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ASCE Tackles Design Challenges
ASCE Earns Third in International Steel Bridge Contest

By Adeliza Perez
 Vector Editor

The American Society of Civil Engineers (ASCE), the oldest national engineering society in the US, takes part in two very exciting events every year, Steel Bridge and Concrete Canoe build-offs. These events take a lot of hard work and determination and high expectations are a requirement.

Concrete Canoe is just what it says, a canoe built from concrete. The first competition was held in 1988 and is held in a different location each year, hosted by an ASCE Student Chapter. One of the main objectives of Concrete Canoe is to gain hands-on experience and leadership skills.

The Concrete Canoe team did not compete in Beaumont, TX this year because the concrete pour did not go as planned. Brian Hugman, Concrete Canoe Chair, said, "We used a different mold this year, we used fiberglass instead of styrofoam, which is one of the reasons why it didn't work."

About ten people helped build the concrete canoe. The other Concrete Canoe chair is Chris Wolter and next year's chair is



ASCE's steel bridge won third in a competition in Kingsville, Texas against schools from across Texas and Mexico.

Whitney Lawrence.

Steel Bridge is sponsored by the American Institute of Steel Construction (AISC) and ASCE. This year's regional competition was held in Kingsville, TX on January 13th and UT competed against schools from Texas and Mexico. UT placed third overall and also placed 2nd-Lightness, 4th-Stiffness, 2nd-Structural Efficiency. They will compete next in the national competition on May 27-28 at the University of Utah.

Building something like a bridge is hard work and takes a lot of energy and experience. Basic engineering classes do not show you how to build a structure. Homework is all about plugging numbers into equations and not really understanding the meaning.

Gary Lehman, Steel Bridge Chair, said, "We go through engineering school learning equations that mean absolutely nothing, until you are faced with real life experience. Building the bridge allowed my engineering judgment to sharpen. Coming

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A Letter to the Co-Editor



As my 4th year at UT has come and gone, I've made great friends. Not only a great friend but like a sister is what I have seen in Adeliza Perez.

I met Adeliza in 7th grade in UIL back in Junior High School. Since we lived in neighboring towns, we competed against each other in Journalism and sometimes in Science. I could not understand why this girl (Adeliza) was so friendly with me when we were (I guess you could say) "rivals."

As the years went by and we proceeded into high school, we continued competing against each other in UIL and strangely both joined One-Act Play so we interacted more. She was always friendly and good spirited. Despite it all, I have to admit that Adeliza has always been a more proficient writer. To this day, I love her for that because I have learned from her.

Come Senior year (2002) in high school, we graduated and without knowing each other well, we both attended UT together; Adeliza studying Civil Engineering and me studying Chemical Engineering. Not knowing anyone else, we once again connected and renewed our friendship and became closer.

Throughout all the years at UT, I've left to Co-Op Fall 2004 and Fall 2005 but still I've realized that regardless of where I've been or how little Adeliza and I have spoken, she has always been a true friend.

Now that May is around the corner, I have to wish the best of luck to my dear friend Adeliza Perez who will graduate on May 19. I will be travelling to South Carolina for my final Co-Op and will unfortunately miss her graduation.

Concluding, the best accomplishment at this point in in our lives is a college graduation. I am truly proud of Adeliza because she is a motivated and hardworking girl who has all the determination and potential to succeed in whatever she sets her mind to.

We all have someone in our hearts who has been a consistant and continual inspiration, that has prouded us with a personal example that we can associate with and who motivates us and propels us towards success. Adeliza has done this for me.

Thank you Adeliza for your unconditional friendship and all you have done for me. Since you'll be working in Austin, I hope we still keep in touch and I want you to know you are close to my heart. Congratulations and may all your dreams come true!

- Ludy Quezada, Vector Staff

A Farewell...

By Adeliza Perez
Vector Editor

After four years on the Forty Acres, my time is up; I'm graduating from the University of Texas. These four years have passed so quickly. It seems like just yesterday I came for orientation. UT was at first intimidating because my hometown has a population of 5,000 and my graduating class was 100. At UT, the freshman class was 8,000 and I had classes with more than 100 people. Being around so many different people took some adjustment.

