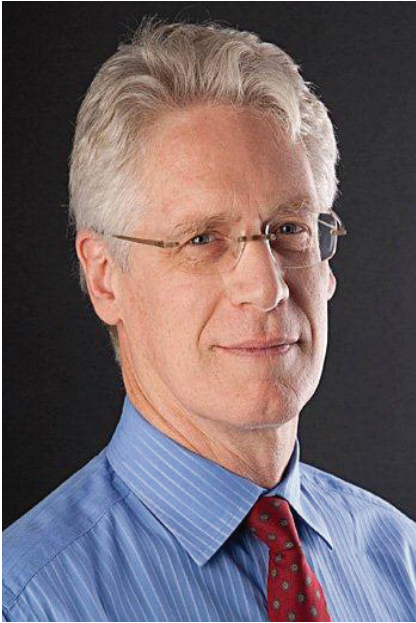


UF

INSIGHTS

into Sustainable Engineering

**Engineering
School of
Sustainable
Infrastructure &
Environment**



Dr. Kirk Hatfield
Director
The Engineering School of
Sustainable Infrastructure
& Environment

RE-IMAGINING SUSTAINABLE ENGINEERING

I am sending you hearty greetings from the University of Florida Engineering School of Sustainable Infrastructure & Environment! There is a multitude of ongoing changes being made while we continue to move forward with our school's mission. We are hiring new faculty, creating new space for innovations within our programs, and faculty collaborations have been energized between our two departments.

In this newsletter we have highlighted faculty research in the areas of transportation engineering, water resources and hydrology, and within our coastal engineering program. We have also included ongoing student research in hopes that you can get a strong understanding for the direction that we are now heading. Like you, we

are proud of the accomplishments of our faculty, staff, students and alumni and we want to share this information with you.

We continue to move forward with our pursuit to move into the global community through the establishment of agreements with our international colleagues. We believe these partnerships will propel ESSIE's research activity to expand even further past traditional borders as cross-cultural discussions perpetuate inquiry to resolve issues on a global scale.

I hope that you take the opportunity to peruse this newsletter as it reflects the heart and soul of ESSIE, its faculty, staff and students.

front cover photo:
Part of the Environmental Engineering
Sciences air resources program lab on
the roof of Black Hall on the campus of
the University of Florida

credited to Nancy McIlrath-Glanville

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if so, contact: news@essie.ufl.edu

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The quality of our air is a significant quality of life issue and a major focus for many government agencies. One of these agencies, the United States Department of Transportation, has established strategic goals regarding livability and environmental sustainability in order to minimize the significant effect of transportation systems on the environment. These goals have motivated the need for accurate measurements or estimates of micro-scale (i.e., second or sub-second) vehicle Energy Use and Emissions (EU&E). The availability of such data is especially important considering the growing need to assess the environmental effectiveness of traffic and Intelligent Transportation System (ITS) management strategies such as ramp metering, managed lanes, traveler information systems, speed harmonization, and even connected vehicle systems on EU&E. Since highway transportation accounts for large portions of the national annual emissions, transportation planners and engineers must pay special attention to these strategies to ensure that improvements in transportation operations also result in acceptable air quality conditions.

CORSIM is a microscopic traffic simulation software program used by a large number of traffic analysts in the United States. CORSIM models traffic at the individual vehicle level, and at a 1-second time resolution. The software is currently maintained by the McTrans Center at the University of Florida. While the traffic modeling aspects of the program remain state of the art, the emissions modeling aspect of the program has not been updated in over 20 years. In order to bring CORSIM into the 21st century, Scott Washburn, Ph.D., an associate professor at the University of Florida and Nagui Rouphail, Ph.D., a professor at North Carolina State University (NCSU), are working with emissions modeling expert Christopher Frey, Ph.D., an environmental engineering professor at NCSU.

Frey has long been concerned with the influence of traffic lights, road conditions, traffic congestion, and driving behavior on motor vehicle emissions in real-world situations. In an extensive 2003 study, Frey and his colleagues were able to analyze the emissions figures for various vehicle types in actual driving conditions by fitting vehicles with an onboard diagnostics system which records second-by-second engine and emissions data. Frey and his team then developed models from light-duty vehicles, transit buses, and heavy duty trucks based on specifics such as engine load, acceleration rates, and road grade. The data are analyzed using the EU&E estimation method founded on the concept of Vehicle Specific Power (VSP), which is a vehicle activity measure of engine load. In addition to the VSP model being sensitive to more roadway and vehicle factors than the current emissions modeling approach in CORSIM, it reflects

EMISSIONS: Environmental effectiveness of traffic

current vehicle technologies and driving behavior. The incorporation of the VSP emissions estimation model into CORSIM will make it a valuable tool not only for evaluating traffic operations, but also one that can be used to assess the air quality impacts of various traffic management strategies. Furthermore, with such a tool, transportation planners and engineers can more reliably and accurately consider the potential tradeoffs in traffic performance and air quality.

In order to validate the VSP model once it is implemented in CORSIM, the researchers will compare CORSIM emissions estimates for an arterial roadway section in Gainesville and a freeway section in Orlando using the University of Florida Transportation Research Center vehicle that is equipped with a Portable Emissions Monitoring System (PEMS), which measures the emissions of CO₂, CO, HC, and NO_x, as well as collecting GPS position data and vehicle engine state parameters.

Visit www.stride.ce.ufl.edu/washburn-abstract-014s to read more on the project.

Written by Morgan Witter

photos and illustrations credited to Dr. Scott Washburn

amination of Sites

As a result of past waste disposal practices and accidental releases, we now have many sites around the country where groundwater has become or is threatened with contamination. These sites present long term management challenges with an eye towards reducing future risk to both humans and the environment. How these contaminants enter the subsurface, migrate through groundwater

and ultimately discharge through wells, springs, wetlands, lakes and rivers is critical to understand so that risk can be reduced.

Our research group at the University of Florida has been studying the fate and transport of contaminants in groundwater over the last two decades. This group has focused on improved methods to characterize the nature and extent of contaminants in the ground but also on improved approaches to cleaning sites. Large scale problems such as increased nutrient loading to surface water from groundwater sources are also investigated.

One important technique that the group has employed and developed is the use of environmental tracers to enhance our understanding of how contaminants behave in groundwater. Tracers designed to locate and measure the amount of contaminant and the

physical characteristics of the contaminant have led to patents and a startup company Enviroflux. These innovative methods were developed to evaluate a site's contaminant source and guide decisions on remediation. The group has developed a tool called the passive flux meter which has been commercialized and applied at over 60 sites around the country. The data from wells at contaminated sites is used to focus remedial efforts with the aim of reducing the overall cost of management.

The techniques developed at the University of Florida have been applied at small dry-cleaner and gas station sites up to very large sites at military bases around the country. The method has been applied to nutrient loading challenges in the Everglades agricultural area in South Florida. Other large study areas include a mine tailing site in Colorado with uranium contamination and several large industrial sites in the Northeastern US. International studies have been conducted in Australia, the UK, France and the Netherlands. Always interested in a global perspective, the group recently hosted a groundwater quality conference GQ13 on campus that included participants from 24 countries.

