



The Department of Civil and Environmental Engineering is always interested in how our alumni are doing. We hope you will take time to complete the Alumni Update information below. Please include information on your recent professional and personal developments, along with a high-quality photo if available. Please email your information to jmueller@lsu.edu or mail submissions to *Civil and Environmental Engineering, Louisiana State University, 3418 Patrick Taylor Hall, Baton Rouge, LA 70803-6405.*

Name: _____ Year of Graduation: _____

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Department of

Civil and Environmental Engineering

LOUISIANA STATE UNIVERSITY



Volume 7 • Fall Issue

November 2007

A Foundation Of Excellence Program



Dr. George Z. Voyiadjis
*Boyd Professor, Chairman
and Bingham C. Stewart
Distinguished Professor*

Message from the Chair

Welcome to the latest issue of our department newsletter. In the last issue, I had the pleasure of announcing our department as a Foundation of Excellence Program. This prestigious recognition is proof that our hard work and determination has yielded fruitful results. The global vision of the CEE department remains to be both internationally and nationally prominent and state relevant, to maintain excellence in undergraduate instruction, to continue to develop an international and nationally-recognized program in graduate instruction and to continue to develop and expand research and scholarly activities. Our success at becoming a Foundation of Excellence Program is an accomplishment that we relish but it also serves as encouragement to continue and expand on that vision of excellence. Our department has recently experienced astonishing growth and with the hard work of our faculty and staff, along with the support of our alumni and friends, we will continue on this path of success.

This issue of the newsletter brings to you exciting news in the Department of Civil and Environmental Engineering. Along with high-

lighting student and faculty accomplishments and recognitions, this issue includes coverage of recent departmental events, information on upcoming conferences, an update on the Forever LSU campaign and an enlightening article about the safety of our bridges. In particular, Dr. R. Richard Avent and Dr. Vijay Singh have both retired after serving 25 years each in our department. We wish them both a happy and fruitful retirement.

Also, on the weekend of the LSU and Virginia Tech football game, the CEE department student organizations teamed up to host eight Virginia Tech students and one professor from the university to honor the victims of the tragedy with an enjoyable weekend. Guests enjoyed a tour of New Orleans, lunch in the French Quarter, a spectacular pregame presentation, tailgating, and more. Our department would like to thank all of the student organizations, sponsors and volunteers who contributed in making this weekend a success and a memorable tribute to a tragic event.

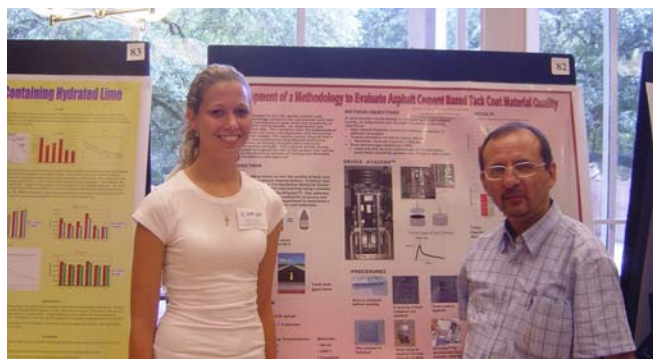
In closing, I would like to wish you and your family a safe and happy holiday season.

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Student Highlights



Allison Vinson pictured with Dr. Mohammad



Matthew Morales pictured with Dr. Mohammad

CEE students, **Allison Vinson** and **Matthew Morales** (see pictures above), participated in the 14th Annual Summer Undergraduate Research Forum, held Thursday, August 2, 2007 in the LSU Union Cotillion Ballroom. At the forum, undergraduate students from across the LSU campus presented their summer research projects.

Hement Chowdhary, a PCE student working with Dr. Singh and Dr. Deng, attended The Third International Conference on Environmental Science and Technology in August and presented a paper titled *Watershed Scale Statistical Evaluation of Effectiveness of BMPs in Southwestern Louisiana River Basins*. The paper received the Student Paper Award awarded by the conference.

