Lu receives prestigious Sloan Research Fellowship

Researcher Hang Lu has been selected as one of 118 recipients of the prestigious Sloan Research Fellowship, joining faculty members at 61 universities and colleges to earn the coveted honor.

Lu was the only Tech researcher selected. Winners were selected from a field of candidates conducting research in the areas of physics, chemistry, computational and evolutionary molecular biology, computer science, economics, mathematics and neuroscience.

An assistant professor in the School Chemical and Biochemical Engineering, a faculty member of the Coulter Department of Biomedical Engineering doctoral program and a researcher with the Center for Biologically Inspired Design and Engineering (CBID), Lu is considering neuroscience studies that have been recognized with the $50,000, two-year Sloan grant.

Last Wednesday, the Board of Regents of the University System of Georgia named G.P. “Bud” Peterson, chancellor of the University of Colorado at Boulder, Tech’s 11th president.

Peterson is scheduled to assume his new post on April 1, according to Board Chair Richard Tucker. He replaces G. Wayne Clough, who stepped down June 30 to become Secretary of the Smithsonian Institution in Washington, D.C.

“Dr. Peterson’s credentials are excellent and we were very impressed with what he has achieved in his time at the University of Colorado,” said Tucker. “His leadership experience and his outstanding engineering credentials are a good fit with Georgia Tech.”

University System Chancellor Erroll B. Davis Jr. said that Peterson’s appointment “provides the high caliber leadership that will allow Tech to continue to build and expand upon its national and international reputation. “I am honored by the opportunity to serve as President of the Georgia Institute of Technology,” said Peterson. “As an engineer, this is, of course, a great professional fulfillment. But as someone who has spent a majority of his career as an educator, it also presents an opportunity to continue to have an impact on higher education nationally. Georgia Tech is at the forefront of innovation and discovery in a time in our nation’s history where both are great necessities, and I am privileged to be a part of these efforts. Val and I are looking forward to meeting and getting to know the entire Georgia Tech community.”

On Wednesday afternoon after the announcement, Peterson and his wife, Val, met with the campus community.

Taking charge
Campus has five locations for recycling cell phones, batteries

Battery and cell phone recycling is now an everyday operation at Tech. While the campus community can still recycle batteries and electronics at the annual Earth Day celebration, AA, C, 9-volt batteries, rechargeable batteries and cell phones can also be dropped off at any of the five appointed battery and cell phone recycling sites.

The Office of Environmental Health and Safety is operating the new battery recycling program. “All batteries can, and should be, recycled,” said Hazardous Materials Manager Ed Pozniak. “Those with the ‘three chasing arrows’ symbol must be. Improper disposal of batteries can lead to contamination of soil and groundwater.”

The program will recycle small batteries, such as alkaline and zinc-carbon batteries, button cell batteries and non-alkaline “rechargeable” batteries.

Cell phones are included in the battery recycling program because they all have rechargeable batteries in them.

“On-campus recycling of batteries is limited to locations where attendants
Research

Tiny dancers

Researchers see complex atomic choreography as crystals melt

JOHN TOON

RESEARCH NEWS

Conga lines of atoms wend their way through a crystal, their numbers growing as more and more atoms join the migration. The worm-like lines of atoms randomly converge, forming tangled lines that signal the beginning of the complicated process known as melting.

That’s the picture painted by Tech researchers, who used molecular dynamics simulations to study how melting takes place deep within a perfect crystal. Reported in the April 2008 issue of the journal Physical Review B, the research offers a new and highly detailed look at a complex phenomenon that has intrigued theoreticians for nearly a century.

“Atoms start to vibrate, and then they find a buddy with the same vibration, attitude and direction,” said Materials Science and Engineering Professor Mo Li, who led the study. “They then start to move together and form this line that resembles a worm. When you generate a lot of worms in a crystalline system over time, they start to tangle. That’s when homogenous melting starts.”