During my years at UT, I have been caught in a thunderstorm where I got soaking wet and my calculator stopped working (I had a Calculus test the next day), taken a friend to the ER, gone to the ER myself, taken memorable road trips, escaped death, found love and learned to change a poopie diaper (I have become an aunt three times over). I have also gotten out schooled on a mountain bike by a 50-year old with a hip replacement, gone to Vegas, the first Texas Rose Bowl, the Big12 Football Championship and the Red River Rivalry.

At UT, I've made so many new friends and have had many adventures that I will never forget. We have had many study sessions and many sleepless nights, but it was all for a good cause.

I interned for the Texas Department of Transportation (TxDOT) for three summers, and that is where I'm headed after graduation. At TxDOT, I worked outside where I worked on my tan and learned a lot about engineering.



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ASCE Wins Competition

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The ASCE Steel Bridge team poses for the camera.

away with the knowledge that anything is possible if you break it up into parts is exactly what they teach you here in school, but this is real life.”

Participating in these two events can be life changing and provide valuable experience in the professional world. It can also help with your leadership skills.

“I became chair of this competition to represent all civil engineering students at UT. The event brings attention to the field of engineering, and it also brings fellow engineers to reflect on what our young engineers are capable of doing,” said Gary.

Engineers Win I2P Competition

By: Stephanie Beckett
Vector Editor

The sixth annual university-wide Idea to Product (I2P) competition held its final rounds April 21-22.

College of Engineering students were well-represented in the teams selected for the last rounds of the university-wide contest, with four out of the ten teams including at least one member who is studying engineering.

The last rounds represented a semester's worth of work for many of the teams. To be selected for the final rounds, the teams had to submit a brief proposal outlining an innovative, marketable new technology during the middle of the semester. The teams that were selected for the final rounds then prepared 10-15 minute presentations to explain and sell their ideas to a panel of judges.

“I2P was extremely innovative and helped us popularize our novel product in a formal manner,” Raghavan Srinivasan, a I2P participant in the final rounds and Computer Engineering graduate student, said. “It was a great and enjoyable experience.”

Raghavan's team, OPTER, was “an all optical router that can process and transmit data at the speed of light,” Raghavan said. The OPTER team also included another Computer Engineering graduate student, Raghavendra Hareesh Pottamsetty.

Another team composed mainly of engineering students

won first in the competition. The team's product was an “Injectable Nano-fabricated Disease Responsive Drug Delivery Device,” and the team members were Abiola Ajetunmobi (Mechanical Engineering), Luz Cristal S. Glangchai (Biomedical Engineering), Shreyas Rajasekhara (Materials Science and Engineering), and Jakub Felkl (Physics).

Their technology was a sophisticated, more effective drug delivery technique to help treat cancer.

“Our technology combines capabilities for precision targeting of disease sites in the body, disease responsive drug release, and simultaneous multi-agent delivery onto a single drug delivery vehicle to achieve more efficient delivery of larger doses of anti-cancer agents to a cancerous cell while protecting healthy tissues from interacting with the potent cancer drugs in the process,” team member Abiola said.

The technology is complex.

“It is basically a nanocontainer with targeting ligands and a stimuli sensitive lid that sequesters a payload/drug inside,” team member Cristal said. “The nanocontainer targets specific cancer cells, goes inside the cell and when the lid interacts with specific cancer enzymes it dissolves to release an immediate dose of the payload.”

The design of the drug limits the negative interference of the cancer drugs with healthy cells.

“Since the device is site-specific and disease-responsive, it doesn't interact with healthy tissues resulting in lower side effects,” team member Shreyas said.

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Earth Slopes and Retaining Walls Around Austin

By Dr. Jorge Zornberg
Guest Writer

Facing ever increasing technical challenges and a vastly expanded technical base, our engineering programs are confronted with the dilemma posed by the need of limiting the range of material that can be covered while, at the same time, meeting the needs of young engineers who should be able to integrate an often fragmented accumulation of analytical tools before confronting real projects as practicing engineers. However, field trips provide fantastic opportunities for direct exposure of our students to the nuances of design and integration of skills learned in basic courses.