An LSU CEE graduate student, **Jun Yun**, was selected from a national pool to attend the 2007 American Society for Microbiology (ASM) Robert J. Kadner Institute for Graduate Students and Postdoctoral Students in Preparation for Careers in Microbiology at the Colorado. Yan was among 36 senior-level graduate students or early postdoctoral scientists from universities across the United States and Canada selected for the program. From July 21 through 25, he participated in the intensive five-day institute in Boulder, CO. The Kadner Institute consisted of hands-on training in grant-writing, scientific presentations, scientific communication and ethics. Sessions also addressed career opportunities in applied research in industry, public health, patent law and teaching. Each participant was required to prepare a 10-page grant proposal, a 10-minute scientific presentation and a curriculum vitae that was critiqued and evaluated by faculty and peer scientists. The Kadner Institute is managed by ASM and sponsored by the National Institute of Allergy and Infectious Diseases and the Burroughs Wellcome Fund.

Deep South 2008 Conference Update

On April 3-5, 2008, the student chapter of American Society of Civil Engineers at Louisiana State University will host the Deep South Regional Conference. The region consists of ten schools from Louisiana, Mississippi, Arkansas, and Tennessee. The main events include the concrete canoe competition, the steel bridge competition, and the surveying competition. Also, there will be a "mystery" event.

Your support is needed to ensure that this event is a success! Whether your support comes through judging any of the events, volunteering, serving as a conference sponsor, making a monetary contribution or simply sharing your ideas



and suggestions with the management team, there is an opportunity for everyone to get involved. Both companies and individuals who are interested in assisting with the conference, please contact either Amanda Hamlin at ahamli2@lsu.edu or Claire Murray at cmurra4@lsu.edu.

So, mark your calendars and do not miss out on this opportunity to experience these events first hand. This conference will not return to LSU until the year 2020! So, bring the family for a beautiful day by the lake and be a part of this wonderful event.

YES, count me in!

I want to donate to the: Geotechnical Lab Project
 Civil and Environmental Engineering Siess Endowment Fund

Here's my contribution of:
 \$10,000 \$5,000 \$2,000 \$1,000 \$500 \$250 \$_____

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Note: If your/your spouse's employer has a Corporate Gift Matching Program, you may be able to double or even quadruple your gift! Please contact the employer's human resource office for more information. Your gift is tax deductible to the fullest extent allowed by law.

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LSU Renames CEBA Building Patrick F. Taylor Hall



LSU has renamed the CEBA building in honor of Patrick F. Taylor, LSU College of Engineering alumnus who is deemed the "father of TOPS". The official name is now **Patrick F. Taylor Hall** and is currently occupied by both E. J. Ourso College of Business and the College of Engineering.

A formal re-naming ceremony was held on September 8. Chancellor Emeritus James Wharton served as master of ceremonies, along with LSU Chancellor Sean O'Keefe, LSU Board of Supervisors Chairman Jerry Shea, LSU College of Engineering Dean Zaki Bassiouni and many others. Mrs. Phyllis M. Taylor, who continues her late husband's legacy through the Patrick F. Taylor Foundation, was in attendance to accept the honor.





Campaign Update

By Brenda Tate

The FOREVER LSU campaign is a fundraising effort with a goal of improving and transforming our university. For Civil & Environmental Engineering (CEE), gifts from alumni and friends will:

- **Encourage students to perform** their best through scholarships
- **Encourage top undergraduates students to pursue engineering graduate education** through support provided by fellowships and graduate assistantships
- **Recruit and retain top faculty** through endowed professorships and chairs, and by offering competitive start-up packages
- **Improve laboratories and equipment** to advance both research and teaching programs to stay on the cutting-edge of technology and knowledge
- **Renovate current space** to meet the latest needs in research and education
- **Provide additional facilities to students** to enable them to meet their national engineering competition initiatives

We are already seeing the impact that numerous generous donors, alumni, corporations, and friends are making toward improving our Department. While we look to our key leaders in industry to help us make transformational improvements to the LSU Civil & Environmental Engineering Department, every single person has a role to play. I urge you to make the largest contribution you can afford--to whatever area most engages you.

Don Eisenberg, our Development Officer, can assist. Our volunteer leadership, the CEE Campaign Steering Committee, is comprised of Mr. Wilfred Barry, Mr. Lloyd J. Guillory, Mrs. Ann Trappey, and chaired by Mr. Ron Rodi. Any of them would also be willing to discuss with you the many ways in which you can help improve CEE at LSU. We would like to take a moment to extend our special thanks and best wishes to outgoing chair, Mr. Larry McKee, for all his hard work on our behalf.

