The Link

NEWS FROM Information and Telecommunication Technology Center

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ITTC Alum Gets NSF Grant for Start-Up

ITTC alumnus **Benjamin Ewy** has received a $100,000 research grant from the National Science Foundation for a new start-up company called Ambient Computing, Inc.

Ewy and other ITTC alumni will use the grant to continue developing smart rooms. The group concentrates its efforts on near-term commercial applications of inexpensive computing and networking for intelligent environments. It will initially focus on creating devices to control environmental factors such as the temperature and humidity. Through the Small Business Innovation Research grant, they will build programmable thermostats that give users greater control and flexibility than current thermostats. Through a sub grant, ITTC will help with the evaluations of these devices.

Ewy, other former students, and **Joseph Evans**, a Charles E. Spahr professor of electrical engineering and computer science and director of the Networking and Distributed Systems Laboratory at ITTC, founded the company in 2000. They share a common vision with the Ambient Computing Environment project at ITTC—making environments more intelligent. ITTC's work focuses more on the long term, while the company deals more with short-term projects. The company hopes to have the thermostat available to consumers by 2003, Ewy said.

"We started with a smart thermostat because, unlike many smart home concepts, everyone knows what a thermostat is, and the potential energy savings make the purchase a good entry point for consumers interested in smart homes," Ewy said.

To determine temperature and humidity in different rooms, users can log on to their computers, pull up a Web page, and easily change settings. They can save configurations for different parts of their house. For example, a family could have the house set for 66 degrees from 8 a.m. to 5 p.m., and then raise the

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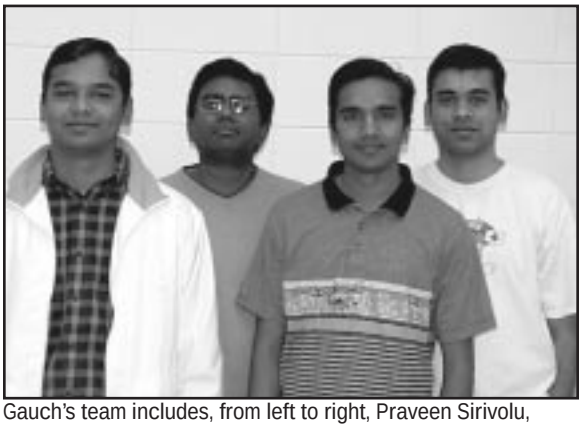
Web Site Launched for VitalSeek Project

From AIDS to cancer to weight issues, Vitalseek.com offers answers on an array of health questions.

The launching of Today Communications, Inc.'s Web site in December marked the successful completion of a yearlong project for **Susan Gauch** and four graduate students. The group developed and built a Web site that allows users free access to health information. Today Communications rated 1,000 sites on 53 different criteria, and then ITTC indexed each site.

"In 2000, more than 30 million people in the U.S. went to the Web looking for medical information," said Ace Allen, the company's CEO. "The Web offers tens of thousands of health-related sites. So the good news is that there's lots of information, but it is difficult for people to sort through it all."

Graduate students **Praveen Sirivolu**, **Solomon Nagelli**, **Subhash Induri**, and **Rajan Vijayaraghavan** hope to offer people a solution to that problem. They created 51 Web sites within the one site. They



Gauch's team includes, from left to right, Praveen Sirivolu, Solomon Nagelli, Subhash Induri and Rajan Vijayaraghavan.

categorized information from each site into separate categories such as arthritis, depression, and heart disease, and then filed the information again into a general category. Gauch, associate professor in computer science and electrical engineering, said that

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Director's News

National indicators, such as February's decreasing unemployment rate, report encouraging news for our economy. But even as Federal Reserve Chairman Alan Greenspan says economic recovery "is already well under way," our own Chancellor Hemenway reports the possibility of significant, upcoming budget cuts for the University.

Director Victor Frost

All areas of campus will feel the tightening of our collective belt; but at ITTC we hope to minimize the impact of any budget cuts with our own economic stimulus package—increased federal research funding and support for regional economic development.