Written by Dr. Michael Annable

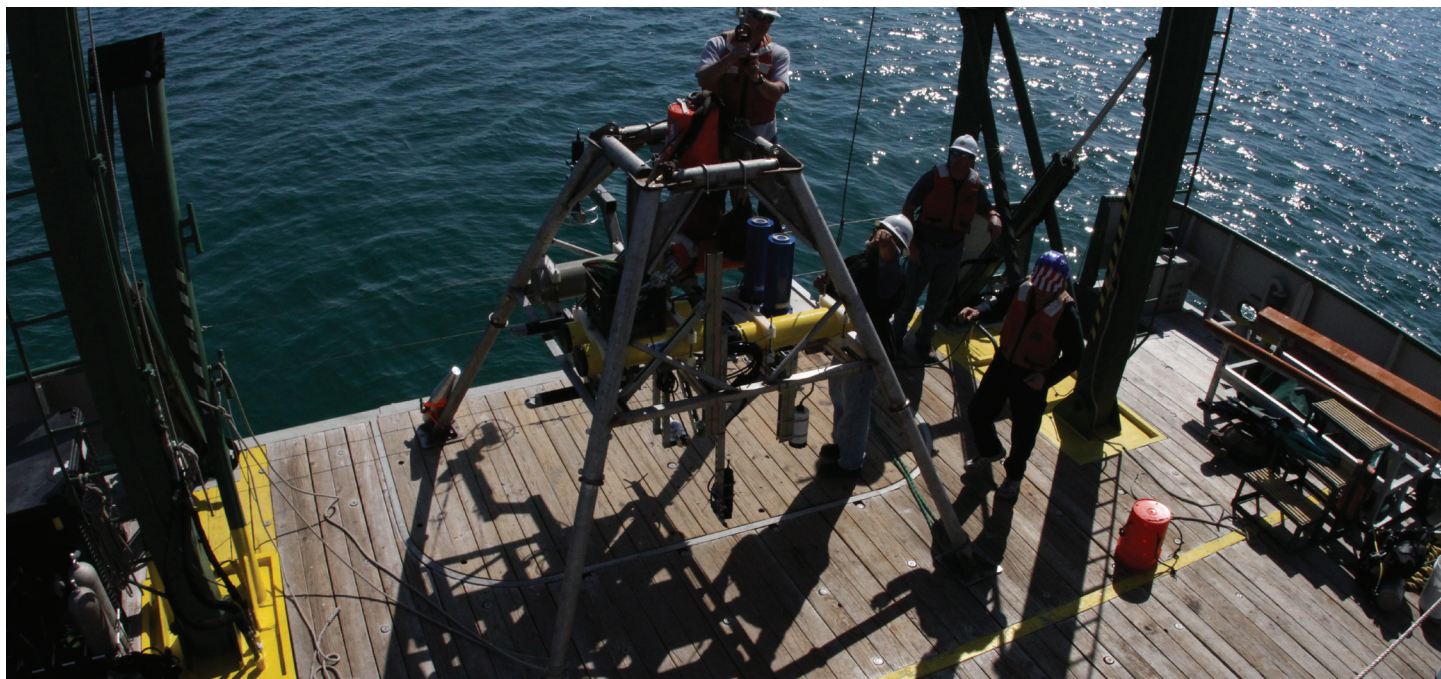


Portable Emission Monitoring System



Ambient Air Sensor

SAND RIPPLES & TSUNAMIS



Under the supervision of Dr. Alexandru Sheremet, Ph.D. students Uriah Gravois, Tracy Staples, and Miao Tian, recent Master's degree recipient, Duncan Greer, and Senior Engineering Technician Viktor Adams are collaborating with several universities and research institutions. They are conducting research on topics that span diverse oceanographic problems, from nonlinear tsunami evolution to sediment transport processes on the shelf.

Two of the most recent collaborations involve the Naval Research Laboratory (NRL) and the O.H. Hinsdale Wave Research Laboratory at Oregon State University. The team of researchers (previously listed) from the University of Florida Engineering School of Sustainable Infrastructure & Environment's (ESSIE) Coastal and Oceanographic Engineering program is leading the effort to understand the nonlinear physics underlying the processes studied. It also provides instrument support, diving support, and is in charge of the field deployment. The team brings to the collaborative projects data-analysis and modeling expertise of considerable width and flexibility.

Under the NRL project, the team is working with Dr. Joseph Calantoni (NRL Stennis) to study the movement, burial, and excavation of heavy objects on the seafloor under variable forcing conditions (see picture above). The project is funded through the U.S. Department of De-

fense's (DoD) Strategic Environmental Research and Development Program (SERDP). The first experiment is being conducted on the shelf near Panama City, Florida, on the Research Vessel F.G. Walton Smith to deploy and retrieve instruments.

ESSIE researchers Gravois, Staples, Greer, and Adams are American Academy of Underwater Sciences (AAUS) certified divers.

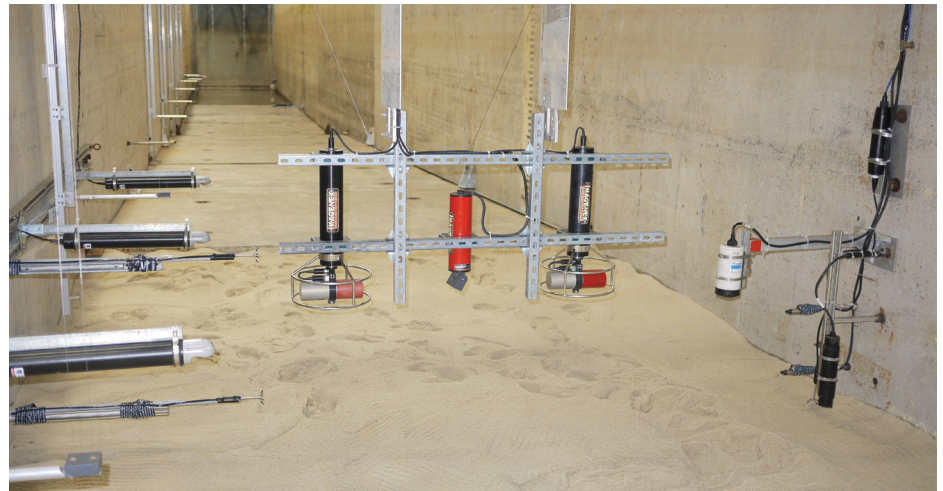


The first field experiment spanned five weeks with instruments being retrieved in late May 2013 and data being reviewed in early June. The deployment consisted of a pair of large rugged frames, deployed at depths of 20 feet

and 60 feet, that supported a diverse instrumentation suite for monitoring acoustic wave, current and suspended sediment concentration. The movement of objects on the floor was tracked by continuous sonar-imaging instruments, supplemented with scientific diver surveys. High-resolution, full water column (including boundary layer) measurements of horizontal and vertical wave and current motions were used to provide detailed information about wave-current forcing. The technical analysis of collected data will investigate the erosion and/or deposition of sediments, the characteristics of sand ripples on the sea bed, and wave and current boundary layer flows, and relate them to the drift and burial of the objects on the floor.