The campaign has already substantially impacted your Department in a positive way, and we have made strides on all fronts. Some examples include:

The numerous donations of many alumni and friends to the **Chester P. Siess CEE Departmental Enrichment Endowment Fund** provided nearly \$85,000 (over the past three years) to our Department, resulting in many improvements. Likewise, the many gifts to the **Civil and Environmental Engineering Enrichment Fund** also brought nearly \$110,000 to the Department. These important funds bring money directly to the CEE Department, so they may be distributed to the areas of greatest need.

The **Arthur K. Barton Professorship Fund #2** and the **Chester P. Siess Distinguished Professorship in Civil Engineering** help us to recruit and retain faculty.

Scholarships are helping our undergraduates: the **Joseph W. Carmena, Sr. Memorial Scholarship**; the **McDermott Scholarship Fund**; the **Robert E. Watson, Jr. Memorial Scholarship**

Fund; the **Stanley M. and Hilma R. Cothren Undergraduate Scholarship**; and the **Chevron-Exxon Scholarship Fund in Civil Engineering** are all a direct result of this campaign, and they will continue to aid our students throughout the years to come.

Our graduate students too, are getting some assistance, with the creation of **Raphael G Kazmann Center for Graduate Studies Fund** and the **Stanley M. and Hilma R. Cothren Graduate Fellowship for Engineering Excellence**.

Many donations have combined to raise over \$10,000 over the last four years, helping the **Steel Bridge Fund** to assist our young engineers in their quest for excellence.

Recently, the **Wal-Mart Laboratory for the Study of Pollution Control** and the **John Edlin and Mary Virginia Johnson Materials Behavior Laboratory Equipment Fund** (through the Seattle Foundation) were created to help bring state-of-the-art equipment to the CEE Department for both teaching and research.

Today's students at LSU will be the guiding force in rebuilding and taking Louisiana to new heights in the future. We have made a good start towards improving our Civil & Environmental Engineering Department, although more remains to do. With your assistance, we can make our Department—and our graduates—the best they can be.

Together, we are **FOREVER LSU**.



LSU Virginia Tech Tribute

On April 16th, 2007, twenty-seven students and five professors at Virginia Tech were killed in the worst school shooting in US history. On the weekend of the LSU-VT football game, the LSU Department of Civil & Environmental Engineering student organizations honored the victims of this tragedy.



Virginia Tech guests enjoying the game on Saturday.

On September 8th, 2007, the LSU Fighting Tigers defeated the Virginia Tech Hokies in convincing fashion as one of the most memorable seasons in the history of LSU Saturday Night Football began. With the entire nation watching, the LSU community welcomed its Virginia Tech guests with quintessential Southern hospitality, an appropriate pregame presentation, and a few thousand "Tigah Baits." One exceptional gesture of hospitality included eight students and one professor from the Virginia Tech Department of Civil and Environmental Engineering. The students and professor, hosted by the LSU Department of Civil and Environmental Engineering Student Organizations, were all close friends and survivors of the events of April 16th, 2007 and the participants of the LSU Tribute to Virginia Tech Weekend.

Community Service is a key characteristic of LSU's Civil and Environmental Engineering Student Organizations. Chi Epsilon Civil and Environmental Engineering Honors Society, the American Society of Civil Engineers, and Tau Beta Pi Engineering Honors Society chose to combine its efforts to make the Fall 2007 Community Service Event truly special. The 2007 football season provided a unique opportunity to expand our meaning of "community" due to our top ten match up against the Virginia Tech Hokies. This was the first away game for a school recovering from the worst school shooting in American history, in

which the Civil and Environmental Engineering community was not spared. Of the thirty-two victims, eight students and one professor were in an Advanced Hydrology classroom, one of the most localized areas of violence. To honor our fallen colleagues, the LSU Tribute to Virginia Tech was formed to host eight Virginia Tech Civil and Environmental Engineering students and one professor for the LSU-Virginia Tech Football Weekend. LSU and Saints football games in Tiger Stadium were magical occasions after Hurricane Katrina and Hurricane Rita. This is one place where the community came together and forgot about their troubles. Our intentions were to allow these students the same opportunity many of us had, to experience a re-



prieve from their trials in Tiger Stadium. Universities across the nation helped the Gulf Coast after Hurricane Katrina, the worst natural disaster in American history; LSU now had the unique opportunity to host deserving students and a professor adjusting to life after the worst school shooting in U.S. history.

