



RFID Lab Begins Testing Tags

ITTC has teamed with Rush Tracking Systems, a private RFID systems integrator, and *RFID Journal*, a leading media company, to create the RFID Alliance Lab. The Lab will assess how well various RFID tags perform when placed on various product types.

Radio frequency identification (RFID) tags are microchips that contain tiny antennas that allow products to be tracked anywhere in their supply chain, said **Daniel Deavours**, ITTC's principal investigator on the project. RFID tags "listen" for a radio query and respond by transmitting their unique ID code. Most RFID tags are passive, with no internal power source. They are far less expensive and smaller than active tags, which have batteries; and passive tags can be disposed of with the product packaging. Passive tags use the power from the initial radio signal to transmit a response.

The U.S. Department of Defense, Best Buy, Target, and Wal-Mart have said that by next year they will require their suppliers to use RFID tags for inventory tracking. Suppliers need objective information about the performance of tags under real-world conditions. The Lab will provide the critical data.

"If you are a supplier trying to comply with these RFID mandates, you are wondering where you even start," says Deavours. "You do not know where to go for reliable information. We would like to be the place people could turn to for accurate, unbiased RFID information."

The vast majority of the product information



Graduate student Karthik Ramakrishnan adjusts an antenna used in RFID testing. The antenna is connected to an RFID reader that sends out electromagnetic waves, which an RFID tag's antenna is tuned to receive.

available is direct from the manufacturers. It can be difficult to determine what is real and what is marketing hype, said **Toby Rush**, president of Rush Tracking Systems. Rush realized an unbiased third party was needed for performance testing.

Rush contacted the *RFID Journal* about helping support a laboratory. **Mark Roberti**, the *Journal's* founder and editor, said that companies were purchasing tags and readers and performing tests to determine which ones would work with their products. It was time consuming and a waste of resources.

The RFID Alliance Lab will conduct tests through the fall, with technical performance and benchmarking reports available for purchase following the testing. n

ITTC Assembles IWAN 2004

Imagine telling your data network how you would like your data handled, just as you can tell the post office to be careful with photos or send them via airmail. Active Networking is a research area that explores techniques and protocols to enable users and system operators to rapidly program the network to do

new things. These "new things" might include handling connections to emerging wireless networks or providing a more robust network service resistant to attacks.

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In our last newsletter, we noted **Xuewen Chen's** EPSCoR First Award in our Achievements and Acclaim section. This award marked the first success for our new bioinformatics faculty. Chen recently received another grant from KU's NIH Center for Biomedical Research Excellence (COBRE) in Protein Structure and Function for computational proteomics: protein interaction prediction. He will build computational models of domain interactions and predict protein interactions based on these models.



Director Victor Frost

In addition to Prof. Chen's research, we have also expanded our technical staff: **Adam Hock** and **David Johnson** will help with our bioinformatics efforts.

Our newest bioinformatics investigator, **Terry Clark**, is expanding our research activities to include genome analysis and related data management infrastructure. Clark continues collaborations with **Daphne Preuss**, a Howard Hughes Medical Institute investigator, and her group at the University of Chicago in these areas.

In other Center news, ITTC's Wireless Network Visualization Project, a collaborative effort between the Center and Kansas Applied Remote Sensing Program, received a nod in *Communications of the ACM* (Volume 47, Issue 9, pages 21-26). This prestigious computer science journal showed the work of **Brett Becker**, an ITTC network specialist, and **Matt Dunbar**, a graduate student in geography in **Hal Berghe's** "Digital Village" column. Becker and Dunbar are educating wireless users about security concerns through their useful representations of wireless network coverage. For more on their project, please log on to <http://www.ittc.ku.edu/wlan/index.shtml>.

