



ALUMNI REGISTRATION & UPDATES

The Department of Civil & Environmental Engineering is always interested in how our alumni are doing. We hope you will take the time to send your updates to jmueller@lsu.edu or, if you prefer, you can "snail mail" them to:

Department of Civil and Environmental Engineering
Louisiana State University
Attn: Julie Mueller
3418 Patrick Taylor Hall
Baton Rouge, LA 70803-6405

Please include basic information such as your full name, year of graduation, degree, mailing address, email address, telephone number, company, and your title/position. For your update, please include information on your recent professional and personal developments, along with a high-quality photo, if available.

Thanks for staying in touch!

To connect with the LSU College of Engineering, please visit
www.eng.lsu.edu/alumni/update



It is a pleasure to introduce three new faculty members to the Department of Civil & Environmental Engineering (CEE). They have been selected to fill new faculty lines in the strategic initiatives of the department and the College of Engineering. Drs. Celalettin Emre Ozdemir, Hongliang Zhang, and Shengli Chen have

already joined the department this fall and a fourth new faculty member will start in January 2015. The three assistant professors encompass the areas of coastal engineering, environmental engineering and geotechnical engineering, respectively. Descriptions of their research areas are highlighted in this issue of the newsletter. It is anticipated that we will hire three additional faculty members next year.

Also, the department recently celebrated the debut of the ETEC Hydraulics and Water Distribution Laboratory with a ribbon cutting ceremony and reception. This lab was created to provide CEE undergraduate students an experimental and modeling facility where they can get hands-on experience in the real-time monitoring, control, and modeling of hydraulic systems. The department would like to sincerely thank Ronnie Hebert of ETEC, Inc. and Michael Pittman of the M.R. Pittman Group for their generous support.

FROM THE DEPARTMENT CHAIR

A letter from George Z. Voyiadjis

Another recent celebration for the College of Engineering as a whole was the ground breaking ceremony held in mid-November for the renovation of Patrick F. Taylor Hall. This \$110 million endeavor, made possible by the generous contributions of so many donors and through an impressive state match, is expected to be completed in fall 2017. This new, state-of-the-art facility will provide students with an enhanced and inspirational learning environment and will serve as a superior space for innovative research.

In the meantime and amidst all of the impending construction, our undergraduate programs will be preparing for our upcoming ABET accreditation visit in fall 2015. The ABET process requires that we are engaged in the continual improvement of our undergraduate programs in civil and environmental engineering and provide documentation that a process is in place to ensure such a goal is achieved. This continuous process of re-evaluation is vital to the growth and continued success our programs.

In closing, myself and the department would like to wish you and your family a wonderful holiday season.

Sincerely,

Dr. George Z. Voyiadjis
Boyd Professor, Chair
Bingham C. Stewart Distinguished Professor

IN THIS ISSUE





Pictured left to right: Emily Weigand, Sean Moore, Alicia Fortier, Mitch Everhardt, Brendan Copley, Brad Jacobs, Jabari Landry

2014 CURRENT ASCE OFFICERS

- President - Emily Weigand
- Vice President - Jabari Landry
- Secretary - Alicia Fortier
- Treasurer - Robert Davis
- Meeting Coordinator - Sean Moore
- Fundraising Chair - Brad Jacobs
- Webmaster - Mitch Everhardt
- Community Service Chair - Brendan Copley

2015 INCOMING ASCE OFFICERS

- President - Alicia Fortier
- Vice President - Robert Davis
- Secretary - Kelsey Schmaltz
- Treasurer - Enrico Targa
- Meeting Coordinator - Gabrielle Dubroc
- Fundraising Chair - Megan Corzo
- Webmaster - Mitchell Everhardt
- Community Service Chair - Amy Olson

Faculty Advisor - Dr. Michele Barbato
Practitioner Advisor - Ben McArdle

ASCE STUDENT CHAPTER

The American Society for Civil Engineers (ASCE) at LSU student chapter had a busy start this fall semester welcoming new members, as well as holding elections for 2015 officers (to be instated at the end-of-semester banquet in December). The chapter's monthly meetings feature guest speakers and this semester is no exception. Kicking things off in August, a representative from Forte & Tablada spoke to the students about the new 3-D scanning technology being utilized by the firm, and Joey Coco, President of the ASCE Baton Rouge Branch, also spoke about the 2012 ASCE Report Card as well as the importance of staying involved with ASCE after college. September meetings featured speakers from BASF and Stantec, and in October featured Ford, Bacon & Davis as well as ISC Engineering. Later in the semester, students welcomed Manchac Consulting Group and CDI Corporation.

This semester the chapter also attended the Engineering Tiger Connections Fair hosted by the LSU College of Engineering. It is an annual welcome event and open house for incoming freshmen and transfer students. Students were introduced to ASCE at LSU and got an opportunity to speak with chapter officers.

The steel bridge and concrete canoe teams are already hard at work preparing for the Deep South Regional competition, to be held this coming spring in Oxford, MS. Fundraising efforts are already underway and those interested in supporting these teams and/or speaking at a monthly meeting can contact the chapter via email at asce@lsu.edu.

Those interested learning more about the chapter can visit online at www.lsuasce.weebly.com.

2014 LOUISIANA HEIGHT MODERNIZATION WORKSHOP

On July 29, 2014, the Center for GeoInformatics (C4G) hosted the 2014 Louisiana Height Modernization Workshop at the Lod Cook Conference Center on the LSU Baton Rouge campus.

The workshop was the first of many events that will be conducted across the Gulf Coast over the next few years. These events are supported through a research grant funded by the National Geodetic Survey. The five-year, multi-million dollar grant was awarded to a consortium of institutes and spatial reference centers in Texas, Louisiana, Mississippi, Alabama, and Florida. The workshops are designed to communicate the latest technologies and resources for reliably observing and accurately measuring heights and elevations using GPS and GNSS technologies.