To select the most worthy candidates for the tribute, the Virginia Tech Chapter of Chi Epsilon Engineering

Honors Society was contacted. Eight students and one professor from the Virginia Tech Department of Civil were chosen to attend what one student described as, "An incredible bonding experience for my group. I didn't know what to expect when we accepted ya'lls invitation to come down, but you blew any expectations that I had away." This group included many of the victims' closest academic friends as well as three out of the four survivors of the hydrology classroom shootings. Dr. Randy Dymond was chosen as the professor to attend due to his warm actions as a fatherly-figure for the group following the horrific event. Dr. Dymond was also instrumental in deciding the most appropriate and enjoyable destinations and activities for the group during their visit.

On Thursday, September 6th, 2007 the guests arrived in New Orleans and spent the night at the Sheraton Hotel on the revitalized, historic Canal Street. Friday morning they were joined by a group of LSU students for a tour of Katrina Rebuilding efforts given by the U.S. Army Corps of Engineers. This was a true highlight of the trip due to the first-hand experience of Katrina devastation and rebuilding, a keen interest and curiosity of many aspiring Civil and Environmental Engineers. A typical New Orleans cuisine lunch in the French Quarter at Landry's Seafood House followed by beignets at Café Du

continued on page 4

LSU Virginia Tech Tribute *cont.*



Virginia Tech guests in front of St. Louis Cathedral in New Orleans



Left: Chair standing with Chi Epsilon President Stuart Adams with a memorial from Virginia Tech. Right: Virginia Tech entertaining the crowd at Saturday's game.

Monde preceded a mid-afternoon trip from New Orleans to Baton Rouge. Upon arriving in Baton Rouge, the group head to home of Professor John Scalzo, a Virginia Tech Alum, currently teaching for the LSU Department of Electrical and Computer Engineering. Here the guests were welcomed to the familiar Chicago Maroon and Burnt Orange Virginia Tech colors with the delightful aroma of Cajun cooking. A couple of the students had trouble adjusting to Louisiana's over indulgent tendencies towards spicy foods; however, the casual conversation was well received.

Saturday morning began at the LSU Christian Student Center for a hearty breakfast and casual game predic-

tion conversations. To solve any prediction disputes we headed toward the LSU Parade Grounds to hear the ESPN College Gameday Crew's "professional" opinion of what we would see that night. After Lee Corso claimed, "God must be a Hokie," but put on an LSU Tiger head, we decided to walk around campus visiting various tailgates. At 3 P.M. the group headed to the Maddox Field House for the Virginia Tech Alumni tailgate and an oasis from the constant, mild-mannered "Tiger Baits."

The guests spent Saturday night under the lights of Tiger Stadium watching a clash between two potential BCS contenders. Despite the lopsided loss for Virginia Tech, the group voiced their excitement for

Freshman QB Tyrod Taylor's future, awe of LSU's team, and gratitude for being able to attend the game and tribute. Early Sunday morning, the Virginia Tech students and professor flew back to Blacksburg after an enjoyable weekend that they will, "Never forget."

Substantial fundraising efforts to fund this memorable tribute were an essential key to the Tribute's success. We would like to thank the following companies for their outstanding donations and support: The Baton Rouge Chapter of the American Society of Civil Engineers; The LSU Department of Civil and Environmental Engineering; La Carreta Mexican Restaurant of Baton Rouge; CH2M Hill; EDG Consulting Engineers; ABMB Engineers, Inc.; The LSU Alumni Association; Linfield, Hunter, and Junius, Inc.; The LSU Tiger Athletic Foundation; The Virginia Tech Alumni Association; and Raising Canes Chicken Fingers, Inc. Further, this would not have been possible without the support of the following individuals: LSU Senior Associate Athletic Director Herb Vincent; Dr. George Voyiadjis; Dr. Randy Dymond; Janet Labatut; Trisha Lawhon; Dr. Sherif Ishak; The Durhams; The Smiths; The Tufts; The Drewes; The Juneaus; Adam Toups; John Scalzo and Family; Alexandra DeBrock; Allan Bagents; Bradely Tolar; Josh Reaves; Antione Jefferson; Holden Wright; Amanda Hamlin; and Taylor Persac.

