practitioners, and assisting with the education and technology transfer of lifeline earthquake engineering issues.

Dr. **Jaehong Kim**, associate professor, was recognized by Environmental Science and Technology journal, earning the 2009 Excellence in Review award. This award recognizes the significant contributions that reviewers provide to the scientific community and to the publication of scholarly research.

Professor **Don White** was awarded the 2009 T.R. Higgins Lectureship Award, making him the third winner of this honor in CEE.

Professor **Jim C. Spain** honored by the American Society of Microbiology with the 2009 Proctor & Gamble award in Applied and Environmental Microbiology.

Professor **Bruce R. Ellingwood** was awarded the Senior Research Prize in the area of Risk Analysis and Decision Making by the International Association for Structural Safety and Reliability. The award ceremony was held in September at the 10th Annual International Conference on Structural Safety and Reliability (ICOSSAR) in Osaka, Japan.

Alumni

Three CEE alumni with Uzun & Case participated in the award winning renovation of the Marriott Marquis Hotel in downtown Atlanta. They include: **Robert Weilacher** (Project Manager, BSCE '90, MSCE '91), **Daniel Kuemmerle** (Engineer, MSCE '99), and **Rees Culpepper** (Engineer, BSCE '05, MSCE '09). This innovative project involved repurposing a significant portion of the interior and resulted in saving large portions of the building from demolition. Through creative reconfiguration and leading innovation, Uzun & Case has earned the following awards: NCSEA 2009 Excellence in Structural Engineering Award (National Council of Structural Engineering Associations), SEAOG 2009 Excellence in Structural Engineering Award (Structural Engineer's Association of Georgia), and ACEC 2009 Engineering Excellence Awards - State Award (American Council of Engineering Companies, Georgia Chapter).

In Memoriam

With heavy hearts, the School of Civil and Environmental Engineering (CEE) at the Georgia Institute of Technology mourns the loss of CEE Emeritus Advisory Board Member **Henry Hammond (Buck) Stith Jr.**, BSCE '59. Buck passed away at his home in September 2009 after a long and courageous battle with cancer. He was a true friend and champion who will be sorely missed. He is survived by his wife, Mary Ann, and their daughter, Susan Stith Miller, and her family.

WE WANT TO HEAR FROM YOU.

CEE Alumni News highlights promotions, awards, scholarships, fellowships, and the publication of books. We want to hear from you! Stay in touch with the School and your classmates.

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or by mail to:
Communications Department
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790 Atlantic Drive
Atlanta, GA 30332-0355



SAVE THE DATE APRIL 15-17, 2011

CEE Alumni Weekend in New Orleans: Rebuilding the Crescent City, Post Katrina



In their research, CEE graduate students **Nortey Yeboah** and **Chris Shearer** quantify the engineering properties of biomass fly ash to identify characteristic trends in the fundamental fly ash particle. Materials resulting from the high temperature combustion of fuel are highly oxidized and can be reactive components of a variety of construction materials, such as concrete.



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