

The GTRI Connector

Did You Know:

The largest living species of kangaroo has a head the size of a sheep's and may stand 7 feet tall. An extinct species of kangaroo had a head the size of a Shetland pony's and reached a height of more than 10 feet. There are miniature kangaroos, such as the musk kangaroo, that are no bigger than a jackrabbit.

—from *2201 Fascinating Facts* by David Louis

Vol. 10 • No. 9

Published Monthly for the Georgia Tech Research Institute Family

August 1994

Defense Conversion Office Up and Running — Involves GTRI, Academic Researchers, Industry and Others

By Lea McLees, RCT

The end of the Cold War ushered in a declining need for weapons produced by industrialized states throughout the world. Countries once involved in armament production are now trying to decide how to best convert their weapons production plants to practical and profitable civilian uses.

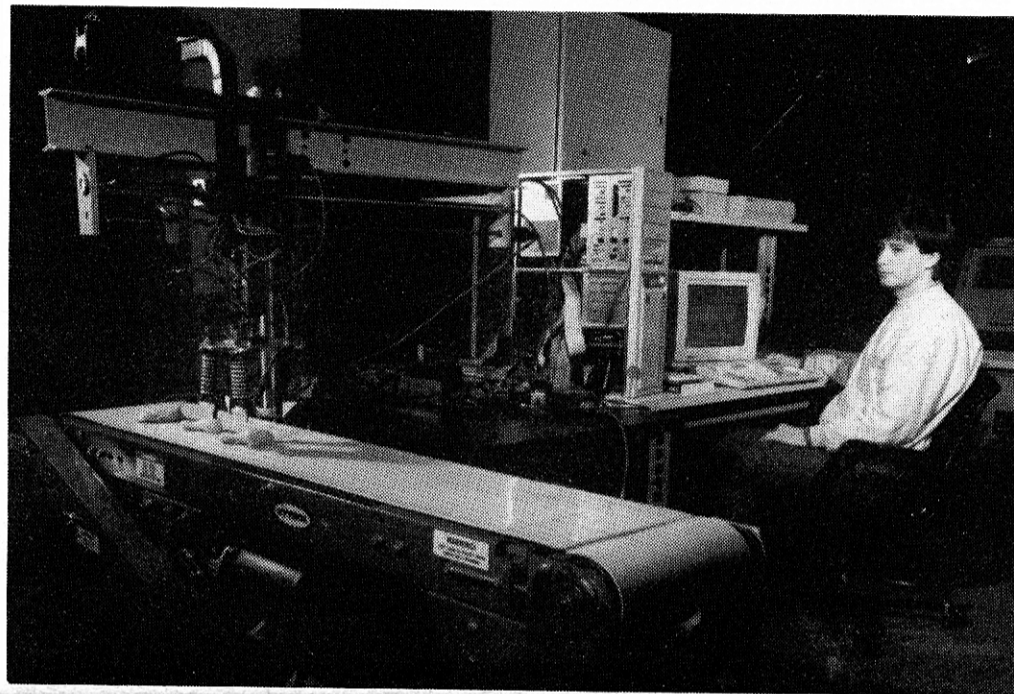
Few countries have succeeded in such defense conversion efforts, in part because of the complexity of the process, says Dan Papp of Georgia Tech's School of International Affairs.

Defense conversion requires not only engineering and technical knowledge, but national and international policy understanding, management and marketing capabilities, and legal expertise, explained SEAL's Larry Corey and Martha Willis, co-directors of the Office of International Defense Conversion. Teams with these skills must also have working relationships with decision-makers in defense production plants.

GTRI is in the process of formally establishing the Center for International Defense Conversion (CIDC), which has all these capabilities. Working with the School of International Affairs and the Center for International Strategy, Technology and Policy, CIDC would draw on an accomplished team of experts both on campus and throughout Georgia.

The team members' objective is to take on specific, practical projects converting defense

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Gary McMurray (EOEML) watches the "intelligent integrated belt manipulator" pick up simulated poultry pieces. (Photo by Rae Adams)

Inflatable Fingers, Computer Intelligence Help Low-Cost Robot Handle Poultry & Other Processing

By John Toon, RCT

A low-cost robotic system developed to retrieve chicken legs from a conveyor belt could help open new applications for industrial robots, potentially doing for the robotics industry what the personal computer has done for the computer industry.