The ESSIE team is also working on a research project at the O.H. Hinsdale Wave Research Laboratory at Oregon State University (OSU) in collaboration with Texas A&M University and Virginia Tech. The project is studying tsunami waves as part of the Network for Earthquake Engineering Simulation (NEES). The NEES is authorized by Congress under the National Earthquake Hazards Reduction Program (NEHRP) and is funded by the National Science Foundation (NSF) as part of a coordinated effort to address earthquake risk in the United States. Earthquakes are the primary generation mechanism of tsunami waves, hence the sponsorship by NEES. This research effort studies the interaction of tsunami processes with the oceanographic background: surface waves and bottom sediment. During the spring of 2013, the ESSIE researchers conduct-

ed the first laboratory experiment in the large wave flume (LWF) at OSU. The LWF measures 104 meters long, 3.7 me-



ters wide, and 4.6 meters high (see right picture) and is the largest facility of its kind in North America. The study was focused on testing wave propagation and sediment transport on a scaled 1:24 beach, instrumented with over 30 sensors, including wave gauges, acoustic velocimeters and profilers, sector scan and pencil sonars, and suspended sediment sensors. Simulations included random waves as well as coherent waves (solitary and cnoidal). To study sediment transport processes under different types of waves, during the second phase of the experiment the wave tank was equipped with an 8-m long sediment box filled with synthetic sand whose properties are known with very high precision. Data from this project will be archived and made available to the public through the NEES Project Warehouse/data repository (<http://www.nees.org>).

Written by with photos credited to Dr. Alex Sheremet



FACULTY AWARDS & RECOGNITIONS

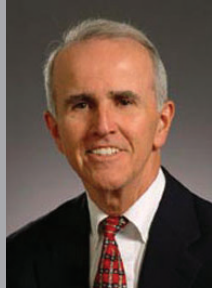
Dr. Chang-Yu Wu

Dr. Chang-Yu Wu, Alexandros Theodore, Jin-Hwa Lee, and Lindsey Riemenschneider were issued a patent for their technology, "A High-Efficiency Viable Sampler for Ultrafine Bioaerosols."



Dr. James Heaney

Dr. James Heaney was awarded the prestigious Warren A. Hall Medal from the Universities Council on Water Resources (UCOWR).



Dr. David Prevatt

Dr. David Prevatt has been selected by the National Institute of Higher Education, Research, Science, and Technology (NIHERST) as an awardee for the NIHERST Award for Excellence in Science and Technology.



Dr. Arnolando Valle-Levinson

Dr. Arnolando Valle Levinson is a professor in the Department of Civil and Coastal Engineering and he has been selected to become a member of the Mexican Academy of Sciences.



Dr. Tom Sputo

Congratulations to Dr. Tom Sputo who was advanced to Fellow in the ASCE Structural Engineering Institute.



FACULTY

ESSIE RETIREES

Dr. Ronald "Ron" Alan Cook

was hired as an Assistant Professor on August 11, 1989, promoted to Associate Professor on August 12, 1994 and to full Professor on August 10, 2001. He was hired into the Civil Engineering program working within the Structural engineering specialization. Ron has served the university and the CCE department for almost 24 years.

Dr. Yeayi "Peter" P. Sheng

was hired as an Associate Professor in the Coastal and Oceanographic program on June 2, 1986 and was promoted to Professor on August 12, 1988. He will retire on July 31, 2013 serving the university and the CCE department for more than 27 years.

Mr. Anthony "Tony" J. Murphy

was hired as a Senior Computer Support Specialist for the Department of Civil & Coastal Engineering on October 10, 1996. He has been a loyal and dedicated employee serving the faculty, students and staff for almost 17 years. He is scheduled to retire on June 30, 2013.

NEW FACULTY, NEW IDEAS

Dr. Barron Henderson



Dr. Henderson received his B.A. degree in Biology from Austin College and both his M.S. and Ph.D. degrees in Environmental Science and Engineering from the University of North Carolina, Chapel Hill. He has worked for the USEPA as a post-graduate research fellow and as a post-doctorate research fellow. Dr.

Henderson's research focuses on improving the scientific basis of policy decisions regarding air pollutants and greenhouse gases. He seeks to identify and improve model deficiencies by integrating regional and global chemical transport models and observations. His research first identifies model weaknesses by comparing model outputs with observations and then identifies the key model processes and constrains the model based on the scientific uncertainties involved. His modeling efforts have included ozone and NO_x transport. He has worked with the Comprehensive Air quality Model with extensions (CAMx), the Community Multi-scale Air Quality model (CMAQ), and the Weather Research and Forecasting Chemical model (WRF-Chem) among others. He taught the course Global Air Pollutants in the spring 2013 semester.

Dr. David Kaplan



Dr. Kaplan obtained his B.S. in Agricultural and Biological Engineering from Cornell University. After graduating, he worked on environmental protection and ecological restoration projects for the natural resources division of the New York City Department of Parks and Recreation, including urban wetland restoration, oyster reintroduction, and remediation

of contaminated parkland. He received his Ph.D. in Agricultural and Biological Engineering from the University of Florida in 2010. Dr. Kaplan's primary research focus is related to understanding feedbacks between biological, hydrological, and human systems; environmental and ecological thresholds to natural and anthropogenic drivers (climate change, population growth, watershed development, nutrient loading); and ecological restoration. He also is interested in development of hydrological and ecological models in support of conservation, management, and restoration of natural resources, and uncertainty and sensitivity analysis of natural and human systems modeling. In addition, he studies wetland hydrology, impacts of altered hydrology on structure, and function of wetlands, lakes, and rivers, and saltwater intrusion impacts on coastal wetlands and aquifers. He taught Wetland Restoration and Management in spring 2013.

Dr. Maitane Olabarrieta Lizaso



Dr. Maitane Olabarrieta Lizaso will be joining ESSIE's Coastal and Oceanographic program this coming Fall 2013 semester. Dr. Olabarrieta received her undergraduate degree from the Universidad de Las Palmas de Gran Canaria and her M.S. and Ph.D. from the Universidad de Cantabria (Spain) in Marine Science and Technology. She has been actively involved in collaborative research projects with the United States Geological Survey (Woods Hole Center), the Woods Hole Oceanographic Institution, Scripps Institution of Oceanography, and the Hydrographic Institute of the University of Cantabria. Her research interests include: wave-current-atmosphere interactions

under extreme storm events; wave-current-atmosphere coupled numerical models; ocean and estuarine hydrodynamics; operational oceanography; long wave dynamics (infragravity waves, tides, tsunamis and meteotsunamis); storm surge, runup, and inundation during storm conditions; inlet opening processes; estuarine and coastal morpho-hydrodynamics; and coastal wetting and drying algorithms for numerical models. She has published numerous research articles in the most prestigious journals. We are eager for our newest Gator faculty member, Dr. Olabarrieta, to share her expertise with our students and faculty!

WATER & ELEPHANTS

UF Graduate Students Participate in IGERT Program in Southern Africa



With funding from the National Science Foundation's Integrative Graduate Education and Research Traineeship (IGERT) Program, 28 Ph.D. students under the leadership of Dr. Mark Brown, professor of Environmental Engineering Sciences and Principle Investigator of the IGERT at UF, conducted research in southern Africa for the past six years. The team studied the response of ecosystems and human systems to the combined effects of climate change, population growth, and tourism development. Working primarily in the Okavango Delta and Kavango-Zambezi watersheds, trainees in the IGERT program not only conducted their individual research activities, but devoted time and energy during their in-country data collection to community involvement projects. An example of the research and outreach they conducted involved management issues surrounding water and elephants.

