

## Alumni Registration & Updates

The Department of Civil and Environmental Engineering is always interested in how our alumni are doing. We hope you will take time to send your updates to [jmueller@lsu.edu](mailto:jmueller@lsu.edu) or, if you prefer, you can “snail mail” them to

**Department of Civil and Environmental Engineering  
Louisiana State University  
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.



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

Volume 12

Fall Issue

November 2012

**LSU**

College of  
Engineering  
Department of  
Civil & Environmental Engineering

Louisiana State University  
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Louisiana State University  
Department of Civil and Environmental Engineering

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## Message from the Chair



The Department of Civil and Environmental Engineering began the fall semester with the full implementation of our new graduate program: Master's in Coastal and Ecological Engineering. The first graduate will be recognized at the fall 2012 commencement, and we anticipate several more within the next year. This summer's announcement of the approval stimulated an even higher level of interest through general inquiries and a steady stream of applications. We are excited about this new program and the impact it will have right here in our state and invite you to visit our website ([www.cee.lsu.edu](http://www.cee.lsu.edu)) where you can find more information about this important new degree.

In support of the new coastal and ecological engineering program, CSRS selected Dr. Q. Jim Chen (P.E., professor) as the CSRS Distinguished Professor in Coastal Engineering at LSU. This professorship was the first gift established to support faculty for the new Coastal Engineering program at LSU. Along with CSRS, the department would like to thank all those who played a role in seeing this new program come into fruition.

Also this semester, an exciting announcement was made by the LSU College of Engineering and Gov. Bobby Jindal: a public-private partnership project to renovate and expand Patrick F. Taylor Hall to create a state-of-the-art LSU engineering education complex (expected completion date 2016). In the months to come, we look forward to sharing details with you about this endeavor and how you can take part in driving the College of Engineering forward.

As always, our newsletter brings to you highlights of recent student, faculty and alumni achievements. Our ASCE and LWEA student chapters are already having an active year and are now preparing for the steel bridge and concrete canoe competitions in the spring. For faculty highlights, in addition to the news of recent awards and funding announcements, we would also like to welcome assistant professor Dr. Jongwon Jung to the geotechnical area.

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

**LSU** | College of Engineering  
Department of Civil & Environmental Engineering

## In This Issue



A Foundation of Excellence Program



## ASCE Student Chapter Update

The LSU ASCE student chapter has been hard at work this Fall semester. Our regular chapter meetings began early in the semester, along with our participation in various service projects. Alongside the ASCE Baton Rouge Younger Members, ASCE at LSU joined with Habitat for Humanity for a day of fellowship and service. The chapter also spent a Saturday working with the Baton Rouge Food Bank. These service projects not only provided chapter members with ways to give back to our community but also served as networking opportunities with other young professionals in the Baton Rouge area.

We would like to sincerely thank the guest speakers who take time out of their schedules to speak at chapter meetings. Thus far, our guests have included: Jeff Decoteau and Blake Roussel (Stanley Consultants); Dr. Rudulfo "Rudi" Aguilar (Pyburn & Odom MCE, LLC and LSU CEE Hall of Distinction inductee); William "Bill" Rushing (ACI and Waldemar S. Nelson); and Justin Schexnayder (Providence Engineering). These speakers serve as excellent examples of where a LSU civil engineering degree can take you and their words of wisdom, as always, are a great inspiration to everyone in the chapter.

As the chapter gears up for the Spring semester, we have already started preparing for the 2013 Deep South Regional Conference. Both the steel bridge and concrete canoe teams are hard at work developing plans and campaigning for support. Our captains of steel bridge and concrete canoe are Ryan Jeansonne (rjeans2@lsu.edu) and Jabari Landry (jlan136@lsu.edu), respectively. We welcome involvement from alumni and industry members. If you or your company are interested in sharing your expertise with the chapter and/or sponsoring the chapter at regionals, we welcome you to contact us.

Sincerely,  
James Parker  
President, ASCE at LSU



Back (left to right): Adam Catanzaro (Fundraising Chair), Matthew Stewart (Treasurer), Bill Rushing (VP of Waldemar S. Nelson and VP of ACI; meeting speaker), James Parker (President), Philip Goppelt (Webmaster), Jabari Landry (Concrete Canoe Captain), Andrew Cook (Community Service Chair), Dr. Michele Barbato (Faculty Advisor). Front (left to right) : Holly Steffen (Meeting Coordinator), Brittany Alexander



Pictured above and below: chapter members participated in a Habitat for Humanity build this semester.



## Faculty Highlights

The project, funded by LTRC at a budget of \$42,000, is expected to be completed in a year. Ishak will be working with the PIs, Dr. Fereydoun Aghazadeh and Dr. Laura Ikumah, both from the Department of Construction Management and Industrial Engineering.