Besides the major research grants won by ITTC's investigators, the Center also benefits from the successes of ITTC-related spin-off companies, commercialization efforts, licensing and royalty fees, and business partnerships.

An article on page six notes that, on average, ITTC has grown its research expenditures each year, while the contribution from State funding from KTEC for technology transfer and commercialization has remained relatively static.

ITTC currently has several projects in various stages of research and development that have the potential for commercialization and significant benefit to Kansas. As mentioned on the front page, a start-up company founded by ITTC's Joe Evans and Ben Ewy has received a $100,000 SBIR award from the National Science Foundation (NSF). ITTC will be working with Ambient Computing, Inc. through a subcontract to evaluate the ambient control systems.

Likewise, Susan Gauch and her team are providing unique solutions to a small local company, Today Communications, Inc., on a project that began one and a half years ago. In December the health information Web page was launched, and the company is one step closer to success.

Along with spin-off companies, ITTC has developed valuable partnerships with regional companies. Just announced is a technology trial that we'll be participating in for Sunflower Broadband of Lawrence and Advent Networks of Austin, Texas.

These partnerships, as well as major research awards, have made ITTC a major contributor to the University's climb in national ranking for science and engineering research activity. According to a recent NSF report, KU climbed 15 spots among all universities. And KU recently announced it has broken its previous record of total research funding, exceeding the $224 million mark.

The success of our researchers and their projects allows ITTC to thrive, even in tough times. ■

ITTC Welcomes New Staff, Adjusts to Changes

Michelle Ferguson is the new student office assistant in room 203. The social welfare student, from Liberal, Kansas, joined ITTC this January. She plans to graduate in May 2005 and then begin work on her master's in social welfare. She would like to work with families planning adoptions after her graduation. She's a big fan of KU basketball and football and enjoys playing tennis, running and reading.

Michelle Ferguson

Danico Lee has received a full-time position at ITTC as a software engineer. She started at the Center in 1998 as an undergraduate. After earning her degree, she taught Java at KU for a year before deciding she wanted to return to the Center. She rejoined ITTC as a graduate research assistant and has worked on such projects as DiscoverMe and PHOENIX. In her new role, she will continue to work with PHOENIX in the development and administration of the client-server tracking system for intellectual property and research projects.

Danico Lee

Vitaliy Ostropyts'kyy has joined ITTC for the spring semester. The visiting Ukrainian researcher started work on February 1 through the regional scholar exchange program.He will investigate Internet technologies, and plans on using the knowledge he gains at ITTC, in the classroom. Ostropyts'kyy is an associate professor of computer science at Onipropetrovsk National University in Onipropetrovsk, Ukraine.

Vitaliy Ostropyts'kyy

Peggy Williams will be the new program assistant to the ITTC director. She will help the director in the daily operations and strategic development of the Center. Her responsibilities include recruitment and coordination processes for ITTC's staff. She will monitor fiscal information along with planning special events. Williams will be in room 207.

Before taking her new position in February, Williams worked as ITTC's secretary for research. She has been at the Center since March 1997.

Paula Szuwalski left ITTC in January to begin work as program assistant for Kansas Biological Survey/Kansas Applied Remote Sensing. She has moved just down the hall from her old office to 257 Nichols. ■

Ambient Computing, Inc. Gets NSF Grant

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temperature to 72 degrees for the evening, Ewy said.

If a family slept upstairs, they could turn the heat down for the bottom portion of the house. If someone got up in the middle of the night and went downstairs to watch TV, she would not have to fix the thermostat. The room's heat would increase as motion detectors alerted the heating system of her presence. These sensors placed in each room would allow rooms to remain cooler when unoccupied and heated when people were in them.

Ambient Computing, Inc. will develop these wireless smart devices during the next year. Work will initially focus on the creation of prototypes of the sensors and other environmental controls. At ITTC, Victor Frost will help in the system evaluations of smart rooms through a $25,000 sub-award from NSF. The Center will aid the company in the advancement of the connected and coordinated system.

"ITTC has a number of great resources to help with the testing and analysis of prototypes," Ewy said. ■

Business leaders from across Mexico visit ITTC's labs to learn about economic and technology development in Kansas City.