Besides the obvious connection that elephants need water, and lots of it; water and elephants share something else in common. They are both serious management issues in southern Africa and each is driving the other to make things worse.

The interdisciplinary team of Ph.D. students and faculty from the University of Florida's IGERT in Adaptive Management worked with local and national government agencies to help solve two of Africa's most serious natural resource management problems...too many elephants and too little water. The team of students and faculty represented a diverse array of UF Departments including: Engineering, Geography, Soil and Water Science, Natural Resources, and Forest Resources and Conservation which brought into sharp focus the challenges of the multifaceted complexity of the water-elephant-people nexus.

In partnership with scientists from the University of Botswana's Okavango Research Institute, the IGERT team used state of the art simulation models linked with satellite monitoring to predict impacts of global climate change on the ecology and economy of southern Africa and measure the impacts of ongoing development activities that are aimed at addressing water and wildlife related issues. Most of southern Africa is vulnerable to climate change as it is situated in one of the most highly variable climatic regions on the planet. Water resources are already under pressure in southern Africa, and climate change will lead to a decline in the availability of surface water resources. This is happening at the same time as population growth and socioeconomic development are increasing the demand for water.

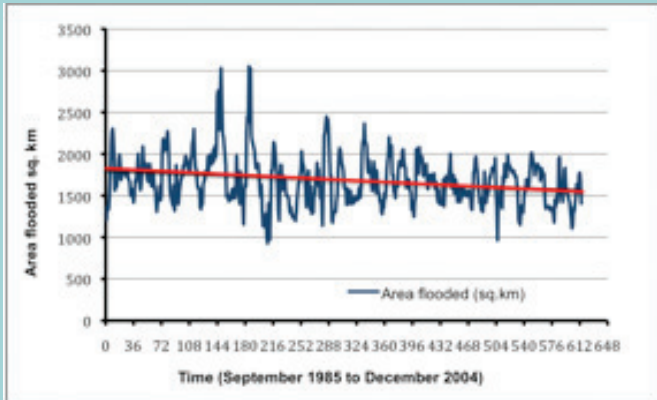
Southern Africa's elephant population is expanding at a rate that many scientists consider destructive to the region's ecology, not to mention impacts on human welfare. Elephants do not have natural predators other than humans and since elephant hunting has been outlawed in Africa, populations are increasing. Human and elephant populations are growing at rates of about 3% and 5% per year, respectively. As human populations expand, the result is conversion of more and more marginal land into agricultural production, further reducing elephant range, increasing their density and increasing human-elephant conflicts. The researchers found that both issues are coupled in a most important way. Human expansion into marginal lands is leading to large-scale deforestation of woodlands which in turn is changing regional hydrology and potentially affecting rainfall in the long run. Elephants too impact woodlands, as they are browsers of grasses, shrubs and trees and are known to deforest woodlands to increase growth of shrubs and grasses. The conversion of woodlands by both humans and elephants impacts water balances through changes in transpiration, discharge timing and stream flow characteristics. The net result of which is less water availability exacerbating the effects of climate change, these changes have increased the annual fluctuations in wet and dry seasons.

Using simulation models and analysis of satellite imagery from the past 20 years, our IGERT team found significant declines in total rainfall and a three-fold increase in the number of drought years over the past 25 years as compared to the previous twenty-five. Ecological models of the Okavango Delta predicted significant shifts in the extent of floodplains that are critical wildlife foraging

wildebeest frequent the site, along with diverse species of wading birds. The profusion of wildlife and the pristine setting draw tourists from around the world. As more and more service jobs are required by the expanding number of tourists, major population increases in the region have occurred.

With the increased human populations, elephants have been confined to smaller areas and their numbers are exceeding local carrying capacities. As their numbers increase and the extent of flooding by the rivers north of Botswana decline, the team's simulation models show that elephant impacts on both ecological systems and human economies

scape. The team's simulation models when allowed to run far enough into the future suggest that this scenario is not without merit. The results of their simulation models are striking, showing a disproportionate sensitivity to changes in flow patterns of rivers with declining extent of wetlands under most simulated development and climate change scenarios.



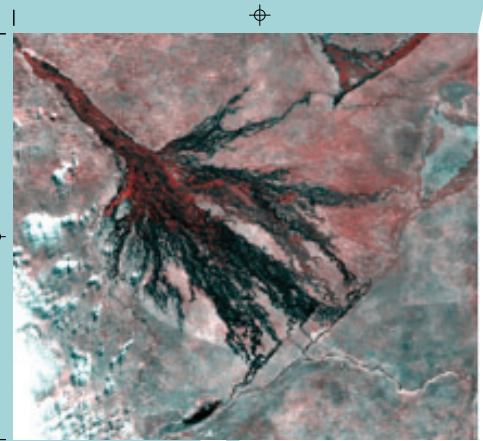
The annual flood pulse in the Okavango Delta in Botswana, threatened by future upstream water abstractions

areas and fish breeding areas, which will translate into declines in these populations. Results from the modeling efforts were used to shape management of the Okavango and Chobe watersheds and to provide needed scientific input to OKACOM, the transboundary governmental organization charged with developing an overall policy framework for management of the Okavango River.

The increased density of elephants in places like Botswana's Okavango Delta is driving large-scale changes in hydrology and flow patterns of annual floods, forcing changes in vegetative communities and biodiversity. The Okavango Delta is inundated by water from upstream Angola every dry season, providing an oasis in the middle of Botswana's Kalahari desert that attracts dense populations of wildlife. Large grazing and browsing animals such as elephants, hippos, giraffe, zebra, impala, and

will continue to grow in seriousness, with increased conflicts between human populations and elephants over water and space. There are few alternatives available to wildlife managers for control of elephant populations. Even culling presents unimaginable logistical complexities because of the size and sheer number of elephants.

Combined, the effects of climate change on rainfall patterns producing longer and more frequent dry periods, the increased numbers of elephants, and the decreased habitat area may be forcing the northern Botswana region toward a tipping point shifting the region into a far dryer inhospitable land-



The annual flood pulse in the Okavango Delta in Botswana, threatened by future upstream water abstractions

UF-IGERT trainees include: Anna Cathey, Andrea Gaughan, Bill Kanapaux, Gregory Parent, Narcisa Pricope, and Deborah Wojcik. UF-IGERT faculty involved: Dr. Mark Brown, (PI), Dr. Sandra Russo (Co-PI), Richard Hamann, Esq. (Co-PI), Dr. Rafael Munoz-Carpena, and Dr. Gregory Kiker. University of Botswana Faculty: Dr. Mike Murray-Hudson, Dr. Piotr Wolski, and Dr. Olekae Thakadu.



Botswana children at riverside to collect drinking water.

Photos and charts credited to Dr. Mark Brown and UF IGERT Team

AS A UF GRADUATE STUDENT IN MONGOLIA

ANA MARIA HAGAN



Toxology Center Team

The challenge and adventures during my 10-month fellowship made it one of the most memorable and rewarding experiences of my career. When I applied for the Fulbright Fellowship Award to conduct independent research in Mongolia my motivation was simple; I wanted to practically apply knowledge and skills from my doctoral research under my advisory committee chair, Dr. Mazyck, on mercury and its removal from wastewater using ultraviolet radiation.

