Students develop robotic hand as sign language teaching tool

Larry Bowie
Institute Communications and Public Affairs

Even though mechanical engineering graduate student Damien Gaudry never took a course in sign language, he wanted to build an instructional tool for those who want to learn.

Gaudry and two other graduate students — Cindy Pereira and Russell Marzette — have built an 18-inch tall robotic hand that can sign the 26 letters of the English alphabet.

“We wanted to develop an interactive and fun device to teach children sign language, whether they are hearing impaired or not,” Gaudry said. “We thought it would help them to see the signs rather than having to look at them in books.”

The students worked on the project for two months this year as their final project in a graduate-level introductory course on “mechatronics” — an emerging technique in engineering that deals with the integration of familiar mechanical systems and components with new electronic components and intelligence-based software.

Students enrolled in the course, offered in the School of Mechanical Engineering, continued, page 3

‘Old-fashioned’ trolleys link campus to Technology Square

Elizabeth Campell
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Earlier this month, eight new rubber-tired, alternative fuel vehicles — designed to look like old-fashioned trolleys with wooden seats and even a bell — began transporting faculty and students to Technology Square.

Students developed a robotic hand that can sign the 26 letters of the English alphabet as a teaching tool.

Tech’s 216th Commencement

Among the 900 graduates who participated in Tech’s Summer Commencement ceremony were the school’s first two students in the National Science Foundation’s Cyber Corps scholarship program.

Cyber Corps, a scholarship opportunity for students in either the Department of Defense or the National Science Foundation (NSF), is designed to strengthen the cadre of professionals who protect the government’s critical information infrastructure.

At right, Chad Sellers, Master of Science in Computer Science with a concentration in information security, and Christopher Messer, Master of Science in International Affairs, were selected for the NSF’s Scholarship for Service program for students studying information security.

Messer has accepted an offer to work in the Information Assurance Directorate of the National Security Agency (NSA) and will focus on information security policies and procedures. Sellers, a self-described “technical guy,” plans to work in network security with the NSA Information Assurance Directorate as well.
“Green Chemistry’ researcher to lead Institute of Paper Science and Technology

Sean Selman
Institute Communications and Public Affairs

Beginning Sept. 1, William “Jim” Frederick, Jr., the CEI Professor of Green Chemistry and Chemical Engineering at Chalmers University of Technology in Gothenburg, Sweden, will assume duties as director of the Institute of Paper Science and Technology (IPST) at Georgia Tech.

“Jim Frederick brings superb strategic and leadership qualities to this position, not to mention a strong, global perspective on issues and concerns facing the pulp and paper industry,” Provost Jean-Lou Chameau said.

“The coming weeks and months represent an important period in IPST’s history,” he added. “Jim will be key in defining the technical direction of IPST and maximizing its strong ties to the forest products industry.”

Frederick, who also will maintain a faculty appointment in the School of Chemical and Biomolecular Engineering, said the forest products industry stands at a “crossroads of transition period.”

“The industry has begun to recognize itself as a producer and processor of biomass, as a manufacturer of diverse and environmentally sustainable products from renewable resources, and as a major provider of green energy,” Frederick said.

“The direction of change is toward more profitable, differentiated products for consumers at all levels, rather than production of commodities,” he continued. “The changes in focus are accompanied by a need for new technology plus a need for scientists, engineers, and business people with the vision to achieve the change. My vision is that IPST will become an organization that connects industry and government with the larger Georgia Tech faculty and research base.”

Frederick’s background in industry, government and academia should prove beneficial in his new endeavor at Tech.

Between 1972 and 1974, Frederick was a research engineer for General Motors Research. He then conducted research for Battelle Memorial Institute in Columbus, Ohio, and the U.S. Department of Agriculture’s Forest Products Laboratory in Madison, Wis., between 1974 and 1976.

From 1976 to 1980 Frederick was an associate professor at the Institute of Paper Science and Technology in Appleton, Wis., and then he served as group leader for Recovery Technology Applications at the Weyerhaeuser Co. in Tacoma, Wash., between 1980 and 1983.

Frederick maintained faculty positions at Oregon State University from 1983 until 1996, and between 1988 and 1991 he was a visiting professor in the Department of Chemical Engineering at Finland’s Abo Akademii University. He returned to Atlanta and IPST in 1997 and then was named CEI Professor of Green Chemistry at Chalmers University in August 2001.

Frederick maintained faculty positions at Oregon State University from 1983 until 1996, and between 1988 and 1991 he was a visiting professor in the Department of Chemical Engineering at Finland’s Abo Akademii University. He returned to Atlanta and IPST in 1997 and then was named CEI Professor of Green Chemistry at Chalmers University in August 2001.

“I’m delighted with Jim’s appointment and return to IPST,” said Ron Rousseau, chair of the School of Chemical and Biomolecular Engineering. “He’s been a leading researcher and administrator, and he has strong ties to the Institute. Also important is that he is well-connected to the pulp and paper industry. He knows the strengths of IPST, and he knows the opportunities for strengthening the delivery of research output to member companies.”

Born in Bangor, Maine, Frederick graduated from the University of Maine in 1967 with a bachelor’s degree in chemical engineering. He went on to earn his master’s degree and doctorate in chemical engineering from the University of Maine in 1969 and 1973, respectively.

For more information...
Institute of Paper Science and Technology
www.ipst.edu

Trolleys, cont’d from page 1

Peachtree to the Midtown MARTA sta-
tion. It will return to campus via Spring Street to Fifth Street to Perst Drive.

The Midtown community and visi-
tors are invited to use the trolley as well. “Anyone can get on the trolley, so visitors to Georgia Tech and Midtown can come to Technology Square directly from the airport. They can ride MARTA and board the trolley at the Midtown station,” said Furniss.