During the tour, led by Victor Frost, Juan Madrid surprised the guests by explaining his work in the Lightwave Lab in Spanish.

Tour Gives Insight for Mexican Visitors

Juan Madrid had the group's attention with the first words out of his mouth. The delegation of Mexican leaders had been using translators throughout their tour of the greater Kansas City area. But when Madrid began explaining his work, the native Colombian spoke to the visitors in their own language about his work in the Lightwave Lab.

Their visit to ITTC was part of a whirlwind tour for the nine business leaders. The international visitors came to explore the economic and technological developments in the area. They visited the Mid America Manufacturing Technology Center in Overland Park, the Enterprise Center of Johnson County in Lenexa, and Kansas Technology Enterprise Corporation in Topeka—all before mid-afternoon on Thursday. They continued their hectic schedule on Friday, Dec. 14, as they arrived that morning at KU.

"They were delighted to hear all the technical stuff explained in an easy way and in their language," said Madrid, a Ph.D. student in computer science. "That's one of the greatest challenges you have to face as a professor and you have to talk about what you've learned in a different language. In addition to an excellent understanding of the subject, you must find adequate translation for all the technical terms, so the meaning of what you say is not obscured."

The nine guests and three translators received a tour of ITTC and listened to talks from Victor Frost, the Center's director; Jimmy Morrison, associate director of KU CIBER; Rich Bendis, president of KTEC; and Charles Ranson, president of Kansas Inc. The trip gave the delegation an idea of the technological advancements being made within the State.

"We want to show that Kansas has world-class research going on in a wide variety of areas ranging from radar to intelligent systems," Frost said.

The group also met with the Greater Kansas City Chamber of Commerce, then returned home the following day. ■

"Now more than ever, we see the importance of federally funded research at our public universities. The fact that KU continues to attract more funding speaks volumes about the quality of our researchers and their projects."

Robert Hemenway
KU Chancellor

Today Communications, Inc. Enters Next Phase

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quickly indexing the large amount of information was the biggest challenge.

"The indexing of the general category was quite a mammoth task," Vijayaraghavan said. "We had quite a lot of good sites rated, which increased the document collection." With such a large amount of information, he said they often hit limits set by the system before they were finished.

The group started creating the sites after Today Communications judged each health site based on privacy, accuracy, currentness, and user friendly categories. These different measurements were then grouped together and fit within the quick search, content, or site filters. For example, font size and availability to return to the home page from anywhere on the site fell under the ease-of-use heading. Users can click what filters they would like to have on during their search, creating a user profile that will help guide their search, Gauch said.

Nagelli, a graduate research assistant at ITTC, said the filters would aid people in their specific searches.

"I think the companies' privacy, viewpoint and reading levels will help people to navigate easily as the search will be narrowed down." Nagelli said. "More and more people are looking for information that is very specific to their needs. And since our Web site is mainly for medical searches, people will be more interested to do a specific search rather that a broad search."

With the launching of Vitalseek.com, Gauch and her students completed Phase I of their project. They received a grant to continue development on the site through the spring, Gauch said. ■

Wireless Security Research Receives Attention

Brett Becker and Matt Dunbar's work on wireless security has led to cyberspace acclaim for the two researchers. Their work has piqued the interest of many, including Slashdot.com and NetStumbler.com, which discussed the project online.

Becker, a network specialist at ITTC, and Dunbar, a graduate student in geography who works at the Kansas Applied Remote Sensing Laboratory, have developed the Wireless Network Visualization Project (http://www.ittc.ku.edu/wlan/), which aims to educate wireless users about security concerns by providing a more useful representation of wireless network coverage.

"People think that their wireless network is contained within their home or business, but that is definitely not the case," Becker said. "We hope the images we are creating will help to demonstrate that wireless network signals can travel a long way."

The two researchers said wireless security should be a concern for everyone. Hackers could gain access to information on servers and crash systems. They could send computer viruses anonymously using someone else's network.

With the continued growth of wireless systems, more and more users need to know how to protect themselves. The interest in security has created the opportunity for Dunbar and Becker to be recognized by online publications and traditional media.