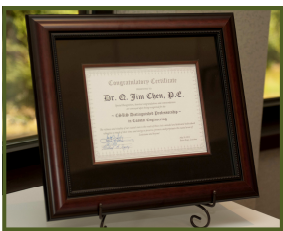


### Chen Receives Funding from NSF and NOAA National Aquaculture Research Program

Dr. Q. Jim Chen, CSRS Distinguished Professor in Coastal Engineering, recently received an NSF research grant entitled

"Collaborative Research: An Efficient Computational Approach for Wave and Surge Attenuation in Wetlands and Applications in Flood Risk Reduction." This three-year project is developing and testing efficient computer models for predicting the attenuation of hurricane-generated waves and storm surges by wetland vegetation. Results from the research will aid civil engineers in the design of hurricane protection projects.

Also, Chen received a research grant from the *NOAA National Aquaculture Research Program*. The project titled "Projection of Freshwater Diversion Impacts under Relative Sea-Level Rise on Louisiana Oysters Using a Coupled Hydrodynamic-Water Quality-Oyster Population Model" is a multi-institutional collaboration among LSU Civil and Environmental Engineering Department, LSU AgCenter, and the USGS National Wetlands Research Center. The open-source computer model, Delft3D, is being integrated with an oyster population model and field measurements to assess the impacts of river diversion projects on oyster population size, growth rates and total



### (cont) Chen Named First CSRS Distinguished Professor in Coastal Engineering at LSU

hydrodynamics and near shore processes, including surface waves, wave induced near shore circulation, storm surges, estuarine circulation, and sediment transport.

In 2011, Chen was named the Principal Investigator of a \$1.35 million award for LSU to develop the Northern Gulf Coastal Hazards Collaboratory (NG-CHC). Funded by the National Science Foundation, researchers in Louisiana, Mississippi, and Alabama are leveraging their unique part-

production, and to project those impacts on oyster production under different scenarios of relative sea level rise in the Breton Sound Estuary, an important oyster production area in Louisiana.



### Barbato To Serve As ASCE Student Chapter Faculty Advisor

Dr. Michele Barbato, Assistant Professor, was recently appointed as the new ASCE student chapter faculty advisor. Barbato began working with the chapter starting at the beginning of the Fall 2012 semester. The position was previously held by Dr. Ayman Okeil for approximately 10 years; the Department thanks him for his service.



### CEE Expands Its Coastal Engineering Pool of Experts

The department conducted a search for a faculty position in the Structural Engineering area recently. We are pleased to announce that Dr. A. Aly has accepted the position

with an expected starting date in Spring 2013. Dr. Aly was among strong pool of 43 candidates applied from all over the world. His expertise is in the field of wind engineering. Currently, he works as a research associate at the Boundary Layer Wind Tunnel Laboratory in Western University; a world leader in this area. Prior to this appointment, Dr. Aly worked at Florida International University, where he participated in the development of the state of the art Wall-Of-Wind facility. He received his Ph.D. in 2009 from the Polytechnic University of Milan (Politecnico di Milano) in Italy. We are looking forward for this newest addition, which will strengthen our expertise in the coastal engineering research arena.

nerships, proximity, and significant prior investments in cyberinfrastructure to advance science and engineering of coastal hazards of the Northern Gulf Coast. This consortium is aimed to catalyze collaborative research via enhanced cyberinfrastructure that will potentially address problems such as engineering design, coastal system response, and risk management of coastal hazards; and to enhance the research competitiveness of the Gulf region.

*Article excerpted from Kimberlie Wessman, CSRS, Inc.*

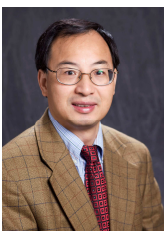


for the Sparta aquifer north-central Louisiana. This area has been declared as an area of Ground Water Concerns by the LaDNR Office of Conservation since 2005. The outcome of the project will provide a better understanding on water resources management for the north-central area of Louisiana.



### CEE Welcomes Assistant Professor Jongwon Jung

The LSU Department of Civil and Environmental Engineering would like to welcome Dr. Jongwon Jung to our faculty as Assistant Professor., effective Fall 2012. Jung received his PhD in Geosystems Engineering from Georgia Institute of Technology. His research interests include energy geotechnical engineering (energy recovery), sustainable use of engineered geo-material, sensor application to geo-engineering, and development of numerical tools.



### Cai Receives NSF Funding for Research on Hurricane Effects on Residential Buildings

Dr. Steve C.S. Cai, Edwin B. and Norma S. McNeil Distinguished Professor, Dept. of Civil and Environmental Engineering, LSU, has received a fund of \$217k from the National Science Foundation. The project is titled "Collaborative Research: Progressive Failure Studies of Residential Houses towards Performance Based Hurricane Engineering". The proposed research addresses hurricane effects on residential buildings that are one of the most vulnerable coastal structures.

### Okeil Receives Outstanding Educator Award

At a luncheon held in June, the ASCE Baton Rouge Branch recognized Dr. Ayman Okeil with a 2011-2012 Outstanding Educator Award.



