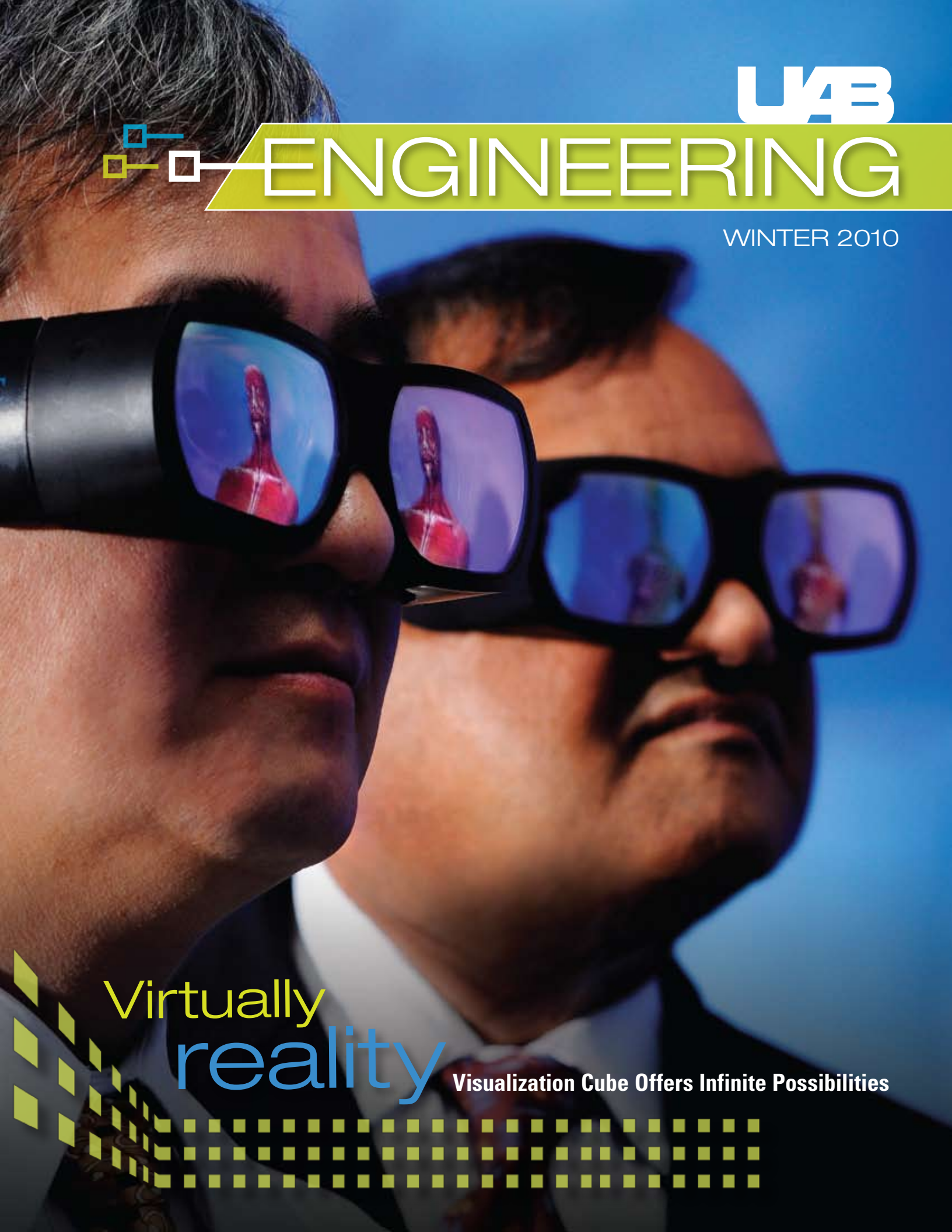

UAB

ENGINEERING

WINTER 2010

Virtually reality

Visualization Cube Offers Infinite Possibilities

ENGINEERING AGENDA

WELCOME to the Winter 2010 issue of *UAB Engineering*.

During a time of challenges and economic uncertainty, we are encouraged by projects at the School of Engineering that are leading the way to a brighter future.

In this issue, you will read about our new visualization cube—an extension of our visualization and simulation capabilities that will transform many different fields in the coming years. Our faculty have already laid the groundwork for collaborations in fields such as nursing, physical therapy, and medicine. But the beauty of this facility is that the technology can be applied to almost any field imaginable, from industry to entertainment to education.

In addition to the visualization cube, the school has also added the William F. Edmonds Interactive Learning Center—a high-tech classroom that has been completely outfitted with laptops and projectors. This classroom was made possible by a generous gift from BE&K. It will be used for many of our freshman learning communities, but it also is being used for graduate education. Along with the visualization cube and the Enabling Technology Laboratory, these facilities ensure our students will be trained using the most advanced technology to prepare them for the 21st century workplace.

Over the past year, our Engineers Without Borders group has continued to have an impact around the world, as our engineering students helped dig wells for drinking water in remote parts of Peru and helped with plans for a regional training facility in Zambia. The school is now offering scholarship money to incoming freshmen, which will help fund future Study Away experiences, ensuring that this exciting program continues to afford invaluable experience and opportunities to future students. Such funding, along with our honors programs and research opportunities, will help the School of Engineering continue to attract top undergraduate and high school students into the different fields of engineering.

Last fall, we held our second annual Blazer BEST robotics competition. Students from more than 30 central Alabama high schools and middle schools participated last fall at Bartow Arena, with more than 110 volunteers, many from the UAB community, helping to put on the event. We are truly thankful for all those who participated, and we anticipate this event continuing to grow in coming years as more area schools become involved.

With all the developments in the school over the past year, we are constantly encouraged by the support we receive from all of our alumni, as well as from the professional societies in the Birmingham area. The support we receive from engineers in the field helps ensure the continued growth of our school as we seek to provide the very best in engineering education and research.

Linda Lucas, Ph.D.
Dean, UAB School of Engineering

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UAB SCHOOL OF ENGINEERING

UAB Engineering is published by the UAB School of Engineering in collaboration with the Office of Public Relations and Marketing.