Over 100 professionals and exhibitors attended the all-day workshop. The morning sessions featured invited speakers, including Dr. George Z. Voyiadjis (LSU CEE), Vice Chancellor K. T. Valsaraj (LSU), Mr. Tim Osborn (NOAA Office of Coast Survey), Mr. Clifford Mugnier (LSU C4G), and Mr. William Henning (NGS, ret.). The afternoon sessions included a panel discussion composed of professionals representing geodetic stakeholder groups from Louisiana's academic, public, and private sector communities.

Recordings of the workshop are available online at the LSU C4G YouTube page: <https://www.youtube.com/playlist?list=PLPfCaQAHXOdcAYHESScyC3OsPr5yRknh9>



For more information about C4G, please visit :

Website: <http://c4g.lsu.edu>
 Twitter: @LSU_C4G
 Facebook: C4GLSRC

ALUMNI NEWS

The department would like to congratulate CEE alumnus **Dr. Pradeep Kurup**, a professor at UMass Lowell, on being named Distinguished University Professor. This is the highest distinction bestowed on a University of Massachusetts Lowell faculty member, recognizing exceptional teaching, research, and service to the university.

Dr. Kurup, who received his PhD in civil engineering from LSU in 1993, worked under the advisement of Dr. George Z. Voyiadjis and co-advisor Dr. Mehmet Tumay. Dr. Kurup is the developer of an innovative electronic "nose" that can sniff for traces of explosives. Also, his research includes the development of an electronic "tongue" that can detect and identify traces of toxic heavy metals such as arsenic.

Robert J. Slimp, who received his bachelor's in civil engineering from LSU in 1996, was recently promoted to CEO of HNTB Infrastructure, the largest business unit of HNTB Corporation. Since joining HNTB, Slimp has held executive positions at the local, regional, and national levels, including recently serving as president of the Northeast and Southeast divisions of HNTB Corporation. In his new position as CEO of Infrastructure, Slimp will be responsible for the overall direction of professional services provided to clients.

Congratulations to **Ara Arman** on being selected for the ASCE Louisiana Section Wall of Fame. Arman is a civil engineering alumnus as well as a member of the CEE Hall of Distinction.



Connect with us on Facebook! Search for "LSU Department of Civil & Environmental Engineering." Click "like" and add us to your interest list to receive news and updates from the department!

CEE ALUMNI: WE WANT TO SHARE YOUR NEWS!

If you are a CEE graduate and have news that you would like to share, please email your news and (if available) a high-resolution photo to Julie Mueller at jmueller@lsu.edu

FACULTY HIGHLIGHTS



Dr. Louay Mohammad, Professor of CEE and Director of the Engineering Materials Characterization Research Facility at LTRC, was awarded \$100,000 from the National Cooperative Highway Research Program (NCHRP) to (1) document the capabilities of available commercial Hamburg test

equipment, (2) determine Hamburg test equipment capabilities, components, or design features that ensure proper testing and accurate, reproducible results, and (3) provide proposed revisions with commentary to AASHTO Test Method T 324 to enable the use of a performance type specification for Hamburg test equipment. The Hamburg Wheel-Track Test Equipment is commonly used to evaluate permanent deformation and moisture susceptibility of asphalt mixtures during design, production, and construction. Co-principal investigators in the study are Dr. Mostafa Elseifi (CEE), and Amar Raghavendra (LTRC).



CEE Instructor **Kerry Reed** was selected by the ASCE Baton Rouge branch as the recipient of the Educator of the Year Award. This award is presented to an outstanding educator who has contributed substantially to the field of civil engineering.

Drs. Ayman Okeil and Aly Mousaad Aly received funding (\$179,991) from the Louisiana Transportation Research Center (LTRC) to investigate the performance of a Link Slab detail for continuous bridges. The three-year project involves installation of sensors in a new bridge. Recommendations about the performance of the continuity detail will be made based on field data and analytical work.



Dr. George Z. Voyiadjis, Boyd Professor and Chair of Civil & Environmental Engineering, is editor of the recently released *Handbook of Damage Mechanics: Nano to Macro Scale for Materials and Structures*. This authoritative reference provides comprehensive coverage of the topics of damage and healing mechanics.

Computational modeling of constitutive equations are provided, as well as solved examples in engineering applications. A wide range of materials that engineers may encounter are covered, including metals, composites, ceramics, polymers, biomaterials, and nanomaterials. The internationally recognized team of contributors employ a consistent and systematic approach, offering readers a user-friendly reference that is ideal for frequent consultation. *Handbook of Damage Mechanics: Nano to Macro Scale for Materials and Structures* is ideal for graduate students and faculty, researchers, and professionals in the fields of mechanical engineering, civil engineering, aerospace engineering, materials science, and engineering mechanics.



The Gulf Coast Center for Evacuation and Transportation Resiliency, under the direction of Edward A. and Karen Wax Schmitt Professor **Dr. Brian Wolshon**, recently took part in the CityLab program hosted by The Atlantic in partnership with The Aspen Institute and Bloomberg Philanthropies. The CityLab program, held in Los Angeles, CA this

September, brought together 300+ of the world's top mayors, urban experts, city planners, writers, technologists, economists, and designers. The goal of the 3-day program was to foster construction dialogue and create scalable solutions for city leaders to share with their constituencies across the world.



ITE STUDENT CHAPTER

The Institute of Transportation Engineers (ITE) student chapter at LSU was revitalized in 2011. Every year since, the student chapter has participated in the ITE Collegiate Traffic Bowl competition, competing against ITE student chapter teams from various universities in the deep south region. It is a fun competition focused on transportation planning and engineering.