Solid materials ordinarily melt when the combination of entropy and energy favors the liquid phase. Melting most often starts on the surface, or where crystalline defects and boundaries create weak bonds that allow vibrations to shake atoms loose from the structure.

But with the advent of material-cutting lasers that can heat crystalline materials from the inside—and with growing interest in high-pressure geothermal melting that also takes place from the inside—scientists need to understand how non-surface melting happens.

Simulating the action of millions of atoms requires considerable computing time, so to minimize processor load, earlier simulations had raised the temperature of crystals rapidly, causing them to melt catastrophically. Li and his collaborator, former graduate student Xian-Ming Bai, decided to slow the process down to observe what would happen with more realistic scenarios in which the temperature rises gradually over time.

“If you heat the atoms too quickly, they have no opportunity to explore low-energy configurations,” Li explained. “We wanted to slow the process down and look at how the thermodynamics works. We heated the material to a specific temperature and then held it for as long as we could to let the system evolve—like marinating meat for better flavor.”

Using a large computer cluster in the School of Materials Science and Engineering, the researchers studied what would happen to a crystal composed of several thousand argon atoms as it was heated.

Their patience was rewarded by a new and different view of the choreography behind this common phase transition. Beyond the basic scientific interest, those revelations could lead to a better understanding of materials processing.

“The results point toward some very interesting applications in controlling and manipulating melting,” said Li. “Since atoms don’t move individually, perhaps we can do something to change the behavior of this melting.”

At this point, Li doesn’t know if the dancing atoms observed in the simulated argon crystal are typical of melting in atomic crystals. He would like to study other systems, and expand the work to include more complex structures such as ceramics, metallic alloys, polymers and semiconducting materials such as silicon.

“For this we give an reference for understanding what is really happening in nature,” he says. “There are still a lot of open questions, but no one really imagined that a mechanism like this existed.”

For more information

www.mse.gatech.edu

Tech commits to help build mobile Internet

True mobile Internet capability for wireless devices—including high-definition TV, movies and video-conferencing—has taken a step closer to reality.

The Georgia Electronic Design Center (GEDC) is partnering or teaming up with several major corporations and an international standards group to promote a new worldwide cognitive radio (CR) standard that would allow new levels of performance in portable devices such as cellular phones and computers.

“GEDC is extremely pleased to be named the university-based member of this important alliance,” said Joy Laskar, director of GEDC. “We believe this effort can make an important contribution to the development of the mobile Internet.”

The new alliance—called the Cognitive Networking Alliance (CogNeA)—is comprised of top players in the consumer electronics, personal computing, home entertainment, semiconductor and digital imaging fields.

The new CR standard would allow the ultra-high-frequency (UHF) band currently used for television broadcasting. Use of this could enable the broad bandwidth demanded by wireless video, while also providing extended range, improved coverage and superior penetration through walls.

For more information

www.gedcenter.org

GTRI marks 75th anniversary

The Georgia Tech Research Institute (GTRI) held a breakfast at the Georgia Railroad Freight Depot across from the Capitol on Feb. 11 to celebrate its 75th anniversary and to thank state leaders for their support. GTRI Director Steve Cross and GTRI were recognized by both the Senate and House where SR 51 and HR 219 were read, respectively, commending GTRI for its contributions to the state of Georgia. From left are 57th District Rep. Amos Amerson, chairman of the House Government Relations; 56th District Rep. Kathy Ashe; Eric Geter, systems and director of Research; Tom Horton, GTRI chief of staff and director of Operations; intern Toby Tatum, GTRI Office of Policy Analysis & Research; Steve Cross and GTRI were recognized by both the Senate and House where SR 51 and HR 219 were read, respectively, commending GTRI for its contributions to the state of Georgia. Reporters write from the scenes where SR 51 and HR 219 were read, respectively, commending GTRI for its contributions to the state of Georgia and its residents. From left are 57th District Rep. Pat Gardner; Lisa Sills, GTRI deputy director and director of Support Operations; intern Toby Tatum, GTRI Office of Policy Analysis & Research; 122nd District Rep. Hardie Davis; Tom McDermott, GTRI deputy director and director of Research; Tom Horton, GTRI chief of staff and director of Government Relations; 55th District Rep. Kathy Ashe; Eric Geter, systems support specialist; Marlit Haystrell, director of the GTRI Office of Policy Analysis and Research; 9th District Rep. Amos Amerson, chairman of the Georgia House of Representatives Science and Technology Committee; Steve Cross, GTRI vice president and director of GTRI; and 19th District Rep. Glenn Richardson, Speaker of the Georgia House of Representatives.