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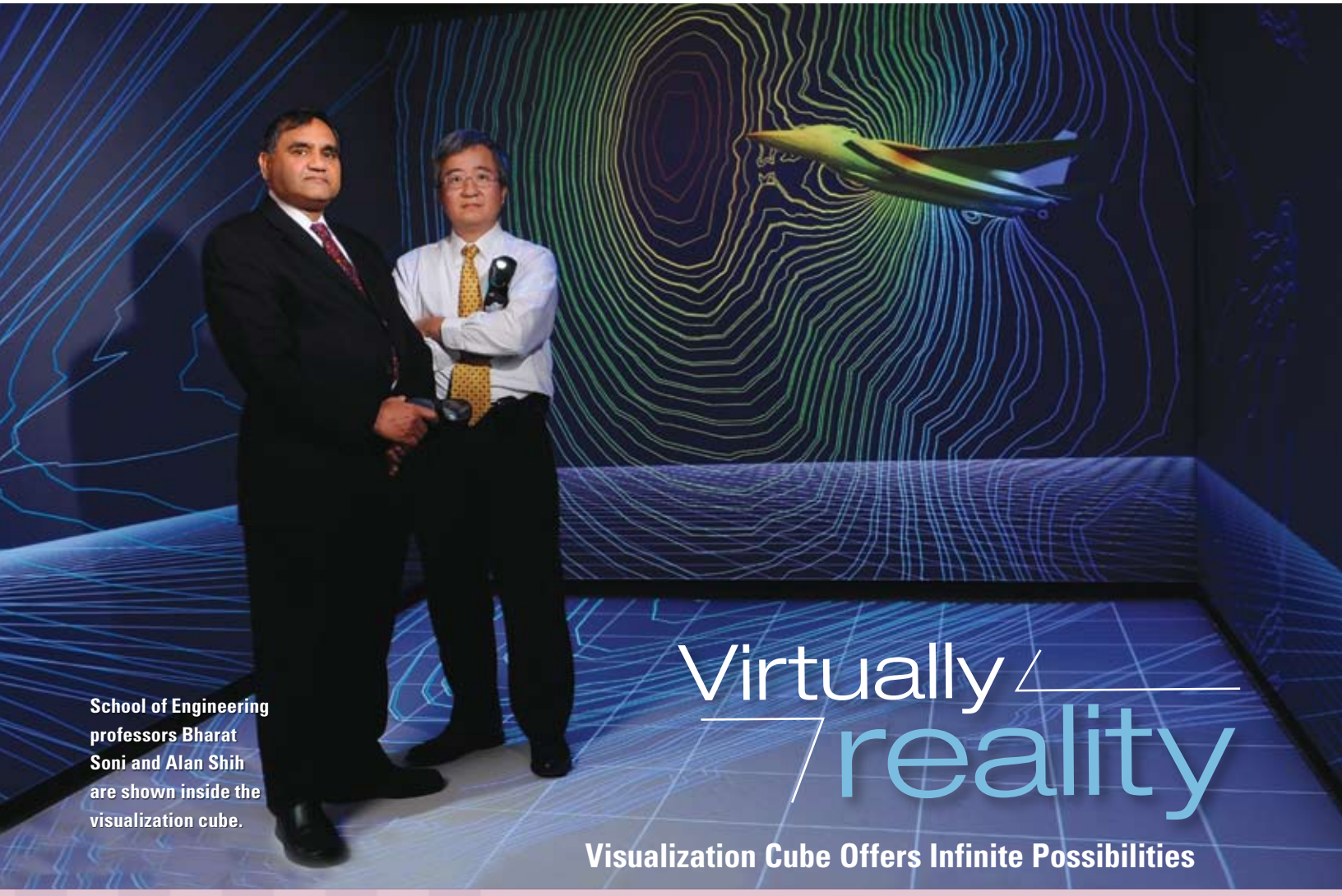


School of Engineering professors Bharat Soni and Alan Shih are shown inside the visualization cube.

Virtually reality

Visualization Cube Offers Infinite Possibilities

"One of our goals for this technology is to one day allow practitioners to go through a critical surgery in a virtual environment so that they can see exactly what issues might arise; they can get all the kinks out before they ever enter an operating room."

IMAGINE A PLACE where a recent amputee could learn to ski without risking serious injury; where a bomb squad could disarm any number of explosive devices with no chance for casualties; or where doctors could make precise injections and perfect incisions, performing flawless surgical procedures—all before they ever touch a patient.

Computational engineers of the Enabling Technology Laboratory in the UAB School of Engineering are assembling a facility in the UAB School of Engineering that will create just such a place—a virtual-reality environment that can be utilized for a host of creative applications. This "visualization cube" is the latest expansion of the school's computer imaging and simulation capabilities, and it will lead to revolutionary advances in medicine, rehabilitation, emergency management, training, and education.

"This facility will create a virtual environment and multidimension visualization capability resembling a real world," explains Bharat Soni, Ph.D., chair of the Department of Mechanical Engineering. "At UAB, we're using this technology mostly

for engineering and health-care applications, but the possibilities really are virtually endless."

The acquisition of the visualization cube was made possible through the financial support of the schools of Engineering and Health Professions and the state of Alabama.

The Virtual Patient

To demonstrate his point, Soni shows 3-D volumetric images of CT and MRI scans on a screen in the school's Enabling Technology Laboratory. A life-size image of a human pelvis rotates on the screen, turning 360 degrees to allow the viewer to examine it from every angle. Such images provide much more information than the two-dimensional versions, but when projected into a visualization cube, the images provide an even more immersive environment.

Soni says he envisions a future where doctors will utilize this imaging technology in conjunction with haptic devices, which add the element of touch to the immersive experience, allowing those wearing the devices to feel sensations of heat, cold, pressure, and resistance. "One of our goals for this technology is to one day empower practitioners to go through a critical surgery in a virtual environment so that they can see exactly what issues might arise; they can get all the kinks out before they ever enter an operating room," says Soni.

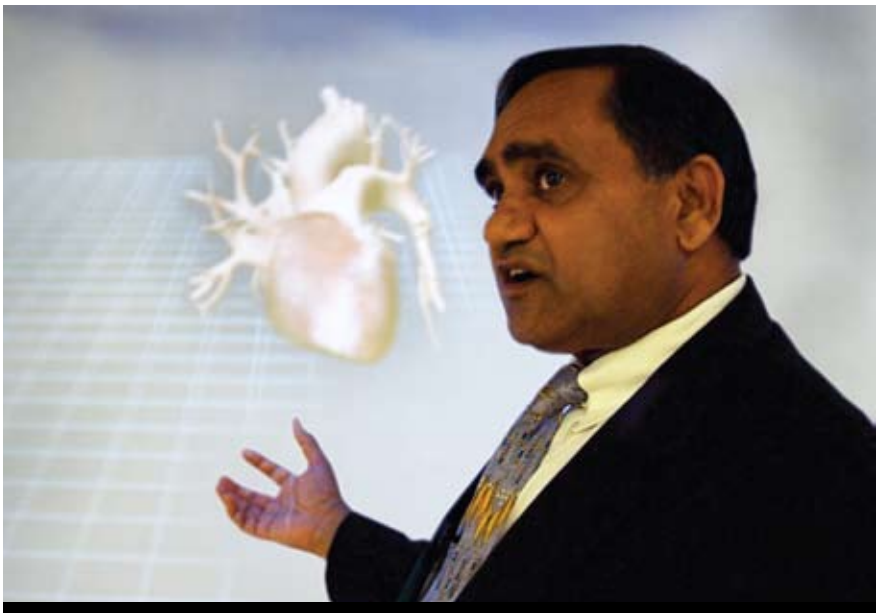
While this would be an obvious advantage prior to a risky surgery, the technology could find more widespread use in the classroom, where virtual patients could reduce the need for cadavers in medical schools. "The savings in time and expenses would be tremendous," Soni says. "Imagine how much more efficiently students could be trained by performing procedures in this environment."

