University of Houston Cullen College of Engineering

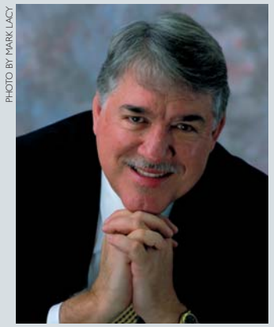
[ParamETErs]

Spring 2003

SPORTING ENGINEERING

Dean's Message

PHOTO BY MARK LACY



Bringing about positive change in the community, creating jobs, helping Houston become a better city, a more important city. These are important goals of the college and the university—goals that are perhaps overshadowed by the fundamental priorities of teaching and research. These are also the goals we try to embed in our students, the future "front-line" professional engineers, as they venture beyond the bounds of the campus to conduct their life's work.

Our feature in this issue on alumnus Jimmie Schindewolf demonstrates success and how one engineer can make vital contributions to our community. It serves as a reminder that we should do more, and I'm happy to report that the college is expanding its efforts in community outreach. From helping the city improve air quality to working with local community leaders in creating the Texas Energy Center, we are determined to increase our involvement in community success.

As always, our students are at the forefront of our endeavors, and the four young student athletes also featured here are excellent role models for their dedication to hard work, their self-discipline and their drive to compete in the NCAA while pursuing serious academic programs. They are also doing an excellent job representing the college and university in the community, and we are extremely proud of them.

Also in this issue, we feature one of our brightest young chemical engineering researchers, Peter Vekilov, who is doing important work that may lead to a breakthrough in the treatment of sickle cell anemia. Some of his work, published in the Feb. 4, 2003 issue of the *Proceedings of the National Academy of Sciences of the United States of America*, focuses on a fundamental discovery that reverses the view of the mechanisms that underlie most solution-solid phase transitions. He has also recently placed one of his images of hemoglobin on the Feb. 14, 2003 cover of *Science* magazine.

In the end, our reputation, image and standing are shaped by how we contribute to science and to our community. We're proud of our role in education and research, and we will strive to expand on our accomplishments. But we also value our responsibility as leaders in the drive toward a new generation of technology and new business opportunity, and we look forward to meeting the challenges with more landmark research, exemplary students and bold new ideas.

Sincerely,

Raymond W. Flumerfelt, *Dean*
Elizabeth D. Rockwell Endowed Chair

pa·ram·e·ter
Pronunciation: pə-'ram-ə-tər
Function: noun
Etymology: New Latin, from para- + Greek metron measure
Date: 1656

1: a. an arbitrary constant whose value characterizes a member of a system (as a family of curves); also: a quantity (as a mean or variance) that describes a statistical population
b. an independent variable used to express the coordinates of a variable point and functions of them—compare PARAMETRIC EQUATION
2: any of a set of physical properties whose values determine the characteristics or behavior of something
<parameters of the atmosphere such as temperature, pressure and density>
3: something represented by a parameter: a characteristic element; broadly: CHARACTERISTIC, ELEMENT, FACTOR
<political dissent as a parameter of modern life>
4: LIMIT, BOUNDARY—usually used in plural
<the parameters of science fiction>

contents

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

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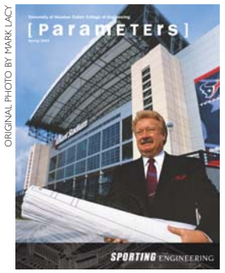
ORIGINAL PHOTO BY MARK LACY



Sporting Engineering
UH alumnus Jimmie Schindewolf, pictured on the cover, has enjoyed a brilliant career in civil engineering, making tremendous contributions to the City of Houston and the surrounding community. Former Dallas Cowboys Head Coach and UH alumnus Tom Landry and four engineering student athletes are also featured.

UH Launches Engineering Leadership and Entrepreneurism Program

A new program developed by the UH Cullen College of Engineering will prepare graduates to be more successful when assuming leadership roles in their companies and facing real-world business challenges.

The new Engineering Leadership and Entrepreneurism Program was launched this spring as a pilot program with 25 students. In time, the college hopes to expand the program so that most engineering students will be able to participate. The new program is one of only a handful of its kind in the country, and represents a recent trend toward incorporating business concepts in engineering programs.

The program consists of a two-course, project-focused curriculum designed to simulate the realistic conditions surrounding technical-based companies. The program emphasizes problem-based learning, professional communications and the integration of business and engineering concepts.

"This new program combines two of the university's traditional academic strengths—business and engineering—but in an innovative new way," said Raymond Flumerfelt, engineering dean. "It prepares students for the real challenges of today's competitive global markets, and it grooms them for entrepreneurial and intrapreneurial success in a technical-type business."

During the classes, students will be divided up into enterprise teams, each selecting executive leadership positions and a product or service, form a board of directors, prepare a business plan and request capital—fictitious money—from an investment board.

The company's enterprise team will prepare quarterly and annual reports. Along the way, the teams also will have to deal with real-world challenges, such as technical, manufacturing, financial, environmental, legal and human resource issues.

Selected students will receive course scholarships, as well as book allowances, and each will be assigned an executive mentor from the industrial/business community.

"I believe this program will widen the perspective of the engineering students, especially when it comes to the total business process in which they're involved," said William Sherrill, director for the Center for Entrepreneurship Innovation at the UH Bauer College of Business. Sherrill assisted in developing the program's curriculum and will help teach the courses.

For more information about the program, visit www.egr.uh.edu/academics/leadership/. For more information, contact Jeannie Conklin at 713-743-4233 or jconklin@uh.edu.

First Master's Students from Mexico Program Graduate

Thanks to a new distance-education program at the UH Cullen College of Engineering, 16 students who are employed by Petróleos Mexicanos (Pemex) in Mexico graduated with master's degrees in petroleum engineering last November. It was also the first time any of the students had ever been on the UH campus.

The program, developed jointly with Universidad La Salle in Mexico City, has provided a model for possible future distance education efforts and, perhaps as important, has prompted enhancement of the courses taught at UH, says Christine Ehlig-Economides, director of petroleum engineering at the Cullen College of Engineering.

The program consists of the same courses traditionally offered at UH, but the format is very different. Each course is taught in a condensed, five-week session, with the first week consisting of 40 hours of lectures from UH professors and the following four weeks involving assignments and tests conducted via CD and the Internet. Courses are taught one at a time, sequentially, and in optimal order.

PHOTO BY JONATHAN COBB

The first class of petroleum engineering graduates from the UH/Universidad La Salle program.

"We found a format that is workable so that we can provide face-to-face, classroom instruction, and that's what makes this program unique," Ehlig-Economides said. "The students know the professors so it's not classic distance learning where all they get are videos or self-paced content through the Internet. It's much better than that."

The origins of the program stem back to Summer 1999 when Jorge Ignacio Galicia Perez approached UH professor Michael Economides. After a format was approved by the Texas Higher Education Coordinating Board, an agreement was signed by both universities in Fall 2000. The first course was offered in April 2001.

National Ranking Places UH Civil Engineering at No. 14

After performing its own in-depth survey of more than 117 institutions, *Engineering News-Record*, a McGraw-Hill publication, ranked UH 14th in the nation in its list of "Leading Civil Engineering Research Schools," published in the Oct. 21, 2002 issue.

The list, which ranks schools by percentage of income from research, places UH engineering in the national spotlight and will help build prestige for the department, says Cumaraswamy "Vipu" Vipulanandan, chair of the Department of Civil and Environmental Engineering.

What the ranking also shows is how well the UH department is optimizing its resources. More than 75 percent of the faculty in the Department of Civil and Environmental Engineering is active in research. "A notable level," Vipulanandan said. "But it's also important to remember that we have only 17 full-time faculty members. So although we are a relatively small department, we are running a very efficient operation—and that pays rich dividends, both for our students and for our community."

PHOTO BY JONATHAN COBB

Jie Liu, civil and environmental engineering Ph.D. student, checks for deterioration of concrete coating caused by long-term exposure to various chemicals.

Some of the research at the local and state level is also funded and supported at the national level by the National Science Foundation, Environmental Protection Agency, American Water Works Association, Gulf Coast Hazardous Substance Research Center, American Petroleum Institute and a number of industries.

For the full story, visit www.egr.uh.edu/news/0103/?e=civilrank. For more information about the department, visit www.egr.uh.edu/cive.

Dunn Foundation to Give UH $500,000 for Biomedical Engineering Endowed Professorship

In support of UH's new biomedical engineering program, the Houston-based John S. Dunn Research Foundation has committed $500,000 to establish an endowed professorship.

The grant that creates the first John S. Dunn Professorship in Biomedical Engineering will support a faculty member in the Cullen College of Engineering who can broaden course offerings, spearhead new research and increase working relationships with the Texas Medical Center.

"This professorship in the Cullen College of Engineering will represent a significant asset to the university's rapidly emerging biomedical engineering academic program, and will enhance our research efforts that are leading to the improvement of health care," said Raymond Flumerfelt, engineering dean.

The university will conduct a national search to identify a candidate for the position.

The UH undergraduate biomedical engineering curriculum, currently under review by the Texas Higher Education Coordinating Board, is expected to be launched next fall.

Matthew Franchek, chair of the Department of Mechanical Engineering and director of the undergraduate biomedical engineering program, said the program would emphasize biosensing and bioanalytics and include multidisciplinary courses involving natural sciences, mathematics and engineering. The college currently offers a master's degree in biomedical engineering and is seeking approval for a Ph.D. option.

"Our faculty are actively pursuing a fundamental understanding of the life sciences, the creation of new and innovative biosensing technologies and the effective integration of these knowledge bases to invent new practices in clinical medicine," Franchek said. "Eventually such advancements will move health care monitoring to our homes and allow people to better manage their individual health care. This is the kind of impact we want our research efforts to have on real-world health care and quality health care delivery. We are also excited to provide a unique education to the next generation of biomedical engineers through our biosensing focus."

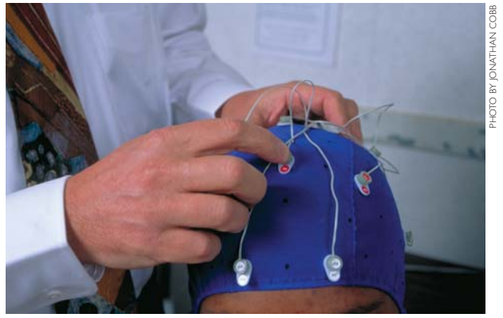


PHOTO BY JONATHAN COBB

$3.2 Million Environmental Project In Houston Ship Channel May Set National Trend

A major scientific study underway in Texas may help clarify how toxic chemicals are transported through the environment.

Since last summer, UH environmental engineers have been taking hundreds of water, fish and sediment samples from the Houston Ship Channel to determine what levels of dioxins, if any, are present. The scientists will use that data, and more gathered through Spring 2003, to develop new computer models to find out where such contaminants originate and to track how they move through the environment, possibly ending up in crab and fish that travel to fishing regions.

"This aspect of the study is quite interesting because such a comprehensive model has never been attempted before," said Hanadi Rifai, associate professor of environmental engineering at UH and principal investigator on the Ship Channel project. "I think this project will set the trend for a lot of national studies looking at these compounds and we'll have many people looking at our results."

Last year, Rifai received a $3.2 million grant from the Texas Commission on Environmental Quality to fund her project in the Houston Ship Channel, home to one of the world's largest industrial complexes. Results from the study will be used by regulatory agencies to help craft implementation plans for reducing pollutants and achieving minimum water quality standards.

The Environmental Protection Agency currently is preparing a comprehensive reassessment of the scientific consensus on dioxin, including its sources, its fate and transport, levels of human exposure, and its toxic effects on humans and other animals.

"Dioxins are a family of contaminants that are very tough to understand in terms of their behavior, toxicity and how they distribute themselves in the environment," Rifai said. "Although there have been health advisories warning people not to eat blue crab and catfish caught in certain areas of Galveston Bay because of dioxin contamination, there has never been such a comprehensive study of the Houston Ship Channel to determine where contaminants might be."

Rifai says the regulatory limits for acceptable dioxin concentrations are extremely small, and until recently the technology did not exist to detect such minute quantities in water. "Because of the lack of sampling technologies, we don't actually know what the dioxin concentrations are in the water. We'll be the first ones to do this."