In the spring of 2014, election of the student chapter board took place. The elected officers for the 2014-2015 year are:

Nélida Herrera—President
 Sydney Jenkins—Vice President
 Faculty Advisor—Dr. Sherif Ishak

Since the spring elections, the ITE-LSU chapter activities have included a tour at the Advanced Traffic Management Center in Baton Rouge, a site visit to the roundabout in Dalrymple, chapter meetings, and a joint meeting with ASCE-LSU. In fall 2014, ITE-LSU worked with the Baton Rouge Metropolitan Airport to organize a tour of the facility. All chapter events give students an opportunity to learn more about transportation engineering.



Students interested in becoming a member of ITE-LSU (membership is free!) should contact Nélida Herrera at nherre2@lsu.edu.

LWEA LAKE CLEANUP EVENT

Louisiana Water Environment Association (LWEA) is a member association of the Water Environment Federation (WEF). The student organization is open to all students that possess the desire to learn about the natural environment. The focus of the organization is on environmental issues in the state of Louisiana, emphasizing rivers, swamps, marshes and lakes.

Each semester the LSU student chapter of LWEA student chapter hosts a bi-annual lake cleanup in support of its mission to educate students about the environment through hands on service-work. The fall 2014 semester cleanup focused on the University Lake on LSU's campus. Whether by canoeing the lakes or walking the perimeter, more than 50 students worked together to pick up trash. Food and drinks were provided for the students by the event's corporate sponsor, Environmental Resources Management (ERM).



STUDENT AWARDS

Rebecca LaPorte has been awarded a 2014-15 scholarship from the Tau Beta Pi engineering honor society. LaPorte will receive a cash award of \$2,000 for her senior year of engineering study. Tau Beta Pi scholarships are awarded to junior members on a competitive basis of high scholarship, campus leadership and service, and promise of future contributions to the engineering profession.

A student majoring in civil engineering, LaPorte currently serves as vice president of the Louisiana Engineering Society (LES) LSU student chapter, is a member of Tau Beta Pi honor society, and a member of the American Society of Civil Engineers (ASCE) LSU student chapter.

Congratulations to CEE graduate students **Getnet Agegehu, Jonathan Barnett, Jacob Foy, and Trent Key** on being selected to receive Chevron Graduate Assistantship Supplements in the College of Engineering, in recognition of the distinction that has characterized their academic and research performance to date.

Jacob Foy was also a recipient of a Louisiana Water Environmental Association (LWEA) scholarship. The LWEA scholarship program encourages and assists students in their pursuit of a degree, leading to a career in the environmental field.

CEE has awarded the following new PhD students one-time Enrichment Awards: **Ramendra Das, Omar Elbagalaty, Marsardar Esmaeili, Milad Rezaee, Maryam Roostae, Shima Shamkali Chenar, and Yang Yu.** These awards, supplements to graduate assistantships, are used to recruit exceptional students to the doctoral program.



As a civil engineering undergraduate student, **Syndney Jenkins** was one of twelve LSU students to receive a 2014 LSU Discover Scholar Award, recognizing students

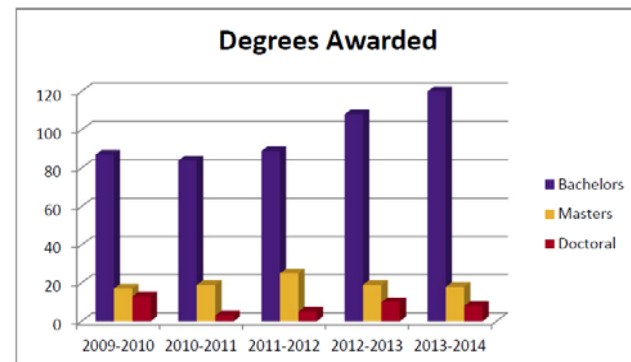
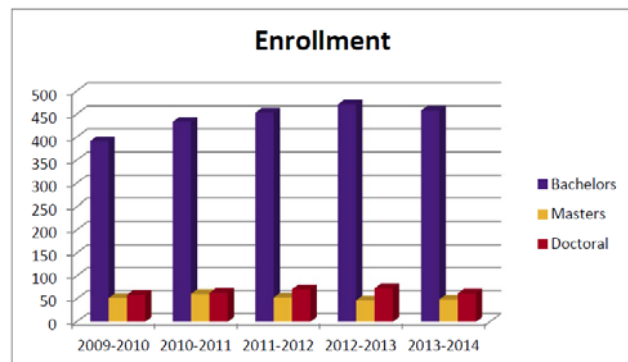
for their outstanding undergraduate research. These students were recognized at the LSU vs Kentucky football game in October (pictured above). Now as a CEE graduate student, Jenkins was selected for a fellowship through the National GEM Consortium as well as a Dwight David Eisenhower Transportation Fellowship awarded by the Federal Highway Administration (FHWA). Jenkins, under the advisement of Dr. Sherif Ishak, will use these fellowships to fund her Master's thesis research and academic expenses.

Nitin Kumar, a CEE graduate student working with Dr. Michele Barbato, was selected for a LSU Graduate School Economic Development Assistantship (EDA). Nitin, under the advisement of Dr. Barbato, will be performing research on a hurricane-resistant housing construction system.

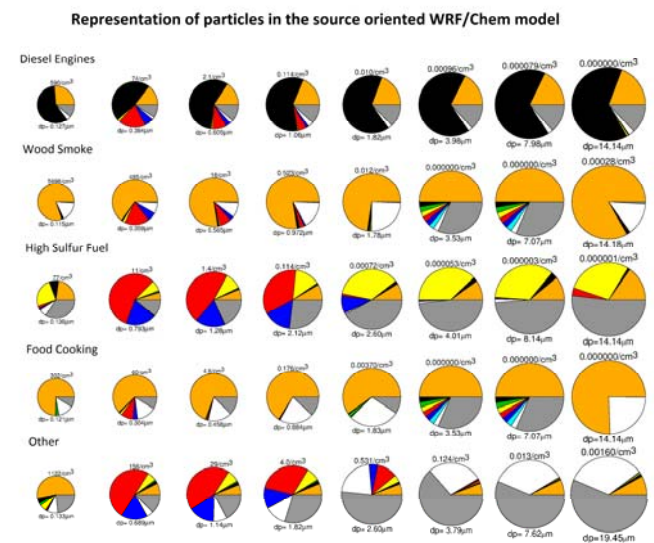
Jaworski Sartin, a CEE graduate student working with Dr. Brian Wolshon, has been selected for a Donald W. Clayton Ph.D., Graduate Assistantship Supplement in the College of Engineering, in recognition of his academic performance to date.