Such capability, Soni says, would be a breakthrough for modern medicine, but perfecting the technology and actually incorporating it into hospitals is still five to 10 years away. In the meantime, however, there are infinite other uses for this type of imaging technology—and UAB researchers are already exploring many of them.

Simulating the Possibilities

Computer imaging and simulation have long been strengths of the School of Engineering. Soon after Soni arrived at UAB in 2002, the school set up the Enabling Technology Laboratory, which utilizes both 3-D and high-definition visualization technologies. Alan Shih, Ph.D., is director of the lab, where he and his team can simulate and

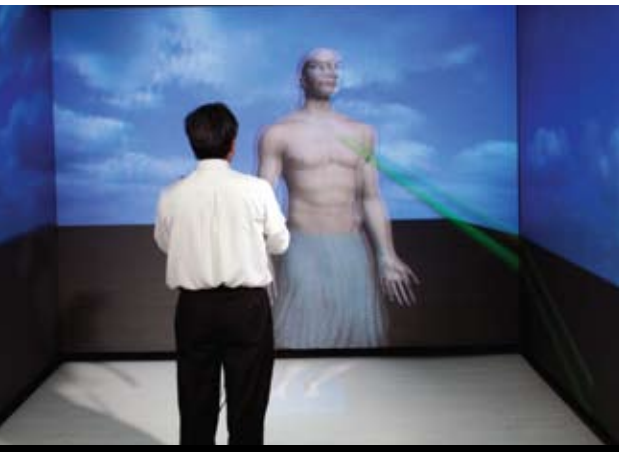
"This facility will create a virtual environment and multi-dimension visualization capability resembling a real world. At UAB, we're using this technology mostly for engineering and health-care applications, but the possibilities really are virtually endless."



Bharat Soni explains how 3-D visualization technology can increase the amount of information health-care workers can obtain from medical scans.

visualize wind currents through cities, blood flow through arteries, or air flow around a car or airplane.

On one side of the lab, two projectors beam images onto mirrors, which reflect onto a large screen. This creates a 3-D image when viewed through polarized glasses. On the other side, a similarly sized screen is separated into nine separate tiles that show images from nine precisely aligned projectors, resulting in a combined resolution of 3,000 x 2,300 pixels.



Inside the visualization cube, users can experience any number of simulated environments.

"People with disabilities can go into these virtual environments, and you can see exactly where the limitations are and which areas are showing progress. And all this is done with minimal risk to the patient."

Using these two screens, researchers are able to view 3-D images of medical scans as well as simulations of mechanical issues such as wind resistance and airflow. "By creating a visualization of airflow, you can study chaotic behavior, such as turbulence," Soni says. "This is a very useful design tool to help streamline products, such as designs for car or airplane parts. By visualizing these things on screen, you can see how the air would flow around them, thereby eliminating much of the time that would otherwise be spent machining parts and testing them in a wind tunnel or laboratory."

The technology has even broader applications. In a recent study for the U.S. Department of Homeland Security, UAB researchers were able to create a virtual model of Chicago in order to study wind currents through the city. This allowed them to provide information to first responders about how contamination would spread through the city in the event of a chemical accident or attack. A similar model was produced for New Orleans, showing how the population would most likely move in the event of a mass evacuation.

"By entering the relevant data, the computer will simulate precisely how such an event would play out," Soni says. "You can see exactly where the problem areas are likely to occur. Of course, you can't anticipate exactly how events might transpire during a disaster, but this simulation gives you a chance to see where the potential problems might arise and plan accordingly."

The concepts from those large-scale simulations could also be applied to medical scans. "You could input patient-specific diagnostics and simulate blood flowing through the veins, for example," Soni explains. "This could help a physician determine whether to insert a stent or to perform a bypass operation. Simulation technology allows you to get that information quickly with less stress on the patient."

Putting Simulation into Practice

As advanced as the simulations and images in the Enabling Technology Laboratory are, they are only images. They can provide tremendous amounts of information, but there is still a gulf between visualization and application. The new visualization cube, however, will bring those stages one step closer.

Soni's team is currently exploring collaborations with the School of Health Professions and Birmingham's Lakeshore Foundation that will empower patients to perform rehabilitation activities in the controlled environment of the visualization cube. "This is an exciting area to expand our 3-D capabilities because it has so many practical applications," says School of Engineering dean Linda C. Lucas, Ph.D. "People with disabilities can go into these vir-

tual environments, and you can see where the limitations are and which areas are showing progress. And all this is done with minimal risk to the patient."

For example, amputees are often taught to water ski as part of their therapy in order to strengthen their muscles and improve balance. For those patients, the cube can become a lake, and with the help of haptic and other devices, the patients can experience virtual skiing.

"It also gives the patients the feeling of actually participating in these activities," Soni says. "This allows them to build confidence and a comfort level that is very important in rehabilitation."

Playing Catch-Up

While the possibilities are exciting, Soni says areas such as medicine and education are way behind in the use of 3-D technology. Just last year, he says, the University of Florida filmed a football game in 3-D. "Of course, viewers had to wear glasses to get the 3-D effect, but if you have seen it once, you will never want to watch another game on a two-dimensional screen," Soni says. "There were 15 movies scheduled to come out in 2009 that will be available in 3-D; Samsung and Philips are already manufacturing 3-D televisions, so the entertainment industry is definitely a step ahead in getting the technology out there."

As exciting as that may be, Soni says it is a problem when children are being exposed to such exciting technology on a daily basis, yet schools are teaching from textbooks and using the same methods that were established decades ago. "We need to find new ways to incorporate technology into education," Soni says. "At UAB we're already using simple computational simulations to introduce high school students to basic engineering concepts, but we need to get more of those types of innovations into the classroom."

Education and training, medicine and health care, engineering and homeland security—these are just a few of the areas where Soni can envision a way to use visualization technology to make processes safer, more efficient, and more fun.

Abdul Kalam, former president of India, recently toured the Enabling Technology Laboratory along with a delegation that included Jim Folson Jr., lieutenant governor of Alabama; Rajiv Arora, consulate general of India, Houston Office; Sanjeev Mohoni, vice president of Mahindra Automotive Company, India; Richard Marchase, UAB vice president of research; and Malcolm Portera, chancellor of the UA System. Above, Kalam joins Bharat Soni in a visualization cube demonstration.