Developed by GTRI and academic side researchers, the "intelligent integrated belt manipulator" substitutes computer intelligence and inflatable fingers for mechanical accuracy. Diminished accuracy requirements allow the system to use pneumatic

actuators and simple photo-electric detectors instead of electric motors and vision systems.

By lowering the system's cost and making it easy for non-engineers to operate, the researchers hope to make their equipment cost-effective for other industries.

"If you look at food processing and other areas of manufacturing, you find many workers whose job is to pick up one object and place it somewhere else," said Gary McMurray (EOEML). "A \$70,000 piece of robotic machinery designed to position a part with extreme accuracy is not economically justifiable, so many of these industries now can't use standard robotics in such applications.

"We are looking at what we call human-level performance robots," he continued. "We envision that they could cost about

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Observed & Noted

Georgia Tech's new president enjoys the outdoors, swimming and reading. Read more about G. Wayne Clough on page 5.

Get to know your Research Security Department colleagues.

More profiles appear on page 2.

Do you want the 1994 GTRI Annual Report sent to your contacts? Turn to page 2 for more information.

GTRI's Biosketch Database is acces-

sible on-line. To find out how to access it, look at page 4.

Researchers have developed a better way of making high-temperature carbon-carbon composites. Turn to page 4 to learn

what they've done.

Janet Leininger is learning the ins and outs of groupware while working at the Army Research Lab. An article on her work is on page 5.

Have a research-related Olympics question? Send it to the address on page 6 and RCT will get it answered for you.

We had space to share 10 each of the many good things about new

employees Sonny Fletcher and Tom Horton. Turn to page 7 to find out what they are.

Find out about colleagues' achievements and a posthumous honor for Charlie Krebs. See page 8.

News & Notes



Rosser Jones

Meet the Research Security Department

Rosser Jones

A security specialist, he has worked at GTRI since 1989. His responsibilities include helping people at Georgia Tech get security clearances for work here and official travel elsewhere, as well as ensuring that visitors to Georgia Tech classified projects have proper clearances. Rosser also helps project directors get documents from the Defense Technical Information Center and sends and receives classified communications. He likes interacting with people, and would like to see automated systems in RSD enhanced. After work he reads history and other non-fiction and enjoys sports.



Jerry Bryson

Jerry Bryson

The RSD manager of operations, Jerry has worked at GTRI for 12 years. He previously worked in military security for 23 years. Among his management responsibilities are document control, clearances, ordering documents from the Defense Technical Information Center, visitor control, and changing safe combinations. He appreciates the cooperation between researchers and RSD. After work he bowls with the Yellow Jacket Bowling League, fishes and hunts.

Bill Grizack

A student assistant, Bill is studying mechanical engineering at Georgia Tech. He answers phones, puts information in databases, makes security badges, and closes out contracts. He would like to see RSD have more autonomy. Bill will graduate from Georgia Tech in Spring 1995. He is interested in working in biomedical engineering. When he is not working or studying, he is the Rush Chairman for Lambda Chi Alpha and plays on its sports teams at Tech.



Bill Grizack

Fellows Want Your Input

The GTRI Fellows Council was formed in 1993, partly to provide recommendations to the GTRI director from the research community without passing through the management chain. Continued comments and specific suggestions for improving the research enterprise at GTRI are invited. You may contact Krish Ahuja (AERO) 528-7054, Larry Corey (SEAL) 528-7156, Bill Rhodes (EOEML) 894-2929, or Chris Summers (EOEML) 894-3420.

Have the 1994 GTRI Annual Report Sent to Your Contacts

The Research Communications Team (RCT) is updating the mailing list for the 1994 GTRI Annual Report, scheduled for distribution in the fall. RCT wants to be sure that current and potential sponsors and collaborators, legislators, Washington officials, campus faculty and others know about GTRI's past accomplishments, current projects and future goals.

If you would like to add anyone to the mailing list, please send each person's name; title; organization; and mailing address to John Toon, RCT/GTRI 0800, or fax the information to 894-6983. Please send all information by September 9.