Also thanks to the hard work of the following Student Organizations and its leaders: Chi Epsilon at LSU- President, Stuart Adams; Vice President, Christopher Siverd; Advisor, Dr. Clint Willson; the American Society of Civil Engineers at LSU- President Lauren Johnson; Vice President, Bridget Scheyd; Advisor, Clifford Mugnier; and Tau Beta Pi at LSU- President, Megan Drewes; Advisor, Dr. Clint Willson!



BR Branch of ASCE Holds Monthly Luncheon at LSU

The Baton Rouge Branch of ASCE held its monthly luncheon at LSU's Germano Center on October 18. Department of Civil and Environmental Engineering chairman George Voyiadjis and faculty members John Pardue and Sherif Ishak provided brief updates on recent departmental news. Key items included the proposed Coastal Engineering advanced degree program, the department's recent recognition as one of eleven campus "Foundations of Excellence Programs," and the current status of the departmental undergraduate programs. In addition, the Branch heard from the LSU ASCE student chapter president Lauren Johnson. The featured luncheon speaker was Barry Erwin of the Council for a Better Louisiana who spoke on "Election 2007—A New Direction for Louisiana?"



Alumni Highlight: Dr. William Golz

CEE alumni Dr. Golz's research describes how soluble chemicals cross natural interfaces between two distinct materials such as layered hydrogeological strata or from a bulk liquid into a bacterial biofilm. The behavior of solutes as they cross such boundaries has been poorly understood and a subject of much equivocation.

The focus of Dr. Golz's dissertation was the application of continuum mechanics in a mathematical proof showing that there is only one set of correct boundary conditions for a governing equation which is very general in nature. Physical applications of my work have included improvements to biological nitrification in aquaculture systems which provide food fish and determining how contaminants like those released following hurricane Katrina will behave as they travel through Louisiana's estuaries and coastal marshes in the decades to come.

As a continuation of his research, Dr. Golz conducts peer-reviews for scholarly journals for original contributions on numerical modeling and partial-differential equations and am currently working on a series of publications which summarize and extend his work on par-

tial-differential equations. His research was recently employed in studies focused on providing better understandings of how drugs cross cellular membranes and why bacterial biofilms demonstrate increased antibiotic resistance.

The research conducted by Dr. Golz at LSU on numerical modeling for biofilters used in aquaculture are available on his web site <http://mysite.verizon.net/res6m3ph/> and in the permanent archive of the National Sea Grant Library <http://nsgl.gso.uri.edu/search/>. The papers resulting from his Ph.D. research on partial-differential equations describing contaminant hydrogeology are also available on his web site <http://mysite.verizon.net/res6m3ph/> and Los Alamos National Lab's permanent archive http://arxiv.org/multi?group=grp_math&%2Ffind=Search.

After earning his Ph.D. at LSU and working for LADEQ for a short time, Dr. Golz moved to Tampa, Florida. He now lives in Fountain Hills, Arizona with his wife Annette Tatman Golz and 10-year old son Will. Dr. Golz teaches high school physical and earth science and enjoys hiking the Grand Canyon and Southeast Utah's canyon country.

Did you know?

The CEE website www.cee.lsu.edu now has an **alumni guest book** that allows alumni to post their most up-to-date information. Please take the time to visit the guest book and add yours. We enjoy hearing from our treasured alumni!

Alumni: We want to hear your news!

We would like to thank the treasured alumni who forward up-to-date information and addresses. Please use the form on the back page to make your submission. Also, please visit our website www.cee.lsu.edu to sign our new Alumni Guestbook. We look forward to hearing from you!



CEE Annual Faculty Retreat



On August 21st, faculty and staff from the CEE department gathered at the Lod Cook Alumni Center for the department's annual faculty retreat. Led by Dr. Voyiadjis, Department Chair, attendees discussed the past year's departmental accomplishments and strategic planning for the upcoming year, while enjoying food and beverages. The

daylong session included topics in the areas of undergraduate planning activities, vision for graduate education, research endeavors, ABET visit requirements, fund raising, and more.