Keeping Pace with Progress

New Programs Help Graduates Stay Abreast of Industry Demands

In the past year, the School of Engineering has introduced new graduate programs that will help engineers in a variety of disciplines. Whether engaging in high-level research, pursuing opportunities on modern construction sites, or simply maintaining a secure exchange of information within a company, graduate students now have programs to prepare them for a wide range of opportunities.

Master of Engineering

The increasing complexity of modern construction projects is boosting the demand for management-level personnel within the construction industry, with an estimated 27 percent growth in demand for engineers with management and technical skills by 2014. The UAB School of Engineering is prepared to help meet these demands with its new master of engineering degree.

"The master of engineering has two main focus areas," says Linda C. Lucas, Ph.D., dean of the School of Engineering. "One is the Construction Management Program, and the other is the Information Engineering and Management Program. Graduates will be able to assume leadership positions in their professional fields."

Construction Management

The Construction Management (CM) Program is led by Bill Hitchcock, Ph.D., professor in the Department of Civil, Construction and Environmental Engineering.

"There is a new world in the construction environment, which includes everything from building facilities such as factories and home construction to infrastructures like roads and sewer and electrical systems," Hitchcock says. "Today's construction managers must be able to appreciate the perspective and understand the requirements of all the stakeholders in building anything in any city around the world. These include engineers, architects, politicians, and the public."

The curriculum was developed to mirror the diverse backgrounds of the people who work in the industry.

"The comment most often heard from both prospective and current

students is that the plan of study contains the exact content they need to expand their expertise and advance their careers," says CM instructor and program director Dianne Gilmer. "Groups of students enter as a class and stay together throughout their five-term education experience, which is typically about 19 months. To accommodate schedules, the on-campus classes are taught in the evenings, with all course materials being accessible online from anywhere in the world. Important elements of the program are the peer interaction in group projects, class discussion, and oral presentations by students."

In an effort to increase the number of students in the program, an online program was introduced in the spring of 2009. "The foundation for a distance-learning program was already in place, since all classes utilize online tools for posting assignments, quizzes, chats, and even live meetings," says Hitchcock. "But the one big question that had to be addressed when considering an online program was, 'How do we ensure the students experience the face-to-face relationships with peers and faculty?'" To accomplish that, the program holds a one-and-a-half-day "boot camp" at the beginning of each term. The first camp included 22 students.

"The boot camps have been a big success," says Hitchcock. "In May 2010, we expect to have a new class of 30 to 40 students."

By developing two delivery methods for the CM Program, the door has been opened for significant growth in the potential student pool. The strategy for the next few years is to plan and recruit so that there are two on-campus groups and two online groups progressing continuously. With continued growth, officials say a target of 60 online students is attainable.

Information Engineering and Management

The Information Engineering and Management (IEM) Program within the master of engineering degree is led by Dale W. Callahan, Ph.D., associate professor in the Department of Electrical and Computer Engineering.

"No matter the industry, the need for managers who understand information technology and who can anticipate trends and future needs to keep systems current and secure is growing," Callahan says. "This program was designed by corporate officers to develop leadership talent in a technically complex area."

The success of the IEM Program is measured not just in individual client achievements. The program also is very successful at helping spawn the development of new companies. "The number of start-up companies from the program continues to rise," Callahan says. "This year alone we should have five or more as a result of IEM client efforts. Many of them are starting companies that are entirely Web-based. Other clients were entrepreneurs when they started the program, and as a result of their participation, they have significantly grown their networks and their businesses."

Although the master's program is open to those who have undergraduate degrees in engineering disciplines, it is not restricted to those individuals because industry today requires a multidisciplinary set of management skills, Lucas says.

Interdisciplinary Ph.D.

The new Interdisciplinary Ph.D. in Engineering Program will help meet a growing demand for graduates with multidisciplinary research capabilities.

The Ph.D. program, which will include tracks in environmental health engineering and computational engineering, aims to prepare engineers to solve complex problems in teams that include scientists.

"The interdisciplinary approach is the wave of the future," says Lucas. Students enrolled in the interdisciplinary program will gain the skills needed to succeed as independent and productive investigators in multidisciplinary analysis and design, with applications over a wide spectrum of science, engineering, health, and medical fields.

The need for engineering graduates with interdisciplinary training and multidisciplinary research capabilities has increased dramatically in the past decade. As funded research involving faculty from a number of collaborating disciplines continues to increase at UAB, the School of Engineering is well positioned to help fill this need. Recent investments in enabling technology and high-performance computing laboratories will provide the tools required for this program.

faculty briefs

Rose Scripa Receives Florida Alumni Award

Rose Scripa

Rose Scripa, Ph.D., professor in the Department of Materials Science and Engineering, was recently named the University of Florida's Distinguished Alumnus of the Year.

Scripa is no stranger to professional honors, having won more than 25 awards during her time at UAB. She joined the SOE faculty in 1976 and since then has been involved in NASA-sponsored microgravity research, serving at NASA headquarters in Washington, D.C., as a program scientist in the materials science area.

UAB Professor's Firm Wins Latest Alabama Launchpad

An entrepreneurial group led by School of Engineering professor Selvum (Brian) Pillay, Ph.D., won the $100,000 first prize in the Alabama Launchpad competition last spring. Also in the group are UAB professors Uday Vaidya, Ph.D., and Barry Andrews, Ph.D.

Innovative Composite Solutions won the annual entrepreneurial competition for its design and development of thermoplastic composite components for various industries, including military and aerospace.

The company's product is a lightweight, recyclable, heat-reversible, and fiber-reinforced plastic that is a lighter and stronger alternative to metal.

Alabama Launchpad is a competition that offers winning start-up firms seed money. Past Alabama Launchpad winners have gone on to raise almost $3 million in "follow-on" money from investors.

Janowski Named Assistant Dean for Assessment and Accreditation

Gregg Janowski, Ph.D., has been named the School of Engineering assistant dean for assessment and accreditation. He will be responsible for coordinating the school's assessment and accreditation activities and providing assistance to the programs.

Dean Linda Lucas, UAB provost Eli Capilouto, Bob Pinson, Bryson Edmonds, and Joan Edmonds attend the ILC dedication ceremony.

The Future of Engineering

Interactive Learning Center Offers an Exciting Introduction to Engineering

LAST FALL, the UAB School of Engineering dedicated the William Fleming (Bill) Edmonds Interactive Learning Center (ILC) in the Business-Engineering Complex.