On April 20, the students of ce375 'Earth Slopes and Retaining Structures' had the opportunity of integrating much of their formal classroom education in a field trip that exposed them to many of the ongoing major geotechnical structures in Austin. The field visit started at the TxDOT construction site in the vicinity of RM620 with US Route 183. This Project is a new toll road facility that is being constructed by the Central Texas Regional Mobility Authority. The Project is funded through a combination of TxDOT, Federal and local contributions, and toll revenue bonds. The focus of this field visit component was the construction of Mechanically Stabilized Earth (MSE) Retaining Walls and Abutments. MSE walls are externally stabilized fill walls that provide flexible structures capable of sustaining significant loads without structural distress. The key for the good performance of these walls is the presence of reinforcements within the backfill, which are attached to concrete panels at the facing.

The second stop in the visit was Mansfield Dam, along RM620. This is a concrete dam built from 1937 to 1941 by the Lower Colorado River Authority (LCRA) and the United States Bureau of Reclamation, the dam is almost 300 ft high, over 7,000 ft long, and 65 ft thick at the base. The concrete gravity dam with embankment wings and saddle dikes was designed to control flooding; to store 369 billion gallons of water; and to generate hydroelectric power (102 megawatts). Personnel from LCRA provided the students an overview of several aspects of the dam, including the use of instrumentation data (piezometers) that was one of the questions in the recent midterm in the course. Figure 2 shows a view of the downstream facing of the concrete dam, showing a



Above: View of testing facilities at TRI
Below: MSE Wall under construction



view of the electric power plant.

The final stop in the trip was Texas Research International (TRI), where students received a tour of TRI's impressive laboratory facilities. The focus was on the testing of geosynthetics, polymeric materials used in combination with soils. These systems are being used extensively around Austin, particularly for retaining walls in private developments. The active participation of the students facilitated the learning experience throughout the various stages of the field trip, and provided opportunities to learn not only about the course, but also about Austin and professional practice in general.

BME Accreditation Process

By: Katie Glass
Vector Staff

Once again, another year has passed and it is time for another graduation. This year, however, at the undergraduate ceremony for the College of Engineering, a new group of students will be joining the line for diplomas: the biomedical engineers. As a freshman in biomedical engineering, I never experienced a College of Engineering without this unique program. It is easy to forget the small detail that this is the first ever University of Texas Biomedical Engineering Undergraduate Program graduating class. After it graduates a class, the biomedical engineering program is eligible to take another step in its development: accreditation.

Although it sounds very mysterious, accreditation is in actuality a process that all programs in the college of engineering go through every six years, and in fact successfully completed two years ago. The undergraduate biomedical engineering program is currently working on the application for accreditation, which will be turned in to ABET by the end of June. ABET, or Accreditation Board of Engineering and Technology, is dedicated to ensuring that programs meet certain standards of the profession for which they are designed. ABET will spend the fall reviewing our request and then the process culminates in a visit from ABET in November or December of 2006. If it is a success, we will be accredited by spring semester 2007. As soon as the program is granted accreditation, the seniors currently graduating will retroactively be given the status of graduating from an accredited program.

At first read, the criteria for attaining accreditation seem rather vague. For example, in describing the biomedical engineering curriculum: "The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program. The program must demonstrate that graduates have: an understanding of biology and physiology, and the capability to apply advanced mathematics (including differential equations and statistics), science, and engineering to solve the problems at the interface of engineering and biology; the ability to make measurements on and interpret data from living systems, addressing the problems associated with the interaction between living and non-living materials and systems" (ABET Criteria for Approving Engineering Programs, 11). I asked myself, how does one define depth and breadth? I found the

answer to this question and many others with Dr. Jack Hart, the assistant chairman of the department of biomedical engineering.