SELECTED JUNE 1994 AWARDS

Title	PI/Laboratory	Sponsor	Funded Amount
SCAT Research Assistance	Michelson, R. (AERO)	South. Coalition Adv. Transp. Inc.	\$ 60,000
Performance Testing of Golf Cars	Handley, J. (AERO)	Yamaha Motor Corp. USA	38,268
Open Jet Test Section Aerodynamic Performance Study	Ahuja, K. (AERO)	Calspan Corporation	49,981
Demonstration of Aeroelastic Analysis of Fighter A/C Employing Twin Vertical Tails	Smith, M. (AERO)	Ball Systems	62,995
Information Systems Plans for GDOT	Youngblood, W. (AERO)	Georgia Dept. of Transportation	337,550
F-14D Flight Test Support	Addison, W. (ELSYS)	Navy	23,000
Support for Development of IR Missile Environmental Effects Simulation	Faust, N. (EOEML)	Dynetics Incorporated	34,998
Applied Research & Analysis in Support of Army Weapons Systems Piece Parts	Miller, M. (HRO)	Army	154,995
Generation of Large IM Free Frequency Sets - Phase II	Moss, R. (ITL)	Clark Atlanta University	18,126
Cell Evaluation Tool - Phase IV	Pickering, L. (ITL)	Hitachi Telecom	90,000
GPS/Flight Plan Mapping System - Falcon View	Pyles, J. (ITL)	Army	474,979
Manufacturing Technologies for High Performance Missile Seeker Components	Bohlander, R. (ITL)	Army	289,554
Low-Cost Optical Interconnects Using Thin Film Integrated Optoelectronic Mfg.	Bohlander, R. (ITL)	Army	249,766
XM-43A Instrumentation Development & Test Support	Toph, E. (SDL)	Army	265,468
Threat Simulator Developmental & Test Support	Camp, S. (SDL)	Army	993,704
VTS-2000 Program	Greneker, E. (SEAL)	PRC Corp.	20,000
Special Studies & Analysis	Lamm, D. (SEAL)	Army	203,980
Target Identification Demonstration with Multi-Role Survivable Radar (MRSR)	Cohen, M. (SEAL)	Army	117,938
MMW Multipath Mode Validation	Saffold, J. (SEAL)	Army	31,325
200-450 MHz Antenna Development Program	Weaver, E. (SEAL)	Navy	24,993

News & Notes

More GTRI E-mail Distribution Lists Available

By Lea McLees, RCT

GTRI's Computer Coordinator Tony White (AIST) has created some additional e-mail distribution lists for employees. Following is an updated summary of the lists available, with bullets denoting those added since our February article on this topic.

To send a note to recipients on a list, just address your e-mail to the list name you select, followed by @gtri -- admin.support@gtri, for example.

If you have questions about the lists, or would like to be added to **as.ccrf**, **as.campus**, or **gtri.csr**, you may send e-mail to tony.white@gtri.gatech.edu.

exec.staff

Richard Truly, Janice Porter, Charles Brown, Ed Reedy

exec.staff+

Exec.staff, Don Wilmot, Jim Cofer, John Nemeth, Jim Allen

lab.dirs

Includes both of the following smaller lists:

•ld.campus

Campus lab directors -- Bob Hyde, John Meadors, Larry Holland, Randy Case, and Huntsville's Richard Stanley

•ld.ccrf

Cobb County Research Facility lab directors Bob Cassanova, Bob Trebits, Joe Parks

senior.staff

Exec.staff+, **lab.dirs**, plus Barbara Walsh, Carolyn Mahaffey, Bob Lang, Tom Brown and Evan Chastain

support.mgrs

Leaders of all groups in Research Support and Finance (RSF) -- includes the three following lists:

•fo.mgrs

Leaders of all fiscal operations groups -- Barbara Walsh, Carolyn Mahaffey,

Tom Brown, -- and leaders of groups reporting to them.

