

blueprint

SPRING 2012

THE ENVIRONMENTAL IMPACT OF GRAPHENE

CEE'S DEBORA RODRIGUES
WINS NSF CAREER AWARD

- CEE ENHANCES GRADUATE PROGRAMS WITH NEW COURSES
- HSU REGOGNIZED WITH ACI'S HIGHEST HONOR
- CEE ACADEMY INDUCTIONS



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blueprint

blueprint is published biannually by the University of Houston Cullen College of Engineering, Office of Communications.

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Chair's Message



Abdeldjelil "DJ" Belarbi

Chair, Dept. of Civil and Environmental Engineering

Dear CEE Alumni and Friends,

Welcome to the Spring edition of blueprint. The Civil and Environmental Engineering (CEE) department continues to thrive and develop into a Tier One department through its talented group of faculty, staff, students, and outstanding alumni. This newsletter conveys some of what we were able to achieve in the last two years by building on existing strengths and looking at new horizons.

Two years ago, the CEE department had 13 faculty. Now we are at 22 and heading to a goal of 30 by 2014. We had one NAE member; now we have three and are working on hiring a fourth one. Our Ph.D. student population was at 35; now we are at 56 and heading to a goal of 100. Our talented faculty, working side by side with their graduate students, continues to produce groundbreaking research and publish their work in respected journals at a rate of three journal papers per faculty per year in addition to numerous books. We have restructured our staff positions and duties to serve the department more efficiently to support our growth and expansion.

CEE continues to thrive and develop into a Tier One department through its talented group of faculty, staff, students, and outstanding alumni.

While building on existing strengths in structural, environmental, geotechnical and hydro-systems engineering, we have engaged in new research fields including airborne laser mapping, materials and computational mechanics, have added eight faculty in these areas, and have established a new center: The National Center for Airborne Laser Mapping (NCALM) and one new lab: Advanced Material

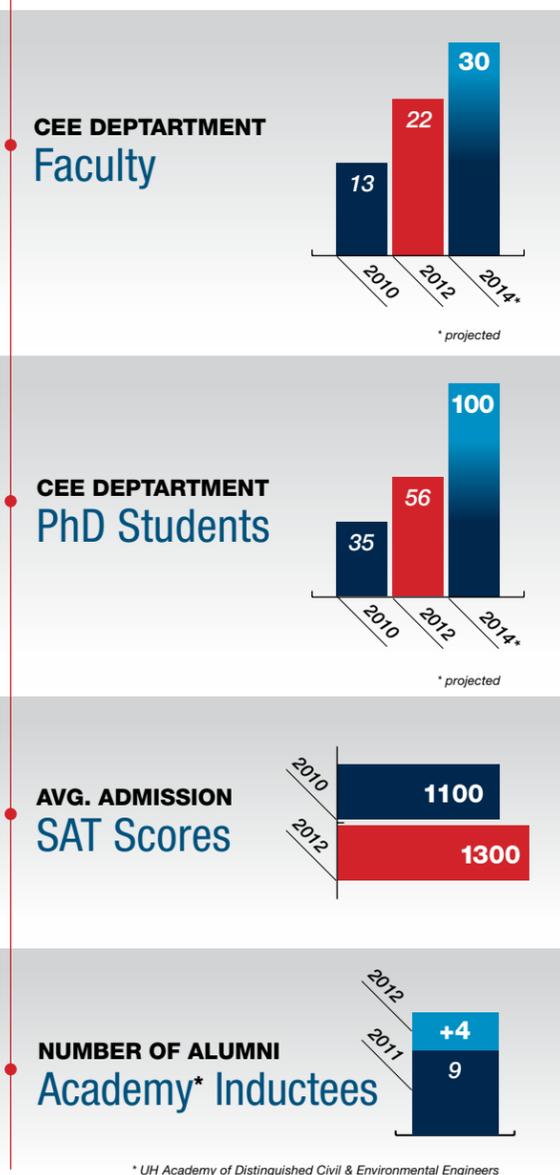
Imaging and Testing Lab. We continue to improve our facilities, update our undergraduate and graduate curricula, and raise the standards for educating our students. In fact, two years ago the admission SAT scores for our undergraduate students was 1100. The students admitted for fall 2012 are averaging more than 1300. Research expenditures increased by 25 percent, and this year the department received more than \$14 million in new grants and projects.