We are also happy to report that **Dan DePardo**, an ITTC RF electronics engineer, has received a U.S. patent for his wideband planar antenna design. DePardo initially developed the antenna in support of the ACE (Ambient Computing Environments) project to improve reception of the HDTV signal from KCPT in Kansas City. The patent primarily involves a method of feeding and extracting energy from a patch antenna element. It provides a relatively inexpensive method of increasing the frequency range or "bandwidth" capability over that of more traditional patch antennas. He has incorporated the patented technology into antenna designs for Professor **Gary Minden's** National Radio Networking Research Testbed (NRRNT) and flexible wireless projects. n

Center Welcomes New Faculty, Staff

Jim Miller, associate professor of EECS, wanted more opportunities for research with other faculty members, which led him to ITTC. While he has taught at KU since 1987, he just recently became affiliated with the Center. His research interests include visualization, geometric and solid modeling for computer aided design, and computer graphics.



Miller

Ron Sass joins ITTC as an assistant research professor. Sass has brought several reconfigurable computing projects with him, and he looks forward to supporting these and other high-end computing efforts in the Center.



Sass

Before coming to ITTC, he was an assistant professor at Clemson University in the Department of Electrical and Computer Engineering. He earned his Ph.D. in computer science and engineering from Michigan State University in 1999.

Adam Hock is the new senior systems administrator for the Integrated Bioinformatics Information Infrastructure. He will be in charge of system integration, administration, and maintenance for the cluster being built as well as the development of new software tools. Hock has worked for five years as a system administrator. Before joining ITTC, Hock was an engineer at Atipa Technologies, a provider of information technology solutions based on the Linux computer operating system.



Hock

David Johnson is the new systems administrator for the Integrated Bioinformatics Information



Johnson

Infrastructure. Johnson's duties include administering the bioinformatics database and software and developing new bioinformatics tools. He is finishing his thesis for his master's degree in computer science from the University of Oklahoma. n

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New Smart Tool to Aid XML Users

ITTC researchers have developed SmartXAutoFill to help users of XML (eXtensible Markup Language) enter information online. SmartXAutoFill is an intelligent assistant for automating data entry for XML documents by predicting the values of the XML nodes.

XML is the simplified markup language (symbols and rules for displaying documents online)

endorsed by the World Wide Web Consortium,

which establishes the standard protocols for Internet use.

Converting data to XML's simple, flexible format facilitates the exchange of data between computer systems and databases that contain data in incompatible formats. Each discipline writes its own tags and has its own XML language. Using XML, for example, chemists and biologists can share data, and businesses can exchange financial information, without worrying about its format.

However, while current XML tools can simplify the implementation process, large amounts of data must still be



manually entered into XML documents. Consequently, autofill technologies have been invented. But existing autofill technologies are mainly for simple data entry, such as online shopping and login forms, and do not support the complexity and nested structures of XML grammars. As XML has become the primary standard of data representation and data exchange between businesses and academic disciplines, SmartXAutoFill will become an important time-saving tool.

Danico Lee, ITTC lead software engineer, and **Costas Tsatsoulis**, professor and chairman of KU's EECS Department, began developing SmartXAutoFill with the observation that collections of data—whether in a row of a database or the data in an XML document—are usually related. For example, the value "Lawrence" will appear only with the values "Indiana," "Kansas," "Massachusetts," "Michigan," "Mississippi," "Nebraska," "New York," or "Pennsylvania."

SmartXAutoFill is currently available for licensing to existing XML application users and/or vendors. For more information, please contact **Keith Braman**, ITTC's associate director for applied technology, kbraman@ittc.ku.edu. n

ITTC Assembles IWAN 2004

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The sixth annual International Working Conference on Active Networking (IWAN) gathered researchers from four different continents at ITTC on October 28 and 29. **Gary Minden**, director of ITTC's Networking and Wireless Systems Laboratory (NWSL), led the conference that focused on active networking systems, security, applications, and management.

"Hosting IWAN 2004 is an honor for KU and ITTC," says Minden. "I was pleased so many colleagues took time to participate in the conference and visit KU and Kansas from around the world. This conference continued the strong tradition of presenting and discussing leading work in Active Networking."