Mr. Hart assured me that the creators of the BME undergraduate department designed the program with the standards and criteria of ABET in mind, and the department is confident that we will be accredited in the fall. ABET provides a template for the program to complete a self-study, a report of how exactly we are accomplishing the program objectives they outline. Dr. Hart explained that the key to accreditation is "direct measure," that is, hard evidence that the students can perform adequately. The primary method we are currently using to accomplish this is to compile "a representative sample of student work" (Hart) from each biomedical engineering course, and analyze it according to the program objectives. The senior professors review the student work at the end of every semester to assess whether or not the course, whose assignments they designed to effectively teach the program objectives, were successful. Also, to measure student accomplishments, Dr. Kenneth Diller, the Chair of the department, has discussed the program objectives with each graduating senior and received their feedback. Another example of direct measure is to receive feedback on the success of our interns from employers. However, the BME department has not gathered this evidence to include in their self-study. The BME department has a policy of "continuous improvement", in which the faculty and staff are dedicated to making changes for the betterment of the program; the changes they have made in the past four years will be documented in the self-study, evidencing the dynamic nature of the program. The entire BME department has been persevering through this process and hopefully will be prepared to turn in an excellent report in the fall.

Personally, I am not afraid of continuing my education with the BME department at UT even if we do not receive accreditation at this time. Dr. Hart, who has a background in private industry as a recruiter, feels that most companies do not ask whether or not a program is accredited, unless of course they are unfamiliar with the program. Also, medical schools and graduate programs have accepted our seniors this year, showing their confidence in our academics. With the great reputation of the University of Texas behind our program, I do not think we have anything to fear, and I am looking forward to the future development of the undergraduate biomedical engineering department.

For more information, I would suggest visiting:
<http://www.abet.org/>
<http://www.whitaker.org/index.html>

Dr. Peppas Receives National Honor

By Ludy Quezada
Vector Staff

Dr. Nicholas Peppas is a professor of biomedical engineering, chemical engineering, and pharmaceuticals at The University of Texas at Austin. On February 2006, he was elected to membership into the National Academy of Engineering. The National Academy of Engineering examines and reports to the government on engineering topic of interests. Membership to the Academy is very prestigious in the engineering profession. Dr Peppas' induction to the Academy was due to his contribution "on the development of biomedical and drug-delivery applications of polymer (plastic) networks and hydrogels."

Dr Peppas has been at The University of Texas at Austin since January 2003 and has progressed on his research while teaching different courses including ChE 372. He has contributed to 30 international patents with his inventions regarding drug delivery systems and devices. Peppas currently holds the Fletcher Stuckey Pratt Chair in Engineering.

He has received a four-year \$2.1 million grant from the National Institutes of Health to further his oral insulin medication that may improve the treatment of diabetes. In 1999, Dr Peppas published findings discussing his development of a new treatment where insulin could be swallowed instead of being injected. This grant will assist Dr Peppas in perfecting his oral-insulin-delivery device.

Dr Peppas has developed or patented medical devices such as contact lenses that are replaced once a week, intraocular lenses for cataract patients, new materials for artificial heart linings, materials for vocal cord replacement or reconstruction, along with many others.

Other awards that Dr Peppas has received in the previous years include the Founders Award of the Society for Biomaterials in 2005, Elected Member of the French Academy of Pharmacy in 2005, Research Excellence Award for Best Research Paper in 2004, Materials Research Society Graduate Research Award in 2003, along with several awards on his Controlled Drug Delivery Study.

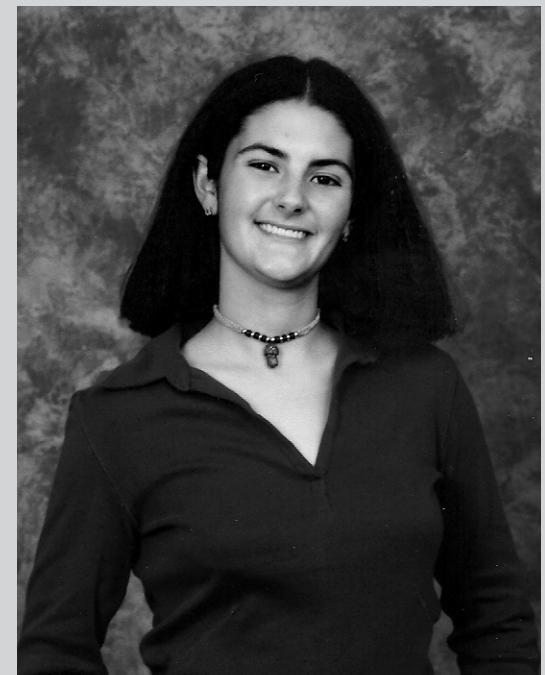
"I look up to Dr Peppas because he is brilliant and cares so much for his students" said ChE student Victoria Diaz. "In various occasions he has seeked students to help them with anything they need to succeed in his class and in the long run as engineers."