Mongolia was once home to Genghis Khan, the ruler of the largest land empire in history. It is now home to 3.1 million people and a land area over twice the size of Texas. A landlocked country bordered by China and Russia, Mongolia often experiences harsh climatic conditions with temperatures ranging from -22 in winter to +100 in summer. Away from the capital city Ulaanbaatar, the country consists of wild and breathtaking scenery; with a scattering of nomadic herders, truck tire tracks, and more increasingly, small-scale industry being the only indicators of a human presence in a vast open land.

The use of “muungun yus”, the Mongolian word for mercury or “silver water”, reached critical levels during the last decade as a significant increase in mercury-based artisanal and small scale gold mining (ASGM) activity coincided with soaring gold prices. Some data on human mercury exposure by direct handling in ASGM communities was available from health assessments following a ban on mercury by the Mongolian government that commenced five years ago. However, no knowledge existed of the potential added contribution from natural environmental background levels. A gap existed as more information on baseline mercury levels was required to establish if they were being elevated by ASGM practice and potentially further impacting human health.

Using my knowledge of mercury and lab experience at UF, my Fulbright project established a study to determine levels of aqueous background mercury in rivers, including the headwaters to one of world’s largest freshwater lakes, Russia’s Lake Baikal. I would work with the Mongolian National Toxicology Center, which is part of Mongolia’s National Public Health Institute, to ensure capability in mercury sampling, and analysis was developed and sustained.

As expected, undertaking the project presented many opportunities and challenges. One of my first challenges was learning how to improvise in the field and laboratory due to limited equipment and supplies, without compromising safety or quality. Fortunately the Center’s lab was equipped with a portable mercury analyzer furnished by the World Health Organization, although it had never been used. Obtaining trace-metal grade reagents and conducting laboratory protocol training vital to the project’s success required much time, careful communication and patience.

My working environment was also full of unique cultural experiences such as joining my colleagues every morning for regimented group exercises or a small drink of fermented camel milk known as Arak in the evenings. I quickly came to understand that Arak is a summer drink very popular during national festivities and highly coveted by my Mongolian colleagues for its health benefits. My most memorable experiences in Mongolia were field trips in spring and summer last year. The team from the Toxicology Center and I headed northwest from the capital Ulaanbaatar across the Mongolian Steppe towards Russia. It was necessary to for us determine community access to river water and identify suitable sampling locations. Having to drive off-road through the countryside in the world’s most sparsely populated country often meant we were many hours from the

nearest town. As is customary on the Steppe, when we were not near a town we were invited to stay with nomadic families in traditional Gers, which are the felted dome tents often referred to as Yurts in other parts of Central Asia. Despite initially feeling a little unsettled by the growling chorus of Mongolian Mastiff farm dogs, I found the hospitality of our host families overwhelming.

Upon entering a Ger, it is convention to walk clockwise until you find a stool in front of the small coal-burning stove next to the support beam in the center. Hearty greetings usually begin with a bowl of salty milk tea and can often end with Arak or vodka. I was fascinated to observe the traditional nomadic herding lifestyle being supplemented with some modern comforts. It was not uncommon to see such things as the daily herding of goats by motorcycle instead of horse, or the use of solar panels to power a satellite dish and television inside a Ger.

The Toxicology Center is now able and planning to lead an integrated program of environmental mercury monitoring. With capacity for continuous aqueous mercury monitoring in place, the natural next step in addressing mercury pollution is the implementation of practical prevention and treatment technologies. However, a critical component of improving human health outcomes is a long term, well-funded environmental monitoring network that can help measure the effectiveness of these methods. The Toxicology Center now has the ability to gather and present data in support of funding requests to pursue this aim and develop these programs.

Aside from the project goals during my fellowship, the responsibility of being an American ambassador of goodwill fostered long-term relationships with my colleagues. This fall, during the final semester of my Ph.D. program, I rejoin my Mongolian colleagues from the Toxicology Center at the 2013 International Conference on Mercury as a Global Pollutant. We will present the findings of the project as the “Background Trace Mercury levels in Surface Waters near ASGM activities in the Orkhon River Catchment in Mongolia” and interact with the world’s leading mercury research scientists.

My time in Mongolia was

both challenging and very rewarding. The project enabled me to apply the skills and knowledge I have developed here at UF in a way that I hope will provide benefit to rural communities in Mongolia. I thoroughly recommend that anyone inspired by the potential that your research has to bring engineering and science-based solutions to defined problems around the world, talk with your advisors and consider applying for a Fulbright Fellowship.

Article and photos credited to Ana Maria Hagan



LONG SPANS WITH TRANSPORTABLE GIRDERS

Due to current truck weight restrictions limiting their transportation to the job site, the length of simple span concrete bridge girders has been limited to approximately 180 ft. The recently adopted Florida I-beam by the Florida Department of Transportation (FDOT), however, is capable of design spans greater than 210 feet.

Graduate student Natassia Brenkus and Dr. Trey Hamilton, in concert with the FDOT's Structures Research Lab in Tallahassee, FL, have been developing and investigating a splice connection to extend simple spans beyond the 180 ft length restriction. The goal is to address the discrepancy between the span lengths deliverable to a job site and those attainable by design by developing a splice connection which would allow shorter, lighter segments to be transported separately and assembled prior to or during



the placement of the segments on the bridge supports. The concept of the splice connection is to pair two precast prestressed concrete girders at the job site, using couplers to join the prestressing strand, and external jacks to instill prestress at the joint. The research has encompassed the development of a new splice design, a splicing procedure and testing of the proposed splice's behavior.

A year of construction and laboratory testing recently completed at the FDOT Structures Research Lab evaluated the proposed connection design. Multiple loading scenarios were utilized to investigate behavior of the splice connection in flexure, shear, and fatigue. Data analysis and evaluation of the splice performance and the system behavior are slated for completion by the end of summer 2013.

Article and photos submitted by CCE Ph.D. student Natassia Brenkus

GOING GLOBAL

Over the past two years ESSIE faculty and administration have been pursuing opportunities to work collaboratively with colleges and universities throughout the world by expanding into the global market. Faculty within ESSIE have pursued the establishment of several cooperative agreements in Italy, Spain, Mexico, Germany and most recently, Turkey (which is currently being coordinated by Associate Professor Dr. Louis Motz and ESSIE Graduate Academic Support Coordinator Nancy McIlrath-Glanville.) These agreements are seen by ESSIE administration as the first steps toward developing a more formalized exchange program with the institutions involved with the possible ultimate goal of establishing joint Ph.D. degree programs. ESSIE faculty are eager to work on collaborative research projects with faculty and students from these schools and our students are eager to experience a portion of their program at an international institution. The University of Parma and the Universidad Autónoma de Yucatán have already sent several students to complete research with faculty within ESSIE. We are looking forward to establishing and maintaining long term relationships with these institutions and working together to resolve issues that impact the global community.

FEATURED STUDENTS

David Roueche awarded the prestigious NSF Graduate Research Fellowship Program (GRFP) award



We are very excited and pleased to share that David Roueche has received a National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) award in this 2013 round! David's important research is directed at reducing tornado damage to residential structures, and it could not be timelier, as in 2012 three federal agencies (NOAA, NSF and NIST) identified the critical science imperative for tornado damage mitigation research to arrest the annual increase in economic loss.