Tech commits to help build mobile Internet

True mobile Internet capability for wireless devices—including high-definition TV, movies and video-conferencing—has taken a step closer to reality.

The Georgia Electronic Design Center (GEDC) is partnering or teaming up with several major corporations and an international standards group to promote a new worldwide cognitive radio (CR) standard that would allow new levels of performance in portable devices such as cellular phones and computers.

“GEDC is extremely pleased to be named the university-based member of this important alliance,” said Joy Laskar, director of GEDC. “We believe this effort can make an important contribution to the development of the mobile Internet.”

The new alliance—called the Cognitive Networking Alliance (CogNeA)—is comprised of top players in the consumer electronics, personal computing, home entertainment, semiconductor and digital imaging fields.

The new CR standard would allow the ultra-high-frequency (UHF) band currently used for television broadcasting. Use of this could enable the broad bandwidth demanded by wireless video, while also providing extended range, improved coverage and superior penetration through walls.

For more information

www.gedcenter.org

Published weekly throughout the academic year and biweekly throughout the summer by Georgia Tech Communications & Marketing.

Editor: Robert Noothnith

Photos: Rob Pril, unless noted

Georgia Tech Communications & Marketing

117 North Avenue

Atlanta, Georgia 30332-0181

www.gedcenter.org

Georgia Tech Communications & Marketing

Wardlaw Center

177 North Avenue

Atlanta, Georgia 30332-0181
in the Student Center Ballroom, shaking hands and getting their first introductions to many of the students, faculty and staff.

After thanking Interim President and Provost Gary Schuster for holding the reins, Peterson spoke of his main goal at Tech: understanding what distinguishes Tech graduates from other institutions, not just nationally, but globally.

“That’s the question you’ll hear me ask as we move forward,” he said. “What has differentiated graduates from this Institute in its history, and what will differentiate [our] future graduates?”

Peterson’s academic career has been spent at three institutions, not counting a one-year assignment with the National Science Foundation in 1993-94. He worked for 19 years at Texas A&M, where he served as head of the Department of Mechanical Engineering for three years (1993-96) and executive associate dean of engineering for four years (1996-2000). Peterson also had the title of associate vice chancellor for the Texas A&M University System from 1996 to 2000.

He was recruited to Rensselaer Polytechnic Institute in Troy, New York, as provost in July 2000. Peterson served in this capacity until 2006 when he accepted the position of chancellor at the University of Colorado at Boulder. He is widely published in the field of phase change heat transfer and is a fellow of both the American Society of Mechanical Engineers (ASME) and the American Institute of Aeronautics and Astronautics (AIAA). He was recently appointed to the National Science Board.

In early in his career, Peterson taught mathematics and science in several Kansas high schools. Later, he went on to work as a research scientist for the NASA-Johnson Space Center in Houston, and in the private sector for Black & Veatch Consulting Engineers in Kansas City, Mo.

Principal investigator with the Lu Fluidics Group, Lu’s research centers around neuroscience, cell biology and biotechnology by creating BioMEMS (Bio MicroElectro-Mechanical System) and microfluidic devices. Often referred to as a “Lab-on-a-Chip,” these tools enable researchers to collect quantitative data from complex biological systems and observe unique processes on the micro- and nanoscale length.

“My lab designs and uses microfluidic devices to study the nervous system of nematodes [C. elegans] among other things,” Lu said.