Also, in between scheduled faculty discussions, several guest speakers attended the retreat. After opening remarks by the chair, Dr. Zaki Bassiouni, Dean of the Col-

lege of Engineering, congratulated the faculty on becoming a Foundation of Excellence Department and gave a presentation that included key points of the college's mission and resources critical to accomplishing that mission. Following the Dean, Don Eisenberg, Associate Director of Development, spoke to the group about fund raising for the department and the Forever LSU Campaign. Shortly after, Ronald Rodi, Chairman of the CEE External Advisory Board, spoke of the role of alumni, friends and industry vis-à-vis CEE. To close the day, Dr. Brooks Keel, LSU's Vice Chancellor of Research, spoke of the role and expectations of CEE in research and also the potential focus areas of that research. Finally, closing remarks were given by the chair to wrap up a long and productive day.

This year's retreat was an overall success. Ideas were generated and discussed, goals were established and the attendees enjoyed the opportunity to relish in the past year's accomplishments.

CEE External Advisory Board Meeting

On Friday, November 9th, members of the CEE External Advisory Board met for their annual board meeting at Patrick F. Taylor Hall. Speakers included Ron Rodi, Dean Zaki Bassiouni, Vice Provost Chuck Wilson, Sherif Ishak, D. Dean Adrian, Don Eisenberg and Q. Jim Chen.

Ron Rodi, chair of the board, welcomed attendees. Zaki Bassiouni, Dean of the College of Engineering, addressed the board regarding goals and current issues of the college along with answering questions from the board members. LSU Vice Provost Chuck Wilson spoke about the new Coastal Engineering program, the Coastal Advisory Council and multi-disciplinary hires. Following the Vice Provost's address, attendees enjoyed a tour of lab facilities and then a brief lunch break. After lunch, Sherif Ishak, CEE Undergraduate Coordinator, and D. Dean Adrian, CEE Graduate Coordinator, both made presentations to the board regarding new developments and accomplishments in each office. Wrapping up the day, Q Jim Chen, coordinator of the new Coastal Engineering program, made a presentation and then CEE Chair George Voyiadjis thanked all for attending and participating in yet another successful CEAB meeting.

First American Academy of Mechanics Conference

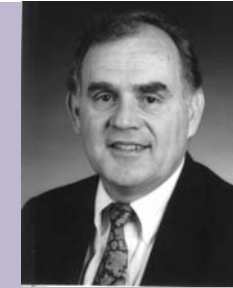
On June 17-20, 2008 the Inaugural Conference of the American Academy of Mechanics will be hosted in New Orleans, Louisiana. Following this conference this event will be hosted in the USA every four years to coincide with the ICTAM conference. This meeting will help the mechanics communities with applications in solids, fluids, bio, etc. to interact and set new challenging concepts and refinements in the existing areas of Mechanics.

This conference will be on all topics addressing mechanics of fluids, solids, biomechanics, macro-, micro- and nano-mechanics, etc. This addresses both Characterization and Assessment of Systems and will cover a broad

spectrum of topics in solid and structural mechanics, materials, and fluid mechanics.

The First AAM international organizing committee, invites you to participate in this important inaugural conference. If you are interested in presenting work at this conference, the deadline for submitting abstracts electronically through the "Author Center" is December 1, 2007. If you would like to organize a mini-symposium in your area of research, please also see the website for a list of topics.

For more information about the conference, please visit <http://firstaam2008.lsu.edu>.



Dr. Avent Retires After 25 Years

Dr. R. Richard Avent, C.W. Armstrong Distinguished Professor, retired in 2007 from the Department of Civil and Environmental Engineering after 25 years of service.

Avent received his Ph.D. in Civil Engineering from North Carolina State University in 1970. Prior to LSU, he taught at the Georgia Institute of Technology and Mississippi State University. Avent joined LSU's CEE department in 1982 and served as department chair from January of 1990 until August of 1998.

While at the University, he has had consistently funded research programs from state, federal, and private sources. His earlier research was related to the analysis and design of long span structural systems. Then, in the mid 70's, Avent began research on repair and rehabilitation of structures.

Avent's development of the epoxy repair method for timber structures was recognized by ASCE when they pre-

sented him the 1995 Innovative in Civil Engineering Award. His research in this area also was included in ASCE's manual on Repair and Upgrading of Timber Structures and the *Wood Engineering and Construction Handbook* published by McGraw Hill.

His work on the use of heat straightening to repair damaged steel structures has been incorporated as a standard repair procedure and also led him to receive the 1991 Arthur Wellington Prize awarded by ASCE.