### Voyiadjis Attends Conference

Dr. Voyiadjis' most recent conference attended was the International Congress of Theoretical and Applied Mechanics, Beijing, China, August 2012. He was also invited to participate in the inauguration ceremonies of

the International Center of Theoretical and Applied Mechanics (ICTAM), Xian Jian Tong University, Xian, China, August 2012.



### Ishak Receives Funding for Driving Simulator Studies

Dr. Sherif Ishak, Associate Professor, Dept. of Civil and Environmental Engineering, LSU, has received funding to undertake various researches with the recently acquired LSU

Driving Simulator, with all projects commencing in July 2012. He was awarded \$30,000 from the TIRE (Transportation Innovation for Research Exploration) program at Louisiana Transportation Research Center (LTRC) for a project titled "Modeling the Effect of Gusty Hurricane Wind Force on Vehicles using the LSU Driving Simulator". As the Principal Investigator (PI), he will lead a team of graduate students to explore untested and novel idea on how driving simulators can be utilized to investigate the effect of gusty hurricane wind force conditions on driving behavior. The ultimate goal of this study is to lay a foundation for future research into vehicle performance on road during harsh hurricane and tropical storm conditions. The project is expected to be completed in a year.

Joint funding of \$89,774 from UTC and LTRC was also received for another project titled "Distracted Driving and Associated Crash Risks", for which Ishak will serve as PI. This project also utilizes the LSU driving simulator to measure the risks associated with various distractions faced by the driving population when driving under different weather and driving conditions. The findings of this research are intended to assist highway safety professionals in developing behavioral strategies to mitigate crashes due to distracted driving.

Ishak is also the Co-PI on another project titled "Effect of Changing Driving Conditions on Driver Behavior towards Design of a Safe and Efficient Traffic System". This project will investigate the effects of traffic patterns and traffic flow levels on driving behavior by gathering performance data on subjects using the LSU driving simulator, and analyzing the data from a human factors perspective. The findings are intended to help develop a better understanding of how individual differences and driver behavior can influence driver safety, and improve traffic flow under conditions such as construction zones and evacuation plans.

### LWEA Student Chapter Update



Louisiana Water Environment Association (LWEA) is a member association of the Water Environment Federation (WEF). The student chapter at LSU is open to all students, but composed primarily of students from environmental and civil engineering majors. The emphasis of the organization as a whole (and subsequently the LWEA student chapter) is on environmental issues in the state of Louisiana, including rivers, swamps, marshes, and lakes, as well as other aspects effecting the environment.

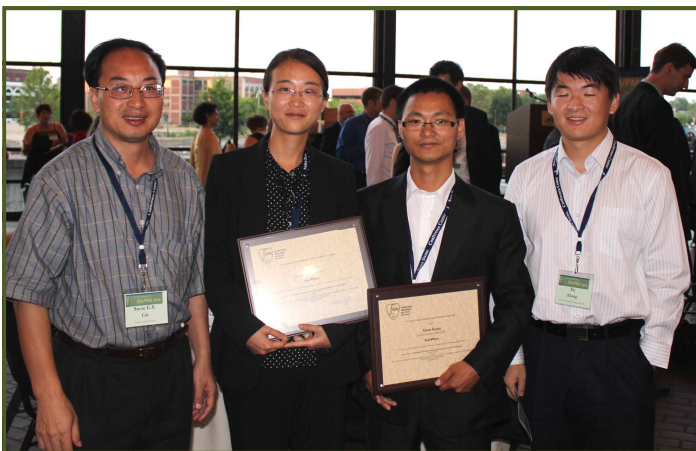
This fall the LWEA student chapter has hosted two events. In the first, hosted by LSU Career Services, members learned tips for creating a resume, finding employers, and interviewing. The information presented was invaluable and served as a great way to expose chapter members to the services offered by Career Services.

Other events are planned for the fall semester, including our semi-annual lake clean-up event. This event takes place on and around the LSU lakes and is a joint effort by chapter members and various LSU faculty. Student use canoes to retrieve trash from the lakes, pick up trash on the perimeter and enjoy a barbeque lunch. This is a great opportunity to meet other LWEA members, professors, and environmental professionals.

All LWEA events are open to any LSU student or faculty member interested in gaining knowledge about the environment. If you have any questions about any upcoming LWEA events or are interested in joining the chapter, please feel free to contact us at [lwealsu@gmail.com](mailto:lwealsu@gmail.com).

Sincerely,  
Danielle Wold

### LSU Grad Students Claim Two of Three Awards



During the 2012 Joint Conference of the Engineering Mechanics Institute (ASCE) held on June 17-20, 2012 at the University of Notre Dame (Indiana) three of Prof. Steve Cai's Ph.D. students participated in the poster competition and two won the award. Fang Pan, Ph.D. candidate, won the first place with the poster "A database assisted damage prediction model for a typical low-rise building under hurricane". Xuan Kong, Ph.D. candidate, won the third place with the poster "Instrumentation Design for Bridge Scour Monitoring Using Fiber Bragg Grating Sensors."