As part of the BASF Team Chemistry Scholarship Fund, civil engineering undergraduate student **Jarrett Logan** was selected as one of four recipients of a \$2,500 scholarship awarded to students for academic excellence and for their leadership both on campus and in the community. A native of Zachary, Louisiana, Jarrett is member of the 1st/244th Assault Helicopter Battalion of the Louisiana Army National Guard and a LSU Army ROTC cadet.

CEE AT A GLANCE



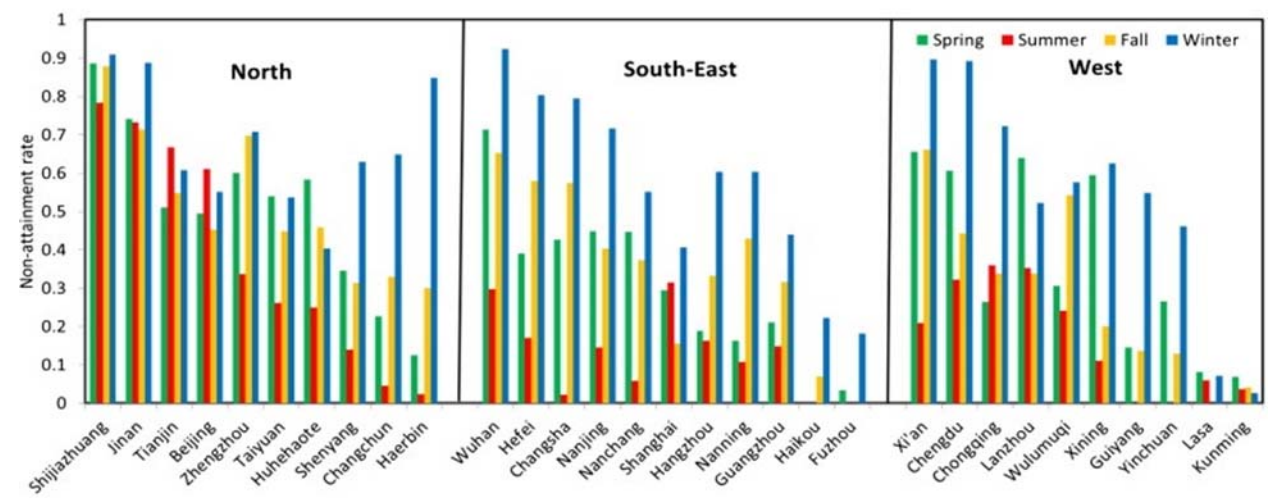
modeling that simulates meteorology and air quality simultaneously. The scheme Dr. Zhang built tracks particles separately depending on their size and sources to more accurately represent atmospheric processes in computer models. This improves the understanding of the complex interactions between air pollution with weather and climate. The source-oriented WRF/Chem model can be used for various research problems. Applications include high resolution simulation (250m) of source-contributions to concentrations of black carbon dispersed over Oakland, simulation of a fog event in the San Joaquin Valley, and simulation of a future scenario in 2050 to evaluate the air quality co-benefits of carbon dioxide control measures associated with the Global Warming Solutions Act of California (Assembly Bill 32). This model will be further used to investigate the effects of air pollution on hurricanes and interactions between air pollution and climate change.



AIR POLLUTION IN CHINA

Air pollution in China has drawn great attention in recent years due to the extremely high concentrations and potential effects to air quality in North America and the global climate. However, it was difficult to accurately evaluate the health risks and potential effects due to the lack of open-access air pollution data in China until late 2012, when the Ministry of Environmental Protection (MEP) of China started to publicize air quality data in major cities. Dr. Zhang's paper on *Environment International* entitled "Spatial and temporal variations of six criteria air pollutants in 31 provincial capital cities in China during 2013–2014" first used the data to analyze the spatial and temporal of pollutants in China. Major cities in China were found to have experienced severe air pollution in all seasons. The pollutants have significant temporal and spatial differences and a strong correlation was found between different pollutants. It was also found that air pollution in China was caused by multi-pollutants, indicating that large efforts are needed to control air pollution in China. This paper builds a platform for a comprehensive understanding of the current air pollution in China. It also directs future studies to investigate the associations between air quality and meteorological conditions, emissions in different regions, transport and transformation of pollutants in both intra- and inter-regional context, to further improve the understanding of the physical and chemical processes that affect the air quality in China. In the future, Dr. Zhang will continue to simulate air pollution episodes and investigate the effects of air pollution in China on meteorology and climate.

Seasonal variation of non-attainment rates in the 31 provincial cities in China.