David's proposed work will result in a better understanding and prediction of tornado-induced surface forces on buildings – arguably the first step towards developing structural systems that can resist those loads.

Please join us in congratulating David on winning this prestigious and career-making NSF award!

Stephanie Ishii receives AWWA Larson Aquatic Research Support Scholarship



Dr. Thurston E. "Lars" Larson was a brilliant and dedicated water chemist and researcher. In addition, Dr. Larson continually emphasized the need for strong graduate programs in water chemistry and related fields to train qualified, dedicated scientists and engineers who will provide leadership in efforts to improve water quality. The Larson Aquatic Research Support

(LARS) scholarship honors the memory of Dr. Larson by providing support and encouragement to outstanding graduate students preparing for careers in the fields of science or engineering. One doctoral and one master's student are chosen annually as recipients of this award based on academic record and leadership.

Stephanie Ishii is a Ph.D. candidate under the mentorship of Dr. Treavor Boyer. Her dissertation research involves quantifying the environmental, economic, and social impacts of wastewater systems using Life Cycle Assessment and survey methods. Stephanie's work is driven by the potential for alternative wastewater systems to achieve a wide range of benefits, including water conservation, enhanced nutrient recovery, and water resource protection. Her previous research experiences have included evaluating the secondary effects of anion exchange on corrosion potential in the distribution system, as well as the use of fluorescence spectroscopy for the characterization of dissolved organic matter.

STUDENT AWARDS

Congratulations to EES Ph.D. student Jun Wang, the winner of the AAAR annual conference student poster competition.

EES Ph.D. student Nima Afshar won the Outstanding Graduate International Student Award and a scholarship from the Air & Waste Management Association for Fall 2013.

Graduate students Craig Dixon and David Roueche win StormStruck scholarships

Civil engineering Ph.D. student Craig Dixon has won the StormStruck® State Farm Scholarship. The State Farm Scholarship is awarded to a student performing research on financial analysis, investment management or corporate finance as they relate mitigating the effects of, responding to or recovery from natural disasters.

David Roueche, also a civil engineering Ph.D. student, has won the StormStruck® Simpson Strong-Tie Scholarship, awarded for performing research on resilient construction materials or techniques.

Student Chapter of ASCE: 2013 Southeast Student Conference



On March 14th, a group of 60 ASCE students arrived in Miami, Florida to attend the 2013 Southeast Student Conference. The University of Miami hosted the first day of the Conference, which featured a food truck rally, the Steel Bridge Display, and a small networking session.

Day two of the Conference took place at the Florida International University campus. The Concrete Canoe Team set up their display while other Conference-goers referred to their program brochures to find their individual competition times and locations. One of the first competitions for the University of Florida was the Concrete Canoe presentation. Many of the UF students attended the presentation to show support for their friends, and as a result, Canoe placed third in the presentation category. Throughout the day, students competed in their respective competitions and attended each other's events to show support for one another. Competitions included Professional Paper, Concrete Testing, Environmental Engineering, Wind Engineering, Hydraulics, Balsa Tower, and Plans Reading. The major event of the day was the Steel

Bridge Assembly. Almost every UF attendee was present to cheer on the Steel Bridge Team as they raced for the fastest and most efficient assembly time. With only three people performing assembly, the Steel Bridge team clocked a time of six minutes and twenty-seven seconds!

On the final day of the conference, ASCE students drove to Tropical Park for the final day of competition. Here, schools set up canopy tents along the lake to watch the Concrete Canoe teams race in the Women's Sprint, Women's Endurance, Men's Sprint, Men's Endurance, and Coed Sprint. The competition was stiff, but the University of Florida managed to place 1st in every race! Other competitions of the day included Mystery, Visual Display, Bocce Ball, T-shirt, and Surveying. Concrete Testing also tested their cylinders from the previous day, and achieved a strength within 15 psi of the design strength.

The Southeast Student Conference proved to be a tremendous success. Students were able to meet conference attendees from other schools, forge new friendships, network with professionals, put their skills to the test in competitions, and win awards. Our ASCE group placed 3rd in Professional Paper, 3rd in T-Shirt Design, 1st in Concrete Testing, 1st in Concrete Canoe Overall, 1st in Steel Bridge Construction Economy, and 2nd in Conference Overall! The 2013 Southeast Student Conference was an overall great experience for all who attended.

Article and photo submitted by Nicole Smith, an ASCE student member

Formation of the student chapter of the Florida Structural Engineers Association

During the Fall 2012 semester, the Northeast Chapter of the Florida Structural Engineers Association (FSEA) requested that the graduate students specializing in structures within the Department of Civil & Coastal Engineering form a student chapter. Their intentions for the organization included providing better preparation for structural engineering practice through events, opportunities to interact with potential employers, and an overall connection to the field that students otherwise would not have. In mid-September of 2012 the chapter was officially created and a core group of officers was formed.

Considering its mid-semester formation, the FSEA chapter had a successful first semester. They hosted two speakers, Dr. Tom Sputo and Tom Grogan, drawing about 50 students for both talks. They also visited the recently renovated historic Gainesville Train Depot. The visit was hosted by the construction superintendent and the engineer of record who talked about the structural challenges that were involved in the renovation as well as the key parts of Gainesville's history.



**COASTS, OCEANS,
PORTS & RIVERS
INSTITUTE**
Student Chapter

A new student chapter of the American Society of Civil Engineer's (ASCE) Coasts, Oceans, Ports & Rivers Institute (COPRI) was formed in January 2013 by graduate students in the Coastal & Oceanographic Engineering (COE) program. This "Gator Student Chapter" joins the three existing COPRI student chapters at Texas A&M University, the University of North Florida and Virginia Tech University. The purpose of the COPRI-GSC is to enhance the educational and social experience of College of Engineering graduate students by providing a centralized way to organize activities and foster the communication and cooperation between government, industry and academia.



ESSIE'S Spring 2013 Graduation Social

This year ESSIE organized a combined departmental graduation event that included both Environmental Engineering Sciences and Civil & Coastal Engineering. It was held in the University Gallery and highlighted artwork by our very own ESSIE students! We also announced this year's award recipients from both departments (see below). Over 130 students, faculty and staff participated in this inaugural event and we, the organizers, believe a good time was had by all!



Civil & Coastal Engineering

Graduate Outstanding Service/Leadership Award
Jeremy A. Magruder
 Faculty Mentor Research Award
Dr. Sira Srinivasan
 Coastal & Oceanographic
 Graduate Outstanding Academic Award
Kim D. Arnott
 Civil Engineering
 Graduate Outstanding Academic Award
David B. Roueche
 Undergraduate Outstanding Academic Award
Jason S. Silbiger
 Civil & Coastal Undergraduate Outstanding Service/Leadership Award
Danielle Soriano

Environmental Engineering Sciences

Graduate Outstanding Service/Leadership Award
Akua Oppong-Anane
 Faculty Mentor Research Award
Dr. Treavor H. Boyer
 Undergraduate Outstanding Service/Leadership Award
Christopher D. Tobiere
 Graduate Outstanding Academic Award
Amy M. Borello
 Undergraduate Outstanding Academic Award
Christine N. Varbis
 John J. McCreary Outstanding Faculty Award
Dr. Ben Koopman

Photos credited to Nancy McIlrath-Glanville

Exhibiting Student Research

ESSIE and the Air and Waste Management Association (AWMA) student chapter co-sponsored a joint departmental poster symposium on Monday, April 15. Fifty undergraduate and graduate students from the Departments of Environmental Engineering Sciences and Civil & Coastal Engineering participated in the First Annual ESSIE Poster Symposium. There were ten poster finalists selected and each finalist received a small scholarship as a prize winner. EES graduate student and AWMA president, Mr. Matthew Tribby coordinated the successful event. Prior to the establishment of ESSIE, the AWMA student association sponsored this event solely for the EES department. Since the formation of ESSIE, the AWMA student association and the ESSIE Graduate Student Advisory Group thought it would be a good opportunity to expand the symposium throughout ESSIE to allow all ESSIE students to participate. Pictured are all of the award winners.