Each week, more than 600 students use the high-tech facility, which features 68 workstations with laptops at each seat, as well as projectors and an integrated digital response system that allows students to answer instructors' questions and solve problems electronically. "This allows for unique hands-on learning and direct participation," says Zoe Dwyer, Ph.D., who uses the classroom to teach introductory engineering classes. "Many students come from high schools where their classroom experiences were not that much different from what students have been experiencing over the past several decades. This facility makes use of modern technology to introduce engineering ideas and applications in an exciting way, and it also helps prepare the students for a field that is increasingly dominated by new technology."

In addition to enhancing the freshman experience, the center is also being used by graduate students in the Construction Engineering Management Program.

The ILC was made possible by a generous gift from the Birmingham-based firm BE&K Inc. Bill Edmonds cofounded BE&K in 1972, and four decades later the company has grown into a leader in the international engineering services industry. Edmonds is acknowledged in greater Birmingham as a groundbreaking entrepreneur and tireless advocate for the school.

Edmonds's wife, Joan, and son, Bryson, attended the dedication ceremony last October. A portrait of Edmonds was unveiled during the dedication and is now displayed in the center.

Worldwide Partnerships

UAB Students Aim for Long-Term Impact in Zambia

By Andrew F. Uehlin

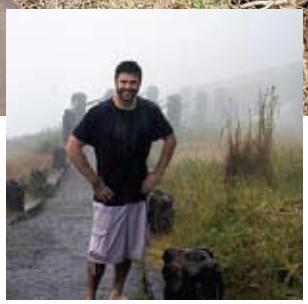
THE UAB chapter of Engineers Without Borders (UAB-EWB) is partnering with the Southern Institute for Appropriate Technology (SIFAT) to build a training center in Lusaka, Zambia. Since 1979, SIFAT has trained thousands of grassroots community leaders from more than 80 developing countries in practical self-help skills and sustainable community development principles. Their training includes water purification, sustainable agriculture, adult literacy, food preservation, HIV/AIDS prevention, and proper hygiene.

To date, most of SIFAT's training programs have taken place at the organization's headquarters in Lineville, Alabama, but SIFAT and UAB-EWB have developed plans to build a training facility in Africa.

In May 2009, UAB-EWB officers Andrew Uehlin and Chris Morrow traveled to Lusaka to conduct a site survey and establish important local contacts within the community.

Student and faculty teams from UAB as well as teams from SIFAT plan to travel to Lusaka over the next two years to work on this project, with an estimated completion date of August 2011. Future plans to offer on-site courses in global health for UAB School of Public Health students are in discussion.

The project is being funded by B. L. Harbert International, a Birmingham-based international construction company that is currently working in Lusaka, and construction management will be provided by B.L. Harbert personnel. Design of the facilities will be done by international and local architecture firms, notably the Birmingham-based Sustain Building Group, LLC. Additional information can be found on the SIFAT Web site at www.sifat.org. For more information on the UAB chapter of Engineers Without Borders, please contact Andrew Uehlin at auehlin@uab.edu.



Chris Morrow (above) and Andrew Uehlin (right) traveled to Zambia to help plan a SIFAT training facility.

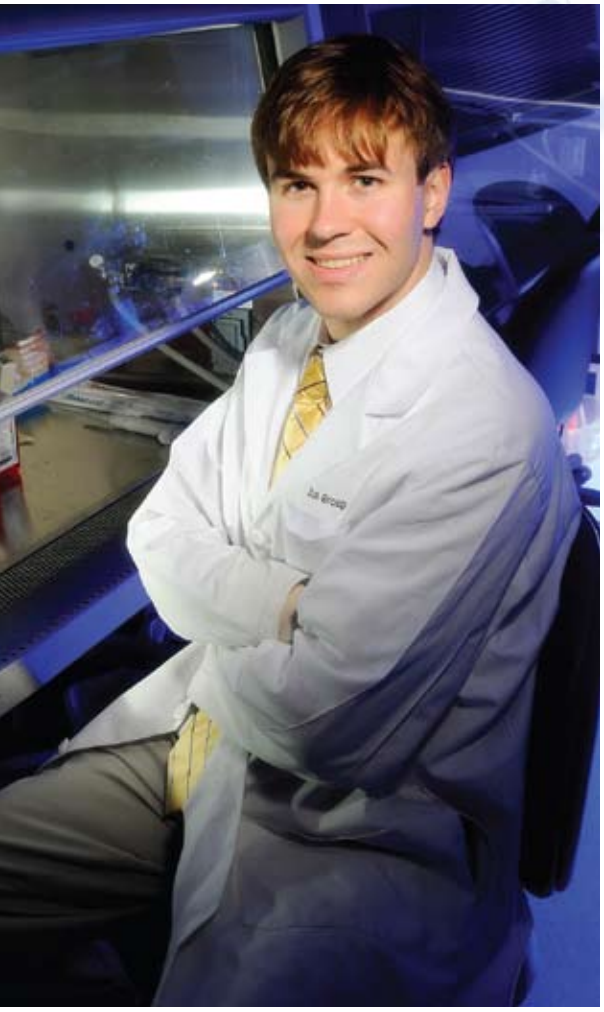
SOE Forms Official Ties in Egypt, India

FACULTY from the UAB School of Engineering visited Egypt last summer to teach international construction management courses with an emphasis on green materials and construction. The program is part of a partnership with Misr University for Science and Technology (MUST) in Cairo.

"I think teaching construction management at Misr University is a great place for us to start teaching internationally," says dean Linda Lucas Ph.D.

The school also signed a memorandum of understanding with the National Institute of Technology Calicut (NITC) in India. The agreement between UAB and NITC creates a formal linkage between the two institutions and should foster the development of collaborative programs in engineering education and research. The relationship is also expected to lead to new chances for overseas learning for students from both schools as they take advantage of new exchange-learning opportunities.

student spotlight



Blakeney Named 2009 Engineering **Student of the Year**

UAB biomedical engineering major Bryan Adam Blakeney has been named the Alabama Society of Professional Engineers (ASPE) 2009 Engineering Student of the Year. The award winner is chosen from the top engineering students at Alabama universities.

Blakeney, 21, from Gulfport, Mississippi, is the son of Dr. Bryan and Karen Blakeney. He is the latest of five consecutive UAB engineering students to receive this award.

Blakeney's statewide recognition follows his receipt of two UAB awards.

During the 2008-09 academic year, he was named the UAB Biomedical Engineering Student of the Year and also received the UAB School of Engineering Dean's Award for Most Outstanding Student.

Blakeney was a member of a team that studied nanomaterials that can regenerate human tissue. Their research was published in *Biofabrication* magazine.

"Adam is truly deserving of this honor," says Timothy Wick, Ph.D., chairman of the Department of Biomedical Engineering. "His level of research has far exceeded the traditional undergraduate output and has led to the development of a new method to create truly three-dimensional scaffolds for tissue engineering.