Another major area of his research includes the repair of bridges. Avent has supervised and conducted over 2000 underwater bridge inspections which led to his design of innovative repairs for critically damaged girders. Avent also wrote the chapter of Underwater Bridge Inspections for *FHWA Bridge Inspections Training Manual 90*.

The CEE department would like to thank Dr. Avent for his outstanding service to the department and to the field of Civil Engineering.



Dr. Singh Retires After 25 Years

Dr. Vijay Singh, Arthur K. Barton Endowed Professor, retired in June of 2006 from the Department of Civil and Environmental Engineering. Dr. Singh is a world-renowned scholar and researcher in the field of hydrology and water quality. His work on watershed

modeling is well known in the field of hydrology. He holds doctorates in civil engineering and engineering from Colorado State University and the University of the Witwatersrand, Johannesburg, South Africa. Before coming to LSU in 1981, he taught at Mississippi State University, George Washington University, and the New Mexico Institute of

Mining and Technology. He was a Fulbright lecturer in Austria from 1997 to 1998.

In a career that spans over 30 years, Dr. Singh has more than 300 books, book chapters, journal publications, and reports to his credit. His work has been presented at conferences all over the world, including Canada, Kuwait, Italy, India, Mexico, the Republic of Georgia, as well as throughout the U.S. He has held visiting professor appointments in Australia, Belgium, India, Italy, Singapore, South Africa, Sweden, and Switzerland, and has been elected as a fellow or member of a number of prestigious scientific organizations world-wide.

Dr. Louay Mohammad was highlighted in an article titled "*Scholarships Fuel Interest in Asphalt -- Louisiana a Model for States*" which appeared in the September/October 2007 issue of *HMAT* magazine, published by the National Asphalt Pavement Association. The article features a scholarship program through the National Asphalt Pavement Association Research and Education Foundation (NAPAREF). This scholarship program, which has awarded 65 scholarships to LSU civil engineering and construction management students since 1994, is fueled by contributions from Louisiana contractors and has served as a way to promote the hot-mix asphalt industry to undergraduate students. Dr. Mohammad is quoted as saying that the program is "very positive" and has greatly benefited students who go on to jobs in both the private and public sectors of the industry.



Are Our Bridges Safe?



Dr. Steve Cai

The highway infrastructure is an important asset of national investment. Bridges are designed to last for decades. Extreme events, aging of materials, varying harsh environmental conditions, etc. lead to accelerated structural deteriorations. Recent studies concluded that the average age of bridges has reached 40 years and about 25% of the 600,000 bridges in the country are classified as structurally and/or functionally deficient, and more than \$200 billion will be needed to eliminate these deficiencies. The tragedy of I-35W Bridge in Minnesota has certainly served as a wake-up call for the nation to re-examine the practice of bridge construction, inspection, and research.

This recent tragedy of bridge failure also posted a question from the general public: Are we safe to drive on bridges? For example, there are many major steel bridges crossing the Mississippi River in Louisiana. A catastrophic failure of any of these bridges will be a disaster for the state. For this reason, Dr. Steve Cai was interviewed by the ABC/WBRZ News 2 Louisiana. His answer is yes but more reliable performance monitoring/inspection measures are desirable and it is possible to prevent such an event in the future.

“The tragedy of I-35W Bridge in Minnesota has certainly served as a wake-up call for the nation to re-examine the practice of bridge construction, inspection, and research.”

In the current practice, America’s bridges are inspected every two years by trained and certified

bridge inspectors. When deterioration is observed, corrective actions are taken and the inspection might be more often than the 2-year cycle. Every state conducts a thorough and continual bridge inspection and rehabilitation program. The bridge failure probability is actually very small. With that said, the national bridge infrastructure is not sufficiently funded and the overall bridge condition is in a grade of C.

Towards the goal to make bridges safer, Dr. Steve Cai’s research group has been working on bridge nondestructive performance evaluation, bridge instrumentation and monitoring, bridge dynamics/aerodynamics and vibration control, and new/smart material applications. These research are Supported by the National Science Foundation, National cooperative Highway Research Program (NCHRP), Federal Highway Administration, LaDOTD/LTRC, Louisiana Board of Regents, etc. The most recent development in Dr. Cai’s research group is to use the Acoustic Emission and fiber Optical Time Domain Reflectometer (OTDR) technology for bridge crack/defect detection.