Rifai says that while the EPA considers air pollution to be a major source of dioxins in water bodies around the country, the Houston area is somewhat unusual.

"Other areas of the country, such as the Great Lakes, have particles from air pollution deposit over the water or land and then wash into the water bodies," Rifai said. "Houston may be different not only because of the nature of its air quality, but also because there may be a greater contribution from industrial water discharges."

Sampling techniques have moved far beyond dipping a test tube into the water. Rifai's research group will use a method called high water volume sampling, where a large amount of Ship Channel water will be systematically concentrated down to a very small sample from which lab technicians can then determine the actual levels of dioxins. The group will also collect samples from fish and crab tissue, sediments from the air at established monitoring stations and from water run-off at various locations.

PHOTO BY MARK LACY

UH Engineering Professor Hanadi Rifai, with the assistance of Steve Kennedy from Parsons, gather a sample of water from the Houston Ship Channel.

NATIONAL ACADEMY OF ENGINEERING MEMBERS

1. **Neal R. Amundson**
   Chemical Engineering, 1970
2. **Abraham E. Dukler** *(deceased)*
   Chemical Engineering, 1977
3. **Dan Luss**
   Chemical Engineering, 1984
4. **James M. Symons**
   Civil & Environmental Engineering, 1994
5. **Benton F. Baugh**
   Mechanical Engineering, 1999
6. **Charles D. Cutler**
   Chemical Engineering, 2000
7. **Fazle Hussain**
   Mechanical Engineering, 2001
8. **Bonnie Dunbar**
   Biomedical Engineering, 2002
9. **Christine A. Ehlig-Economides**
   Chemical Engineering, 2003
10. **John H. Lienhard**
    Mechanical Engineering, 2003

1 2 3 4 5 6 7 8 9 10

Two UH Professors Elected to National Academy of Engineering

UH Engineering Professor John Lienhard and Petroleum Engineering Director Christine Ehlig-Economides will be inducted in October 2003 to the National Academy of Engineering, one of the most highly regarded professional engineering organizations in the world.

Lienhard is the M.D. Anderson Professor of Technology and Culture, Emeritus in the Cullen College of Engineering. He was elected as a member "for creating the awareness of engineering in the development of cultures and civilizations, and for the development of basic burnout theories in boiling and condensation," according to his citation.

Lienhard has gained international visibility as the author of several books and hundreds of papers, and as the writer and voice of the syndicated public radio program, "The Engines of Our Ingenuity," produced by the UH National Public Radio affiliate KUHF. The program is carried by more than 20 public radio stations in the United States and aired internationally by the U.S. Armed Forces Radio Network. Lienhard's newest book, which will be published this spring by Oxford Press, is titled "Inventing Modern: An Engineer Looks for Twentieth Century America."

Ehlig-Economides is an adjunct professor in the Department of Chemical Engineering who also serves as a global account manager and consultant for Schlumberger Oilfield Services. She was elected as a member "for contributions to the testing of wells and the characterization of reservoirs, including the management, integration and visualization of data from multiple disciplines."

Ehlig-Economides works to elevate the visibility of the college's master's program in petroleum engineering. Under her direction, enrollment has increased to more than 100 students and continues to expand. She recently brought the master's program to students in Mexico. Working in cooperation with Universidad La Salle, 16 Mexican engineers graduated from UH in November 2002. The international courses are offered using a special format that Ehlig-Economides designed and guided through the statewide approval process.

Academy membership honors those who have made important contributions to engineering theory and practice, and those who have demonstrated accomplishment in "the pioneering of new fields of engineering, making major advancements in traditional fields of engineering or developing/implementing innovative approaches to engineering education."

Learn more about Lienhard and Ehlig-Economides at www.egr.uh.edu/news/0203/?e=nae.

UH ENGINEER SCORES BIG IN HOUSTON SPORTS SCENE

BY BRIAN ALLEN

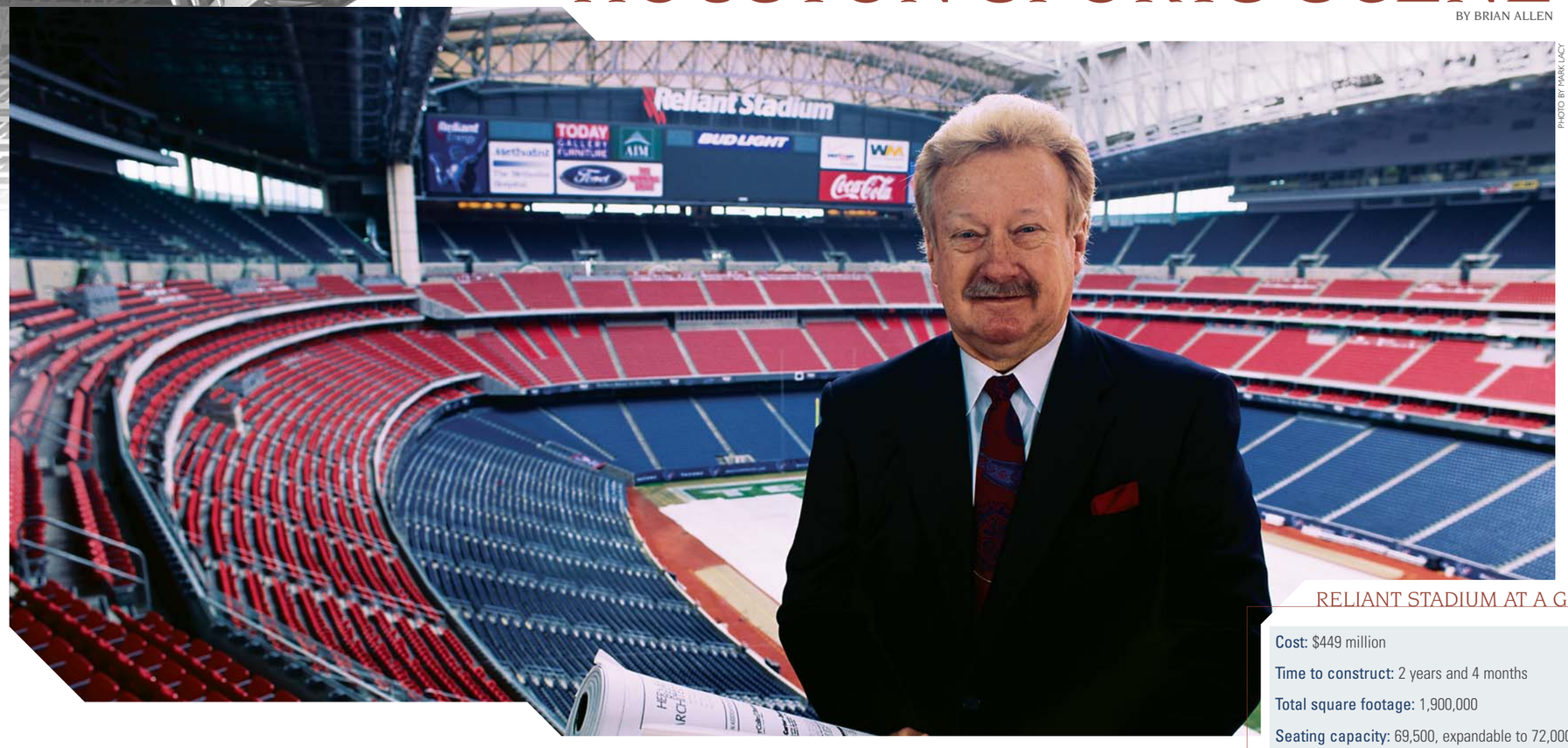


PHOTO BY MARK LACY

Is there an engineer who has directed more landmark construction projects in Houston than Jimmie Schindewolf (1967 BSCE)?

Not likely.

He oversaw the construction of Minute Maid Park, George R. Brown Convention Center and Wortham Theatre Center. Less glamorous but equally challenging large-scale projects include the city's gigantic 69th Street wastewater treatment plant and Bush Intercontinental Airport's Terminal "C" and its many additions.

But Schindewolf's most recent project may be the most impressive of all. Directing construction of the new Reliant Stadium, the world's first retractable-roof football stadium and home of the National Football League's newest franchise, the Houston Texans.

Schindewolf was the owner's representative for the Harris County Sports and Convention Corporation's $449 million stadium. In that role, he interfaced regularly with the various contractors, including the construction manager, Manhattan/Beers, and a number of subcontractors. He also supervised the design team, Houston Stadium Consultants, a joint venture of Hermes Reed Architects, Lockwood Andrews and Newnam, Walter P. Moore Engineers and Consultants, Carter-Burgess and a number of smaller firms.

"We also managed a contract for construction materials testing, such as concrete, structural steel, reinforcing steel and soils, to make sure that whatever materials were placed met specifications. And we oversaw a contract with the firm that did testing and balancing for the entire heating, ventilation and air conditioning system (HVAC) within the facility," Schindewolf says.

In other words, Schindewolf directed just about every conceivable aspect of the project. But the top priority was to complete the project on time and within the budget.

"We did both," he says.

That kind of "can-do" mentality has been the backbone of Schindewolf's remarkable career, which has taken him from county roads and bridges to the inner workings of Houston City Hall, where he served as director of public works and chief of staff to Mayor Bob Lanier for six years. But none of that, he says, compares with the thrill of working on Houston's most exciting new sports facilities.

"Once I left the city, Jack Raines approached me with the idea of being the owner's rep. for the baseball stadium, and I considered that a once-in-a-life-time opportunity to be part of a great project like that," Schindewolf says. "I've since had the privilege of being involved in two once-in-a-lifetime projects, so I consider myself extremely fortunate."

The stadium has been a big hit with the fans and the media. In addition to housing the Texans, the facility is also home to the Houston Livestock Show and Rodeo, which draws more people to the stadium than an entire season of Texans football games. Those two tenants are the reason Houston became the first city with a retractable roof football stadium, says Schindewolf.

RELIANT STADIUM AT A GLANCE

Cost: $449 million

Time to construct: 2 years and 4 months

Total square footage: 1,900,000

Seating capacity: 69,500, expandable to 72,000

One of a kind: Only football stadium in the world with a retractable roof

Roof size: Two 240-foot wide by 385-foot long panels

Roof support: Ten parallel trichord trusses ride on two parallel rails supported by two supertrusses

Height: 227 feet above playing field

Weight of roof: 2,243,000 pounds

Two of a kind: Only the second stadium in the United States with a replaceable, portable field

COURTESY OF HOUSTON STADIUM CONSULTANTS

Portable Field, Retractable Roof

Competing interests between football and rodeo led the project in a new direction, one that hinged on the concept of a retractable roof and a portable field that could be moved in and out of the stadium as needed.

"That was one of the controlling factors from day one. The rodeo wanted a facility that has a closed roof and a dirt floor, and one of the original criteria for the football field was natural grass," says Schindewolf.

One portable field was already in place at the Meadowlands in New Jersey, where the New York football teams, the Giants and the Jets, play their home games. The concept of the portable field was to grow grass on top of portable "palettes" that fit together with precision accuracy to form a crowned natural grass surface.

That approach, combined with the retractable roof, turned out to be the answer for both parties.

"The field gives you flexibility," says Schindewolf. "We talk about this as a football stadium but it's really a multi-purpose venue. It's a football stadium during football season, but it's also the home of the Houston Livestock Show and Rodeo, which is a really big deal in Houston. In fact, a lot more people go through the stadium during that time than do for football games. Consider eight regular season games and two pre-season games compared to 21 or 22 events for the rodeo. And remember, not just the stadium, but the exhibit hall, Reliant Center, is also in use during the rodeo."

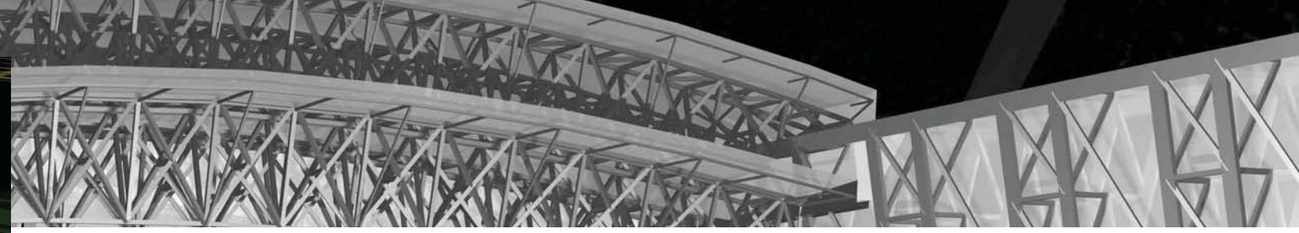
Originally, the plan was to keep replacing the grass between events, but it soon became clear that a portable field would hold many advantages.