•so.mgrs

Leaders of all non-fiscal operations groups: Bob Lang, Eunice Glover, Evan Chastain, RCT, and leaders of groups reporting to Chastain

•inlab.mgrs

Division chiefs, branch heads, associate lab directors, other managers in labs as designated by lab directors

admin.support

Inlab.mgrs, **as.campus** and **as.ccrf** -- wide distribution, good for getting announcements forwarded/posted to many people. Includes:

•as.campus

GTRI administrative support people on campus -- senior secretaries, administrative assistants, equipment managers, CSRs, etc. -- **anyone can be on this list**

•as.ccrf

same type of list as **as.campus**, but for CCRF -- **also open to all**

all.units

Includes **senior.staff**, **support.mgrs** and **admin.support**.

Defense

From page 1

production facilities to profitable and practical civilian uses. They do this by identifying and evaluating opportunities for conversion, developing links between U.S. and foreign companies, providing technical and business expertise, and educating and training those involved in conversion.

The office grew out of initial efforts in 1991 by Corey and now-retired researcher George Ewell (SEAL) to work cooperatively with Russian engineers. Technical seminars have been held at Georgia Tech featuring designers of modern Russian phased array antennas. Corey and others have made numerous trips to facilities in Russia.

"We have a lot of Russian contacts -- now we need to find U.S. companies who are interested in working with Russian companies," said Corey.

Corey, Willis and other participants have identified organizations, techniques, capabilities and facilities in Russia that offer defense technologies that might meet other needs. They have evaluated some radar technologies already. In the future, the center also would offer training in intellectual property protection, management, marketing, technology transfer, export control and international standards, and would incubate joint ventures.

Although the office has focused initially on Russian technology, it is not limited to work with that country. Participants are developing a conversion project with the Argentinean government, as well. The center's work could help stabilize economies around the world; facilitate trade, in that spin-off companies in Georgia might develop; and enhance U.S. security by helping keep scientists employed in their own countries on non-defense projects.

Among those actively developing the center are Corey; Willis; Papp; Brad Newton (SEAL); Jim Allen (GTRI Arlington Office); Jim Cofer (ACO); Fred Burman (Management); and Igor Khripunov, former first secretary of the Soviet/Russia Embassy in Washington, D.C., now working with the University of Georgia's Center for East West Trade Policy.

See adjacent box for list of participating campus and off-campus organizations.

GTRI researchers have made progress on several fronts. They are pursuing joint projects with Russian colleagues by submitting white papers to the Advanced Research Projects Agency and the Federal Aviation Administration, among others. They also have a demonstration version of a Russian SA-12 phased array antenna, originally used to guide surface-to-air missiles and intercept targets. The radio

frequency antenna technology is excellent, but the beam steering computer that drives it is bulky and expensive.

"We are developing computer controls to drive the antenna, which will allow us to put together a low-cost hybrid using U.S. and Russian technology," Willis said. Used for a weather radar, this antenna could become a dual-use technology.

If you are interested in the center's work, you may call Martha Willis at 528-7693 or send e-mail to martha.willis@gtri.gatech.edu.

CIDC Participants

Campus Partners

GTRI
Center for International Strategy,
Technology and Policy
Economic Development Institute

School of International Affairs
Ivan Allen College of Management
Advanced Technology Development Center

Off-Campus Partners

Anser, an aerospace not-for-profit corporation with a Moscow office
King and Spalding, an Atlanta law firm
The European Center of the Institute of East West Studies, in Atlanta
R&G Intntl. of Huntsville, a trading St. Petersburg, Russia

University of Georgia's Center for East West Trade Policy
Commonwealth Connections, a company in involved in joint ventures in Russia, operating out of a former military tank plant in the Ural Mountains



SEAL's Martha Willis (left) and Larry Corey (right), shown here with Dr. Sophia Barsukova of Russia, are among researchers working to establish the Center for International Defense Conversion. Behind them is a small Russian SA-12 radar that GTRI researchers have studied. (Photo courtesy Martha Willis)

Focus on Research

Graduate assistant Sundar Vaidyaraman (EOEML) places layers of woven carbon cloth into a furnace for processing using forced flow-thermal gradient chemical vapor infiltration. The process speeds up production of carbon-carbon composite. (Photo by Stanley Leary)

GTRI Biosketch Database Goes On-line

By Lea McLees, RCT

Obtaining GTRI colleagues' biosketches for proposals, capability statements and campus collaboration planning is getting easier, thanks to AIST and PDO.