Fiber-optical-cable-based OTDR technology features in the distributed sensing ability (meaning the whole cable works as a sensor that can monitor a large area, instead of traditional isolated sensors that can only monitor a few points), very small size (mm in diameter, which can be con-



veniently applied to congested places such as the neighborhoods of welds, structural joints and connections that are critical for the integrity of structures), and durable (It can last for several decades in the field conditions). All these features will make it ideal for built structures in harsh environments, such as highway bridges, buildings, pipelines, and gas and oil facilities.

While OTDR technology has been widely used in optical telecommunication industries, its applications for crack monitoring of steel structures have not been explored. For example, the OTDR meter is routinely used to check if a fiber optical cable is broken or not by the staff at the LSU Office of Telecommunications. If the cable breaks or bends, then the light cannot pass the cable smoothly, from which one can tell if the cable breaks or not. Fig. 1 shows the three typical failure modes of the cable. The deformation or break of the cable will result in a power loss of the reflection light. This feature can be used to monitor if there are cracks in a structure by bonding the cable on to structure members. Once the crack in the structure initiates, the optical fiber needs to bend to maintain its continuity with the structure. The bend will induce loss of light power from the fiber core to the surroundings. As a result, the transmitted light in the fiber core, as well as the backscattered optical signal, will both exhibit a sudden drop across the crack and is detected through the OTDR system, indicating a crack.

After the relationship between the crack width and the power loss is established, the OTDR-based crack monitoring system will be ready for the real application as shown in Fig. 2. Crack sensing optic fibers are attached on the interested locations of structures in questions. These optic fibers are connected to a fiber optic switcher, through which all these sensing optic fibers are connected to the OTDR system. The measured data will be processed through Data Processing Center automatically. Further applications will be expanded to gas and oil industries, such as offshore oil platform structures and pipelines shown in Fig. 3.

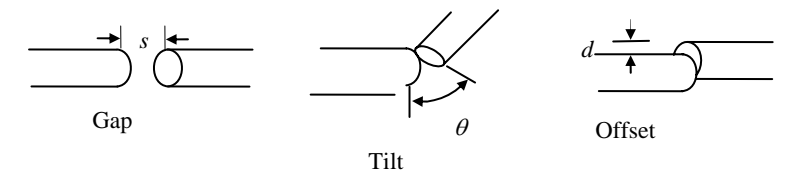


Fig. 1 Three Typical Break Modes of Fiber Optic Cable

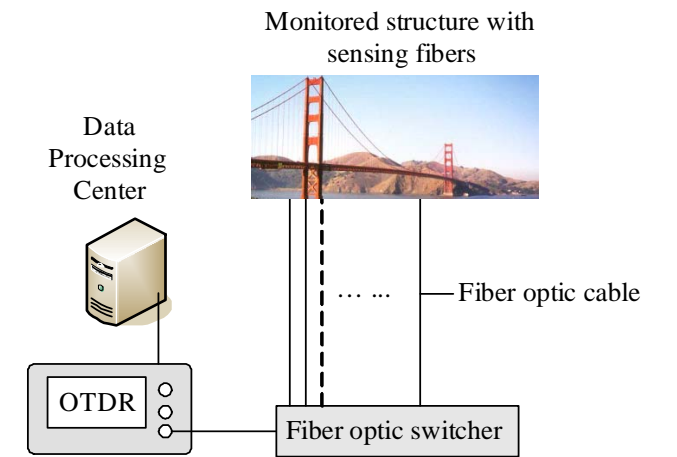


Fig. 2 Online application to bridges

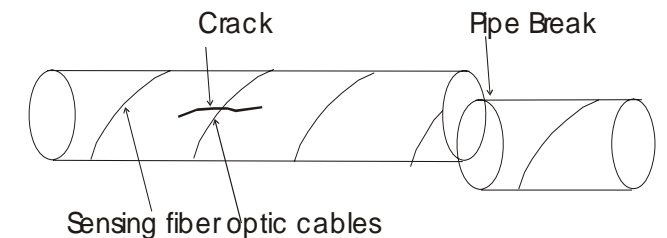


Fig. 3 Application to pipelines

Happy Holidays from CEE!

The Department of Civil & Environmental Engineering has the privilege of being one of the most ethnically diverse departments at LSU. With that brings an array of different cultures and belief systems. The holidays are as perfect a time as any to celebrate our department’s wonderful diversity! Our department would like to wish you and your family a safe and happy holiday season.