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



### CEE External Advisory Board

The Department of Civil and Environmental Engineering's External Advisory Board (EAB) provides outside perspective and valuable input on industry trends and needs. Ronald Rodi (CSRS) has served faithfully as Chairman of the CEE External Advisory Board since 2007. We want to thank him for his outstanding leadership of the EAB as well as the Forever LSU Campaign for CEE. He has been a champion for Coastal & Ecological Engineering through his personal advocacy and generosity. Along with his CSRS business partners, Ron established the first professorship in this new program. Ron's support of CEE has been tireless, for which we are deeply appreciative. He has also been the top donor of LSU Gumbo Yearbooks to the College of Engineering's collection. Ron will remain an active member of the EAB.

John Graves (Evans-Graves Engineers, Inc.) will assume the chairmanship of the EAB, effective January 2013. John has been active on the EAB for several years and has been a very strong supporter of the CEE Department through his involvement and philanthropy. We welcome John into this key role and look forward to his leadership.

Current members of the CEE EAB:

**Verdi Adam** (GEC, Inc.)  
**Wilfred B. Barry** (SJB Group, Inc.)  
**Dr. Jim Coleman** (LSU Coastal Studies Institute)  
**Ron B. Crum** (URS Corporation)  
**Larry East** (Albemarle Corporation)  
**Craig Gardner** (SJB Group, Inc.)  
**John Graves** (Evans-Graves Engineers, Inc.)  
**Lloyd Guillory** (ExxonMobil)  
**Dr. Kam Movassaghi** (CH Fenstermaker and Associates, Inc.)  
**Ronald Rodi** (CSRS)  
**Ann Forte Trappey** (Forte and Tablada, Inc.)

### ASCE Baton Rouge Branch Recognizes CEE Alum as 2011-2012 Awardees

At a luncheon held in June, the Baton Rouge Branch of the ASCE recognized its 2011-2012 branch awardees. Along with Dr. Ayman Okeil, who received recognition as Educator of the Year, awardees included several CEE alumni.

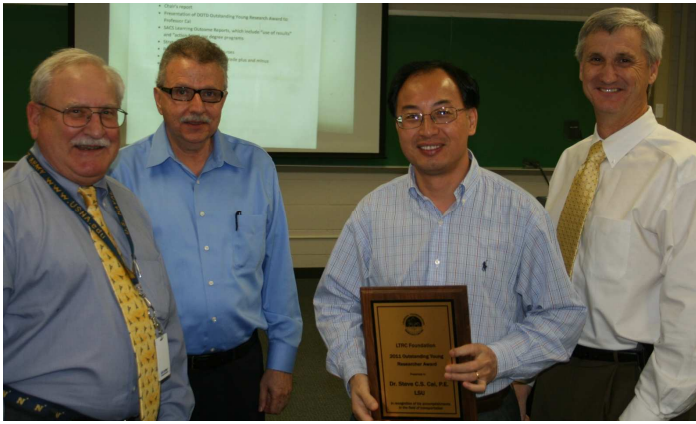
Dr. Sam Amoroso, who received his bachelors in civil engineering in 1999 from LSU and his PhD in civil engineering in 2007, was recognized as an Outstanding Young Civil Engineer. Chris Knotts, who received his bachelors in engineering technology from LSU in 1983 and bachelors in civil engineering in 1989, was recognized as an Outstanding Civil Engineer. Recognized for her outreach, Ann Trappey is a 1982 graduate of the LSU civil engineering program as well as a member of the CEE Hall of Distinction. Earning a position on the Wall of Fame was Gerald Dyson, who received his master's in civil engineering from LSU in 1954. Congratulations to all for their recent recognition and for their service to the civil engineering profession and to the local community.

### Ledet Named VP of Engineering at T. Baker Smith

James P. Ledet (P.E.) was named the Vice President of Engineering at T. Baker Smith (TBS). Ledet joined TBS in 1978, holding numerous positions including Engineer in Training, Project Manager, Thibodaux Branch Manager, and Principal in Charge of Engineering at the Thibodaux office. He received his bachelors in civil engineering from LSU in 1982 and is a professional engineer licensed in eight states—Louisiana, Texas, Mississippi, Arkansas, Alabama, Oklahoma, New Mexico, and Georgia.

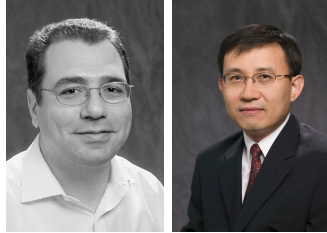
### Email Us Your News and Updates

We would like to thank the treasured alumni who forward up-to-date information and contact information. If you are an LSU Department of Civil and Environmental Engineering 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](mailto:jmueller@lsu.edu).