As you may know, we established the Academy of Distinguished Civil & Environmental Engineers. Thirteen extremely decorated members have been inducted to date; nine in April of 2011 and four in April of 2012. This new organization of distinguished alumni will add a new dimension to the CEE department by helping the university and department achieve prominence in civil, and environmental engineering.

It is my honor to continue serving as the chair of this exceptional department, and we sincerely thank faculty, staff, students and alumni who continue to support the department in so many ways to achieve national prominence. Special thanks go to our alumni for being supportive of our many departmental initiatives. Without their support, we would find it challenging to continue with our growth and provide a world class educational experience and environment. We are always happy to hear and share updates from you, and I look forward to bringing you more success stories in our next edition.

At A Glance

A quick rundown of the Department of Civil and Environmental Engineering's (CEE) latest facts and figures.



CEE Enhances Graduate Programs with New Courses

New and revamped courses for fall 2012 in Civil and Environmental Engineering graduate programs address the needs of current trends in the field.

SURVEY MEASUREMENTS AND ANALYSIS

This is a core course of the Geosensing Systems Engineering and Sciences (GSES) graduate program. The course addresses the analysis and adjustment of survey observations by least squares technique. Students will be exposed to basic principles of probability, propagation of errors, weights, least squares, adjustment, and optimization methods.

About the Instructor

Dr. Ramesh L. Shrestha holds a joint appointment as professor in Civil and Environmental Engineering and the Department of Earth and Atmospheric Sciences, College of Natural Sciences and Mathematics. He is the Principal Investigator and Director of the NSF-funded National Center for Airborne Laser Mapping (NCALM). His teaching and research experience include geodesy, adjustment computations, LiDAR, and airborne digital mapping.

THEORY OF PLATES AND SHELLS

Classical theories of plates and shells based on Love-Kirchhoff hypothesis. Solutions for plates with various boundary and loading conditions; membrane and bending behavior of shell structures; modern and numerical approaches to the analyses of plate and shell structures.

About the Instructor

Dr. Kye Han is an associate professor. He has research interests in shell structures and was the principal investigator in several funded research projects on this subject. He has published numerous papers and book chapters related to shell structures, and has taught many courses in this area.

COMPUTATIONAL MECHANICS

The primary objective of this advanced course is to study additional concepts in the finite-element analysis and the application of these concepts to advanced topics, including nonlinear finite element formulations of problems in engineering and applied science. The course provides both the formulative and computational backgrounds necessary to solve nonlinear problems of structural mechanics, solid mechanics, heat transfer, and fluid mechanics.

About the Instructor

Dr. Kalyana Babu Nakshatralla is an assistant professor. His research interests include mathematical formulation and analysis; development of computational techniques for problems in structural, solid, and fluid mechanics; and scientific computing.

CONSTITUTIVE MECHANICS

This course covers the mechanics of constitutive modeling of engineered materials. The main topics are mechanical properties of infrastructure materials and their implementation in a "constitutive driver" to simulate the material response behavior for general load histories in 3D.

Besides the fundamental aspects of nonlinear elasticity and plasticity, the course will examine rate dependence in form of viscoelasticity and creep/relaxation and the effect of aging in the form of damage of stiffness and degradation of strength due to mechanical and environmental softening.

About the Instructor

Dr. Kaspar Willam is a Distinguished Cullen Professor of Engineering with extensive experience in the field of constitutive modeling. With over 160 publications he is the recipient of several awards, and serves as Chief Editor of the Journal for Engineering Mechanics of the American Society of Civil Engineering. He was elected to the National Academy of Engineering in 2004.

HIGH PERFORMANCE INFRASTRUCTURE MATERIALS

This course will cover design fundamentals and applications of high performance infrastructure materials ranging from cementitious composite materials, to high performance steel, to smart multifunctional materials. Emphasis will be placed on high performance cementitious composite materials which, by reducing the brittle nature of concrete, have opened a new world of possibilities to enhance the safety, durability, and sustainability of the next generation of civil infrastructure.