FACULTY RESEARCH HIGHLIGHT: DR. HONGLIANG ZHANG

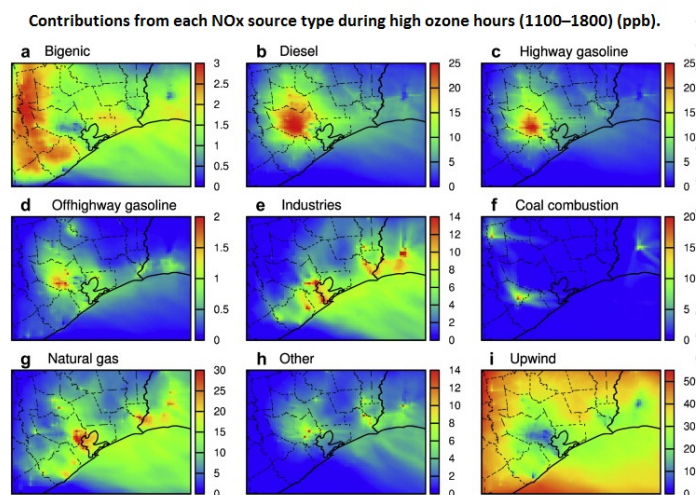
Dr. Hongliang Zhang joined the Department of Civil & Environmental Engineering (CEE) at LSU in August 2014 as an assistant professor. Prior to joining the CEE faculty, he worked as a postdoctoral scholar at University of California Davis for two years after he obtained his PhD from the Department of Civil Engineering at Texas A&M University in May 2012. Prior to his experience in the US, Dr. Zhang received his BS and MS degrees in the Department of Environmental Science and Engineering (2006) and the Department of Thermal Engineering (2008) from Tsinghua University, respectively. His research focuses on the development and application of 3D chemical transport models, which can be used to 1) represent all known atmospheric processes and test new discoveries at global or regional scale; 2) reproduce past pollution events and forecast future scenarios, estimate contributions of a certain source class or region to pollutants at given location and time, and evaluate the proposed control measures; 3) provide detailed pollutants information and quantify their effects on human health by short or long term epidemiological studies; and 4) study the complex interactions between air pollution and climate change. Dr. Zhang has published 21 papers in peer-reviewed journals including: *Environment International*, *Atmospheric Chemistry and Physics*, *Environmental Science and Technology*, *Atmospheric Environment*, and *Journal of Geophysical Research*.

SOURCE APPORTIONMENT OF AIR POLLUTANTS

Air pollutants have adverse effects to both human health and the ecosystem. Contributions of different sources to various pollutants are key information to design effective control strategies. During his PhD studies, Dr. Zhang focused on the development of source and age resolved chemical transport models to quantify contributions of different sources to ozone and particulate matter (PM) through nonlinear atmospheric processes. These models were applied to Southeast

Texas, and East Asia. For example, Dr. Zhang's research entitled "Contributions of local and regional sources of NO_x to ozone concentrations in Southeast Texas" quantified contributions of nitrogen oxides (NO_x) source to ozone in Southeast Texas during summer 2000. Diesel engines, highway gasoline vehicles, natural gas and upwind sources are the main contributors to daytime ozone in Houston.

In the future, Dr. Zhang will improve the current source apportionment techniques by accounting for indirect effects of co-emitted pollutants to the contribution of each source to targeted pollutant, including new mechanisms and processes that are being discovered. The models will be applied to Louisiana to help reduce local air pollution.



INTERACTIONS BETWEEN AIR POLLUTANTS, METEOROLOGY, AND CLIMATE CHANGE

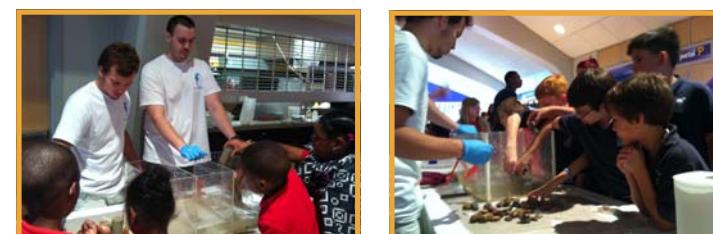
During his postdoctoral research, Dr. Zhang also contributed to another exciting and challenging project that incorporated a new PM scheme into Weather Research and Forecasting models with chemistry (WRF/Chem), which is a new generation of air quality

CEE RECOGNIZED FOR 10 YEARS PARTICIPATION IN OCEAN COMMOTION



Pictured Above Jacob Foy, Jonathan Barnet, Dr. M. Teresa Gutierrez-Wing, (back) C. Davis Lofton, Dianne Lindstedt (Sea Grant College Program Education coordinator), and Caleb Hamilton. Not pictured: Taylor Hayes, Kristen Courville, and Anteneh Lisan.

The LSU Department of Civil & Environmental Engineering recently received an award recognizing 10 years of participation in the **Ocean Commotion**. This event is organized by the Louisiana Sea Grant College program and attracts approximately 2,500 students, teachers and chaperones from K-12 schools from Baton Rouge and other areas. Thirty-one schools participated in this year's event. For more information visit <http://www.lamer.lsu.edu/oceancommotion/>



Students pictured above are (left to right) Joseph Boley (CE senior), Sarah Bozyk (EVEG junior), Andre Romero, Jaci Bourgeois, and Cameron Kuhn (CE juniors).

EVEG3110 BUILD 46 WOOD DUCK HOUSES

The photo above shows five of the 46 wood duck houses that were constructed and hung by students since the Spring 2014 EVEG 3110 class as part of their extra credit exercises. The 46 boxes can produce upwards of 4,000 ducklings over their five year design life. Several students verified the use of the boxes with their cell phones. Jim Brent (CE senior) was surprised to find a Black Bellied Fulvous Whistling Duck incubating eggs in a box he placed near the LSU University Lake.





NEW ETEC HYDRAULICS AND WATER DISTRIBUTION LABORATORY TRAINS STUDENTS ON FLUID MECHANICS

On Friday, October 31, representatives from LSU, Environmental Technical Sales, Inc. (ETEC), and M.R. Pittman Group gathered to celebrate the opening of the ETEC Hydraulics and Water Distribution Laboratory.

“LSU’s College of Engineering gave me a great foundation for going forth in life and starting ETEC with fellow engineering alumni Sam Agnew and Michael Todd,” said Ronnie Hebert (below), president of ETEC. “With this lab, we want to offer LSU students a high-tech experience in the study of hydraulics to prepare them for work after they graduate.”