"Adam's clever thinking and collaboration with assistant professor Ho-Wook Jun, Ph.D., to develop this new technology has great potential to revolutionize the field of tissue engineering," Wick says.

Welcome Students

New and returning students were greeted in style during the fall Welcome Back party. The party kicks off each new school year and sets the tone for a successful fall semester.

Spring Fling **2009**

Engineering faculty and students came out in strong numbers to welcome prospective students to the school's annual Spring Fling. The event is one of the main opportunities the school uses to showcase all that engineering has to offer.

Woszczynski Excels on the Field and in the Classroom

THIRD-YEAR mechanical engineering student Carl Woszczynski was named to the 2009 Conference USA Men's Soccer All-Academic Team. Woszczynski, who was also named a first-team all-conference performer, was tabbed to the all-academic team for the first time in his career. He was joined on the all-academic team by UAB senior Dean Sorrell.

"This is an outstanding award for both Dean and Carl," UAB head coach Mike Getman says. "I am very pleased with both of these young men. Both are great students, great athletes, and great people. They are great ambassadors for UAB and the men's soccer program, and I am glad their efforts have been rewarded."

"I am always impressed with the way our students balance outside ambitions with their engineering studies," says SOE dean Linda C. Lucas, Ph.D. "For Carl to be able to excel in collegiate sports as well as in a challenging curriculum is a definite accomplishment."

Woszczynski, a redshirt sophomore, maintains a 3.24 GPA in mechanical engineering and is a two-time Commissioner's Honor Roll recipient. The Columbus, Indiana, native also earned first-team all-conference honors earlier in the year for his performance in the net for the Blazers. The three-time league defensive player of the week honoree boasts a 0.89 goals against average (GAA), which is on pace to break the single-season GAA school record. He has recorded seven shutouts this season, which ranks third in UAB lore, while his 12 victories during the campaign are tied for sixth-best in program history.

student spotlight

From left, Haley Rilling (mechanical), Christopher Pitts (electrical), and Quinn Dunlap (biomedical) were selected as the School of Engineering's first Engineering Leadership Scholars.

SOE Introduces **Leadership Scholars**

Quinn Dunlap, Christopher Pitts, and Haley Rilling were named the School of Engineering's first Leadership Scholars and will assist in several new and existing recruiting efforts to help shape the future student body of the school, in addition to earning a cash fellowship.

Responsibilities for scholars include making brief presentations to groups of high school students and parents; coordinating and serving as tour guides for groups visiting the school two Fridays per month, beginning in January; and participating in a limited number of additional recruiting events.

The three scholars were chosen based on their academic success as well as their displays of personal initiative, organizational skills, and personality.

Students Visit **Gorgas Steam Plant**

RECENTLY, 20 UAB undergraduate engineering students visited Alabama Power's Gorgas Steam Plant. While there, the students learned about everyday operations of the plant, the research being conducted at the site, and co-op opportunities for students with Alabama Power and Southern Company.

"We love it when UAB engineering students have opportunities to visit industry in this area," says School of Engineering dean Linda C. Lucas, Ph.D. "Our goal is for all of our undergraduate students to perform co-ops, internships, or research experiences while they're at UAB. That real-world experience is invaluable, and visits to our local industrial partners help students understand the opportunities that exist."

Engineering students are developing a program that uses video-game technology to teach lifesaving CPR techniques.

Not Just Fun and Games

BME Students Design Nintendo Wii Function to Teach CPR

THE AMERICAN Heart Association has pledged $50,000 to fund the work of UAB biomedical engineering undergraduate students who are working to develop a computer program that teaches CPR using handheld remote controls from the Nintendo Wii video game console.

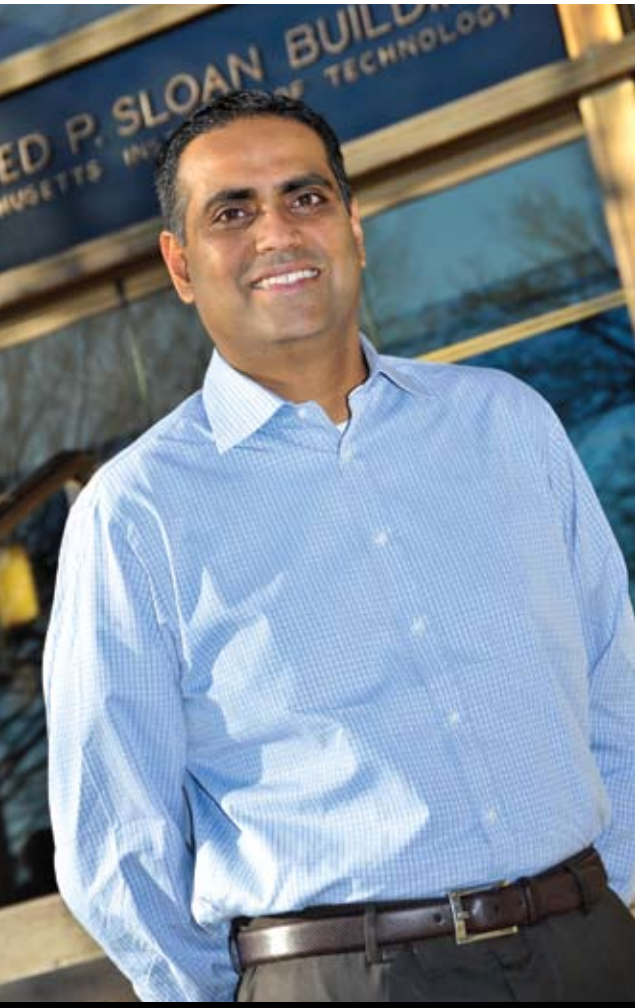
Students James McKee, Jack Wimbish, Haisam Islam, and Zach Clark began work on the project as seniors at UAB. Along with faculty advisers Greg Walcott, M.D., associate professor of medicine, and Jack Rogers, Ph.D., associate professor of biomedical engineering, the team spent several months developing the Wii CPR technology. Based on an idea initiated by Walcott, the technology is a computer program that can be downloaded on home computers and synched with the wireless technology of the Wii remote to teach users proper CPR technique.

"We began talking about the possibility of using the Nintendo Wii to teach CPR, and we contacted the American Heart Association about the idea," Walcott says. "The Heart Association wanted a better sense of how it might work, so we assigned the research to our biomedical engineering students for their senior project."

The UAB team worked on the Wii CPR project for its design course, which required the students to successfully design and construct a prototype of the technology for real-world use. After a successful class presentation showed the students' progress and the real potential for the technology, the American Heart Association contacted UAB to offer the education grant, Rogers says.

"The Heart Association's high interest in our students' innovations points to the potential of this project and how it fits in with the organization's desire to deliver reliable CPR education to the masses," Rogers says.