About the Instructor

Dr. Mo Li is an assistant professor. Her research focuses on creating and implementing innovative material technologies, e.g. smart multifunctional fiber reinforced cementitious composites, for protective and resilient built environments. Her research group engages in interdisciplinary research linking composite material science, biomimicry, structural health monitoring, and industrial ecology to develop and implement new sustainable concrete infrastructure materials and systems.

For more information about these and other classes, visit cee.egr.uh.edu

New Staff

The addition of two new staff members contributes to the substantial growth of the Department of Civil and Environmental Engineering.



Elaine Gildea is CEE's Executive Secretary to the Chair. She was born and raised in a suburb of Detroit, MI. Her father retired from Ford Motor Company the year she graduated from high school and she moved with her family to Tucson, AZ. She has been an administrative assistant/executive secretary for her entire career, working for laboratories, the Boys and Girls Clubs of America, Kaman Aerospace, the City of Yuma Planning Department, and most recently the UH Law Center. Gildea moved to Houston, TX in 2007. She spends her free time reading books and singing in her church choir, as well as being the leader of the Youth Praise Band at her church.



As the new CEE Academic Advisor 2, **Justin Burton** will primarily advise graduate students. He was born in Livonia, MI but grew up in Cape Coral, FL. He graduated with a bachelor's in Psychology in 2005 and a Master of Social Work in 2008. He also married his wife Isabel in 2008. Burton moved to Miami, FL shortly after and began working at Florida International University for three years, where he advised undergraduate students. He and his wife then decided to move to Houston, where he enjoys outdoor activities, travel, TV, movies and a good book.

Report Examines Cracking and Fatigue in Highway Illumination Poles



Mina Dawood

Mina Dawood, assistant professor of civil and environmental engineering, has published a report outlining factors that contribute to cracking of high mast illumination poles during fabrication. The report also provides strategies to prevent cracks from occurring. High mast illumination poles, ranging from 100 to 175 feet tall, are typically used at major highway interchanges in urban areas. There have been accounts across the U.S. of pole failure, presumably due to wind-induced fatigue. Most of these failures start with cracks near the area where the pole is welded to a base plate and connected to a concrete foundation. These cracks first form during fabrication, when poles are galvanized.

The Texas Department of Transportation (TxDOT) gave Dawood a one-year \$50,000 grant to study the

problem through computer simulations and analysis of existing data. Dawood considered many factors that impact pole life, including pole designs, pole fabrication processes, wind speed regimes, the presence of a ground sleeve that reinforces the pole at its base; and wind and terrain conditions specific to the state's five major urban areas of Austin, Dallas/Ft. Worth, El Paso, Houston and San Antonio.

Dawood's report identified pole fabrication practices that were most and least likely to induce cracking during fabrication, as well as pole configurations that were most susceptible to wind-induced fatigue in certain conditions. The report also identified a significant factor of the 'safe' serviceable life of a pole with a pre-existing crack: the presence of a ground sleeve.

NASA Grant Funds Congo River Basin Research



Hyongki Lee

Hyongki Lee, assistant professor in civil and environmental engineering, won a \$663,000 grant from NASA to study the Congo River Basin, the second largest river basin in the world with a surface area of approximately 2.3 million square miles. Its remote location and political instability in the region have prevented geoscientists from gathering even the most basic information about the basin: How much water exists in its wetlands? Is most of this water from direct precipitation, river flooding or upland runoff? How much of the basin is wetland? Lee's research will give a better understanding of everything from regional climate to greenhouse gas emissions.

Lee will combine and process unanalyzed data already collected from satellites operated by the European Space Agency, the Japan Aerospace Exploration Agency and NASA. These satellites have gathered data through optical sensing of the region, radar topography and the creation of gravity maps, which show areas of the earth with significant mass change due to terrestrial water storage change, such as in tropical rainforests. Combining multiple types of data from different satellites is basically unheard of in hydrologic research, Lee noted. If successful, this work will provide investigators with an entirely new method for studying areas of the planet that are otherwise inaccessible.