While funding for basic networking research has dropped considerably in the past few years, the conference participants continued to show interest in programmable networks and self-organizing capabilities. The participants recognized the need to make networks easier to set up and operate and to adapt to current user needs. For example, networks should support users moving from one location to another with little user input. Threats to network operation were also discussed along with mechanisms to improve the robustness of common communications networks.



An IWAN participant looks at an Active Networking poster in the lobby of Nichols Hall. The group beside him actively debates one another's research during the break.

Ken Calvert, associate professor of computer science at the University of Kentucky, said the number of international researchers at the conference provided a broad perspective. Researchers from Australia, France, Germany, Iceland, Japan, Switzerland, United Kingdom, and the United States shared technical information, as well as funding dilemmas and opportunities.

"One of our biggest challenges is convincing people that we have not solved the problem," says Calvert. "We need to be working on networks we will need 25 years from now." n

Achievements and Acclaim

Allen, Gauch Promoted to Professor

This fall two of the Center's affiliated faculty received promotions from the University of Kansas. **Chris Allen**, director of ITTC's Radar Systems and Remote Sensing Laboratory (RSL), and **Susan Gauch**, director of the Center's Intelligent Systems Laboratory (ISL), were promoted to full professor in the School of Engineering. n

EECS Faculty Earn Kemper Awards

In August, EECS Professors **Susan Gauch** and **Jerzy Gryzmala-Busse** received W.T. Kemper Fellowships. The Fellowship recognizes outstanding KU teachers and advisers. A surprise patrol led by KU Chancellor **Robert Hemenway** presented professors with a \$5,000 check on the first day of fall classes. n

ITTC, Sprint Receive U.S. Patent

ITTC earned its second U.S. Patent for its work with polarization-mode dispersion (PMD). At very high data rates PMD randomly corrupts signal quality on fiber-optic cable and cannot easily be distinguished from other kinds of problems, but ITTC researchers have developed a technique for detecting PMD-induced errors so that corrective action may be taken. RSL Director **Chris Allen** along with Sprint's **Doug Richards** and **Doug Hague** were awarded the patent in August. n

ITTC Graduate Fellow Named

Justin Rohrer has received the ITTC Graduate Fellowship, which provides \$2,500 each year for the next two years. Rohrer graduated in May with a bachelor's degree from Rensselaer Polytechnic Institute in Troy, NY. His major was electrical engineering, with concentrations in microelectronics and networking and a minor in economics. n



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Heavey Obtains NASA Fellowship

Brandon Heavey, who plans to pursue a Ph.D. in electrical engineering, earned one of 52 Earth System Science Graduate Student Fellowships, for which NASA received 209 applications. The Fellowship supports graduate students who are conducting research to better understand and protect Earth. Heavey and other ITTC researchers are developing radar that will measure sea-ice thickness. Thinning of the fragile layer serves as an early indicator of climate change.



Heavey

"It is a great honor to receive a NASA Fellowship," Heavey said. "I would not have been able to win this award without the support of faculty and staff."

Sea ice has greater reflective powers than ocean waters. Since it reflects light and heat back into the atmosphere, the ice helps sustain cooler temperatures. But as the ice melts, the ocean is left to absorb more and more sunlight. This leads to warmer temperatures and continued melting of sea ice.

KU's radar, installed on an aircraft, transmits a signal that penetrates the sea ice and reflects back from the ocean water beneath the ice. The returned signal is captured by an onboard computer, and sea-ice thickness is then determined by post processing. Heavey is working on this radar's transmitter and receiver design.

"Brandon is a well-qualified and dedicated young man," said **Prasad Gogineni**, Heavey's advisor and Deane E. Ackers distinguished professor of electrical engineering and computer science. "He has been involved in two major experiments in the Arctic and Antarctic over the last two years. I have no doubt that he will be successful with his proposed research."

Since the Fellowship's creation in 1990, 17 students from ITTC's Radar Systems and Remote Sensing Laboratory have garnered the honor from NASA. n