### Cai Receives Outstanding Young Researcher Award from LTRC

Dr. Steve C.S. Cai, Edwin B. and Norma S. McNeil Distinguished Professor, Dept. of Civil and Environmental Engineering, LSU, was selected for the 2012 Outstanding Young Researcher Award. This award, established by the Louisiana Transportation Research Center (LTRC) Foundation, recognizes a mid-career researcher at one of the Louisiana's universities with a strong record in research, education, and service related to the broad area of transportation. Harold "Skip" Paul, LTRC Director, along with Dr. George Z. Voyiadjis, Civil and Environmental Engineering Department chair, presented Dr. Cai with an award plaque and a check for \$1,000 at a recent faculty meeting.



### Ishak and Shin Receive Funding From LTRC To Study "History of Road design standards in Louisiana DOTD"

Drs. Hak-Chul Shin and Sherif Ishak received \$150K in funding from Louisiana Transportation Research Center (LTRC) for a project titled "History of Road design standards in Louisiana DOTD". According to the Louisiana Statewide Transportation Plan, Louisiana's highway network comprises of over 60,000 miles, of which over 16,000 miles are maintained by the state. The roadways were designed and constructed according to the design standards valid at that time. Currently, the Louisiana DOTD does not have a written record of the road design standards enforced for the practice. It is vital to collect the time-sensitive information before it is lost. A systematic compilation of road design standards and related documents in database can be incorporated into the current DOTD intranet and the compiled time-related record would be a useful resource to retrieve for defending tort liability cases in the state, and for identifying the design used in past projects which require repair or rehabilitation. The primary objectives of this project are: 1. Identify national and state road design standards applied in Louisiana over the last 90 years, 2. Determine state and federal laws that have a bearing on road design in Louisiana, 3. Identify internal directives, policies, and practice applied to road standards in the DOTD over the last 90 years, and 4. Develop a document library listing the standards in chronological order.



### Tsai Receives Grant from the LA Board of Regents

Dr. Frank Tsai received grant (2012-2015) from Louisiana Board of Regents with Dr. Krishna Paudel (AgCenter Economics and Business) to study risk reduction in groundwater withdrawal under saltwater intrusion



### Willson Represents LSU as a Fellow in the SECAC Academic Leadership Development Program

Dr. Clint Willson, Professor in the LSU Department of Civil & Environmental Engineering, has been selected to represent LSU as a fellow in the Southeastern Conference Academic Consortium (SECAC) Academic Leadership Development Program. The ALDP program will consist of two planned workshops October 15 through 17, 2012, at the University of Tennessee and February 6 through 8, 2013, at the University of Florida. The workshops will address topics relevant to leadership in academia and will follow a format designed to maximize interaction among the fellows. In 2005, the SECAC was incorporated to foster academic collaboration among the Southeastern Conference (SEC) member institutions. Led by provosts of the SEC institutions, the SECAC has identified various initiatives based on mutual interests. One such initiative is the creation of the ALDP, which was established by the SECAC in 2007.



Indeed hazards analysis and mitigation strategies are augmented by the services and resources available by the Center. Whether it is supporting the U.S. Army Corps of Engineers to improve surface elevation measurements used to produce storm surge models, estimate levee heights for regional and federal flood protection authorities, or support emergency response activities following the *Deepwater Horizon* oil spill, the Center's has and continues to provide critical positional services to first responders and crisis managers requiring continuous, accurate, and precise positional services.

In addition to the RTN, the C4G and LSRC provides a program of research and service that address critical and timely geodetic issues associated with subsidence and establishing a consistent, accurate, and reliable sources for vertical control in Louisiana. Accordingly, the C4G directly and indirectly supports innumerable scientific and engineering endeavors across the State, including coastal restoration and protection.

Dr. George Z. Voyiadjis is currently serving as Interim Director of the center, which currently reports to the Department of Civil and Environmental Engineering.

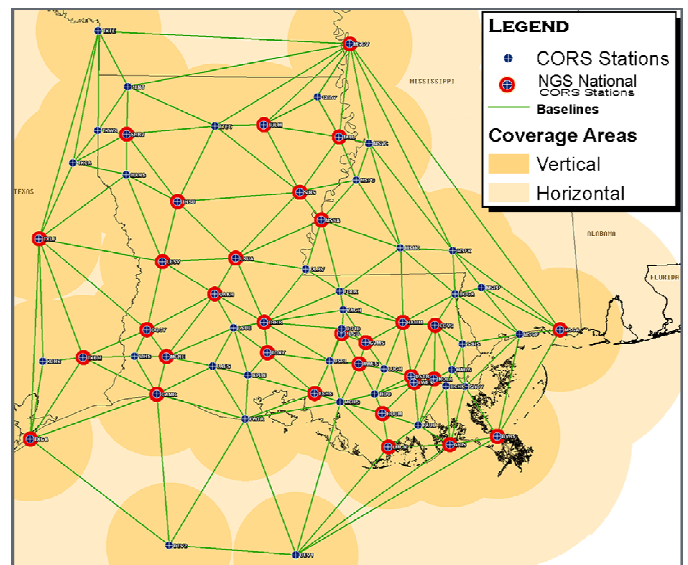
## For more information, contact the LSU Center for Geoinformatics at:

Louisiana State University  
200 ERAD Building  
Baton Rouge, LA 70803  
TEL: 225-578-4609  
FAX: 225-578-4502

### Or Visit Online:

<http://C4Gnet.lsu.edu>

## C4GNET CORS NETWORK



## Services Available

### PRECISION SURVEY GRADE GPS/GNSS RTN

- Geodetic Control Surveys
- Construction Stake-Out
- Hydro-Surveying
- Dredging
- Machine Guidance for Construction

### PRECISION AGRICULTURAL GPS/GNSS RTN

- Guidance & Decision Support
- Variable Rate Technology (VRT)

### MAPPING/GIS SOLUTIONS

- Data Collection
- Topography Mapping
- Asset Inventory

### POST PROCESSING DATA

- Custom Input/Output
- 67 CORS Statewide
- 1-Second Data Available

### DEFORMATION MONITORING

- Strain Monitoring (e.g. dams, bridges, and off-shore platforms).

## Patrick F. Taylor Engineering Complex



The need for this expanded capacity extends from student demand—as the College’s enrollment has climbed over 40 percent in the last four years, the industry’s workforce need to increase the number of engineering, computer science and construction management graduates statewide by at least 30 percent per year, and to help drive economic development in Louisiana.

“This investment will allow the College of Engineering to bring leading-edge educational experiences to our students, perform high-impact translational research and prepare next generation’s engineering workforce with the skills needed to lead the industries driving our state’s economy,” said Rick Koubek, dean, LSU College of Engineering.

The Governor said his administration will support \$50 million in capital outlay funding for the project and the remaining funds will be covered by private donations. That money has to be approved by the state Legislature and the state Bond Commission. To date, the College of Engineering has already raised \$8 million in private and corporate donations for the project, and will need to raise \$42 million. This is the largest academic capital outlay project for LSU, and demonstrates the project’s importance for the state.

The architectural design phase will start in December 2012; construction is slated to begin in the fall of 2014 and is estimated to be completed by the fall of 2016.

**O**n October 2, Gov. Bobby Jindal announced \$100 Million public-private partnership project to renovate and expand Patrick F. Taylor Hall, including a new Chemical Engineering building, to create a state-of-the-art LSU engineering education complex.

The Patrick F. Taylor engineering expansion will include modern laboratory space for teaching and translational research, enhanced and expanded space for student services, updated graduate student space, an academic support center, and dedicated capstone project space and other multi-disciplinary space for student projects.

*LSU College of Engineering*





Chen Named First CSRS Distinguished Professor in Coastal Engineering at LSU



**D**r. Q. Jim Chen (P.E., professor) has been selected as the CSRS Distinguished Professor in Coastal Engineering at LSU.

The professorship is the result of a \$180,000 gift from the firm to assist in recruiting and retaining faculty for the LSU Department of Civil & Environmental Engineering. The CSRS Distinguished Professorship in Coastal Engineering was the first gift established to support faculty for the new Coastal Engineering program at LSU.

The Coastal Engineering program at LSU was developed in response to the increased emphasis placed statewide on the continuous threat of coastal flooding, erosion of Louisiana's barrier islands and loss of coastal wetlands along Louisiana's unique estuaries and shorelines.

"CSRS is very pleased and committed to helping LSU initiate this unique and promising program aimed at the

development of engineering systems and processes for coastal restoration. It is encouraging to note that Dr. Chen will be leading the effort to educate those choosing to pursue a career in coastal protection and restoration engineering," said CSRS Principal Ronald Rodi, P.E.

"These accolades are well deserved for an outstanding academic leader and innovative researcher dedicated to pushing the boundaries in coastal protection and restoration engineering both here at LSU and statewide," said College of Engineering Dean Richard Koubek.

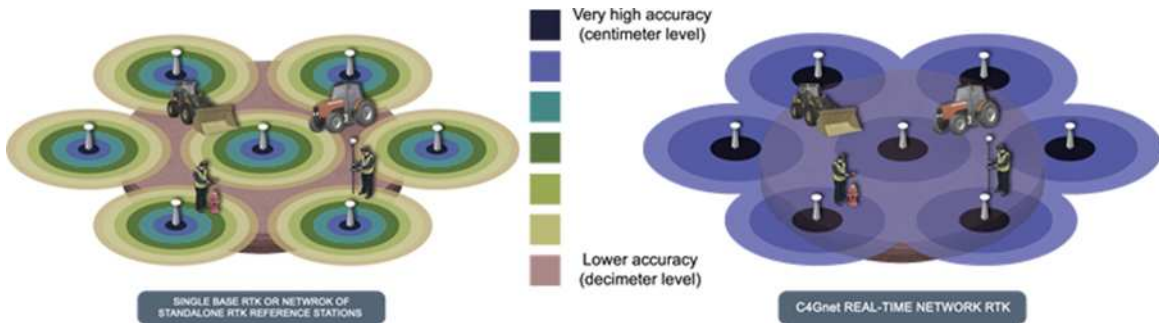
Before joining LSU, Chen had been on the civil engineering and marine science faculty at the University of South Alabama. He conducted postdoctoral research at the University of Delaware's Center for Applied Coastal Research, and doctoral research at Old Dominion University and Danish Hydraulic Institute. He specializes in the development and application of numerical models for coastal