“We are interested in how this simple but elegant system develops and how it functions, and the devices really enable us to get at the answers that are very difficult with conventional techniques that biologists have been using for a long time.”

From both an engineering and a biological standpoint, the Lu Fluidic Group uses experimental and modeling approaches to molecular and genetic techniques to understand how biological systems react to and interact with their environments. Ultimately, the group hopes to gather enough data to discover cures for diseases by understanding the natural and dysfunctional states of biological systems.

Once chosen, Sloan Research Fellows are free to pursue whatever lines of inquiry are of most interest to them, and they are permitted to employ Fellowship funds in a wide variety of ways to further their research aims. “I would like to use the grant for something riskier than usual,” Lu said. “It’s a good opportunity.”

Lu joined the Tech faculty in 2005. “Tech is great in terms of having first-class engineering research, both in [me] facilities and people,” she said. “I have formed wonderful collaborations with many engineers and scientists on campus in areas that I had not imagined before I came here.”

In 2008, College of Computing Assistant Professor Nick Feamster and Adam Kalai along with School of Biology Associate Professor King Jordan were named Sloan Research Fellows. Sam Nunn School of International Affairs Associate Professor Dan Breznitz was awarded one of five Sloan Industry Studies Fellowships.

The Sloan Research Fellowships have been awarded since 1955, initially in only three scientific fields: physics, chemistry and mathematics. Since then, 38 Sloan Research Fellows have gone on to win the Nobel Prize in their fields. The Alfred P. Sloan Foundation is a philanthropic, not-for-profit grant making institution based in New York City. Established in 1934 by Alfred Pritchard Sloan Jr., then-president and chief executive officer of the General Motors Corp., the Foundation makes grants in support of original research and education in science, technology, engineering, mathematics and economic performance.

For more information

www.chbe.gatech.edu
www.sloan.org
Respect the wind
Tech's inclement weather plans in place

Tech’s Emergency Preparedness Director Andy Altizer is marking an anniversary in the next few weeks. On March 14 last year, a large tornado touched down near the Georgia Dome in Atlanta.

While several downtown buildings were damaged, Tech was not affected, but that doesn't prevent Altizer from wanting the campus community to be aware of possible weather issues.

“The best thing to do to protect yourself is to have a plan of action before severe weather or a threatening tornado develops,” Altizer said. “Know what to do and where to go if there is a tornado warning.”

He also warns that tornadoes are not the only concern as warmer weather brings spring storms. People are far more likely to be struck by lightning than tornadoes, he points out. “It may sound corny, but remember the saying, ‘When thunder roars, go indoors’ and follow that advice.”

Altizer said 88 percent of those killed by lightning in 2007 were outdoors, and he points to the 30/30 lightning safety rule: Go indoors if you cannot count to 30 between a flash of lightning and hearing thunder, and stay indoors for 30 minutes after the last thunder clap.

By signing up for Georgia Tech Emergency Notification System (GTENS) and Skywarn, campus community members can be forewarned of imminent bad weather. WeatherData monitors and delivers alerts to the campus concerning hazardous weather.

“Don’t depend on us to have enough time to alert you to sudden weather changes,” Altizer said. “If there is a chance of severe weather, pay attention and be prepared to take action.”

If severe weather strikes, Altizer advises campus community members to stay indoors until the event passes. Real-time situation updates can be accessed by visiting www.alerts.gatech.edu or by calling the Inclement Weather Hotline at 404-894-0500.

For more information
www.police.gatech.edu/weather.htm
www.alerts.gatech.edu

BATTERIES, continued from page 1

...can receive and neutralize the batteries prior to placing them in the recycling container because of a small but real possibility of fire. Pozniak said. “It is a rare but serious event when batteries believed to be fully discharged still retain a small charge which can generate heat or start a fire when they come in contact with other batteries in the collection box.”

As a best practice, the Georgia Tech Office of Environmental Stewardship recommends using rechargeable batteries. Because they can be recharged up to 1,000 times and can be recycled, they save money and the environment.