Rodrigues Wins NSF CAREER Award

by Toby Weber

Debora Rodrigues, assistant professor of Department of Civil and Environmental Engineering, has won a prestigious CAREER Award from the National Science Foundation.

CAREER Awards are given to junior-level faculty with the goal of helping them launch successful research and educational careers. Among the most prestigious awards in the STEM fields (science, technology, engineering, mathematics), the CAREER grants are among the handful of awards that are factored into the official Top American Research University Rankings.

The grant, worth up to \$450,000 over a five-year period, will allow Rodrigues to study the environmental impact of nano-scale materials that utilize graphene, single-atom thick sheets of carbon. Graphene has several properties that distinguish it from essentially every other known material. It is the first two-dimensional material ever developed; the world's thinnest and strongest material; the best conductor of heat ever found; a far better conductor of electricity than copper; it is virtually transparent; it has the ability to kill microbes that it comes in contact with; and is so dense that no gas can pass through it.

While these characteristics make graphene one of the most promising nanomaterials in existence, its impact on the environment is unclear. "The nanotechnology industry is growing exponentially. They're finding so many new applications. We need to be careful about what we are producing and releasing to the environment," said Rodrigues.



photo by TBS Photography



Debora Rodrigues

One of Rodrigues' goals is to explore whether and how nanomaterials impact bacteria that are essential to the treatment of wastewater. Since graphene that makes its way into wastewater treatment plants could end up killing these bacteria, it is important to know acceptable graphene levels, she said. Finding this out will require extensive fieldwork, including trips to Houston-area wastewater treatment plants to collect samples for lab experiments.

"These environmental samples tend to be very complex in the sense that they have different water chemistries, temperature changes, and many other environmental factors acting at the same time," she said. "This might change the material properties and how it interacts with microorganisms. All these environmental factors need to be taken into consideration."

Rodrigues isn't just interested in the environmental ramifications of graphene use. She is also developing technologies that utilize graphene and other nanopar-

ticles, often for the antimicrobial properties. She recently published a paper on an antimicrobial coating she developed that uses 94 percent to 97 percent fewer nanoparticles than similar coatings but is equally effective at killing bacteria.

Rodrigues plans to combine this experimental work with efforts to educate high school science teachers on nanotechnology. She is a co-principal investigator on a Research Experience for Teachers grant from the NSF that will bring teachers into several laboratories, including hers, during summer breaks to participate in research efforts and learn about this emerging field. Ultimately, they will be able to share what they learn with their middle and high school students, she said.

"I want to combine my research with the educational part to give teachers the chance to learn more about the toxicity and the affects of these nanomaterials," she said. "I want to help them learn not just about the applications, but the implications as well."

Hsu Recognized with American Concrete Institute's Highest Honor



Thomas Hsu

Thomas Hsu, the John and Rebecca Moores Professor of Civil Engineering, has been named an Honorary Member of the American Concrete Institute, the highest distinction given by the organization. Hsu received the award at the ACI's Spring 2012 Convention, held in Dallas from March 18-22. In honoring Hsu, the organization cited his "groundbreaking research in the fields of concrete materials and the torsional response of reinforced concrete members and ... outstanding contributions as a teacher and mentor."

Much of Hsu's research in concrete structures has been made possible by the Universal Element Tester (UET). Designed by Hsu and built by his research team in the mid-1980s, this

80,000-pound machine is capable of exerting up to 1,000 tons of pressure in each of four different directions on concrete panels. Thanks to a sophisticated electronic control program, it can apply practically any type of load, including compression, tension, torsion, shear, bending and their combinations.

In 2010, Hsu and fellow civil engineering professor Y. L. Mo published the book "Unified Theory of Concrete Structures," which synthesized roughly 25 years of two- and three-dimensional concrete panel research conducted largely on the UET. These efforts have been especially valuable in understanding shear in reinforced concrete, one of the most complicated topics in the field, Hsu stated.

Rogers Honored for Achievements in Civil Engineering



Jerry Rogers

Jerry Rogers, associate professor of civil engineering, has been selected as a 2012 University of Arkansas College of Engineering Distinguished Alumnus. He was recently honored for his record of exceptional professional and personal achievements at the College of Engineering Alumni Awards Banquet, held in Rogers, Arkansas.