“Guests of the new hotel and confer-
ence center will find this particularly convenient.”

In addition to the trolleys, the fleet of regular shuttle buses used for the Stinger service will be replaced next month with high-efficiency diesel buses. With the new buses and trol-
leys, Tech surpasses the state man-
date of 40 percent alternative fuel vehicles in the entire fleet.

“When we renegotiated the con-
tact for the campus, we were able to add some requirements, including monitoring and data collection, to ensure more reliable service,” said Furniss.

The trolleys also sport a pilot Global Positioning System tracking system, which com-

Packing and Transportation will assess whether to continue and expand the system to the rest of the fleet.

other Stinger routes have few changes from last year. The frequen-
cy on the Green route, which runs through Home Park to GCATT on 14th Street, is being reduced to 15 minutes, half of last year’s wait. Stops along the Red and Blue loops, which circle the campus, will continue at seven-minute intervals.

Parking at Technology Square

The new trolley is designed to minimize the need for the campus community to drive to Technology Square. However, the new 1,550-space parking deck is avail-
able. On weekdays from 8 a.m. to 5 p.m., drivers without a permit for that deck pay on hourly fee. During off-peak hours, any-
one with a Georgia Tech parking permit and a Georgia Tech Buzz Card will be able to park at no charge, with the excep-
tion of Saturday football games and large special events.

The new trolley, making a stop outside the new DuPree College of Management at Technology Square.

Governor gets lesson in Tech research

Several of Tech’s top administrators played host to Governor Sonny Perdue last week, who requested an opportunity to visit campus to learn about some of Tech’s critical research programs.

At right, Regents’ Professor Paul Kohl demonstrates the process for manufacturing silicon wafers, integral to improving the design and performance of microchips.

Hand, cont’d from page 1

Engineering, must design, build and present a mechatronic innovation that fuses mechanics, electronics and information technology. In the class, students are encouraged to engineer for complete “smart product” development for the market.

During their project presentation to the class in April, the students explained they were able to program the hand to make nine different symbols: the letters “A” to “D,” and numbers one to five.

That’s no small feat, considering the engineering involved in building a giant hand that sign.

“I think the most difficult part was integrating electrical components and computer-based systems into one mechanical system,” said Mercette. Fifteen separate motors control the hand, and each motor has its own circuitry.

With fingers made from soldered brass tubing and rods, and strung together by cables connected to a series of small motors, the robotic hand is surprisingly agile. It takes about five seconds to sign a letter.

Gaudry selects the letter “C.” Once selected, the motors begin to wind up the cables in the fingers, bending the joints until the hand produces the symbol, similar to the way a mechanical puppet might be manipulated. After the letter is signed, rubber bands connected to the back of each finger return the hand to an open position.

The team entered the class knowing very little about electronics and microprocessor control, but learned more than they imagined. “The class is time consuming, since you have to put in a lot of your own time outside of the lecture portion,” Gaudry said.

The robotic hand is just one interesting invention to come out of the mechatronics courses. Other notable inventions have been a self-playing guitar that takes requests, a machine similar to an ATM that dispenses money called the "Cashomatic," and an automatic card dealer, a machine that both deals cards and plays along with human players.

“The mechatronic engineering techniques used in this project are representative of the approach that’s used today to design devices and systems that possess a degree of computer-based intelligence,” said Professor Charles Ume, who teaches mechatronics at the undergraduate and graduate levels. “We expect to see the integration of mechanics, electronics and computing — mechatronics engineering — increase rapidly in the near future due to consumer demands for smart products and intelligent machines.”

IN BRIEF:

Hayes promoted to director of admissions

Ingrid Hayes is the new director of undergraduate admission at Tech, filling a spot left vacant by former Admissions Director Deborah Smith’s promotion to vice provost of enrollment services. Hayes came to Tech in 1995 as an admissions officer and has served as the associate director of admissions since 1998. She spent the past seven months filling in as the interim director. “Working with Deborah over the years, we’ve developed a strong recruiting program. I intend to build on that to maintain the high quality of students we bring into Tech and to personalize the admissions process for our prospective students,” said Hayes.

Savannah campus takes shape

Earlier this month, Georgia Tech-Savannah moved some of its offices and programs into its new permanent facility in the city’s newly formed Technology and Engineering Campus, or TEC. Tech will occupy two buildings within this development: to the north, the Program Administration and Resource Building (PARR) will house the Georgia Tech Regional Engineering Program (GTRIP), while the southern building — the Economic Development and Research Building (EDRB) — is for regional offices of the Economic Development Institute (EDI) and the Advanced Technology Development Center (ATDC). The new address for Georgia Tech-Savannah is 210 Technology Circle, Savannah, GA 31407-3038. For more information, refer to www.gtrep.gatech.edu.

President’s Undergraduate Research Awards (PURA)

The Undergraduate Studies Office is competitively funding individual requests by faculty/student teams for funds to be used to support undergraduate student involvement in faculty research. The awards are intended primarily to fund student salaries and travel expenses for undergraduates to attend professional meetings to give presentations. Students should contact individual faculty members for undergraduate research projects. Either faculty or students can initiate projects. Faculty/student teams must apply by August 25 to request funds for the fall semester. The Undergraduate Studies Office, in conjunction with the college of the faculty member, will select award recipients and notify applicants at the beginning of each semester.

More information, including forms and instructions, is available at www.undergradresearch.gatech.edu.

Get checked

Time for your annual physical? The Georgia Tech Medical Clinic, located in the Homer Rice Center, has announced the availability of its services, from comprehensive work-ups to simple screenings, performed by Atlanta Braves’ team physician and Chief Medical Officer for the 1996 Olympic Games John Cantwell. Personal results summaries will emphasize preventative measures. To schedule an evaluation or for more information, call the Clinic at 355-6562.