When completed, the UAB Wii CPR program will become available on the American Heart Association Web site as a free open source code download, which would make it available to anyone with Internet access.



Ramakrishna Venugopalan

"My goal is to create a team that will excel in identifying, evaluating, and developing innovative diagnosis and treatment opportunities that have the ability to serve a wider population of patients in the neurological disease space."

Birmingham to Beantown

Former Graduate Students Land Prestigious Spots in the Boston Area

FROM THE TIME he was a teenager, Ramakrishna Venugopalan knew he wanted to be an engineer.

"As a high school student in India, I enjoyed analyzing situations, framing the problems, and then solving them. In my junior year at Annamalai University, I secured funding for a project titled 'Therapeutic Aid for the Speech Impaired' with five of my classmates. The completion of this project was recognized with the IEEE Vincent Bendix Award in 1991. I found the whole experience not only challenging but also very gratifying."

Venugopalan, who holds a master's degree and Ph.D. from the UAB School of Engineering, eventually began exploring opportunities to address biomedical problems. "During my four years as a faculty member at UAB, I built a successful translational-research program in minimally invasive device development. The research exposure increased my interest in commercializing such devices, and in 2002, I transitioned to a position as principal engineer at Codman, a Johnson & Johnson company."

While at Codman, Venugopalan led research programs on microvalves, sensors, and drug-loaded catheters. He also authored international standards of strategic importance, negotiated product-qualification plans with the FDA, and provided strategic guidance on technologies being considered for organic and inorganic development opportunities as a member of the company's Research and Development Leadership Team. He is currently participating in the Sloan Fellows Program in Innovation and Global Leadership at the Massachusetts Institute of Technology.

"I started the program in June 2008," says Venugopalan, a married father of two. "I expect my critical and strategic thinking ability to be significantly enhanced by the faculty and curriculum and stress-tested by peers and alumni. My goal is to create a team that will excel in identifying, evaluating, and developing innovative diagnosis and treatment opportunities that have the ability to serve a wider population of patients in the neurological disease space."

As for what he hopes to gain from the experience, "I will have the opportunity to apply my learning from the program at work in my new role in the Advanced Concepts Group and continue to improve the outcome through exchanges with

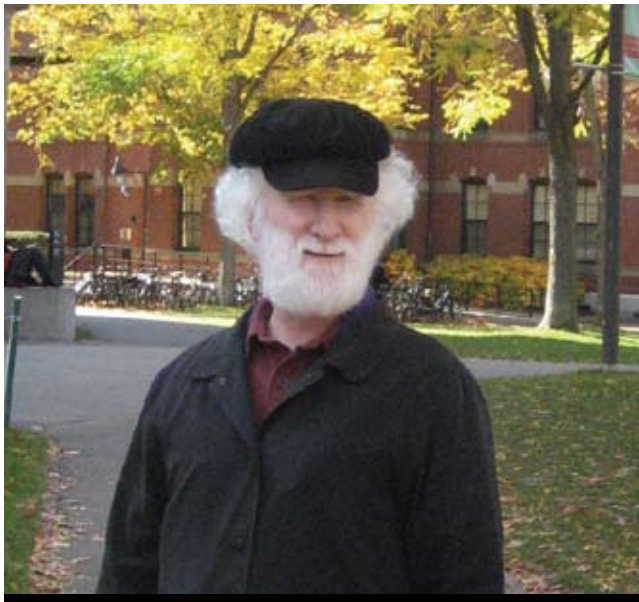
peers, alumni, and faculty."

SOE alum Mark Koopman is also planning for the future, having recently begun a postdoctoral fellow position at the School of Engineering and Applied Science at Harvard University. Koopman says he hopes to use the position to establish a cooperative research program between Harvard and UAB to study residual antibiotics and other pharmaceuticals in drinking water.

"It's a very exciting and potentially high-impact area of research, integrating materials and environmental engineering," Koopman explains. "This is an issue that has been gaining attention from the press and the scientific community lately, with pharmaceuticals now being detected in drinking-water sources and urban wastewater effluents. The dispersal of antibiotics in the general environment is a major concern, because it increases the likelihood of antibiotic-resistant strains of microbes. The system we are investigating holds the potential to break down residual pharmaceuticals as well as a host of other organic water pollutants."

The son of a naval and industrial electrical engineer, Koopman first became interested in his chosen field while performing summer work with a naval research lab. That led to a technician's position and exposure to many areas of materials science and various engineering investigations. He went on to earn a master's degree in materials science and engineering and a Ph.D. in environmental health engineering from UAB and was honored as the School of Engineering and Environmental Health Engineering Graduate Student of the Year in 2007. Koopman has worked in the past as lab manager and research engineer in composite materials engineering with Krish Chawla, Ph.D., and, prior to that, with Robin Griffin, Ph.D., in the Electron Microscope Lab.

"I've probably trained more than a hundred faculty, staff, and students on principles and operation of the scanning electron microscope in the materials science department. In this particular area of research it has surprised some folks to discover I am legally blind," says Koopman, who uses a handheld visual aid for working with computers and reading.



Mark Koopman

Koopman recently traveled to Peru with UAB's student chapter of Engineers Without Borders, of which he was a founding member and the group's first president. "The group repaired school desks in a small village and raised money for constructing a well. I hope this will have a positive effect on other communities around the world, and on the students themselves."

Six School of Engineering alumni joined UAB faculty, staff, and students in the UAB National Alumni Society's 2009 Dollars for Scholars event. The annual event is held each spring and features 5K and 10K races on Birmingham's Southside. Pictured at left are Paul George, Beth Briggs, Nancy Fouad, Jeffrey Putt, Heather Smith Sawyer, David Scott, Candace Watson, Michael Thorn, and Eric Sawyer.

Robots Show Off Their BEST at Bartow Arena

Blazer BEST Has Successful Sophomore Showing

LAST OCTOBER, UAB hosted the second annual Blazer BEST robotics competition inside Bartow Arena. The 2009 "High Octane" event included 25 teams representing more than 30 central Alabama middle schools and high schools. Hundreds of team supporters were also present for the event.

B.E.S.T. (Boosting Engineering, Science, and Technology) Robotics Inc., is a nonprofit, volunteer organization based in Dallas, Texas. The organization started in 1993 with 14 competing schools and 221 students. Today, more than 10,000 students participate in B.E.S.T. events nationwide each year.

Blazer BEST grew by five teams in its second year, and with strong support from School of Engineering students, staff, and faculty, organizers say the event could continue to grow.

How It Works

B.E.S.T. features two parallel competitions. The first is a robotics game, with four teams competing at once in a series of three-minute, round-robin matches.

The second competition is for the B.E.S.T. Award, which is presented to the team that best embodies the concept of boosting engineering, science, and technology.