In 2011 Rogers received the American Society of Civil Engineers Environmental and Water Resources Institute's 2011 Lifetime Achievement Award as well as ASCE's 2011 Civil Engineering History and Heritage Award. He has been a very active member of ASCE, earning such recognition as a Lifetime Service Award from the ASCE Texas Section (2009), and being named a National Distinguished Member (2009), a Lifetime

Member (2006) and a National Fellow (1999). Rogers also received ASCE's National ExCEED Leadership Award (2000), the William H. Wisely American Civil Engineer Award (1997), the Award of Honor (1994), the ASCE Texas Section History and Heritage Award (1992), and the National Service to Profession Award (1990). He has also been named Houston Engineer of the Year by the National Society of Professional Engineers/Texas Society of Professional Engineers (1996).

Rogers received a B.S. in civil engineering and an M.S. in water resources and environmental engineering from the University of Arkansas in 1963 and 1964, respectively. He earned a Ph.D. in civil engineering and water resources from Northwestern University in 1970.

Accolades

Reagan Herman, director of the civil undergraduate program and instructional and research associate professor, received a Cullen College of Engineering Outstanding Teaching Award.

Debora Rodrigues, assistant professor of civil and environmental engineering, was awarded the Grants to Enhance and Advance Research (GEAR) award, a competitive grant within the University of Houston that will help Rodrigues develop and test novel, safe and cost effective multi-functional carbon-based nanocomposite coatings with anti-corrosive and anti-microbial properties to prevent both chemical and biological corrosion of metallic surfaces.

Betsy Roguer, CEE department business manager, received the Cullen College of Engineering 2012 Outstanding Staff Service Award and the Civil and Environmental Engineering Outstanding Staff Award.

Kyle Strom, assistant professor of civil and environmental engineering, received a Cullen College of Engineering Outstanding Teaching Award.

Ghazzaly Faculty Achievement Award



The Dr. Osman Ghazzaly Endowed Faculty Achievement Award in Civil and Environmental Engineering in the Cullen College of Engineering was established this spring. Upon announcing his retirement from the department in 2011, Ghazzaly donated \$15,000 toward the establishment of the award to support civil and environmental engineering faculty at UH. Department alumni generously supported the endowment, contributing \$17,000 in additional funds to establish the award. At the annual Academy of Distinguished UH Civil and Environmental Engineering Alumni Awards dinner, Assistant Professor Mina Dawood (above) was honored as the first recipient of the award.



Isis Mejias

Ph.D. Candidate
Environmental Engineering

Isis Mejias, an environmental engineering Ph.D. student under the supervision of Dr. Debora Rodrigues, received a scholarship from the Rotary Club of Humble Intercontinental, allowing her to conduct research at the University of Sao Paulo on techniques to remove heavy metals from water.

The Rotary Club also awarded a \$50,000 grant to Engineers Without Borders (EWB) – Central Houston Professional Chapter, owing to Mejias' efforts. The grant will provide for the installation of a water distribution system in Maseno, a town in western Kenya. "My involvement with EWB inspired me to go into the environmental field, especially water quality and treatment projects," she said. "It pushed me to leave my job as a process engineer and decide that I want to work in environmental projects, and perhaps do something greater with that at an international level because it's one of my passions."

In honor of her outstanding achievements, Congressman Ted Poe (left) presented Mejias with the US flag that was flown over the capitol on December 14, the day that she received her citizenship, at a recent Rotary Club meeting.

Student News Roundup

Concrete Canoe Team Places Third in Competition

The UH chapter of the American Society of Civil Engineers participated in the concrete canoe competition at the 2012 Texas-Mexico Student Regional Conference in San Antonio in April, taking third place overall. The UH team's entry named HOPE was dedicated to raising awareness of breast cancer. Over 25 UH students were involved in various aspects of the competition, which comprised a design paper, an oral presentation, the final product of the canoe, and five paddling race categories. UH was the only school to win a top-three award in each category.