GTRI's Biosketch Database is now accessible and searchable via computer. The database includes 99 percent of GTRI's active researchers and many other staff, and is currently available on-line in AIST, MAPS and PDO to all employees, said Mary Ann Burke (AIST).

"The plan is to put the capability in the labs, units, and eventually on researchers' desks," she said. "The database is a reference, just like your dictionary, for and about GTRI's most valuable asset: its people."

The biosketch database is the first of several on-line services that AIST and PDO plan to offer, said AIST team manager Tom Brown.

"This is the initial stage of a multi-step program resulting in on-line search capabilities not only for biosketches, but for boilerplate and project abstract materials that can be used to support the proposal development effort," he said.

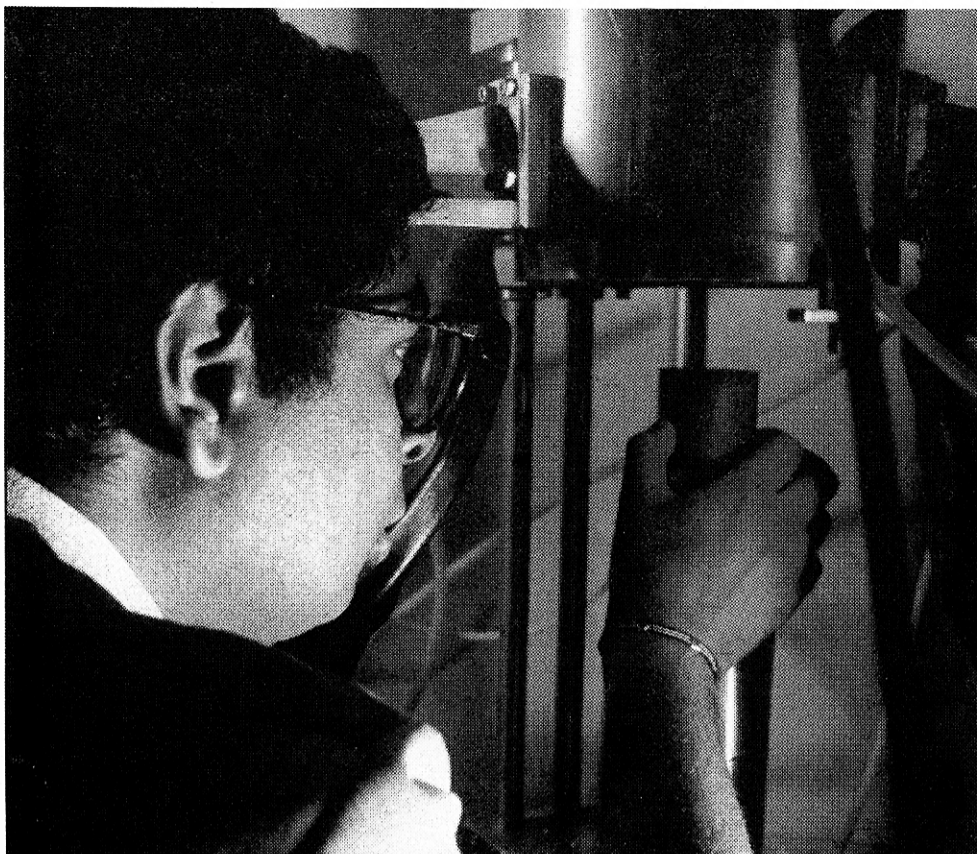
The database is completely indexed and can be searched with user-friendly ZyIndex software. For example, you might type in "2 OF (SOLAR, METHANE, ETHANOL, 'ALTERNATIVE ENERGY', GEOTHERMAL, CONSERVATION)" — meaning you want to know which biosketches contain at least two of the words listed above. Such a search pulls up the biosketches of EOEML's Rich Combes, Craig Wyvill, and Jim Walsh, and AERO's Bob Cassanova. More complex or simple searches using words, phrases, or Boolean methods can be done on any user-defined concept appearing in any biosketch. GTRI has a license allowing 18 people to use the system at one time. With greater use, that number may need to be increased.