"The competition is not just the robot on the field; it's a comprehensive look at the engineering process," says School of Engineering development director Paul George. "Each team must present an engineering notebook. The students have to understand the brainstorming and trial and error that exists in building something new."

Inspiring a New Generation

The B.E.S.T. program is the only engineering competition in the country offered to middle and high schools at no cost. George says several current engineering students were excited to learn that UAB was hosting the event.

"A number of our students talked with us and said they wanted to help because they first became interested in engineering through B.E.S.T. Robotics," George says. "This program is driving young people into science and technology disciplines.

"We are also thankful to the many engineering societies in the Birmingham area that have supported Blazer BEST with their time, talents, and financial resources. We could not do this without their support, and we look forward to partnering in years ahead to make BEST available to more schools."

2009 WINNERS

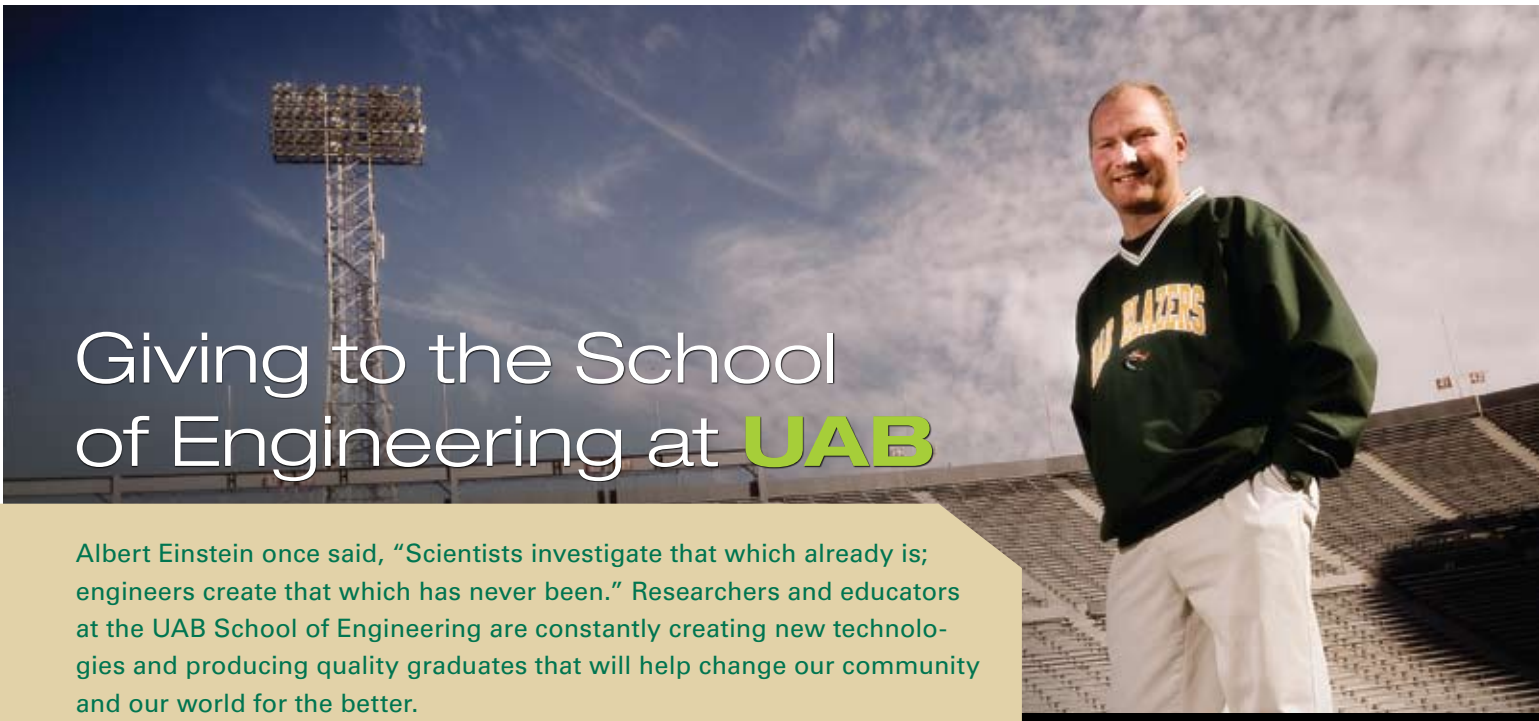
The overall event winners receiving BEST Awards:

- **1st Place:** Spain Park High School, Hoover
- **2nd Place:** Shades Valley Technical Academies, Jefferson County
- **3rd Place:** Oak Mountain High School, Shelby County

The game-day competition scoring leaders receiving Robotics Awards:

- **1st Place:** Homewood High School, Homewood
- **2nd Place:** Briarwood Christian School, Shelby County
- **3rd Place:** Hewitt-Trussville High School, Trussville

These six teams went on to represent Blazer BEST at the South's BEST regional competition in Auburn last December.



Giving to the School of Engineering at UAB

Albert Einstein once said, "Scientists investigate that which already is; engineers create that which has never been." Researchers and educators at the UAB School of Engineering are constantly creating new technologies and producing quality graduates that will help change our community and our world for the better.

Paul George, UAB School of Engineering director of development

FIVE departments make up the UAB School of Engineering: Biomedical Engineering; Civil, Construction, and Environmental Engineering; Electrical and Computer Engineering; Materials Science and Engineering; and Mechanical Engineering. Within these departments, there is significant collaboration—both internal and external—and many areas of cutting-edge research. These areas include

- high-performance computing/modeling and simulation;
- sustainable engineering design and construction;
- composite materials applications and development;
- metals processing and research;
- tissue engineering;
- cardiac-rhythm management; and
- biomedical imaging.

A strong commitment to undergraduate and graduate education is also a cornerstone of the School of Engineering. Students experience real-world application of learned principles through state-of-the-art laboratories, industry exposure, research opportunities, and competitions, such as formula race car, Baja race car, robotics, and concrete canoe. Scholarships are made available for deserving students, both at the freshman level and for students transferring to UAB.

The continued advancement of research and educational priorities in the UAB School of Engineering requires resources above and beyond traditional revenue streams such as tuition, fees, grants, and state funds. Private and corporate support is required—and we ask you and/or your organization to support our quest for continued excellence.

Perhaps you feel strongly about a particular area of research, perhaps you would like to provide scholarship funding for deserving students, or perhaps you would like to contribute to laboratory equipment and infrastructure that will ensure researchers and students are using the latest and greatest technologies.

Whatever your reasons for giving, and whatever the amount, your gift makes a difference. For more information about giving to the School of Engineering, contact Paul George, director of development, at (205) 934-8481 or by e-mail at pgeorge@uab.edu.

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