Mark Demyanek, Assistant Vice President of Environmental Health and Safety, acknowledged that even though campus policy and EPA regulations do not require Tech to recycle this wide range of small batteries, it is the right thing to do for the environment.

“Most types of batteries can be recycled,” he said. “However, some batteries are recycled more readily than others, such as lead-acid automotive batteries [nearly 90 percent are recycled], button cells [because of the value and toxicity of their chemicals] and rechargeable.”

Classifieds

AUTOMOBILES/ MOTORCYCLES

2004 Jeep Grand Cherokee, candy apple red, fully loaded. Sells leather interior, sun roof. Good cond. $13,000. Call 678-642-4945 or e-mail jstuart@biol.gatech.edu.

2006 Silver Mazda 3i touring sedan. 29K miles, automatic. Perfect cond. Full warranty. Owned by visiting professor. $12,000. Call 404-428-4547 or e-mail mkinm@gatech.edu.

REAL ESTATE/ ROOMMATES

For rent: Renovated 3BR/1BA in Clarkston, inside I-285, 10 miles from Tech. Four-sided brick, fenced back yard, all new wiring. New appliances and cabinets in kitchen, new ceramic tile and fixtures in B/R. New paint, refinished HW floors. $1,150 deposit and $1,150 monthly rent. Pets OK w/ deposit. Call 404-218-0409 or e-mail regina.riger8@police.gatech.edu.

18/1B unit 1221 at 12 Atlanta Station. Walking distance to Tech, pool, gym and club room. 24-hour security. HW floors, cherry cabinets, granite, SS appliances, large tub, washer and dryer. Unobstructed views of the Atlanta Downtown skyline. $1,100 a month. Call 404-513-1668.

For sale: 1-level, free standing, 3BR/2BA condo. Exc. condition. New landscaping, near MARTA, In Oak Grove/Lafayette area. Walk to restaurants and shops. $177,382. E-mail donna.brown@ibb.gatech.edu.

FURNITURE/APPLIANCES

Exercise stepper (Tunturi Tri-stepper 5000, $50). For all. Call 404-377-2827 (eva) or e-mail jdemyers@gatech.edu.

SPORTS/FITNESS/ RECREATION

3BR/2BA peaceful, furnished, waterfront cottage along the Southern Outer Banks, NC, 150/day, 3-day min. Pets OK. Boat Slip. More info: http://travel.sj.com/aids/508. E-mail jud.roxby@gatech.edu.

MISCELLANEOUS

Samsung 640 cell phone JPH-4440 (Sprint). Excellent condition. Text messages, games and photos. Comes with home and car charger. $100. Call Ann at 404-407-6171 or e-mail ann.jaudon@ghi.gatech.edu.

Toro riding mower, 42-in. cut. 2 years old, in excellent condition. Sell for $500, cash only. Call Gerald Greene, 894-7571; cell 404-444-1985, e-mail gerald.greene@marc.gatech.edu.

Max Blue & White G3 w/ 21-in. CRT Monitor. 450MHz/400MHz/380MHz. [brand new w/ fresh copy of OS X 10.4] / CD/DVD-RW/keyboard/mouse/joystick. Tons of extras. $350. Call 404-310-5970 or e-mail amartin@oit.gatech.edu.

OK. Boat Slip. More info: http://travel.sj.com/aids/508. E-mail submissions to editor@comm.gatech.edu.

Check out more ads at www.whistle.gatech.edu. Ads appear and run for three weeks in the order in which they are received. E-mail submissions to editor@comm.gatech.edu.

CLASSIFIEDS

www.whistle.gatech.edu

Students speak up to new president

Members of the Special Committee for the Presidential Transition solicited input from the undergraduate campus community on Feb. 24 at the Campanile. Students were encouraged to speak out about what they wanted to ask incoming President G.P. ‘But’ Peterson. Comments— ranging from diversity, intellectual community, campus life and sustainability—will be transcribed into a students’ White Paper, to be presented to the incoming president.