Photo credited to Nancy McIlrath-Glanville

George Knecht

WW Gibbs Outstanding Alumni Award Recipient

If one were to look up the word “alumni” one would find many similar definitions. For our purposes here we will use this one – “alumni are people who previously attended or graduated from a particular school, college or university, or people who had a former association with the same organization.” Mr. George Knecht attended the University of Florida but did not graduate from here. So you ask, “Why would you bestow your highest honor within your Department of Civil & Coastal Engineering on someone who does not hold a degree from the institution?” Our response is even though George does not hold a diploma from the University of Florida, his loyalty, devotion, commitment and dedication as a former associate of this department and the university is a stellar example of an alumnus of the Gator Nation.

At the recent ESSIE Spring Graduation Event, George was recognized for his achievements in the field of civil engineering and for his commitment to Gator Civil Engineering. Mr. Knecht’s career began in the 1960s while serving as an enlisted man in the U.S. Navy Seabees and as an officer in the U.S. Coast and Geodetic Survey (currently the National Oceanic and Atmospheric Administration). In 1971 George joined the City of Jacksonville where he rose from Engineer Intern

to Assistant City Engineer and ultimately Division Chief, an appointed position. Throughout his more than 32-year tenure with the city, he was involved in a variety of activities in the civil engineering field including developing the city’s Standard Specification and Details Manual and the city’s Land Development Procedure Manual. After retiring, George formed his own company, Knecht Engineering Inc., and remains actively involved in that. His involvement in the field also included actively participating in and attaining the highest leadership roles within the American Public Water Works Association, the Florida Engineering Society and the National Society of Professional Engineers.

George has been a steadfast supporter of the UF Civil & Coastal Engineering program for longer than just about anyone within the department can remember. He was, for many years, a major organizer and contributor to our annual ASCE Jacksonville Field Trip, and has supported the ASCE Student Chapter overall and the Concrete Canoe Team for many years. Most importantly, George has volunteered for over 30 years as a member of our External Advisory Board and his candid feedback has been of great value in assisting us in making continual improvements where and when needed.



Many of our students likely do not know George Knecht; this is in part because he has made all of these contributions in his very humble and unassuming manner. But more of our students ought to know him, as he is truly an outstanding individual and a perfect representation of an engineer with a life devoted to the service of his profession. He has not been one to seek the limelight, but the department felt that it was time to give him just a little bit of it anyway so that our students may get to know one great engineer who has helped them and their program behind the scenes in so many ways. So, to us this humble, devoted man is the definition of a true alumnus, graduate of the program or not! George, we cannot thank you enough and we will continue to applaud you for your continuous support of our students, this department and this university. You have earned the title of CCE Gator alumnus!

Photo credited to Nancy McIlrath-Glanville

Giving Back

Doug Miller is a happily married family man and father of two; a successful professional who recently “retired” as the CEO of his firm; a stand out in Jacksonville’s business community for his dedication to doing the best job possible for his clients; an innovative, forward-thinking visionary; an avid golfer and an outstanding Gator Engineer ...

Miller is now the “Chief Strategy Officer” (a self-created title, he jokes, which allows for regular golf games on Fridays) of England-Thims & Miller, Inc. which he joined in 1979. He says the secret to his success has been simple- a consistent focus on doing the job at hand in the correct manner before looking down the road. This vision has been made reality through numerous business and government projects he has spearheaded over the past three decades. He believes his foundation for success began on the University of Florida campus as a young Civil Engineering student. The principle of “giving back” to his beloved alma mater has been and continues to be one of his philanthropic priorities.

Since his graduation in 1975, Miller has been actively engaged with the College serving on the Department of Civil Engineering, ESSIE and the Dean’s Advisory Boards. He has supported the efforts of multiple deans and department chairs throughout the years with his gifts of both time and financial contributions. In early April, Dean Abernathy and Dr. Kirk Hatfield had the opportunity to sit down with him for an in-



depth look at the College’s strategic plans. Miller believes our vision for success aligns perfectly with his. In fact, his confidence in the future direction of the College prompted him to commit an extremely generous leadership gift that will help prepare the College in educating future generations.

ESSIE wants to acknowledge Doug Miller for being a dedicated and loyal Civil Gator engineer who continues to make it possible for great things to happen for our students, our school, our college and the University of Florida!

Doug Miller, you have “paid it forward” time and time again and for that we thank you!

Photo provided by Gloria J. Stephens of ETM

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still have access to many of the
services available at the Career
Resource Center!

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Do you know of internship or
employment opportunities for
our graduates? As an employer
are you interested in
presenting an information
session to our students?
If so, send an email with details
to careers@essie.ufl.edu

RECENT PUBLICATIONS

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GEOTECH GROUP

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In Memorium: Dr. Michel K. Ochi



Dr. Michel K. Ochi, Professor Emeritus in the Civil and Coastal Engineering Department at the University of Florida, passed away Saturday morning April 13, 2013 at the age of 92. Dr. Ochi joined the UF faculty in 1979 after 21 years with the US Navy's Naval Ship Research and Development Center near Washington, D.C. where he was a Research Scientist. He had two doctorate degrees, one in Naval Architecture from Osaka Imperial University and one in Mathematical Statistics from American University. He also received an Honorary Doctor of Engineering Degree from the University of Genoa, Italy. He was a Fellow in the Society of Naval Architects and Marine Engineers (SNAME) and the Royal Institute of Naval Architects and also a member of the American Society of Civil Engineers. He was the recipient of a number of awards including the Davidson Medal and the Linnard Prize from the SNAME and the Navy Superior Civilian Service Award. He was the author of in excess of 100 technical publications including three books and one monograph. He developed graduate level courses in ocean waves. He is survived by his wife of 48 years, Margaret Duke Ochi, who was the Supervisor of Naval Architects at the Naval Ship Research and Development Center prior to her retirement in 1980.

Abbreviated (with photo) from published obituary from Forest Meadows

We Are Proud of our 2012 Gator Grads!