CEE Scholarships Support Academic Excellence

Senthil Puliyadi, a former graduate student of department chair Abdeldjelil Belarbi from the University of Missouri-Rolla, has generously funded the

Puliyadi-Belarbi Graduate Assistantship in Civil Engineering, to be awarded to a student pursuing a graduate degree in infrastructure in the UH Department of Civil and Environmental Engineering.

This year's recipient of the American Concrete Institute scholarship is Kim Pham '12. This scholarship is awarded annually to an outstanding junior or senior who demonstrates the potential for success in the concrete industry. It is supported by the ACI Houston chapter as a gift to the University.

UH Hosts Regional Steel Bridge Competition

The University of Houston American Society of Civil Engineers student chapter hosted the Texas-Mexico Regional Steel Bridge Competition in January at the Pasadena Convention Center. Eleven universities from Texas and Mexico competed in the event and UH came in 9th place over-

all. The head judge complemented UH ASCE for putting together the best-run steel bridge competition he had ever seen. The success of this event was made possible through the hard work of 17 students and 1 faculty member: Francesco Bain, Khanh Bui, Roy Cabrera, Hector Handel, Aadit Kapadia, Juan Macias, Kevin Odom (co-chair), Frederic Ma, Ben Mellado, Kim Pham (co-chair), Lynn Quon, Vika Shcherbakova, Hayley Redweik, Silvia Romero, Jonathan Tran, Julio Villalta (co-chair) and Dr. Reagan Herman.

UH ACI Student Chapter Recognized

The University of Houston has been named an American Concrete Institute (ACI) Excellent University for 2011. The UH ACI student chapter was recognized for its level of participation in ACI-related activities, an exclusive honor awarded to only 21 other peer organizations.

CEE Academy Inductions

The Academy of Distinguished Civil & Environmental Engineers welcomed four new members at the second annual Induction and Award Ceremony in April. The following outstanding alumni were selected for their dedicated advancement of the profession, field, the university and society.

John Odis Cobb, P.E., R.P.L.S.

Board of Directors - Cobb, Fendley & Associates

John Odis Cobb, P.E., R.P.L.S. (BSCE '71, MSCE '79) is a member of the Board of Directors of Cobb, Fendley & Associates, Inc., a civil engineering and land survey company he co-founded in 1980. Throughout his career, Mr. Cobb has provided surveying and civil engineering services for public and private sector projects, including engineering services for private utility company projects and developer projects. He has been a civil engineering consultant to local city and county governments for the preparation of plans for waste water lines, water lines, paving, storm sewer and utility coordination projects. Mr. Cobb has served as a board member and president of Houston Engineering & Scientific Society (HESS), board member of Houston Council of Engineering Companies (HCEC), and board member of Professional Engineers in Private Practice (PEPP). He currently serves as a member of the Department of Civil and Environmental Engineering Advisory Board, as a member of the Engineering Dean's Leadership Board and as a director on the Engineering Alumni Board.



Billy M. Cooke, P.E.

Executive Vice President - Klotz Associates, Inc.

Billy M. Cooke, P.E. is the Executive Vice President for Klotz Associates, Inc. His 34 year career began when he received his BSCE from the University of Houston in 1978. He is an active member of NSPE and TSPE. He sits as a member of the Greater Houston Partnership's Transportation Policy Advisory Committee and served as a member of HGAC's Technical Advisory Committee to the Transportation Policy Council for 17 years first representing Harris County. He was appointed to the Planning & Projects Committee of the Gulf Coast Rail District and he was selected to serve as chairman of the Greater Houston Partnership's Transit Planning Committee. Mr. Cooke serves on the Civil & Environmental Engineering Advisory Board at UH, and is a member of the Engineering Alumni Association and has recently received the UH Engineering Alumni Association's Distinguished Alumni Award. Mr. Cooke and his wife, Marsha, have two sons, Brenden and Aaron, and one daughter, Meredith.



D. Wayne Klotz, P.E.

President - Klotz Associates, Inc.