(continued page 15)

## C4Gnet Real-Time Network RTK



- 1 **CONNECT:**  
Just power-up your receiver and connect to the Network via the Internet
- 2 **CORRECT:**  
C4g Real-Time Network delivers centimeter accurate corrections tailored for your geographic location
- 3 **MEASURE:**  
Complete the project without delay of field base station setup



State. Through partnerships with public and private sector stakeholders, the LSRC provides access to and promotes the utilization of the National Spatial Reference System (NSRS), a federal program designed to provide a consistent, accurate, and up-to-date coordinate system throughout the country. As the Louisiana branch of the NSRS, the LSRC and C4G support the positional needs of agricultural, engineering, surveying, scientific, and other professional communities with C4Gnet: a state of the art, real-time network of 65 continuously operating global positioning system (GPS) reference stations located across Louisiana, neighboring states, and within the Gulf of Mexico.

Two principal areas of focus at the Center are the *C4Gnet Real-Time Network* and its *Research Agenda*. The C4G-Net Real-Time Network (RTN) is a network of 60+ continuously operating reference stations (CORS) installed at locations across Louisiana and neighboring states that provides corrections and improves the positional accuracy of global navigational satellite systems (GNSS) equipment, including GPS. By providing this enhancement as a subscription service, practitioners in the scientific, engineering, surveying, agricultural, and other industries are

able to leverage the accurate positional solutions of the network to increase productivity, decrease error, and access the most accurate and reliable resource for location-based services in Louisiana. In fact, by virtual of State law (R.S. 50:173.1), this system is the only legal source for real-time vertical control and access to the NSRS in Louisiana.

The Center's real-time network utilizes state of the art technologies and services capable of addressing various applications unique to physical geodesy and geomatics. Among the numerous applications, differential motion detection and deformation modeling represent innovative methods by which the RTN is capable of monitoring and detecting mm-scale movements of the Earth. By applying these resources for the C4G is uniquely able to measure the position of critical infrastructure relative to the North American plate. One such example is the sinkhole event in Assumption Parish, LA. By deploying the CORS-911 service, the C4G will be able to quickly install and monitor the positional stability of multiple CORS sites within the vicinity of the sinkhole, thus alerting decision makers of any risk to personnel and nearby infrastructure.





## C4GNet Real-Time Network: The Next Generation of Global Positioning Systems Technology

It is widely understood from the geological record that the southern Louisiana landscape of the late Holocene has been primarily dominated by the interaction between sedimentary accretion, geologic subsidence, hydrologic processes, and global sea level rise. The alternating cycles of flood induced sediment deposition and naturally eroding landforms resulted in a relative equilibrium from which the coastal wetlands were sustained. Contemporary human manipulation of the river and reclamation activities have disrupted this natural cycle, depriving the wetlands of the sediment-laden floodwaters that naturally replenished the

subsiding coastal plain. Studies performed across the coastal plain have measured average relative sea level rise with values between 5-

10mm yr<sup>-1</sup> and more. Consequently, our coastal zone is increasingly becoming more vulnerable to storm surge, seasonal flooding, and global sea level rise. Still further, subsidence has disrupted our ability to accurately and

precisely maintain vertical control within the region. Thus, the techniques previously called upon to base a design, prepare flood certificates, or establish the elevations of a flood protection levee may no longer be valid. In all, subsidence has and continues to exert enormous influence on Louisiana's wetlands, which has significant consequences for the long-term sustainability of our coastal ecologies, economies, and society.

To address the inherent complexities and better understand the long-term consequences of subsidence in the

State, the Center for Geoinformatics (C4G) at Louisiana State University (LSU) was created to pursue a comprehensive program of research, education, and outreach.

***The C4G is the vanguard for providing and ensuring an accurate, precise, and consistent geographic reference framework for the State.***

***Sustainability in this subsiding landscape is dependent on the maintenance of this framework; the foundation of engineering design.***

***The C4G strives to utilize the positional data collected over time to produce an exceptional level of research and service to the State for mitigating the hazards attributed to subsidence.***

***- the Mission Statement of the C4G***

The C4G is also home to the Louisiana Spatial Reference Center (LSRC) – a research facility established in 2002 that is dedicated to ensuring a highly accurate, precise and consistent geographic reference framework for the



# THE FORTRESS OF NEW ORLEANS

A Photographic Tour of the Largest Civil Works Program in U.S. History

**W**ith stunning visuals and detailed technical descriptions, *The Fortress of New Orleans* documents the construction of the largest civil works project completed in U.S. history: a \$14.5 billion levee protection system built around New Orleans following Hurricane Katrina's devastation in 2005.