The biosketches can be part of proposals, research capability statements and other documents — all of the GTRI biosketches you need can be obtained with one phone call to AIST, PDO, or MAPS, or a visit to a properly equipped computer. Users can get a copy of a biosketch and customize it for their needs via computer, as well — for example, deleting all publications except those on a particular subject.

Among the details available from each biosketch are all of a person's publications, an employment history and an experience summary. Biosketches of retirees and other former GTRI employees are accessible, in addition to those of current employees. Support persons' biosketches can be added to the database by request.

Biosketches can be provided by request on a first come, first served basis in any of three formats: on paper, on disk or via e-mail. All biosketches are updated by request and/or from personnel reports.

For more information on the GTRI Biosketch Database or to request a biosketch, call Mary Ann Burke at 894-6981 or Ellen Barrett at 894-1191; or send e-mail to maryann.burke@gtri.gatech.edu or ellen.barrett@gtri.gatech.edu.



Researchers Develop Improved Process for High-Temperature Carbon-Carbon Composite

By John Toon, RCT

An improved process for fabricating carbon-carbon composites could expand the uses for this high-temperature material by lowering costs and permitting greater manufacturing flexibility.

Materials scientists here have shown that a process known as forced flow-thermal gradient chemical vapor infiltration can dramatically reduce the time needed to produce carbon-carbon composite parts. The process also allows more specific control over material characteristics, and could produce components thicker than those made with existing processes.

Aircraft brakes and other high-temperature aerospace applications already use carbon-carbon composites. The material's light weight and ability to withstand high temperatures make it attractive for use in future jet, rocket and gas turbine engines. Its high thermal conductivity makes it ideal for managing heat in electronic equipment.

"If we can get the cost down, carbon-carbon will be more suitable for everyday applications like electronics and even engines," said Jack Lackey (EOEML). "We are working on reducing the cost and making the material faster. Right now, we are depositing the carbon matrix about 30 times faster than in conventional processes."

Process development is supported by the U.S. Air Force's Office of Scientific Research. Lackey is collaborating with Dr. Pradeep Agrawal in Georgia Tech's School of Chemical Engineering on the work.

Carbon-carbon composites are mechanically strong and tough because very high strength carbon fiber is used as reinforcement. Processing begins by preparing

a "preform," often composed of multiple layers (10 to 80) of woven carbon fabric. The resulting composite material offers high resistance to thermal shock and withstands temperatures over 2,000 degrees Centigrade.

There are two existing fabrication processes. In one, the preform is placed in a furnace filled with vapor that reacts to form a carbon coating on the fabric fibers. It requires several weeks and multiple processing steps.

A second process involves injecting a carbon-containing resin or pitch into the preform and driving off volatile materials with heat, leaving only carbon. This process requires as many as a dozen injection/heating cycles.

The forced flow-thermal gradient system uses pressure to force carbon-containing propylene, propane or methane vapor through the layers of fabric, which are heated to a temperature of about 1,200 degrees Centigrade in an electric furnace. The flow provides faster infiltration, producing finished parts one centimeter thick in as little as eight hours. A temperature gradient ensures vapor flow and even formation of carbon matrix through the part.

The force flow process-thermal gradient system can operate in a wider range of processing conditions than conventional techniques, helping materials scientists tailor the carbon-carbon composite to specific needs. That flexibility may also allow the addition of special graphitization catalysts or oxidation inhibitors to the composite as it forms.

Lackey and colleagues have made more than a dozen carbon-carbon parts using the technique, some two centimeters thick, with quality comparable to conventional processes. They are now optimizing the process, determining its limits, and studying ways to make the "fixturing" as simple and inexpensive as possible.

Forced flow-thermal gradient chemical vapor infiltration was invented about 10 years ago to produce composites of silicon carbide and/or carbon fiber in a silicon carbide matrix. That process is now nearing commercialization, Lackey noted.

Focus on Folks

Clough Returns to Alma Mater As Its 10th President

By John Dunn, Alumni Association

Gerald Wayne Clough, the first alumnus of Georgia Tech to become its president, will assume office in September as Tech's 10th chief executive.



G. Wayne Clough He will fill the post vacated by John Patrick Crecine, who resigned effective June 30. Clough and his wife Anne returned to campus on July 21 and 22 for the first time since his selection as president, to meet with administrators, deans, faculty, alumni, students and the news media.