"We spent a lot of time working on that, trying to figure what the best system would be," says Schindewolf. "We looked at several different systems and spent a lot of time trying to determine whether we would be able to grow grass in the stadium or have to be able to exchange or replace the grass. So that led us to look at periodically replacing the grass with a portable field."

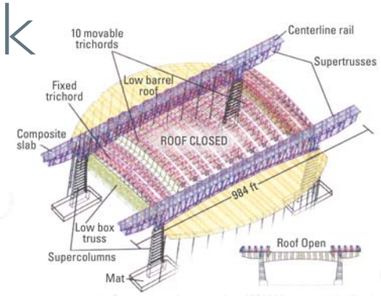
The field palette design is something of an engineering marvel. The $2.6 million portable turf system features 8-foot square steel sections that weigh 1.5 tons each. The patented system was designed by StrathAyr Turf Systems, and takes about 16 hours to be removed.

"If you look at a cross section, you have a concrete slab—and, of course, that concrete slab had to be placed and aligned perfectly, both from a vertical and a horizontal standpoint," Schindewolf says. "The field itself is composed of 8-foot by 8-foot palettes. The grass is grown on these palettes, and then each one of these palettes fits in place very precisely."

Each palette corresponds to a particular point in the grid on the stadium floor, and because every palette has unique specifications, a replacement palette always has to go back into the same spot. Consequently, all of the palettes had to be fabricated to near perfection and identified properly in the grid.



A Race Against the Clock



COURTESY OF WALTER P MOORE

Tight deadlines also played a major role in the Reliant Stadium project, says Schindewolf.

"All along, we knew it was going to be a difficult project from the standpoint of completing it on time," he says. "We felt like we had enough time to do it, but there was no margin for error. Just to give you an idea, in a comparison: Minute Maid Park took 27 months to complete, from the day work started to the first baseball game, and that is a facility that holds, in round numbers, about 42,000 people; Reliant Stadium, which is a much larger facility that holds roughly 70,000 people, was substantially completed for the first football game in 28 months."

Minute Maid Park was a fast-track project. Reliant Stadium was even faster.

"There was no margin for error at all," Schindewolf says. "That's why it was so important that the entire design and construction team and owner's representative team work so closely together. Because of the positions I've held over the years, working for different governmental agencies, I've developed many professional relationships, and friendships too, and it helps to know who to talk to and how to get things done."

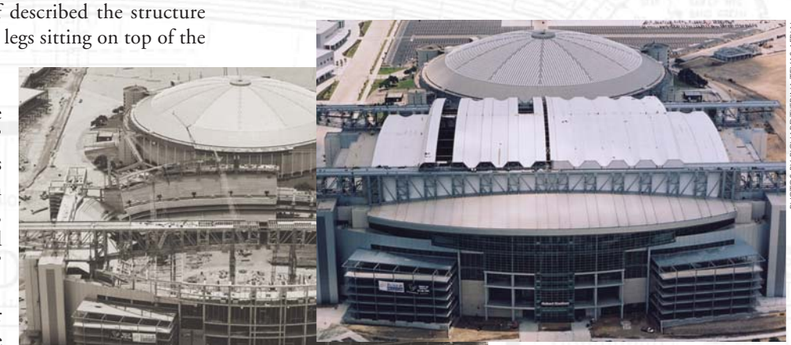
The distinctive structural design of Reliant Stadium posed some challenges to the designers and structural engineers. The roof structure is separate from the stadium, and its most unique features are the four massive "supercolumns" and the 984-foot long supertrusses that support the transportable roof. Schindewolf described the structure as a kind of giant table with four legs sitting on top of the stadium structure.

"This stadium has a retractable roof and a fabric roof," Schindewolf says. "The roof has a structural steel frame and then has a fabric draped over the frame, and it's designed and engineered to withstand high-wind loading."

The entire facility is designed for hurricane wind loading, and the roof was designed to withstand 120 mph winds. A uniquely durable fabric is stretched and held in place by cables. The same engineers that designed the roof at Minute Maid Park designed the retractable roof at Reliant Stadium. Walter P. Moore Inc. was the structural engineer for both stadiums, and the roof transporter systems were designed and built by Uni-Systems Inc.

"In order to have a retractable roof, obviously that requires some real structural engineering expertise," Schindewolf says. "The same design team designed both Reliant Stadium and Minute Maid Park. In fact, those same folks were part of the original design team for the Astrodome, Walter P. Moore, consulting engineers. They're a long-time Houston-based firm and they've done structural engineering for quite a few stadiums constructed throughout the country."

At Minute Maid Park, the roof is composed of three sections which rest on a set of railroad wheels that ride on a track very similar to a railroad track. The wheels on both sides are electronically driven and controlled by computers to make sure that both sides move at the same speed so that you don't get one side of the roof ahead of the other side. The same transporter system is used at Reliant Stadium, Schindewolf says.



PHOTOS BY: RICHARD TIERNA, TEXAS AERIAL
COURTESY OF MANHATTANBEERS

PHOTO BY MARK GREEN, COURTESY OF WWW.STADIUMPICS.COM

The 'Wow' Factor

Former Houston Mayor Bob Lanier praises his former chief of staff and director of public works:

"He's an example of a group of outstanding people who give themselves to public service and really get great fulfillment out of being part of projects built for the public good. And he's in that category that is totally competitive with the best that the private sector has to offer."

Lanier and his wife, Elyse, have been generous contributors to UH programs, particularly in the area of public policy. In addition, Elyse served as a member of the UH Board of Regents from 1994 to 1997.

» "I hear lots of folks talk about how wonderful Reliant Stadium is, how exciting it is, how dramatic it is. When you step inside, it is pretty breathtaking. Every time I walk in to Reliant Stadium or Minute Maid Park, I think, 'Wow'."

The "wow" factor for both stadiums is high indeed. That's why the Super Bowl and baseball's All-Star Game are both on Houston's upcoming events calendar.

"I've had the opportunity to see quite a few baseball stadiums," Schindewolf says, "and I don't know that there is any better than Minute Maid Park. It's certainly a wonderful place to watch baseball, and the same thing is true of Reliant Stadium. It's a wonderful place to watch a football game. Every seat is a good seat. And the same thing holds true for the rodeo too. It is much better to watch a rodeo event and to see and hear the entertainers here in this stadium than in the Astrodome."

In Reliant Stadium, the size of the stadium dictates that fans are higher up if they are in the upper deck, but higher up gives them a great view. The view is so good, in fact, that the press level is at the very top level on the west side of the stadium.

"And it's a fabulous view too," Schindewolf says. "You know it's important for the press to see the game properly—to identify who the players are, how the plays develop—so the fact the press level is the top level in this stadium tells you how great the view is from that level. The concourses are large at Minute Maid Park, and they're large at Reliant Stadium too. It's fan friendly. Both places are."

Working Days, UH Nights

A native of Spring, Texas, Schindewolf grew up in a rural environment before finding his place in the bright lights of the big city. And like so many UH students, he had to work his way through college.

"I was one of the students who did not have the good fortune of having plenty of money in my pocket, so I had to work my way through school," Schindewolf recalls. "At that time, the University of Houston had most of its engineering courses taught at night by professors who were also part of the engineering community. Many of the professors worked during the daytime as design engineers or construction engineers, and at night they taught courses that were very practical and taught you how the real engineering world functioned. I thought that was one of the wonderful things about the University of Houston, the opportunity to work your way through school and to be taught by professors who knew the engineering world extremely well. I think that still holds true today."

Schindewolf was the sole recipient of the UH Distinguished Engineering Alumni Award in 1992, two years before he was named Engineer of the Year in Houston. Throughout his career, he has always touted the virtues of the city's flagship state university.

"I've always considered myself one of the people who is proud to be a University of Houston alumnus, proud to be a graduate of the engineering school, and always felt it was necessary to give something back," says Schindewolf, who has been a significant contributor to the college's golf tournament in past years. "I worked very closely with the Cullen College of Engineering for a number of years. When I was at the City of Houston we worked with a number of professors there in doing research projects for the city, and I understand those connections are still in place today."

Schindewolf says Houston is the ideal place for an outstanding engineering college because of its size and its multitude of industries.

"I can't imagine that there is any other city in the country that has a larger demand for engineers as a whole than Houston does. You look at the many large construction firms and design firms here in Houston. Reliant Energy obviously has a many number of electrical engineers. You look at the petrochemical industry, the petroleum industry and the aerospace industry. When you look at all of those industries in commerce, you realize there is just an unbelievable number of engineers that work in this city. Obviously, there needs to be a way to educate those engineers, and that is where the University of Houston fits in."

If Schindewolf thinks highly of the city and its engineering expertise, the city's engineering community certainly has reciprocated the feeling. In 1994, Schindewolf was named Houston Engineer of the Year by the Texas Society of Professional Engineers. The honor is well deserved, says UH civil engineering professor Jerry Rogers, who won the same award two years later in 1996 to complete a three-peat for UH engineers. Roger Eichhorn, former dean of the Cullen College of Engineering, won the award in 1995. Other award winners from UH include former dean Charles Kirkpatrick in 1972 and Richard Doss (1948 BSCE) in 1980.

"Jimmie Schindewolf is one of the most highly respected engineers in our city because of his good service as public works director for the City of Houston," Rogers says. "Since then he has also coordinated construction on Minute Maid Park, which was named the National Merit Award Winner, or runner-up, by the American Society of Civil Engineers for their Outstanding Civil Engineering Achievement Prize. And now he is back with Reliant Stadium, which is nominated for the same ASCE prize this year."

This year's ASCE winners, along with the top four runners up, will be announced May 1 in Washington D.C. at the OMNI Shoreham Hotel. ■

PHOTOS BY JONATHAN COBB

Students Face DUAL CHALLENGE of Engineering, Athletics

BY AMANDA STRASSNER

Getting an engineering degree from the University of Houston requires an extreme level of discipline, skill and talent. So does competing in the NCAA.

Doing both would seem to require a superhuman effort—but for Anne Gasser, Leslie Guevara, Brian Henderson and Brian Temko, it's just a part of their daily routine.

"It's a big deal for them," says UH Women's Soccer Coach Bill Solberg, who coaches Gasser and Guevara. "They understand that they're student athletes, and the big cliché is 'student' comes before 'athlete' for a reason. They really do have to put in extra work."

In order to accomplish all that extra work, the students need an abundance of energy, something Solberg sees in Gasser's efforts on and off the field.

"Being in the engineering program itself is a task," Solberg says, "and then being a student athlete at the same time at the division one level in one of the top hundred programs in the nation—you have to have energy. I've never seen a kid with more energy in my entire life."

Solberg prefers to play Gasser at the outside midfield position because of her non-stop energy. "She will never stop running on the soccer field, and that position is very demanding" he says. "You have to get up and down the field constantly, offensively and defensively, and Anne is the best on our team at it."

ANNE GASSER

Based on grade point average, the women's soccer team has been ***academic champions*** *seven of the nine semesters that women's soccer has been in existence.*

PHOTOS BY JONATHAN COBB

LESLIE GUEVARA

"I spend a lot of time talking to every single professor, making sure I have all my work done and making sure everything is turned in on time or before the date," says Leslie Guevara, electrical engineering major.

Gasser, a junior civil engineering major, says her low attention span works in her favor because it drives her forward. "To keep myself moving and keep all those little things up in the air, I think I need to be busy constantly," she says.

Solberg, who recruited both women, says Guevara also possesses a unique passion for the game, as well as the speed that is so critical to playing midfield. "Her athleticism, her speed is something that really caught our eye. Leslie will rotate between forward and outside midfield because she has the speed and athleticism to get up and down the field on both offense and defense."

Brian Henderson and Brian Temko play for the Cougars baseball team. Henderson, a pitcher, is studying chemical engineering while Temko, a catcher, is majoring in civil engineering. This combination of academics and athletics works perfectly because, "Baseball is a mental sport that requires more finesse," Henderson says.