The Fortress of New Orleans was released on August 15 and retails for \$49.95. Proceeds will go to the LSU Department of Civil and Environmental Engineering (College of Engineering).

Evans-Graves provided project management support to the Corps of Engineers for all the work that went into building the system. John A. Graves, owner and president of Evans-Graves Engineers, Inc. , received his B.S. in Civil Engineering from LSU and is a member of the LSU Civil and Environmental Engineering Department's Hall of Distinction.

For complete details on the book and order information, check out its website:

<http://www.thefortressofneworleans.com>





*LSU coastal engineering graduate students Kyle Parker (left) and Ling Zhu (middle), and postdoctoral researcher Arash Karimpour (right) retrieved wave gages from Breton Sound by TBS airboat on September 11, 2012.*

## LSU Coastal Engineers Measured and Modeled Waves and Storm Surge on Marshlands during Hurricane Isaac (2012)

**O**n August 27, 2012, one day before the landfall of Hurricane Isaac, LSU coastal engineering professor, Q. Jim Chen, and his graduate students, Kyle Parker and Ranjit Jadhav, and postdoctoral researcher, Arash Karimpour, deployed an array of twelve wave and surge sensors along the east bank of Mississippi River and the perimeter of the Breton Sound Estuary in southeast Louisiana. Guided by the hurricane forecast from the National Weather Services and the hurricane wave and storm surge forecasts by Chen's group and LSU researchers at the Center for Computation and Technology (CCT), the field experiment was designed to measure the waves and surge on inundated wetlands and near coastal infrastructure, such as levees and roadways. The sensors were successfully retrieved two weeks after Hurricane Isaac's landfall. In collaboration with T. Baker Smith LLC, a Louisiana engineering firm, Chen's group conducted topographic survey near the deployed sensors

using the advanced GPS network developed by LSU Center for Geoinformatics (C4G). In addition, students in the LSU Coastal and Ecological Engineering graduate program measured biomechanical properties of marsh vegetation during the instrument retrieval.

The rapidly installed, mobile wave and surge monitoring system consists of seven wave gages and five surge gages. This is the third deployment of wave and surge gages prior to an incoming storm by Chen's group and is part of their field and modeling investigations of wave and surge attenuation by wetland vegetation. Although the value of wetlands in reducing the impact of hurricanes has been recognized, no systematic field observations exist to quantify the extent of flood risk reduction. Funded by a completed federal grant, Chen's group in the Department of Civil and Environmental Engineering at LSU has developed the capability of rapidly deploying wave and surge



sensors on marshlands in collaboration with T. B. Smith, LLC. A similar rapid deployment of wave and surge sensors prior to Tropical Storm Lee (2011) was carried out in upper Terrebonne Bay, LA, resulting in several journal manuscripts and a Ph.D. dissertation. The valuable datasets are aiding coastal engineers and scientists in developing and testing accurate computer models for predicting storm surge and wind waves over inundated coastal wetlands.

In addition to field observations of waves and storm surges, Chen's group has also actively participated in the forecast of storm surge and hurricane waves using the 'Advanced Surge Guidance System' (ASGS). Supported by the National Science Foundation and Louisiana Board of Regents, ASGS is a multi-state coastal modeling research and development effort providing operational advisory services related to impending hurricane events. The interactive and dynamic website CERA (Coastal Emergency Risks assessment) developed by Carola Kaiser and Professor Robert Twilley, Director of LSU Sea Grant Program, posts storm surge forecast results every 6 hours during critical storm events in accordance to the official advisories as issued by the National Hurricane Center. The ASGS group successfully forecasted and displayed storm surge information for Hurricane Isaac for 8 days. A variety of end users accessed the website and obtained valuable information to make key decisions immediately prior to the storm. Field measurements are being used to assess the predictive skills of ASGS.



Locations of wave gages (Groups A-C) and surge gages deployed by Chen's group at LSU on August 27, 2012 prior to Hurricane Isaac's landfall on the Louisiana coast. Right inset: Kyle Parker (left), Ranjit Jadhav (middle) and Arash Karimpour (left) installed wave gages on the marsh.



Wave and surge gages in Chen's coastal engineering lab at LSU before deployment.



LSU Coastal Engineering Ph.D. student, Kyle Parker (right), and post-doctoral researcher, Arash Karimpour surveyed the wave gage elevation and measured vegetation properties on September 11, 2012.



LSU Coastal Engineering Ph.D. student, Kyle Parker (right) and T Baker Smith LLC's employee surveyed the marsh elevation in Breton Sound during sensor retrieval on September 11, 2012.

Hurricane Isaac's waves modeled by Chen's group and compared with field observations (insets).