Bolstered by a \$200,000 donation from ETEC and M.R. Pittman Group, LSU College of Engineering undergraduate students will receive hands-on experience in the monitoring, controlling, and modeling of hydraulic systems in an upgraded experimental and modeling facility.



“Thanks to ETEC and M.R. Pittman Group, this new lab will allow us to better prepare LSU Engineers by providing a state-of-the-art learning environment and in-depth training and research in water resource management,” said George Voyiadjis, chair, Department of Civil & Environmental Engineering (above). “This facility allows our students to test principles of fluid mechanics and hydraulics through experimentation, involving the measurement and calibration of hydraulic machinery, pump and turbine efficiency, and flow in pipelines.”

Features of the new ETEC laboratory include a fluid friction flow apparatus, parallel and series pumps demonstration unit, FM62 turbine service unit, an Opti-Float system, and updated control and visualization software. The new equipment expands the type of experiments students can



SUSTAINABLE INFRASTRUCTURES

During his doctoral studies, Dr. Ozdemir had the opportunity to investigate the erosion susceptibility of hydraulic structures operated by South Florida Water Management District (SFWMD). Located in the heart of the Everglades ecosystem, spillways are utilized to regulate surface flow as part of the efforts to meet the diverse needs of south Florida, while maintaining and restoring the ecosystem. During 2007 and 2008, the water levels at the downstream of these structures dropped to minimum level due to drought. The water

level mentioned cannot moderate the energy of the released flow due to flooding. Therefore, high-energy flow may lead to excessive erosion and hence jeopardizing the stability of the hydraulic structures. Conducting experiments on a physical model in a laboratory may become highly expensive especially if the number of scenarios to be investigated is high. Therefore, use of CFD simulations becomes a comparatively less expensive alternative. For various flood and gate operation scenarios CFD simulations are performed to gather information where maximum bed stress or erosion takes place and guidelines for the operation of these structures.

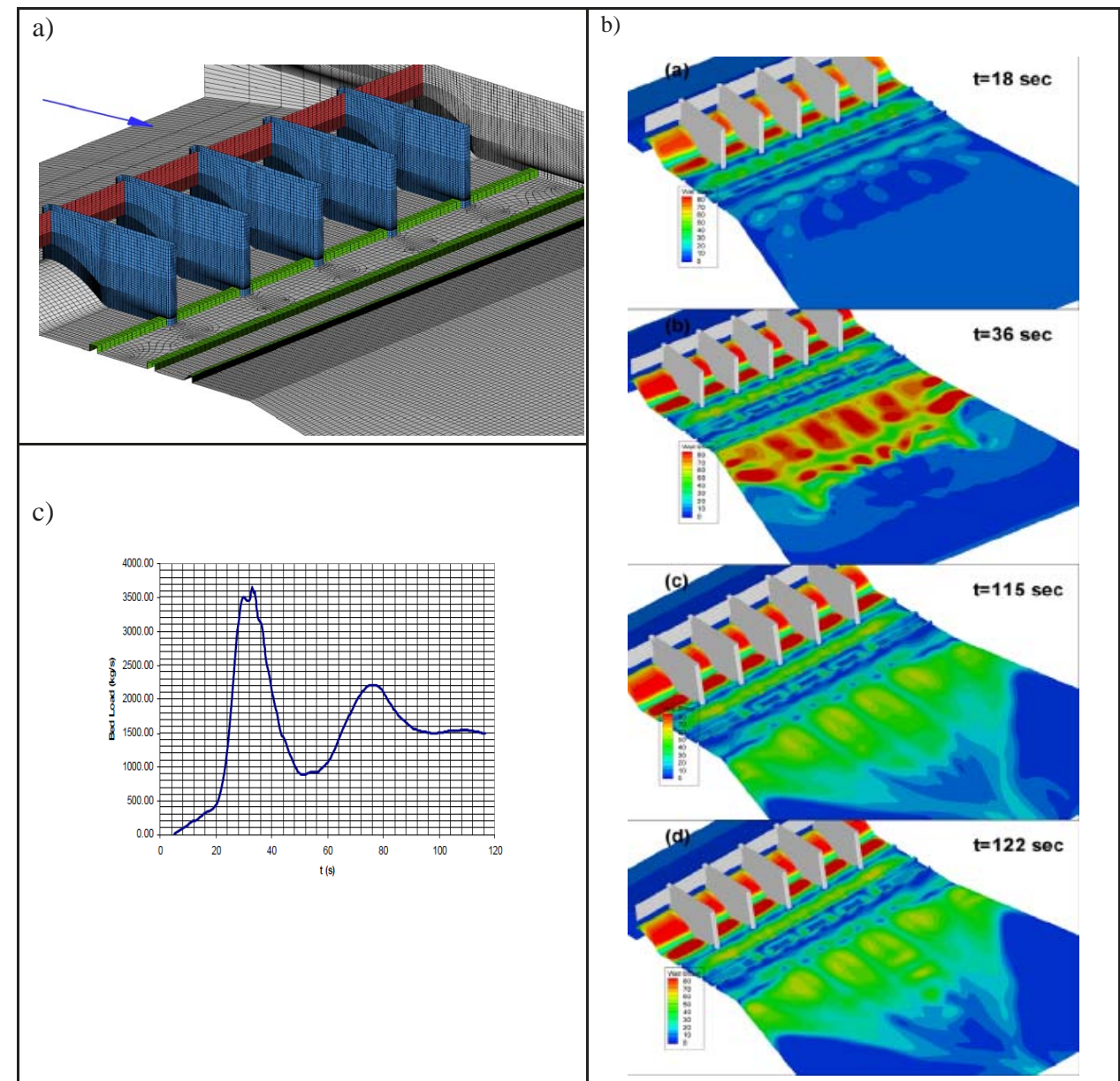
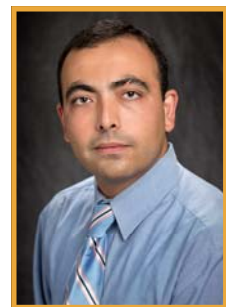


Figure 2. a) Computational setup (spatial discretization) of the S-72 spillway. b) Evolution of the erosive forces in time at the downstream of the spillway. c) Estimated erosion rate in time.