As members of Conference USA, the teams travel all over the country for competition. Although these students are involved in different sports, they enjoy similar aspects of the competition. "I love visiting all the different cities, all the different parts of the country," says Temko.

Gasser and Guevara are in the off-season for a soccer team that posted an 8-8-3 record last year, finishing fifth in Conference USA. They're both working on conditioning and techniques designed to make them faster and quicker as the team prepares for the 2003 season and what is probably the toughest schedule in school history.

"We work on dribbling and running," says Guevara, a junior electrical engineering major. "We run the length of a football field in under eighteen seconds. We're always working with the ball and always in control of the ball. It's intense training for the real season."

Even off-season, balancing training and classes is a challenge.

"A lot of engineering courses would land during practice hours," says Gasser. "So I push back some of the hardest classes into the spring semester so I can play the soccer season. Also, since most engineering classes are very demanding, you have to take into consideration which classes are more demanding than others."

Guevara has answered this challenge by just working harder. "In every one of my breaks between classes, I have to study. Whenever we travel, my bags are full of books and my computer."

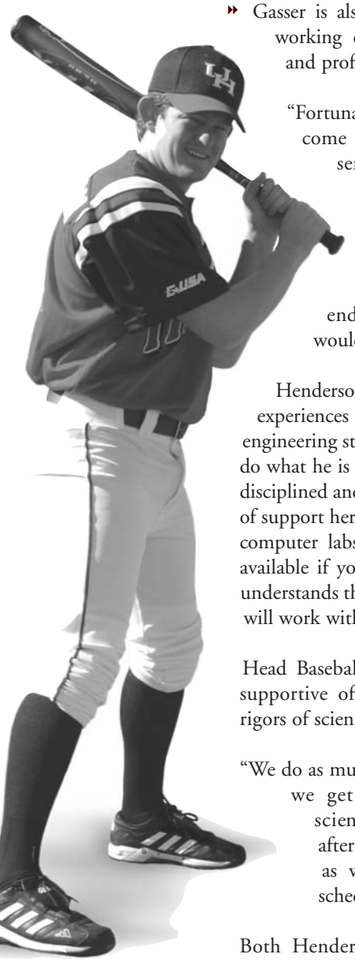
All four student athletes have discovered that communicating with professors is the fastest route to success and avoiding misunderstandings.

"I spend a lot of time talking to every single professor, making sure I have all my work done and making sure everything is turned in on time or before the date," says Guevara. "I guess it could get frustrating, but I actually like the pressure. I have to have a good GPA in order to play, so I stay up late and make sure I do everything." ▸▸

PHOTOS BY JONATHAN COBB

"When people say you can't do something, it makes you want to prove to yourself and prove to them that you can do it," says Brian Henderson, chemical engineering major.

BRIAN TEMKO



Gasser is also familiar with the process of working closely with both her coaches and professors.

"Fortunately, our main projects tend to come due toward the end of the semester when the season is done," she says. "When soccer ends, you suddenly realize you have time to finish everything. It's almost a relief, but at the same time you don't want it to end. Soccer is your passion. I wouldn't play if I didn't love it."

Henderson and Temko have had similar experiences with NCAA baseball and their engineering studies. Henderson knows that to do what he is doing, he has to be responsible, disciplined and determined. "But you get a lot of support here too," he says. "Study hall labs, computer labs and academic counseling are available if you need them. Also, the faculty understands the effort you are putting out and will work with you."

Head Baseball Coach Rayner Noble is also supportive of his students that pursue the rigors of scientific subject matter.

"We do as much as possible—especially when we get students that are studying science and have a lot of labs in the afternoon—we try to be as flexible as we can to accommodate their schedules," Noble says.

Both Henderson and Temko have had to deal with setbacks in their dreams of playing baseball. Henderson was cut from the baseball team his freshman year at Clements High School. His high school coach, Herb Espinoza, remembers when Henderson was cut and how he responded to the adversity.

"Henderson had a lot of heart," Espinoza says. "He had skills as a baseball player, but he was just too little to play at the time."

Henderson and his father, who also played high school baseball, built a mound in their backyard and went to work on developing his skills. All that work paid off in the years that followed, as Henderson developed into an outstanding left-handed pitcher on one of the best high school teams in the state.

In retrospect, Henderson is glad he was cut his freshman year. "When people say you can't do something, it makes you want to prove to yourself and prove to them that you can do it" he says. "I already knew I belonged. I just had to prove it."

Coach Espinoza recalls that, "That's just the kind of kid he was, and guy he is. If you tell him he can't do something—and if he things he can, he has the tenacity and the determination to say, 'I think you are wrong coach, and I am going to prove you wrong.' And the thing is, he is the politest guy you will ever find. He just grins at you as if to say, 'Okay coach, I'll show you.' That is a great attitude."

BRIAN HENDERSON

Although Henderson is attracted to the rational, logical aspects of science, he appreciates the whim of chance that baseball can sometimes generate, saying it all has a way of evening out in the end.

"We always talk about the baseball gods," he says. "That stuff—the 'bloop' hits, the jam-hit singles, the broken-bat singles—those things are counter-acted by fastballs right down the middle that are popped up, bad pitches that don't get hit well. Good hitters separate themselves from the bad hitters by hitting the mistake pitches, hanging breaking balls, fastballs in the middle of the plate that don't have any movement."

Temko has had to learn to live with unanticipated trouble. His shoulder started bothering him in the fall. But, just sitting off to the side was not his style. So he eventually went out to try to participate in drills. He ended up seriously injuring his knee. Temko had surgery on his knee in October and then on his shoulder in January. His rehab schedule will keep him from playing until summer.

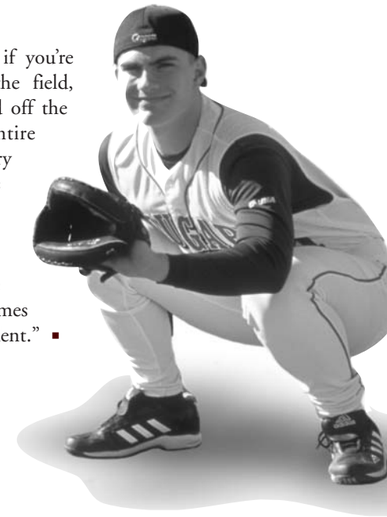
"I hate being out of baseball. Being injured and unable to do something you really love is hard to deal with." But Temko is quick to point out that in baseball, "you can miss the ball seventy percent of the times you step up to the plate and still be considered a good player. There is always failure to deal with in real life, and baseball really prepares you mentally for that."

Discipline, which is so fundamental to academic pursuits, is also the number one goal of the UH soccer team. That's why the word "discipline" is on the whiteboard in Solberg's office.

"All our players are required to meet with academic advisors weekly to determine what needs to be done. It's not optional for soccer players."

The result? Based on grade point average, the women's soccer team has been academic champions seven of the nine semesters that women's soccer has been in existence.

"We think that if you're disciplined on the field, you're disciplined off the field. It's an entire package. It's very important to us to maintain a high level of professionalism on and off the field, and that comes with being a student." ■



"You can miss the ball seventy percent of the times you step up to the plate and still be considered a good player. There is always failure to deal with in real life, and baseball really prepares you mentally for that," says Brian Temko, civil engineering major.

DONOR ROLL CALL [SEPTEMBER 1, 2001 – AUGUST 31, 2002]

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Planned Gifts Create Futures at the College of Engineering

The University of Houston's history has been defined and influenced by visionary individuals from its founding days as a four-year university, when acreage was acquired for a permanent campus and Hugh Roy Cullen and his wife Lillie began their lifelong support. That support continues today through their descendants and a host of others—alumni, corporations, foundations and community leaders—who provide for UH's future.

This same legacy is true for the Cullen College of Engineering, where friends have invested for over 60 years in the college's success. Besides annual giving to the college, planned and deferred gifts have a lasting impact on the quality of the college's programs and students.

PHOTO BY JONATHAN COBB

Alma and David Higgins (1986 BSCE, 1995 MSCE) with their daughter Eva and Engineering Dean Raymond Flumerfelt at the Cullen College of Engineering's Homecoming Reception on Nov. 9.

"I received a small scholarship as an undergraduate student which basically paid for my books and helped me stay in school," said David Higgins (1986 BSCE, 1995 MSCE). "This is why I decided to put the Cullen College of Engineering in my will as a bequest."

Making a planned gift can increase a donor's current income, reduce income tax liability and help avoid capital gains tax, pass assets to family at a reduced tax cost, and provide a significant donation to the College.

"Smart philanthropy is about making a deliberate decision to redirect money and property away from taxes to institutions of your choice," said Vita Como, senior director of development for the Cullen College of Engineering. "By including the College of Engineering in your retirement and estate planning, you can diminish your tax burdens while supporting students, faculty, programs and facilities."

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People, who have included the college in their estates, are recognized through The 1927 Society, a distinguished group of UH benefactors. The 1927 Society honors the historical legacy of giving at UH and seeks to recognize those individuals who have stated their intention to include UH in their estate plans. For more information about The 1927 Society, contact Lynn Mason in the UH Office of Major Gifts and Planned Giving at 713-743-4351 or lmason@uh.edu.

For further information about making a planned gift to the UH Cullen College of Engineering, contact Vita Como at 713-743-4210 or vcomo@uh.edu. ■

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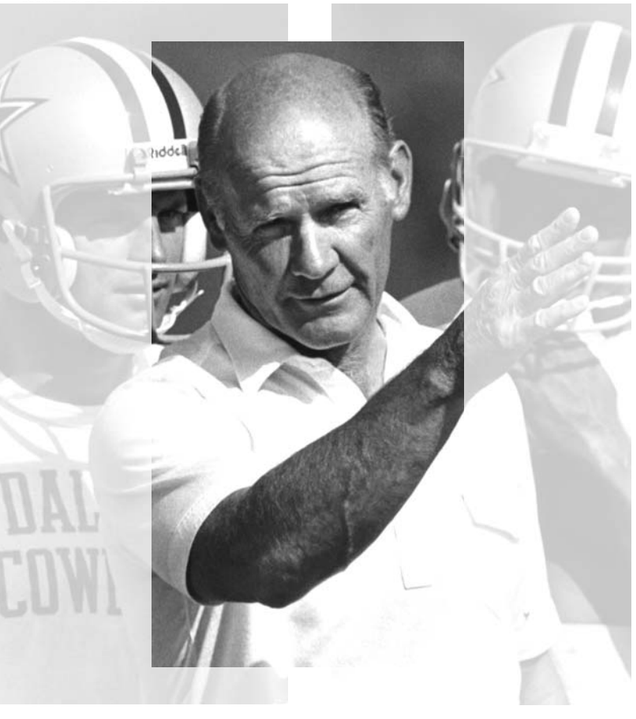

UH ENGINEERING ALUMNUS

TOM LANDRY

Revolutionized Professional Football

By Brian Allen

Former Dallas Cowboys Coach Tom Landry (1952 BSIE) was a graduate of the UH Cullen College of Engineering. Although most people still associate Landry with the University of Texas—because he played college football there as an undergraduate—Landry was also a UH graduate.

How successful was this UH engineer turned pro football coach? Between 1966 and 1983, the Cowboys advanced to the NFL playoffs 17 times in 18 seasons, appeared in five Super Bowls and won two world championships. Landry, now deceased, was inducted into the Pro Football Hall of Fame and is widely recognized as one of football's greatest innovators of all time.

Did Landry make use of his engineering education as Cowboys head coach?

"I think there's no doubt about it," says Landry's son, Tom Landry Jr., from his office in Dallas. "That was his answer. That was how he analyzed the game—as an engineer. And he said so many times."

After his days at UT, Landry came to UH and graduated in 1952 with a bachelor's degree in industrial engineering. At that point in Landry's life, he was playing professional football in New York and preparing for a career in engineering.

"He was working for Cameron Ironworks when we were living in Houston, and he was getting his degree in industrial engineering in connection with that job," says Landry Jr.

Between 1950 and 1957, the Landrys lived in Houston in the off-season and in the Bronx during the football season because Landry was an assistant coach with the New York Giants. In 1957 Landry moved from Houston to Dallas, where he sold insurance in the off-season before accepting the head-coaching job with the expansion Dallas Cowboys Football Club in 1960.