Slashdot praised the ITTC project as an "interesting alternative to just dot maps of wlan base stations." This discussion thread posted by Jeff Bates, co-founder of Slashdot, led to an array of responses and questions about the technology.

"The exposure and contacts resulting from these sites has really kept us excited about the project and provided us with new ideas," Dunbar said.

The Slashdot site serves hundreds of thousands of users and 30 million pages per month. Its mission is to provide "news for nerds" on information that matters, according to the site. People can log on to the discussion, which has received more than 15,000 page views, at *http://slashdot.org/article.pl?sid=02/02/12/1317227&mode=thread.*

Matt Dunbar, on left, and Brett Becker developed a system to show the insecurity of wireless networks. Their project received good reviews online.

The project also received a plug on NetStumbler.com. ITTC researchers used the NetStumbler software to aid them in mapping the various networks. More than 2,000 users have accessed the discussion thread at *http://www.netstumbler.com/article.php?sid=146.*

NetStumbler.com details wireless networking technology and security of all kinds. It is also the official home page for NetStumbler security software. According to the site, it hopes to "raise awareness of the inherent problems with wireless communication security."

The *Lawrence Journal-World* featured the two researchers and their work, and an upcoming issues of the *Kansas City Star* will include a story about the project. The *Journal-World* article is at *http://www.ljworld.com/section/citynews/story/81268.* ■

ITTC Offers New Graduate Fellowship

Only those interested in creating tomorrow's technology need to apply for ITTC's Graduate Fellowship. The Center's executive committee recently approved the two-year honor for doctoral students at the University of Kansas. The first class of fellows will receive yearly funding along with a chance to work in one of ITTC's labs.

The fellows will receive a $2,500 annual stipend, and they may apply to one of ITTC's six labs as a research assistant to gain hands-on experience.

Carl Leuschen, who recently graduated with his Ph.D. in electrical engineering, worked at ITTC for more than five years. His work on radar attracted the attention of NASA and helped him land a position at Johns Hopkins University. Leuschen said his time at ITTC let him see that remote sensing applies in many fields and find the one that suits him best.

Admissions in a Ph.D. program at the University of Kansas will be required before the award will be issued. There is no deadline for the program, which will have one to three fellows in its inaugural year. The ITTC Core Management Team will review applications and select the award winner. ■

To apply for the ITTC Graduate Fellowship, please submit transcripts, resume, an application, and a written referral from an ITTC-affiliated faculty member to:

Victor Frost
ITTC Director
Information and Telecommunication Technology Center
2335 Irving Hill Road
Lawrence, KS 66045

Applications are available online at: http://www.ittc.ukans.edu/education/fellowship.html

NASA Gives Grant to Study Polar Snow

ITTC researchers have a new grant that will enable them to add another piece of understanding to the puzzle of calculating snow depth from satellites. Prasad Gogineni and Glenn Prescott are developing an airborne radar that will measure snow depth over sea ice and help define potential modifications to a recently developed microwave algorithm that measures snow depth from satellites.

A better understanding of snow depth will help researchers more accurately evaluate conditions of the oceans and the atmosphere as they relate to the overall heat budget of the polar regions and the fresh water budget of the oceans. A more thorough knowledge will also enhance precipitation measurements.

NASA will obtain initial data from the Defense Meteorological Satellite Program Microwave Imager, which uses the satellite-based passive microwave algorithm. ITTC will help test the accuracy and find possible error sources of these measurements by creating an airborne pulse radar system to take comparative measurements.

ITTC researchers will develop an airborne radar to measure snow depths over the sea ice in polar regions.

"Although we demonstrated that we can measure snow thickness using a surface-based ultra wideband radar, it is a real technological challenge to measure it with aircraft-based radar. We are looking forward to addressing the technical challenge and developing an aircraft radar," says Gogineni, Deane E. Ackers distinguished professor of electrical engineering and computer science.

The problem with current in situ measurements used to verify the algorithm is that they are sparse and made infrequently. These isolated measurements do not give a complete picture of snow coverage, as it varies by tens of centimeters or more over several meters. The variations occur because of drifting snow or sea ice age.