FACULTY RESEARCH HIGHLIGHT: DR. CELALETTIN EMRE OZDEMIR

Dr. Celalettin Emre Ozdemir recently joined the LSU Department of Civil & Environmental Engineering as assistant professor and is also affiliated with the Center for Computation and Technology at LSU. His expertise is in the development and application of numerical models. Before joining LSU, Dr. Ozdemir conducted postdoctoral research in Woods Hole Oceanographic Institution's (WHOI) Applied Ocean Physics & Engineering Department, and University of Delaware's Center for Applied Coastal Research. He also conducted his doctoral research at the University of Florida. Dr. Ozdemir conducts research on environmental fluid mechanics specifically to understand and parameterize sediment transport processes in coastal regions. Sediment transport has numerous ramifications. Organic sediments are one of the major sources of carbon, and their erosion from the mainland to the deep ocean makes sediment transport one of the chief participants in the global carbon budget. The content of organic carbon in agrarian soil is the main indicator of the soil quality. Erosion of high quality soil will influence the global food security. The sediments' affinity with heavy metals and inhibition of sunlight penetration into the water column make sediments both chemical and physical pollutants. But the most important one is the land loss due to erosion that we are experiencing in Louisiana which jeopardizes the safety and well-being of Louisiana's inhabitants, the infrastructure for a sustainable coast, and its unique culture.

THE FATE OF FLUID-MUD IN THE CONTINENTAL SHELF

Although he has never been to the Gulf Coast, Dr. Ozdemir's whole research endeavors specifically address the sediment dynamics in the Gulf. As part of the U.S. Navy's efforts to assess the state of muddy seabed through satellite images, Dr. Ozdemir has developed a numerical model to understand the details of the physical mechanisms that are responsible for surface wave

attenuation and wave-supported turbidity mud flows which are commonly observed in the Gulf Coast. As a result of his efforts, Dr. Ozdemir identifies the interaction between the stratification in the dense mud layer and ambient boundary layer turbulence that plays a key role on both surface wave energy attenuation and wave supported turbidity mud flows.

Upon his move to WHOI, Dr. Ozdemir focused deeper on mud flow over seabed topography and its impact on the internal mud waves through both field data analyses and numerical modeling. Through field observations, he observed that the mobile seabed plays a critical role on the surface wave energy attenuation. Further numerical simulations confirm that internal mud waves are likely to be triggered by the bedforms and increased energy dissipation is present due to the motion of internal mud waves.

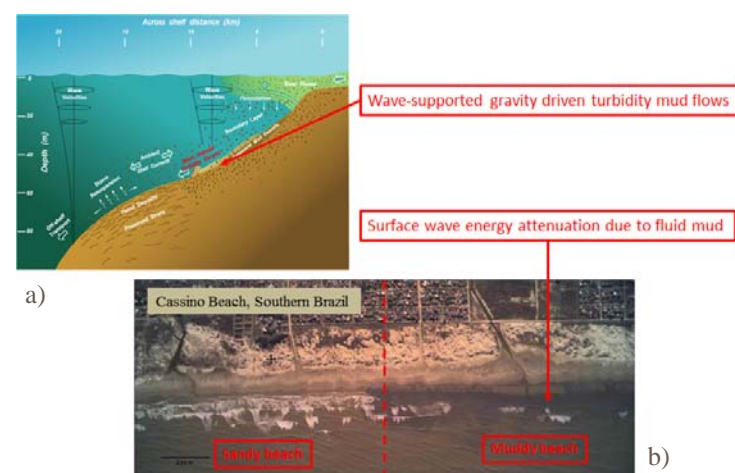


Figure 1. a) fate of the coastal sediment in the continental shelf. b) shows the attenuation of the wave energy due to fluid mud deposits (on the right) in Cassino Beach in Southern Brazil.

perform, making data acquisition and analysis easier and more efficient in preparing lab reports.



"The generous donation by ETEC and M.R. Pittman Group is having a tremendous impact on the education and training of our students," said Clint Willson, professor, Department of Civil and Environmental Engineering. "The addition of several new apparatuses, such as the parallel and series pump system, is providing more opportunities for the students to learn and apply fundamental hydraulics concepts that are crucial in many parts of the state, such as drainage and flood control operations."



Ronald R. E. Hebert, a 1969 Civil Engineering graduate, pledged \$100,000 toward the installation of a hydraulics lab in the College of Engineering. A matching contribution of \$100,000 was made by the M.R. Pittman Group, a Metairie, La. construction firm founded in 2005 by Michael R. Pittman, a 1983 Civil Engineering alumnus.

"There is no better place than LSU to invest our efforts to further education," said Pittman.



The lab is named in honor of ETEC, a manufacturers' representative organization with expertise in equipment applications for water treatment, wastewater treatment, solids handling, and air emissions.



ETEC was founded in 1995 by Hebert, Samuel Agnew, a 1974 Chemical Engineering alumnus, and Michael Todd, a 1979 Mechanical Engineering alumnus.



For more information contact Mimi LaValle, mlavall@lsu.edu, 225-578-5706.