Dr Peppas has recently been awarded the Dow Lectureship Award by The American Society of Engineering Education recognizing his research achievements in chemical engineering. He will receive the Dow award in June for demonstrating fundamental theories/principles, demonstrating success as a teacher, and being a well-rounded professor.



Engineering Student Wins National Contest

Kelli Rankin, a second year Petroleum Engineering student, received Honorable Mention recognition in the 2005-2006 Barry Goldwater Scholarship competition. The scholarship is for second and third year science, math, and engineering majors who want to continue to graduate school. Kelli is vice president of the Engineering Honors Council, president of PES (a service organization for honors students), and performs research in nuclear engineering.



UT-SHPE Ends Year with Triumph!

By Roberto C. Silva and Juanita Lopez
Vector Staff

The UT Chapter of the Society of Hispanic Professional Engineers has excelled in athletics, community service, and academics for the 2005-2006 school year.

SHPE co-hosted Hispanic Business Student Association's (HBSA) Patio Mixer, SHPEs and Salsa, for a night of live music and enchantment, and joined the Mexican American Hispanic Professions Organization (MAHPO) for several social gatherings. Manitos-Manitas increased from a four-pair program to a 14-pair program through the scheduling of mentoring time, movie nights, and student-leader bonding. Directors Baltazar Gonzales and Rene Delgado were responsible for increasing and retaining new and old members through this program.

Athletics-the first words that come to mind are probably win, win, and win. SHPE however, took athletics to a different perspective. Athletics became a fun, social, and relaxing event. A time to release stress and bond with others was what members did. Athletic Coordinator, Rafael Navarro, said that "Sports are about having fun. Anytime we have fun, we win as a team no matter the score." In fact, athletics for SHPE members became such a large part of the organization, that Texas A&M and UT decided to form an annual athletic tradition. The Texas A&M and UT SHPE chapters decided to have an annual volleyball, football, and basketball game, as similar to the traditional "Texas Lonestar Showdown". UT took home the "Lonestar Showdown" trophy.

In fact, sporting events became so strong that a regional volleyball tournament was held at the Sub-Regional Outing in February at Louisiana State University in Baton Rouge, LA. UT participated in the southern division and took the regional championship trophy home after defeating Texas A&M, which allowed them to advance to the Region V finals at the University of Arkansas later that semester at the Regional Leadership Conference (RLC).

SHPE received the Outreach/ Community Service Student Chapter Award at this year's National Technical and Career Conference (NTCC) 2006 in Florida. One of SHPE's first community service events consisted of the participation in the Phone-A-Thon that was hosted by the Friends of Alec. Students from UT called prospective engineering students and talked to them about their experiences and information on how to contact people within the University. SHPE also helped the Equal Opportunity in Engineering Office, an office that promotes the advancement of minorities in engineering, with their SAT Workshop. Local area high school juniors and seniors came to UT and participated in a workshop that prepared them for the SATs. In the spring semester, SHPE participated in

the Communities in Schools Program. Mendez Middle School students were paired with a SHPE member who offered assistance with school work and on their go-cart project. After school, the Mendez Middle School students worked on creating go-carts that they would race at the end of the school year that would be judged by SHPE members. A Walk for Education was another event that SHPE participated in with conjunction with the National Society of Black Engineers. Information packets were created and members walked around the LBJ high school neighborhood distributing these packets that contained information about scholarships, financial aid, and UT. SHPE also participated in the Halloween Can Food Drive. Another event SHPE participated in was Young Engineers and Scientist Day, or YES Day. Pi Sigma Pi hosts this annual event where at risk students from Pearce Middle School are invited to the UT campus. These students were exposed to the various engineering fields offered at UT, as well as testimonials from UT students on their personal struggles to get to where they are today. The students were also informed on the different types of financial aid available to fund their higher education. Introduce a Girl to Engineering, Engineering day at the mall and newest addition to the SHPE's community service list is the SHPE Junior Chapter at Travis high school.