ITTC researchers will employ an airborne stepped-frequency pulse radar modeled on a surface-based radar that has successfully measured snow depths to an accuracy of about 2 cm. This radar will be used on three field missions, including both polar regions and a wide range of sea ice types. ■

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Achievements and Acclaim

LTA Elects Treasurer, Senator Speaks

Timouthy Johnson, ITTC's executive director of applied technology, was elected Treasurer of the Lawrence Technology Association. Senator Pat Roberts attended the group's January meeting, speaking about technology-oriented economic development and the impact of state and federal support on economic development opportunities in the Lawrence area. ■

Gogineni's Work Appears in *Science*

Prasad Gogineni, Deane E. Ackers distinguished professor of electrical engineering and computer science (EECS), was one of five researchers whose work appeared in the Dec. 14 issue of *Science*. The article identified two fast-moving ice streams in the Greenland ice sheet. The team determined that geothermal heat, perhaps of volcanic origin, is causing the rapid basal melt. ■

Roberts Elected Fellow of IEEE

Jim Roberts, associate vice chancellor and EECS professor, was elected a Fellow to the Institute of Electrical and Electronics Engineers (IEEE). The grade of Fellow is reserved for those engineers who demonstrate outstanding proficiency and achieve distinction in their profession. Roberts is the eighth ITTC-affiliated faculty member to be given this high distinction. ■

ITTC Students Win IEEE Paper Contest

Bharath Parthasarathy and Travis Plummer's paper *Target Simulation for Internal Layer of Greenland Ice Sheet* won first place in the IEEE Student Paper Contest. The team received a $300 gift certificate to Amazon.com and could compete in the regional contest in April. Both students work with ITTC's Radar and Remote Sensing Lab. ■

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ITTC Helps Break Record for Research Funding

ITTC's recent successes have helped push the University of Kansas past the $224 million mark for fiscal year 2001, according to officials at the KU Center for Research.

The Center attracted $5,144,122 in total external research, development, and commercialization funds during the last year. This amount for support comprises $3,706,281 in federal and other funding along with $654,084 from industry. Kansas Technology Enterprise Corporation continued to support ITTC as a Kansas Center of Excellence with a grant of $650,000. In addition, the Center generated $133,757 from licensing fees and royalties, according to Tim Johnson, executive director for operations and applied technology.

ITTC increased its activity in 2001 as it has done since 1996. In late 1996, the Telecommunications and Information Sciences Laboratory (TISL) and Center for Excellence in Computer-Aided Systems Engineering (CECASE) merged. The union of these two centers created $2,081,479 in total external funds in 1996, including $525 in licensing fees and royalties.

The Center's development and growth has led to greater diversity in funding for projects and helps ITTC achieve its mission. In 1996, KTEC provided $705,000 or 33 percent of the funding for the Center. Due to ITTC's successful diversification during the last five years, the Center received approximately 10 percent of its funding from KTEC. From 1997 to 2001, federal funding accounted for 53 percent of the budget, with industry providing 34 percent. License fees and royalties created the remaining 3 percent of the $32,015,548. On average, ITTC collaborates with 15 companies a year.

The Center's continued success has helped the University to climb in the national rankings, according to the National Science Foundation report. The report covers federal science and engineering research expenditures during fiscal year 2000. KU moved up two places to 51 among public universities and up five places to 78 among the more than 500 universities surveyed nationwide. Over the past two years, KU has jumped 15 spots among all universities in this measure of federal research activity.

"Now more than ever, we see the importance of federally funded research at our public universities," said KU Chancellor Robert Hemenway in a press release. "The fact that KU continues to attract more funding speaks volumes about the quality of our researchers and their projects."

The U.S. Department of Commerce estimates that every $1 million in university research creates about 40 jobs throughout the state. Just last week, KU officials announced that the total research expenditures for fiscal year 2001 topped $224 million. Applying the Commerce Department formula, that translates into almost 9,000 jobs throughout the state. In the last few years, the Center has produced more than 60 researchers and engineers that have stayed in the state. ■