FACULTY RESEARCH HIGHLIGHT: DR. SHENGLI CHEN



Dr. Shengli Chen joined the Department of Civil & Environmental Engineering at Louisiana State University as an assistant professor in August 2014. He received his PhD in Petroleum Engineering from the University of Oklahoma in December 2012, and was a Research Petroleum Engineer with Aramco Research Center at Houston from February 2013 to August 2014. Prior to that, Dr. Chen had been a researcher in the Department of Civil Engineering at Shanghai Jiao Tong University, and received BS and PhD degrees in Civil Engineering both from Zhejiang University, China. Dr. Chen's main teaching and research areas are Advanced Soil/Rock Mechanics, Finite Element Analysis in Geotechnical Engineering, Constitutive Modelling for Geomaterials, and Theoretical and Computational Geomechanics. His research is focused on poromechanics, pile foundations, time dependent soil structure interaction, wellbore stability drilling through shale/salt formations, and hydraulic fracturing in oil and gas industry. He has published 17 international journal papers in the areas of geomechanics and geotechnical/petroleum engineering, and is currently serving as an associate editor of the SPE Journal.

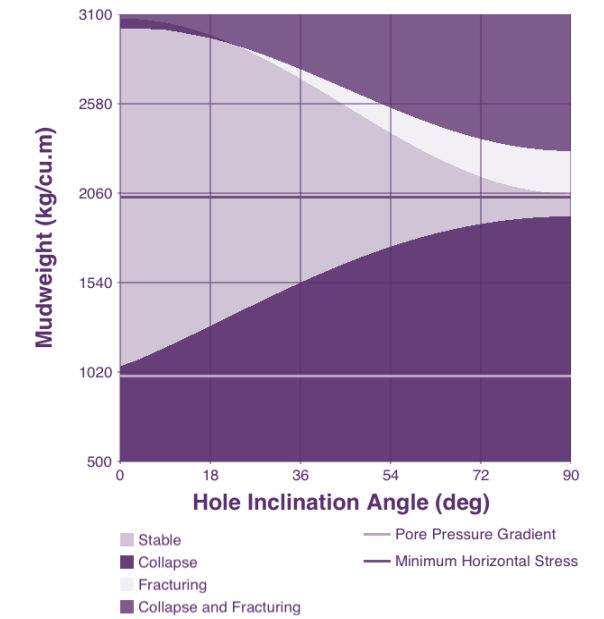
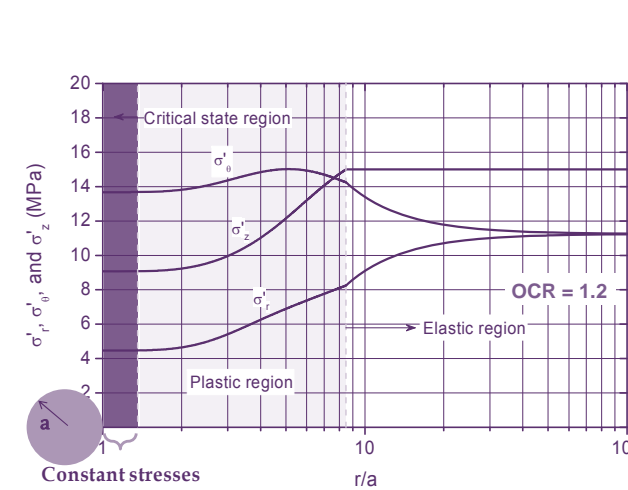
WELLBORE STABILITY AND TUNNEL EXCAVATION ANALYSES

Maintenance of the wellbore/tunnel stability is of fundamental importance during drilling and remains a major concern to drilling engineers in the petroleum and geotechnical communities. In the oil and gas industry wellbore stability may cause stuck pipe due to large borehole deformation or even worse the breakout and hole closure as a result of compressive and shear rock failure. It is estimated that wellbore instability costs an annual economic loss of \$8 billion in the petroleum industry worldwide.

The prevalent method for wellbore stability analysis is based on the linear elastic or poroelastic theory. However, it is well recognized that the real rocks do not behave in this simple way but exhibit highly nonlinear plastic properties above certain stress/strain levels. Dr. Chen's research entitled "Analytical and Numerical Analyses of Cavity Expansion/

Contraction in Poroelastoplastic Geomaterials" has taken comprehensive consideration of such important characteristics of real soil/rock behavior, and developed definitive solutions for this generic class of cavity boundary value problem, for a variety of elastoplastic constitutive models including Drucker-Prager, Mohr-Coulomb, Cam Clay and bounding surface models.

The research has demonstrated that the incorporation of plasticity models would result in substantially less conservative estimation of the critical support pressure required to maintain the borehole stable, the proposed advanced elastoplastic analysis therefore leads to a much more cost effective alternative as compared with the simple elastic method. The outcome of the research also allows for the development of a cavity analysis tool, which can be widely used in the industry and contribute to better prediction and design for the wellbore stability and tunnel excavation practical problems.



PILE FOUNDATIONS UNDER COMBINED LOADS

Large structures such as deep-water offshore platforms, high-rise bridge bents and tall buildings, offshore wind turbine foundations are often supported by pile foundations. These pile foundations are usually subjected to combined vertical and lateral loads of considerable magnitudes from their upper structures, wind and wave actions. Also, significant torsional forces can be transferred to the foundation piles due to the eccentricity of the lateral loads.

Dr. Chen has conducted extensive research on the pile foundations over the past years. He has systematically developed new analytical methods for predicting the interaction factors between two vertically and horizontally loaded piles, the effects on the lateral response of one pile caused by the vertical loading on

an adjacent pile, i.e., vertical-lateral interaction, the torsional-horizontal interaction, and the subsequent analysis of pile groups responses under combined external loading. The newly presented interaction factor approach has taken into reasonable account of the stiffening effect of the piles to the surrounding soil, and thus leads to more accurate estimate of the pile group deformations compared with the routine pile analysis method.

As one of the future research plans, Dr. Chen will continue this research topic by further considering the effect of the soil consolidation on the pile group responses as well as the implementation of more advanced constitutive models for the soils to capture the nonlinear behavior of the pile foundations, both analytically and numerically, with its focus on the application in challenging offshore geotechnical engineering problems.