D. Wayne Klotz, P.E. (MSCE '76) is president of Klotz Associates. His 38-year career began with a BSCE from TAMU in 1974 and an MSCE from the UH in 1976. Mr. Klotz is currently vice-chair of the Institute for Sustainable Infrastructure. In 2011, Mr. Klotz was appointed to the Coastal Water Authority and serves as Board President. He served on the Community Resilience Task Force for the Department of Homeland Security. Mr. Klotz served as National President of ASCE in '08-09. He was named the 2011 Texas Engineer of the Year and 2011 Houston Engineer of the Year. He received the ASCE National 2005 Edmund Friedman Professional Recognition Award, the 2004 TAMU Distinguished Graduate of the Department of Civil Engineering. Mr. Klotz is a Diplomate of the American Academy of Water Resources Engineers. He started Endowed Scholarships in Civil Engineering at UH and at TAMU. He married Karen Wilson in July of 1974, and they have four children and three grandchildren.



Jimmie Schindewolf, P.E., R.P.L.S.

General Manager - Harris County Regional Water Authority

Jimmie Schindewolf, P.E., R.P.L.S., received his BSCE in 1967. Mr. Schindewolf is general manager of the North Harris County Regional Water Authority. Prior to joining the Water Authority, he was the Owner's Representative for Reliant Stadium and Minute Maid Park. Mr. Schindewolf spent the majority of the 1990s as Mayor Bob Lanier's Chief of Staff and Director of Public Works and Engineering. He co-founded and was president of Beyer-Schindewolf Construction from 1983 to 1992. Mr. Schindewolf served as Director of Public Works for the City under Mayors Fred Hofheinz, Jim McConn and Kathy Whitmire. He accepted awards as a National Top-Ten Public Works Official and the Houston-area TSPE Engineer of the Year. He received the U of H Distinguished Engineering Alumni Award in 1992. A Scholarship bears his name at the School of Engineering. The Klein School District dedicated Schindewolf Intermediate in 2002. Mr. Schindewolf resides in the Klein-area with his wife Carrie.



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People on the Move

Delvin Dennis (BSCE '80) is now vice-president and director of Texas Department of Transportation (TxDOT) services within Klotz and Associates. Dennis most recently served as the TxDOT district engineer for the Houston district. He was responsible for department operations in Brazoria, Fort Bend, Galveston, Harris, Montgomery and Waller Counties.

Steve Simmons (BSCE '81) has joined Huitt-Zollars, Inc. as vice president and will focus on the firm's highway practice. Simmons will provide the leadership to expand Huitt-Zollars' services in highway planning, design and construction management. He will support the firm's practice that currently serves state highway agencies, toll road authorities, local agencies, design/builders, and public/private partnerships. He served as deputy executive director of the Texas Department of Transportation for the last 10 years.

Joe Zimmerman (BSCE '83) is the new vice president and public works practice manager at Klotz Associates, Inc. He is currently serving his second term on the City of Sugar Land Planning and Zoning Commission and previously served as a Board Member of the Fort Bend County Toll Road Authority. He is the former deputy program manager of Operations at The HNTB Companies.

To submit a note for an upcoming edition of *Blueprint*, email blueprint@egr.uh.edu

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Thank you for continually helping us meet these needs!

2011-2012 UH CEE Lubrizol Foundation Scholarship

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Texas Society of Professional Engineers – Houston Area Engineers Week

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CIVIL AND ENVIRONMENTAL ENGINEERING OUTSTANDING SENIOR

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University of Houston Engineering Alumni Association – Engineers Week Cash Awards

Mamoun Adyel

ENGINEERING, LEAD AND ACHIEVE AWARD (SHELL)

Tania Arauz

ENGINEERING, THE CAPACITY OF THOUGHT AWARD (SHELL)

Yohanna Gomez

CIVIL ENGINEERING VISIONARY AWARD (AECOM)

Chantalle Oyardo

LEGACY OF WOMEN IN ENGINEERING AWARD (EXXONMOBIL WOMEN COUGAR ENGINEERS)

Hayley Redweik

ENGINEERING DESIGN EXCELLENCE AWARD (FLUOR CORPORATION)

Yesiya Tjoe

ENGINEERING DESIGN EXCELLENCE AWARD (FLUOR CORPORATION)

Kristen Torbett

TRANSPORTATION ENGINEERING EXCELLENCE AWARD (TRAFFIC ENGINEERS, INC.)