"In those days, football wasn't a year-round job," says Landry Jr. "It didn't pay very much and there wasn't much future in it."

In the early years of the expansion Cowboys, between 1960 and 1965, Landry's teams were often over-matched by superior talent. Landry responded by creating new schemes for offense and defense that altered the game of football itself.

"He was not one of these 'run-to-the-ball' guys," Landry Jr. says. "He had a system, and the flex defense, which we ran so well in the seventies and the sixties, was a very complicated defense. Players couldn't let emotion take over because if they started running around outside the scheme, the defense wouldn't work. Each player had to be in the right place. But once it worked, it was coordinated in a way that it could stop anybody."

By the mid 1960s, Landry had revolutionized the scouting and drafting of players by employing computers to analyze and detect players with the greatest potential, as well as talent and ability. Other teams in the league eventually adopted the same methods.

"The Cowboys were so far ahead of everybody, it was unbelievable," Landry Jr. says. "We were the first team to switch the linebackers from weak to strong side, the first to use situation substitution. And when Dad went to the Cowboys, they didn't have the personnel to compete, so he created the flex defense and the multiple offense."

Former UH Running Back Robert Newhouse, who played for the Cowboys in the mid 1970s, has tremendous respect for his fellow UH graduate, comparing Landry with UH coaching legend Bill Yeoman.

"Back when I was playing at UH, Bill Yeoman was the head coach at the University of Houston," says Newhouse from his home in Dallas. "I saw the same style in Landry that I'd seen in Yeoman. They were both disciplinarians, they knew the game, they knew every position and they were both innovators—Landry creating the flex defense, Yeoman creating the veer offense. Neither of them depended on the assistants to be specialists. They taught the assistants because they knew it—they created the schemes."

Newhouse often marveled at Landry's comprehensive understanding of the game.

"There was a lot of attention to detail in Tom's scheme," says Newhouse. "Everybody had an angle of pursuit, everybody had steps. Everything I did in that backfield, I did for a reason. But it was the genius of Tom Landry that really made it work." ■

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Jonathan M. Niess
David L. O'Donnell
Mr. & Mrs. Satoshi Sut Oishi
Shirish Arvind Paripatyadar
Mr. & Mrs. James Randall Pendergrass
R. Thomas Perry
Annappa A. Prabhu
Mr. & Mrs. Michael Proch
Mr. & Mrs. Joseph Edwin Ramsey
Michael Brooks Rasbury
Mark L. Reinke
Randall J. Richert
John K. Roberg
Richard John Schuhmann
Dr. & Mrs. R. V. Seetharam
Dr. & Mrs. Arup Kumar SenGupta
Krishnamurthy Shankar
William S. Shelton
Melvin R. Skarke
Kevin G. Smith
Mr. & Mrs. Walter Kurt Smith
Jack L. Spradling
Hollie M. Stanley, Jr.
James L. Steller
Stone & Webster, Inc.
Leo R. Strom
Edward Gilbert Strong
Michael Alonzo Stus
Mr. & Mrs. William R. Sudlow
Mr. & Mrs. Robert William Sullivan
Dr. Sankaran Sundaresan
Mr. & Mrs. Lauris C. H. Tam
Tamborello Engineering Corporation
Sophia S. Y. Tang
W. L. Tanner
Tetradyne, Inc.
Mr. & Mrs. Lou J. Tichacek
Mr. & Mrs. Tom Tilton
Mr. & Mrs. Fan Tou
William F. Trainor, Jr.
Robert C. Treadwell
Fred A. Trent
Jesus David Trevino
Mr. & Mrs. David K. C. Tsai
Mr. & Mrs. Dan N. Turner
Brian Erkin Turung
William A. Valka
Dr. Suresh P. Venkatesan
Wade D. Vinson
Dr. Suzan Voss
Mr. & Mrs. Rolan W. Walton
Mr. & Mrs. John Bauer Wardell
Drew S. Weaver
Dan N. Westigard
Mr. & Mrs. James L. Williams
Michael D. Williams
Mr. & Mrs. Stephen Lynn Woodring
Donald E. Wooten
Dr. Robert Miner Wygant, Sr.
Mr. & Mrs. Joseph Chi-Yiu Yeung
Victor A. Zaloom
Robert Keith Zappa

DONOR ROLL CALL *(continued)*

::::: 1940's :::::

James (Jody) Collins (1949 BSIE) was the first industrial engineering graduate from UH because he needed two semesters of courses to complete an electrical engineering degree and only one semester to get an IE degree.

::::: 1950's :::::

Jack Scamardi (1952 BSIE) now enjoys teaching at his grandchildren's private school. He worked for Continental Can Company as a manufacturing engineer, then Houston Natural Gas (Enron) and Reliant Energy (Centerpoint Energy). His son graduated from the UH Law Center.

Frank Janoch (1954 BSIE) shows competitive English setters. He was the chief engineer on NASA's Training Ship.

::::: 1970's :::::

Don Willhouse (1973 BSCE) recently joined the Texas Board of Professional Engineers. Previously he was manager of plant maintenance and operations for the Texas Department of Mental Health and Mental Retardation. He is past president of the Austin Branch of the American Society of Civil Engineers and received the Service to People Award from the ASCE Texas Section in April. He is a retired Lt. Colonel from the U.S. Army Corps of Engineers. Don can be reached at donald.willhouse@tbpe.state.tx.us.

James K. Nelson Jr. (1976 MSCE, 1983 PhD CE) was appointed chair and professor of the Department of Construction Engineering, Materials Engineering and Industrial Design at Western Michigan University. A Clemson University faculty member since 1989, he has also taught at UH and Texas A&M University.

Ali Haider (1979 MSEE) and his wife Karen celebrated their 25th wedding anniversary on Nov. 4, 2002. Their son Hassan finished the New York City Marathon with Ali a day before the anniversary to celebrate the event. Ali and Karen got married while they were students at UH. Karen earned her BA from UH and MSIE from Arizona State and is now involved in various charitable activities in the Richardson area. They have three sons: Syed, Hassan, and Ali Jr. Ali is vice president of engineering at Chorum Technologies and can be reached at ahaider@ieee.org.

::::: 1980's :::::

Charles Londa Jr. (1983 BSChE, 1985 MBA) was named senior vice president of investments for Salomon Smith Barney.

Umesh Verma (1980 ChE) was recognized in the Ernst & Young Entrepreneur of the Year Awards Program for building Blue Lance Computer Security Software into the 28th fastest growing company in Houston. Houston Mayor Lee P. Brown proclaimed May 15, 2002 as Blue Lance, Incorporated Day in Houston. Umesh is president and CEO of Blue Lance.

Mike Baldwin (1987 BSCE) and wife Julie have established a $10,000 endowed scholarship at the UH System at Sugar Land for engineering and business students. While at UH, he was chapter president of Chi Epsilon fraternity and a member of Tau Beta Pi, the engineering honor society. In 1991, he formed Provident Engineers, Inc., a civil engineering firm of which he is currently president. They recently established Goldenrod Development, a subdivision in the Richmond area.

John Grounds (1987 MSCE, 1988 PhD CE) ran in his 13th consecutive Houston Marathon. He is chair of the Water & Drainage Committee, past president of the American Water Resources Association and is an active volunteer for the American Cancer Society in the Relay for Life. He works on the Tropical Storm Allison Recovery Project (www.tsarp.com) at Brown & Gay, Inc., a Houston consulting firm. He has two daughters: Elizabeth, 2, and Jennifer, 8 months.

Kaihan Abidi Ashtiani (1988 BSEE) is director of technology for Novellus Systems, Inc. in San Jose, California. After graduating from UH, he received his MS and PhD at the University of Wisconsin-Madison in electrical and computer engineering specializing in plasma-aided manufacturing. Kaihan can be reached at kaihan.ashtiani@novellus.com.

::::: 1990's :::::

Nathan Harris (1995 BSME) presented two papers at the 53rd International Astronautical Congress at The World Space Congress 2002 in Houston Oct. 10–19. The paper he wrote with George Morgenthaler, former president and CEO of Lockheed Martin and currently at the University of Colorado, was entitled, "Planning, Implementation and Optimization of Future Space Missions Using an Immersive Visualization Environment (IVE) Machine." The second was written with Michael Yukish of the Pennsylvania State University and

Alumni News Briefs

Distinguished Engineering Alumni Awards Dinner

PHOTO BY JONATHAN COBB

The Engineering Alumni Association will honor Jesse Gonzales (1969 BSCE) and Manmohan Kalsi (1969 MSME) as Distinguished Alumni at the 2003 Distinguished Engineering Alumni Awards Dinner on Friday, June 7 at the Four Seasons Hotel in Downtown Houston. Other honorees include Siddika Demir (1993 BSCE) for the Distinguished Young Engineering Alumnus Award, Ray Scheliga (1979 BSME) for the Roger Eichhorn Leadership Service Award, and Osman Ghazzaly for the Abraham E. Dukler Distinguished Engineering Faculty Award.

The awards program was established in 1987 to recognize alumni, faculty and friends of the UH Cullen College of Engineering and the Engineering Alumni Association for significant contributions to society and the profession. For more information, visit www.egr.uh.edu/alumni/?e=awards.

Alumni Support Student Organizations

This year, the Engineering Alumni Association budgeted $5,000 to support engineering student society activities, particularly to help sponsor travel to regional or national meetings to participate in discipline-related contests (paper contests, concrete canoe race, steel bridge contest). Representatives of the student organization must make a brief presentation to the board explaining their request, provide a one-page description and one-page budget, and give a follow-up report after the event.

Are you interested in taking a more active role with the Engineering Alumni Association? Volunteers are needed throughout the year to help with a variety of activities. For more information or to get involved, visit www.egr.uh.edu/alumni, e-mail alumni@egr.uh.edu, or call 713-743-4200.

UH Day in Austin

PHOTO BY THOMAS SHEA

EAA president Billy Cooke (1978 BSCE), Mary Schulz and Angie Shortt with the Cullen College of Engineering, State Representative Wayne Smith and wife Brenda Smith, and Dawnelle Prince with the college at UH Day in Austin on Feb. 18. Other engineering alumni that participated that day included Bill Fendley (1971 BSCE), Dale Rudick (1991 BSCE), Ray Scheliga (1979 BSME) and Daniel Wong (1985 MSCE, 1988 PhD CE).

15th Annual ASME/UH Cajun Crawfish Boil

The 15th annual ASME/UH Cajun Crawfish Boil will be held Sunday, May 4 from 1–5 p.m. in Lynn Eusan Park on the UH campus. This popular kick-off event to the Offshore Technology Conference draws over 5,000 people to the campus each year. The event will feature live music by Zydeco, a display by high school robotics contest winners, games and a moonwalk for kids, crawfish, hot dogs, barbecue, beverages and $10,000 in door prizes. For more information, contact Diane Ashen at 713-271-1983.

PHOTO BY ANGIE SHORTT

14th Annual Golf Tournament

PHOTO BY JONATHAN COBB

Approximately 112 golfers helped raise money to support the UH Cullen College of Engineering at the 14th Annual Engineering Golf Tournament on April 7 at Hearthstone Country Club. Low Net winners are listed below; Low Gross winners were Mike Alton, Gary Craig, John Mendel (1972 BSME) and Mike Wallace from W.W. Industries, Inc.; the longest drive was Brian Muery; and the closest to the pin was Dustin Qualls. To see pictures of the golfers and a listing of sponsors, visit www.egr.uh.edu/news/0403/?e=golfrecap.

Low Net winners on April 7 were Benny Bartos, Kippy Clearinger, Colby Wright (2002 BSCE) and Dustin Qualls from Traffic Engineers, Inc.

entitled, "Formulations to Support Automated Satellite Design Synthesis." Nathan is a senior mechanical engineer at Lockheed Martin Space Systems Company in Denver.

::::: Marriages :::::

Keir Wylie (1999 BSME) married **Nicole Kelm** (2000 BSME) on Sept. 7, 2002 in Houston. Keir is a senior mechanical engineer for ALSTOM Power Inc. and can be reached at keir.wylie@power.alstom.com. Nicole is a project manager for Forensic Engineers Inc. and can be reached at Nicole@ForensicEng.com.