The above were only a small portion of events that SHPE participated in. This year SHPE completed over 153 events, completed all goals, increased membership to about 150 students, and improved the relationship between members. Seniors will depart and a new generation of SHPE members will be created. However, the tradition of excellence and friendships will continue. A great year comes to a close, but a better one is about to set sail. Congratulations to graduating seniors, officers, directors, and all the members that helped SHPE make this year a year to remember.





I2P Encourages New Technologies

(continued from page 3)

The technology has several innovative facets.

"This technology differs from other competition out there due to its unique clean room fabrication which allows for uniform high throughput manufacturing, its potential not to harm normal cells, and the potential for improved efficacy and lower side effects," Cristal said.

As winners of the competition, the "Drug Delivery Device" team will have the chance to participate in the international I2P competition in the fall, which is also hosted at the University.

"My team and I found out that we won first place [April 22] and were in shock the entire day," Cristal said. "We're looking forward to preparing for the International competition."

In addition to winning a monetary prize and advancing to the international competition, the first place team members mentioned a number of other, less tangible benefits.

"The I2P presented an avenue for a great learning experience in teambuilding, communication skills (selling your ideas to the industry), and learning how technological innovations/capabilities can be matched with societal needs to create successful products and ventures," Abiola said. "I enjoyed the opportunity to network with technology entrepreneurs and investors, and look forward to the avenue created by these interactions to create a start up company for our technology. All in all, the very high level of competitiveness of all participants from different disciplines across the university added to the whole excitement during the competition and look forward to representing UT in the international version."

Although the competition took a lot of work from the contestants, they agreed that it was worth it in the end.

"I would encourage any person who is business inclined to participate," Shreyas said. "The experience and skill set achieved in preparation for the competition is worth the sweat put in."

Glaucoma, Grants, and BME

By: Tricia Teoh
Vector Staff

Imagine your side vision slowly disappearing into a sea of black dots. It's hardly noticeable and not at all painful, so maybe you think it's just a phase, it'll go away...Until one day, years later, you can't even see what's in front of you.

What happened? What stealthily robbed you of sight? The answer for about 3 million Americans, most of whom don't know it, is glaucoma, one of the leading causes of blindness in the world. The most common form of glaucoma involves increased pressure in the eye, which eventually kills the optic nerve. The optic nerve is vital to sight, since it is the nerve cable that sends signals from the retina to the brain.

The dangerous thing about glaucoma is that there is currently no cure, and there are no symptoms—the first losses of peripheral vision are unconsciously compensated for—until too much damage has been done. Thus, the best treatment for glaucoma is prevention.

Unfortunately, as mentioned before, there are many causes of glaucoma. Not all of them have to do with increased ocular pressure. Because of this, the available glaucoma tests may not be looking for the correct symptoms, and glaucoma is diagnosed when it is too late.

Two Biomedical Engineering professors, Dr. H. Grady Rylander III and Dr. Thomas Milner, received a \$2.3 million grant from the National Eye Institute this month to go towards research in a universal glaucoma test that can be used despite the different types of glaucoma there are. All kinds of glaucoma have the same result: the ganglion cells—the cells at the connection of the optic nerve to the retina—begin to die and become replaced by gliotic tissue, which is sort of like scar tissue for the nervous system. Using Optical Coherence Tomography (OCT), Rylander and Milner hope to be able to detect the structural changes when ganglion cells begin to become gliotic tissue, thereby diagnosing glaucoma at an early stage. OCT involves measuring the light reflected back from the tissue, which can be affected in ways that depend on the type of tissue.

The professors hope to have a glaucoma test modified for humans in about five years. For a disease that gives its victim no sign of its existence, a diagnostic test cannot come too soon. After all, as Dr. Rylander put it, "Glaucoma kills the optic nerve—once it's gone, we can't bring vision back."