EES GRADUATES

Ph.D. Spring 2012 Hwan Chul Cho Emily K. Faulconer Myung-Heui Woo Summer 2012 Wei Bai Tianyi Chen Sanghyun Chun Giuseppina Garofalo Charles M. Jenkins Fall 2012 Saurabh Nitin Raje Kathryn Enga Louise Smith	Wesley D. Hogan Aimee L. Jordan Joseph Kietner Adeeba Abdul Raheem William L. Taylor José A. Yaquián Luna Taylor J. Bomarito Sylvia Deputy Giuseppina Garofalo Jasmine N. Holmes Stephanie Kino Louise Ishii Kellie E. Norris Cristina Ortega-Castineiras Mary Ann Payette-Hopkins Vusal Shafiyev Tracy Ngo Tibbitts Summer 2012 Saraya Q. Sikora Tyler J. Tedcastle Fall 2012 David M. Beben	Petersen R. Benjamin Ileana N. Bracete Stephen T. Casey James S. Cramer Leslie N. Harris Armondo Hodge Tôrren N. Hoyord Kimberly A. Marshall Laurie E. McCollum Eric T. Morgan Michael R. Petersen Mallory S. Peterson Saurabh Nitin Raje Bachelor's Spring 2012 Ross L. Beardsley Jenna L. Bobsein Angela D. Bolden Kyle T. Brown Troy L. Chasteen Jacqueline N. Cooke Ryan G. Eickholt Elizabeth Gómez Priya Hrenko Jonathan E. Kalantar	Mark D. Kalivoda John B. Million Whitney L. Morrison Pedro A. Palomino Alesandra F. Reed Shkun D. Scott Valerie Thorsen Jenna K. Timtiman Nhan Dinh Truong Earendil S. Wilson Summer 2012 James M. Allen James L. McCall Sasa Milivojevic Kenny L. Vera Morales Brett D. Gallrein Priyanka S. Jagtap Avni A. Solanki Fall 2012 Stephen K. Adams Zachary E. Black Krisha E. Capeto Christopher T. Caruaiello Weizhi Cheng	John Chou Roya P. Darioosh Natasha C. Darré Joseph K. Heath Natalia V. Hoogesteijn von Reitzenstein Beth L. Howard Jourdan D. Jayashekaramurthy Curtis A. Jeffries Allison M. Lewis Camille L. Liebnitzky Shiqing Lin Chris M. Moody Heather A. Rivers Justin G. Roessler Alicia P. Sendrowski Matthew S. Shupler Daniel Van Wie Smith Thao Xuan Tran Tunhi Ngoc Vo James R. Wally Michaael J. Wisniewski
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CCE GRADUATES

Ph.D.	Jerry M. Paris	Juan D. Ponce	Michael Robert Mazer	Carlos A. Dillon
Spring 2012	Robert C. Pyle	Jason E. Ressler	James L. McCall	Andrew Wetherell
Grandy Thomas Carrick	Matthew Redfern	Michael B. Rodgers	Max S. McGrahan	Duncanson
Jing Li	Dany Romero	Anthony Rondino III	Sasa Milivojevic	Camilo Fita
Young Jun Park	Sandro Sanchez	Priscilla D. Sale	David C. Mocilan	Wesley Foster
Summer 2012	Bernaola	John L. Schwartz III	Jaclyn E. Moon	John C. Gladdis
Luciano Absalonsen	Daniel J. Smith	James F. Stephenson III	Julio C. Morelos III	Matthew Reid Galloway
Todd M. Davis	Kevin M. Stone	Jared B. Tharpe	Alexander R. Murray	Virginia A. Goff
Nabil Jalall Hossiney	Thanachart Subgranon	David A. Thomander	Leonardo J. Nediani	Jonathan S. Grant
Jing Li	Lara I. Swanson	Elia Govantes Twigg	Toan Nguyen	Rachel M. Gwyn
Md Shahid Mamun	Matthew B. Taylor	Bruno Rios Vasconcelos	Riley M. O'Brien	Christopher Hee
Dimitra Michalaka	George W. Tedder III	Brian J. Wemple	Blake T. Oliver	Ben T. Keller
Brandon E. Ross	Robert A. Walters	Peter M. Whitfield	Caitlyn M. Oram	Amir J. Keshavarz
Cihan Sahin	Zachary A. Workman	Kelsey J. Wood	German Ordoñez Patiño	Blacke C. Kinney
Yu-Min Su	Summer 2012	Bachelor's	Kinsman P. Pearson III	Chelsea M. Knox
Fall 2012	Jacqueline M. Branyon	Spring 2012	Jared M. Pritz	Dean E. Koggan
Nagendra Singh Dhakar	Richard M. Carder	Marcelino Jr. Aguirre	Andrés E. Puerta	Priyadarshini Kumbhojkar
Kwang-Kyun Lim	David E. Eng	Kile W. Alford	Ravindra Ramgulum	Brett M. Kuziak
Carlos Raul Rodriguez	Zachary D. Borah	Christian Aristizabal	Akexander J. Randall	Estela G. Leo*n Aguilar
Diaz	Faraone	Paul A. Beata	Corbin A. Robeck	Carmine William
Yu-Min Su	Brandon R. Ferrante	Jilian E. Berrey	Andrew R. Savage	Matarazzo III
Master's	Jared A. Fralix	Andrew J. Bilello	Jennifer H. Seip	Keith D. Merkel
Spring 2012	Christopher J. Frank	Roy Bodman	Shawn C. Steers	Contessa T. Middleton
Megan S. Beery	Kevin Frost	Brett D. Boncore	Joseph C. Stollings	Alex M. Moyer
Michael A. Bekoe	Jeffrey D. Fryer	Aaron D. Boyer	Philip C. Strauss	Brendan S. Mullaney
Kyungchu Chang	Corey A. Hill	James L. Brown	Zachary D. Todd	Andres I. Navarro
Anindya Chowdhury	Eric J. Holshouser Jr.	William E. Buehn	David E. Ureña	Andrew S. Nelson
Yexi Guo	Daniel A. Koch	Liam S. Capstick	Silvana Milagros Vargas	Miriam Nguyen
Krista J. Henrie	David M. Lavenhagen	Paul G. Carballo	Joseph B. Verboncoeur	Kristin N. Novack
Arden T. Herrin	Juan C. Losada Arcila	Stefan C. Lopez	Bennett A. Wachob	Daniel A. Ortiz
Scott M. Kirts	Carlos Belarmino Peña	Chardé A. Carter	Kyle E. Watson	Matthew H. Parrish
Zhuofei Li	Sandra J. Pérez	Luis De La Cruz	Benjamin Watts	Michael C. Perry
Jie Lu	James W. Ryhal Jr.	Kevin M. Deckers	Lindsey R. Whidden	William D. Pigozzi II
Kunal Malpani	Guillermo A. Salinas	Melissa Deschamps	Amy N. Williams	John R. Porter
Taban Mamaghanizadeh	Cesar D. Verdugo	Samual T. Edwards	Michael D. Willis	Elizabeth A. Radford
Siddharth Pandey	Donald C. Watson Jr.	Robert Y. Endicott	Robert M. Wilsnack	Harry S. Ramnath
Nitesh Sangam	Zachary A. Workman	Matthew R. Galloway	Bentley D. Zephirin	Timothy K. Rankin
Dilip H. Shenoy	Joshua R. Yerk	Tyler A. Garner	Antonio Milanes	Katty Reyes
Chao Sun	Fall 2012	Travis R. Gates	Summer 2012	Richard W. Ridenour
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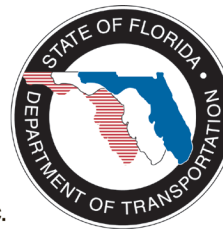
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