::::: Births :::::

David Higgins (1986 BSCE, 1995 MSCE), wife Alma and big sister Eva welcomed home Emma Rose on Feb. 8, 2003. She weighed seven pounds and four ounces and measured 18 ½ inches long.

Anu Lal (1995 BSEE) and husband Shirish welcomed home Anisha Agrawal Lal on May 6, 2002. Also enjoying their new granddaughter are **Durga Agrawal** (1974 PhD IE) and wife Sushila.

Jacob Collins (2001 BSChE) and his wife welcomed home their first child Allan David Collins on July 15, 2002. Jacob works for NASA and has hopes of becoming an astronaut.

::::: Deaths :::::

Louis Aaron Kronberg (1947) died Nov. 14, 2002 at the age of 79. A loyal alumnus of San Jacinto High School, he had just attended his 61st reunion. He served in the U.S. Army Air Corps in the Pacific during WWII, attaining the rank of corporal. A self-described gourmet chowhound and raconteur, he was also an avid Ham Radio enthusiast (W5IHY) and renowned water colorist. He along with his wife Mamie established Associated Builders Specialties, now known as Kronberg's Flags and Flagpoles.

Thomas Edmund Pickell (1950 BS ChE) died Nov. 6, 2002 at the age of 73. A native Houstonian, he was a direct descendent of Alexander Hodge. A retired employee of the City of Houston, he served as a lieutenant in the U.S. Army in Korea, umpired for the parks department for many years and was a member of the Knights of Columbus as well as the American Legion.

Frank Alley (1956 BSEE) died Feb. 18, 2003 at the age of 83. During WW II he served in the Coast Guard where he met and married the love of his life, Mildred, in New York City in 1945. He then moved to the Houston area in 1946 where he raised his family and graduated from UH. He practiced his profession with Reed Roller Bit, Hughs Tool, Texaco, BS & B and at NASA during the first moonwalk expedition. He was married to his wife Mildred for 57 years and they had two children, Donna and Clark, and one grandson, Steven.

Julius Victor Tupa (1956) died Oct. 5, 2002 of cancer at the age of 71. A guitarist and bass player, Tupa performed in Western swing and polka bands, and his last group, the decade-old Sound Connection, was the first Slovenian-style polka band in the state. In 1951, he made his first recording and met his future wife at a Heights-area Czech dance hall. The Tupas were married three years later in Germany, where he was stationed with the military. Additionally, he was editor of the *Texas Polka News*, a 16-page monthly publication, founder and director of the Texas Polka Music Association, a founder with his wife, Marie, of the Texas chapter of the Polka Lovers Klub of America—they were the group's first king and queen—and host of the long-running Saturday morning Polka Express on KYND-AM. Tupa began his radio career on a Rosenberg station in 1984, then moved to KYND four years later. In 1956, Tupa, enrolled as an electrical engineering student at UH. Tupa was a lifetime achievement member of the American Legion Post 654 and the VFW Post 8790. He was also a member of the Knights of Columbus Council 4550, the Czech Heritage Society and the Slavonic Benevolent Order of the State of Texas.

Alumni News Briefs

2002 Graduates

The Class of 2002 engineering graduates from UH received their degrees at the Cullen College of Engineering Convocation on May 11 and Dec. 20, 2002. A web cast of the ceremony is available at www.egr.uh.edu/academics/graduation/?e=gradwebcast.

2002 Engineering Degrees Awarded	
Bachelor of Science Degrees:	193
Master's Degrees:	131
Doctoral Degrees:	29
Total:	**353**

Top: May 2002 graduates
Middle: December 2002 graduates (bachelor's)
Bottom: December 2002 graduates (master's and doctoral)

Homecoming 2002

Engineering alumni, faculty and friends gathered early on Nov. 9 for a Homecoming Reception honoring engineering alumni from 1940–1959. Following the brunch in Engineering Building 1, approximately 200 engineering alumni, faculty, staff, students and friends came out to Engineering Alumni Association's annual Homecoming tailgate party to eat barbecue and reunite with old classmates. Even the children were entertained for hours in the moonwalk. During the live auction, Bill Fendley (1971 BSCE) and his wife Pam once again won the Four Seasons Suite, perhaps unofficially renaming it the "Fendley Suite." A special thanks to the following sponsors that contributed to the raffle and auction: Four Seasons Hotel, Radoil, Inc., Klotz Associates Inc., Lockwood, Andrews, Newnam, Inc., ABB Vetco Gray and Cobb, Fendley & Associates, Inc.

The Homecoming tailgate was also a gathering of great minds. EAA past presidents Bill Fendley (1971 BSCE), Leo Garcia (1978 BSCE, 1997 MBA), Mike Lacy (1985 BSCE), Mark Loethen (1981 BSCE), Ray Scheliga (1979 BSME), Jim Sikes (1970 BSME) and Tom Sofka (1975 BSCE) made plans to create a formal EAA Past Presidents Advisory Board.

For its active involvement this year, EAA received the Houston Alumni Organization's 2002 Red Banner Year Award at its Annual Meeting on Nov. 9. This was the fourth year that EAA has won this prestigious award. Also honored was Stuart Long, associate dean and professor of electrical engineering, as an Outstanding Faculty Award Recipient for demonstrating outstanding teaching skills and having countless accomplishments and faculty and student recommendations.

Alumni and faculty at the UH Cullen College of Engineering's Homecoming Reception on Nov. 9 honored the engineering graduates from 1940–1959.

Lynn and Roger Schultz (1958 BSChE) with Mike Harold (1985 PhD ChE), chair of the Department of Chemical Engineering.

Charles Campbell (2002 BSChE) with Allison Mascorro at the Cullen College of Engineering's Homecoming Reception on Nov. 9.

PHOTOS BY JONATHAN COBB

George Henry Pardue, Jr. (1968 MSME) died Jan. 9, 2003 at the age of 76 due to complications from Alzheimer's disease. He served in the U.S. Navy during WWII and was a Phi Beta Kappa, a Shriner and a "Rambling Wreck from Georgia Tech," earning a bachelor's degree in mechanical engineering in 1948. Pardue had a long and distinguished career as a professional mechanical engineer with Schlumberger Well Services, including as a consultant after he took early retirement to care for his ailing mother. He was reported as the last paralytic polio victim in Houston, contracting the disease in 1962. Despite this setback, and while working full time to support his family, he returned to graduate school at UH, where he graduated with a master's degree in mechanical engineering in 1968. He was preceded in death by his wife of 47 years, Sarah Frances "Pam" Galvani Pardue.

Nelson Clegg "Ned" Turner (1971 BSEE) died Feb. 12, 2003 at the age of 98. In the early 1930s, he spent two years in the Soviet Union advising the government about modernizing natural gas processing facilities. At the time, Turner, a chemical engineer, worked for Burrell-Mayes Engineering Corp., which contracted to advise the Soviet government about upgrading their gas industry. After returning from Russia, he went to Clarion, Pa., to design a liquefied gas plant. There he met his future wife; they were married in 1935. Born in Chicago, Turner grew up in Sciotoville, Ohio. In 1925 he graduated from Ohio State University with a degree in chemical engineering. During WWII he worked in Tulsa, where he formed a partnership in the Mayes-Turner Engineering Co., which was building airplane gasoline plants in the area. In 1947, Turner joined Hudson Engineering Corp. in Houston as a vice president. In 1959, he joined Transwestern Pipeline, where he stayed until retiring in 1969.

Michael Otto Sullivan (1987 MS ChE) died Jan. 8, 2003 at the age of 44. He was a passenger on flight US Airways Express flight 5481, which crashed at the Charlotte Airport, killing all 21 aboard. Michael was a sales vice president for Case Software, a company where he spent the last 10 years. He learned to shave hours off his trips to make sure he was home with his family, wife Donna, 3-year old daughter Eleni and 15-month-old son Sam.

Key:

AeroE — Aerospace Engineering
BioE — Biomedical Engineering
ChE — Chemical Engineering
CE — Civil Engineering
ComE — Computer Engineering
EE — Electrical Engineering
EnvE — Environmental Engineering
IE — Industrial Engineering
ME — Mechanical Engineering
PE — Petroleum Engineering

class notes & alumni news

Class Notes

Send us your alumni news about new jobs, promotions, honors, moves, marriages, births, etc. Attach additional news clips or photos separately. Please include a self-addressed stamped envelope if you want your photos returned.

All Class Notes should be sent to:
Parameters Magazine, UH Cullen College of Engineering
E316 Engineering Bldg 2, Houston, TX 77204-4009
E-mail parameters@egr.uh.edu or visit www.egr.uh.edu/parameters

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News _____

Alumni News Briefs

UH Engineering Alumna and Former Shuttle Instructor Remembers Columbia

Neurologist Liana Dawson (1981 BSIE) and her husband, Carroll (1968 BSME, MSEE), were two of the many UH engineering graduates deeply affected by the recent space shuttle Columbia tragedy.

Liana spent 14 years working with NASA on the first eight space shuttle flights at Houston's mission control center. Carroll, now retired, spent more than 30 years working at NASA on projects ranging from Skylab, Apollo to the space shuttle.

"I just cried, and I'm not normally a tearful person," Liana says from her office in Good Shepherd Medical Plaza in Longview, Texas.

Liana was working at NASA in 1986 during the Challenger disaster when that shuttle's crew was killed soon after launch.

"This really brought back a lot of memories of what everyone with the program went through then," she says. "I had some friends on the Challenger, and I remember how I felt then. Judy Resnick helped tutor me, and Ron McNair was in a 17-piece band that I was in that was composed of flight controllers and astronauts who played locally in the area."

Liana said she is hopeful the tragedy will not set back the nation's space exploration program too much. The fact that there is a manned space station in orbit already could facilitate action to get additional flights in motion, she says.

"It is my hope and dream that some day the space program will get to Mars—but I'm not sure it's going to happen in my lifetime," she says.

Liana says some of her most significant years working for the shuttle program were those spent as a shuttle flight-training instructor. The training involves a lot of simulation, classroom training and workbook training, and part of her job was to develop a workbook called the crew software interface.

"As simulation instructors, we would build scripts that had programmed failures to test certain systems and would cause certain problems so the mission controllers and the crew had to go through check-listed procedures to try to recover," Liana says. Her initial work with the space program was through a contractor, McDonald-Douglas, in a job she landed while attending the UH Cullen College of Engineering.

"The UH Co-op program is the reason that I ended up at NASA," Liana says. "It all started through a Co-op job at NASA with McDonnell-Douglas," says Liana, who speaks highly of the value of her UH education. "The industrial engineering degree is a very well rounded one for going into technical fields. I thought I got a very good engineering education at the University of Houston."

After deciding it was time to tackle new challenges in her life, Liana left the space program to attend medical school at Baylor College of Medicine, but she returned to UH for another year and a half of pre-med classes before entering medical school. That work was also instrumental in her future success.

"I went back to the University of Houston for a year and half of background courses," she says. "In fact, I was very close to a second degree by the time I left for medical school. I also repeated some courses because biology, for example, had changed a whole lot. The counselors at the University of Houston really helped me too. I was having some second thoughts about age, about whether or not I was too old to be embarking on this long undertaking—I was 33—and they were very supportive, they told me to stick with it, that I wasn't too old."

Liana, in the fourth year of her medical practice, says she has a mix of the type of personality that needs to be in medicine and the type that needs to be in engineering.

"One of the things that I do in neurology is called EMG/Nerve Conduction Velocity Studies. It's an electrical study that tests the nerves, their conduction velocities, and listens to the muscles and listens to muscle recruitment patterns and spontaneous activity and deduces diagnoses from those studies. Those are very objective, scientific, engineering-type studies. So in a way I kept that part of me and applied it to my medical field."

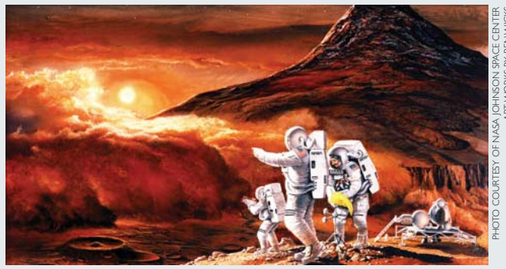


PHOTO COURTESY OF NASA JOHNSON SPACE CENTER ART WORKS BY REN WICKS

Artist's concept of the landing of the first human mission to Mars in the year 2019. In the foreground, astronauts conduct scientific observations, recording wind speed with an anemometer and planetary features with a hand-held camera.

Chemical Engineer Sets Sights on New Treatment for SICKLE CELL ANEMIA

BY BRIAN ALLEN

14 seconds.

That's about how long it takes for red blood cells to circulate from the capillaries back to the lungs. For patients with sickle cell anemia, it's also the time it takes for their mutated red blood cell hemoglobin to harden into ordered structures, called polymers, which cause the painful and sometimes lethal symptoms of the disease.

The defective hemoglobin molecules are only susceptible to the tendency to crystallize while they're in the "deoxy" state, so the window for polymerization is brief, but recurring. The triggering process for polymerization, the point at which a molecule begins the phase transition from liquid to crystal form, is called nucleation. The challenge before medical science, says UH Chemical Engineer Peter Vekilov, is to find a way to slow down nucleation in sickle cell hemoglobin.

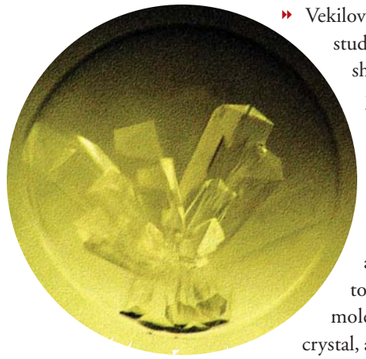
> "My hypothesis is that nucleation is the weakest link in the disease. It is the stage at which the disease should be attacked," says Bulgarian-born Vekilov, who joined the UH Department of Chemical Engineering as an associate professor in the summer of 2001. "Nobody has ever directly studied nucleation. We are one of only two labs in the entire country involved in this kind of work." »

PHOTO BY MARK LACY

Faculty research showcased

How Does an Atomic Force Microscope Work?

The atomic force microscope, pictured here, measures forces on an atomic scale by using a tiny cantilever with a mounted, force-sensing tip that lightly drags across the surface of the sample. The tip is sharpened to a width of a few nanometers. As the tip makes its way across the surface, a corresponding laser deflection detects the motion of the tip and converts it to a topographical image of the sample.



Crystals of the protein lysozyme.

» Vekilov is not just breaking ground in the study of sickle cell hemoglobin. He is shedding light on the fundamental principles of nucleation itself—and the scientific community has taken notice. In August 2000, Vekilov published an article in *Nature* titled "Quasi-planar nucleus structure in apoferritin crystallization." Vekilov, along with co-author Siu-Tung Yau, took the first pictures of individual molecules forming the nucleus of a crystal, and their pictures revealed something unexpected: The polymer "hatchlings" were not spherical in shape, but rather had a mostly flat, raft-like form.

Using a modified atomic force microscope, Vekilov was able to view the protein apoferritin as it began to crystallize in a solution, something no scientist had ever been able to achieve with any kind of molecule. The implications of this discovery are far reaching, says Vekilov, who developed an original technique to "trap" the molecules at the moment of nucleation, a point when they would normally have been in motion and impossible to view.

Some of his most important current research at the UH Cullen College of Engineering now brings to bear his unprecedented understanding of nucleation on the mysterious mechanisms that underlie the pathology of sickle cell anemia.

"There are actually many technological and health-related issues in which you want to control the rate of nucleation," Vekilov says. "Sickle cell anemia is a clear case where even a modest slowdown in the rate would yield a breakthrough in treatment. We don't need to prevent nucleation; we just need to slow it down. It takes somewhere between 14 to 20 seconds for the red blood cells to get from the capillaries to the lungs. Once it gets to the lungs, the hemoglobin turns into its oxy form and no longer polymerizes. So it's only in the venal circulation that the polymerization occurs, in the deoxy state."

What is Vekilov's strategy for discovering a method for slowing down the nucleation rate?

"First, we will measure the nucleation rates under different conditions; then we will uncover the mechanisms of nucleation; and then, based on what we have learned about nucleation, we will try to find ways to slow it down," says Vekilov, who hopes to deliver treatment strategies within the next five years. Meanwhile, the journey toward discovery promises to yield more insights into the fundamental mechanisms of nucleation.

"There are actually many technological and health-related issues in which you want to control the rate of nucleation," Vekilov says. "Sickle cell anemia is a clear case where even a modest slowdown in the rate would yield a breakthrough in treatment."

"The nucleation rates of sickle cell hemoglobin are huge," Vekilov says. "They are one billion times greater than the rate of nucleation of protein crystals. It is a mystery why this is so. What makes it so easy to nucleate?"

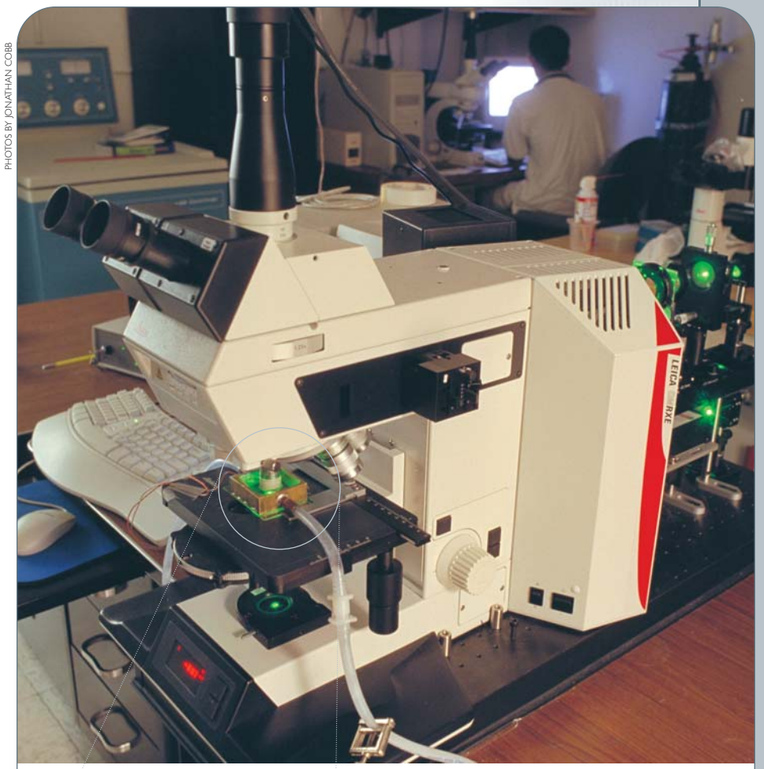
The rate of nucleation is even more puzzling considering the size of the sickle cell hemoglobin molecule. Ordinarily, the smaller the molecule, the faster the rate of nucleation. The sickle cell hemoglobin is 30 times larger than a water molecule, and yet its rate of nucleation is about equal to the rate for water droplets nucleating from vapor.

"We know that the rate of nucleation is an exponential function of many factors, including temperature, concentration, composition in terms of the presence of other compounds. We will examine all of these in a variety of conditions to discover which ones play the most important role. The red blood cell has several hundred small molecule components, and roughly 20 of those compounds have a comparable concentration to hemoglobin. We have already identified »

What is Sickle Cell Anemia?

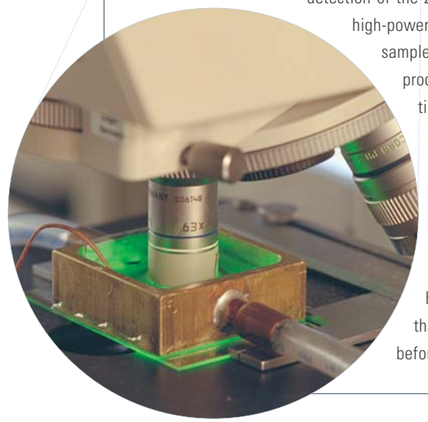
Sickle cell anemia is an inherited blood disorder in which the hemoglobin, an oxygen-carrying molecule within the red blood cell, is defective. After the hemoglobin molecules give up their oxygen, some of them condense into rod-like structures that cause the entire cell to stiffen into a sickle shape that no longer will fit through the tiny blood vessels where a normal red blood cell must go. The result is painful blockages that can lead to serious tissue damage in vital organs and a chronic low blood count called anemia. Half of those born with sickle cell anemia die before reaching the age of three. Roughly 72,000 people in the United States have the disease, and another 2 million Americans carry the sickle cell trait in their genes.

PHOTOS BY JONATHAN COBB



SPECIALLY EQUIPPED MICROSCOPE ENHANCES RESEARCH EFFORTS

This fluorescent microscope, used in research on the nucleation of fibers of sickle cell hemoglobin, is equipped with differential interference contrast imaging that allows detection of the 22-nanometers-thick fibers. In addition, it employs a high-powered green laser for flash photolysis of the hemoglobin samples to initiate the reaction of fiber formation. The processes are recorded in real time with a 9-millisecond time resolution using a high-resolution, high-contrast digital video camera. A custom-made thermocouple-controller assembly allows determination of the temperature in the sample within 1 millisecond. The short characteristic times of the experimental techniques are necessitated by the processes of formation of the sickle cell hemoglobin fibers that have a maximum length of 10–20 seconds, the time that a red blood cell spends in the veinal circulation before reaching the lungs.



Other research projects Vekilov and his group are currently working on include:

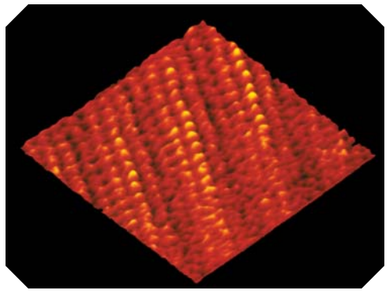
» The protein crystallization project is an investigation of the processes leading to the formation of protein solid phases, ordered or disordered, and the mechanism of defects generation in protein crystals at the molecular level.

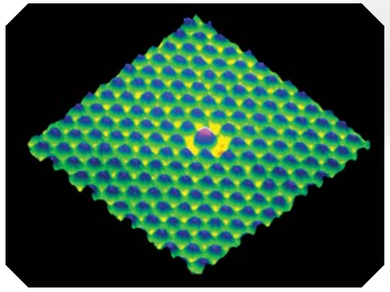
» Research on protein intermolecular interactions and phase diagrams focuses on the correlation between the intermolecular interaction potentials, the means to modify them in a physiologically compatible way, and the phase behavior of the protein solutions.

» A project establishing the criteria for the impact of reduced gravity on protein crystal perfection is based on the link between the variations in the rate of supply of material toward a growing protein crystal and the patterns formed by the growth steps on the crystal surface.

» Research on kinetics and stability of crystal growth is a search for means to constrain and minimize detrimental step bunches during the growth of small-molecule and protein crystals.

» Retinal signal transduction research aims at direct statistical characterization of the binding of transducin to a retinal surface protein.





about ten. So this is one strategy: Identify these compounds and determine which ones have the most effect on nucleation."

Another strategy is to study the variability of those compounds in people.

"Nobody has ever studied the variability of these compounds in individuals," Vekilov says. "Maybe you have a little bit more. Maybe I have a little bit less."

The compounds could lead to further insights, because they are the likeliest explanation for the wide variability in the symptoms of the disease.

"Some patients live to be 70 and never have a crisis," he says. "Why?"

In the months ahead, Vekilov and his colleagues will be looking for the answer. Vekilov's team of researchers, some of whom came with him from the University of Alabama at Huntsville, include Oleg Galkin, assistant research professor; Nick Booth, senior research associate; Olga Gliko, research associate; Ilya Reviakine, research associate; and six graduate students: Mrinal Shah, Panos Katsonis, Luis Filobelo, Dimitra Georgiou, Weichin Pan and Yasser Qutub.

Vekilov was born and raised in Sofia, Bulgaria, the country's capital, by parents who were successful university professors. His father was a professor of medicine and philosophy, his mother a professor of chemistry. He was educated at Moscow State University, where he earned a master's degree in chemistry in 1985, and at the Russian Academy of Sciences, where he earned a Ph.D. in chemistry in 1991. Between his master's and his Ph.D., Vekilov served a mandatory two-year term in the Bulgarian army.

"They trained me as a mess officer," Vekilov says with a grin. "I was chief of the mess. As long as my soldiers had rosy cheeks, I was happy."

Vekilov worked in Bulgaria and Japan for two years before coming to the United States to pursue his career in science and education.

"After graduating in 1991, I worked for a year in Bulgaria. Communism had collapsed, democracy was getting its foundation and the economy was in trouble. I saw that there were going to be problems in science, so I decided that if I wanted to keep the investment that I had made—which actually the government had made—I had to get out of the country."

Vekilov resides in Friendswood with his wife Roumy and two daughters, Elena, age 14, and Dessy, 12. ■

PROFESSOR'S WORK
DISPLAYED ON COVER OF SCIENCE MAGAZINE

The work of University of Houston Chemical Engineering Associate Professor Peter Vekilov and Assistant Research Professor Oleg Galkin is on the cover of the Feb. 14, 2003 issue of *Science* magazine.

The striking image on the cover is a crystal of human hemoglobin C (approximately 600 micrometers across its horizontal diagonal), one of the hemoglobin mutants whose crystallization underlies hemolytic anemia. The image provides illustration for the upcoming Gordon Research Conferences on Thin Film & Crystal Growth Mechanisms.

This prestigious distinction follows quickly on the heels of Vekilov's recently published paper in the journal *Proceedings of the National Academy of Sciences of the United States of America*.

In that paper, Vekilov disproves the applicability of existing theories explaining how and why proteins and other small molecules congeal into solids while dissolved in water, their natural state.

His paper, "Diffusion-limited kinetics of the solution-solid phase transition of molecular substances," reveals that previously accepted theories involving transition-state kinetics are not followed by broad classes of substances, and that the only force driving the transition is the naturally occurring random movement of surrounding water molecules and their impact as they carom into the proteins or other small molecules in question.

The discovery provides researchers of various protein condensation diseases, such as Diabetes II, Alzheimer's, Parkinson's and Huntington's Disease, with a valuable insight into the fundamental molecular mechanisms of the critical aggregation process that leads ultimately to the symptoms of those diseases.

"The mechanisms of solution-solid phase transitions hold true for a cluster of diseases, most of which are neurological disorders," says Vekilov. "We hope our findings will provide insight to those in search of new ideas and methods of treatment."

Vekilov's experiments focused on two protein molecules, ferritin and apoferritin, which have identical shapes but different masses. Using an atomic force microscope, Vekilov and his co-authors Dimiter N. Petsev, Kai Chen and Olga Gliko observed identical rates of crystallization for the two proteins. That finding rules out the previously accepted notion that solution-solid phase transitions are driven by transition-state kinetics, says Vekilov.

"If this phase transition follows Einstein's law of Brownian diffusion, as we predicted," Vekilov says, "the mass and velocity of the protein molecules should have no effect on the rate coefficients. And this is precisely what we observed. The rates were identical despite a significant difference in mass and velocity between ferritin and apoferritin."

Vekilov's research is funded by grants from the Office of Biological and Physical Research, National Aeronautics and Space Administration, and the National Lung, Heart and Blood Institute, National Institutes of Health.

RENDERINGS OF PLANE COURTESY OF NASA LANGLEY RESEARCH CENTER

UH ENGINEERS

Help Develop NASA's Visionary New Aerospace Initiative

BY BRIAN ALLEN

Imagine an airplane that morphs into different shapes, monitors its own structural health and even "heals" itself in mid-flight.

That's the kind of futuristic vision University of Houston engineers are working to fulfill as members of a new nationally funded research institute launched last October at the George Bush Presidential Conference Center in College Station.

The University of Houston is one of six participating universities in NASA's new Texas Institute for Intelligent Bio-Nano Materials and Structures for Aerospace Vehicles (TiiMS), which will be administered by the Texas Engineering Experiment Station at Texas A&M University.

U.S. Senator Kay Bailey Hutchison joined faculty and dignitaries from UH and other participating institutions last October to launch a $15 million research program aimed at developing high-tech materials for future airplanes and spacecraft.

"Through projects such as TiiMS, we are rekindling interest in bringing young people in and having NASA associate with our universities," Hutchison said. "We will be encouraging more people to go into science and engineering. The research conducted at the institute will allow American science to soar into the future. The research will not only advance aerospace technology but also help develop goods and products we can use for our everyday lives here on Earth."

Hutchison was joined by Arthur Vailas, UH vice president for research, and by dignitaries from other participating universities and from NASA.

TiiMS is one of NASA's seven new University Research, Engineering and Technology Institutes (URETIs), which include elite research universities such as Princeton, Maryland and Purdue. The institutes are all related to NASA's bold initiative to thrust aviation and space flight into a whole new realm of technological advancement and efficiency. The role of the URETIs will be to research and exploit innovative and emerging opportunities in technology that can have a revolutionary impact on the missions NASA pursues in the future.

Vailas sees UH involvement in the institute as a resource for building stronger collaborative research relationships, both within and outside the university.

"The URETI program is a resource and network base that builds upon our existing strengths in material science, the biological science and nano-technology," says Vailas. "This is also good recognition for the Cullen College of Engineering, and especially mechanical engineering, and I commend the college for taking a leadership role in this. At the same time, it's important to recognize the contributions of others because the excellence of this endeavor lies in the value of strategic collaboration."

In addition to UH and Texas A&M, TiiMS research partners include Rice University, Texas Southern University, Prairie View A&M University and the University of Texas at Arlington.

"This really represents one of the first times that our college has been involved in a multi-university, federally funded research center," says UH's David Zimmerman, professor of mechanical engineering and an associate director of the institute. "For the past decade, that has really been the major funding model from a national perspective. This will raise the visibility of our university and our college, and will also point the way to establishing additional centers in the future."

University of Houston engineers and scientists will concentrate on two broad research areas. The major focus of the UH initiative will be to establish distributed intelligence architectures to improve flight and mechanical performance and safety of future aircraft and spacecraft. The second effort will focuses on fabricating new nano-materials that are stronger and lighter than conventional materials.

While adaptive shape reconfigurability, or "morphing," is the main focus of the institute, NASA's vision is that future structures and materials will also incorporate the following features:

» Multi-functionality
» Sensing
» Health-monitoring
» Self-healing
» Fault tolerance and autonomy/intelligence

These features will be developed at length scales from nano to macro, a staggering sweep of variation in sizes. The first official steps toward achieving those research goals were taken after the press conference.

"It was very exciting to see the wide range of support across all the universities for the objectives of the center," Zimmerman says. "The afternoon meetings were our first meetings with NASA people involved in discussing the long-term objectives of the center, and it was exciting to get their feedback into our planning."

Other UH faculty involved in the work of the new institute include Ramanan Krishnamoorti, Yi-Chao Chen, Lewis Wheeler, Karolos Grigoriadis and Fazle Hussain from the Cullen College of Engineering, and B. Montgomery Pettitt and T. Randall Lee from the College of Natural Science and Mathematics are also participating. In addition to the university's research involvement, the project has also received strong support from UH administrators.

"One of the reasons why we were successful here at UH as part of the team is that we had very strong support from Dean Flumerfelt and Dr. Vailas," Zimmerman says. "You have to have the infrastructure around you to be able to compete for a center, and our academic leaders really came together on this to ensure that we have that infrastructure." ■

PHOTO BY JONATHAN COBB

UH Engineering Professor David Zimmerman, who is spearheading UH's involvement in NASA's new aerospace initiative, is pictured holding a nodeball with truss components for a distributed control structural optic testbed. His research group is working on theories and associated algorithms for giving structures intelligence, and the testbeds will allow the researchers to evaluate how well the algorithms perform.

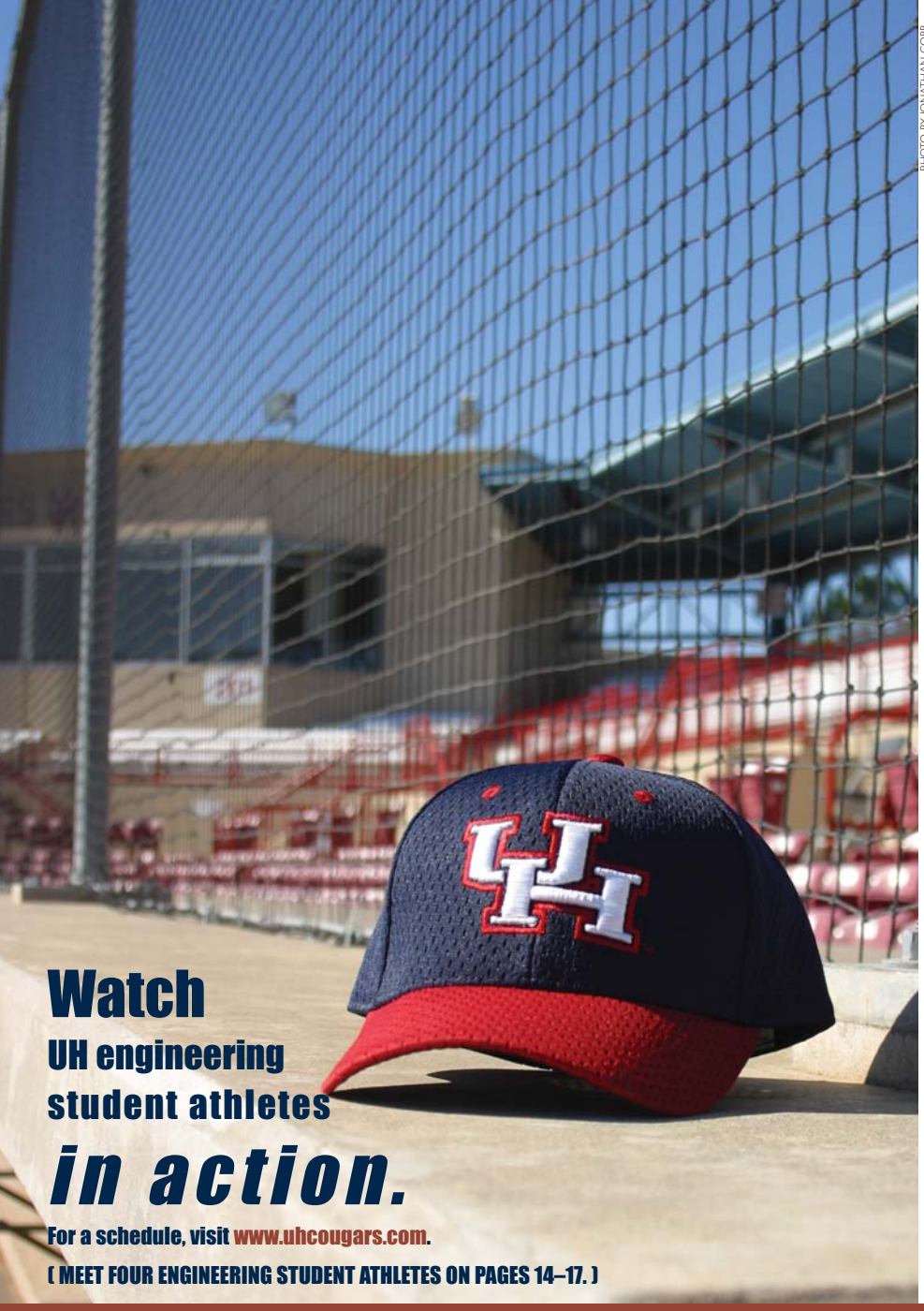


PHOTO BY JONATHAN COBB

2003 UH Cullen College of Engineering Events

Second Thursday of each month

Engineering Alumni Association Board Meetings
All engineering alumni are welcome
5:45 p.m.
Dean's Conference Room (E421 Engineering Bldg 2)

May 4

15th Annual ASME/Cajun Crawfish Boil
1–5 p.m.
Lynn Eusan Park, UH campus
See page 23 for details.

May 9

Engineering Convocation
1 p.m.
Cullen Performance Hall, UH campus

June 6

Distinguished Engineering Alumni Awards Dinner
6 p.m.
Four Seasons Hotel, Downtown Houston
See page 22 for details.

Offered between June 1 – July 11

Summer Camps for High School Students
For a full listing of summer camps offered to high school students by the Cullen College of Engineering, visit www.egr.uh.edu/news/?e=camps

For more information about any of these events, call 713-743-4200, e-mail alumni@egr.uh.edu or visit www.egr.uh.edu/events.

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