Clough, provost and vice president of academic affairs at the University of Washington, was unanimously selected by the University System Board of Regents on July 13.

Chancellor Stephen R. Portch says he is absolutely convinced that Clough is the best person in the country for Tech's presidency.

"This is a person with impeccable academic credentials," Portch said. "Dr. Wayne Clough brings to this position a reputation as one of the top engineers in the country, who I think will be a terrific role model."

A native of Douglas, Ga., Clough earned both bachelor's (1964) and master's degrees (1965) in civil engineering from Georgia Tech. He completed his Ph.D. at the University of California/Berkeley. He says being president will require balancing undergraduate and graduate educational needs while coping with diminished state and federal funds.

"We have to look very carefully at the balance between teaching and research," he said. "That is an issue that exists on many campuses. We want to make sure we're giving a fair deal to both the undergraduate student and the graduate student in terms of the services they are getting and the education they are getting"

"In addition, we have to understand

that this is a national research institution — and to be a nationally competitive research institution, you have to do research," he continued. "You have to have research funding — that sustains your graduate program The challenge is finding a balance in those activities."

Clough, 52, is a member of the National Academy of Engineering. He was dean of the college of engineering at Virginia Polytechnic Institute and State University from 1990 to 1993, and has taught civil engineering at Stanford and Duke universities. He has won numerous awards, including the 1991 State-of-the-Art award from the American Society of Civil Engineers. His research interests include geotechnical engineering — earthquake problems, numerical simulation and soil-structure interaction.

Clough and his wife, Anne, were high school sweethearts who married during his junior year at Tech. They have two children: Matthew, a 1994 graduate of Virginia Tech, and Eliza, who is attending community college in Virginia. Clough enjoys being outdoors, skiing, hiking, swimming, and reading.

Now Everyone Can Talk At Once: Leininger Learns Ins and Outs of "Groupware" While Working at ARL

By Lea McLees, RCT

Imagine a meeting where everyone speaks at the same time. Do the words "chaos" and "bedlam" come to mind? Not if you are IITL's Janet Leininger. As part of the Army Research Lab's (ARL) Group Decision Support Team, Leininger helps people conduct meetings using ARL's computerized Group Decision Support System (GDSS).

"All participants are sitting at computer keyboards and screens," she explained. "All of them literally can be writing on a document or adding to a group discussion at the same time."

The system allows groups to do everything from developing proposals to brainstorming or analyzing alternatives. Participants can generate lists, vote, and get statistical information based on meeting activities, Leininger said. "It has been established that this technology saves time and that users see increases in productivity. All branches of the military are embracing this technology — it saves time because it is automated, and it allows everyone to talk at once."

Leininger is researching groupware through her participation in an intergovernmental personnel activity — being "on loan," in a way — from IITL to ARL's Software Technology Branch. "I jumped at the chance," Leininger said of the exchange. "ARL has promoted and supported groupware research for years. They are developing methods for integrating groupware with video-conferencing technology. One of my objectives is to increase the use of this technology within GTRI and Georgia Tech."

The GDSS software can be configured to allow anonymous input from participants, encouraging contributions from people who

might not ordinarily speak up in a regular meeting. It lets participants pool data, and provides printouts and floppy disk copies of all group activity. GDSS allows meetings with all participants in the same location at the same time; and in different locations at the same or different times.

"The system affects group dynamics in a positive way," Leininger said. "People feel more like a team, and it allows everyone to contribute. Groups can discuss what might be sensitive issues in a very calm way. It's non-emotional."

The College of Computing's Mike McCracken, Director of the Center for Information Management Research (CIMR), first introduced the GDSS software to Georgia Tech through work with the University of Arizona (UA), a CIMR partner. UA's management information systems department originally developed GDSS software, now marketed by Ventana Corporation. McCracken's research group is looking at extensions for the GDSS model to support software system development. Their version of the system is hosted on a Unix environment and was developed with GTRI researcher Ron Chadwick (IITL).

Georgia Tech also has installed the Ventana GDSS tools in a meeting room at ISYE and has used them for strategic planning meetings, but the system is not completely operational,

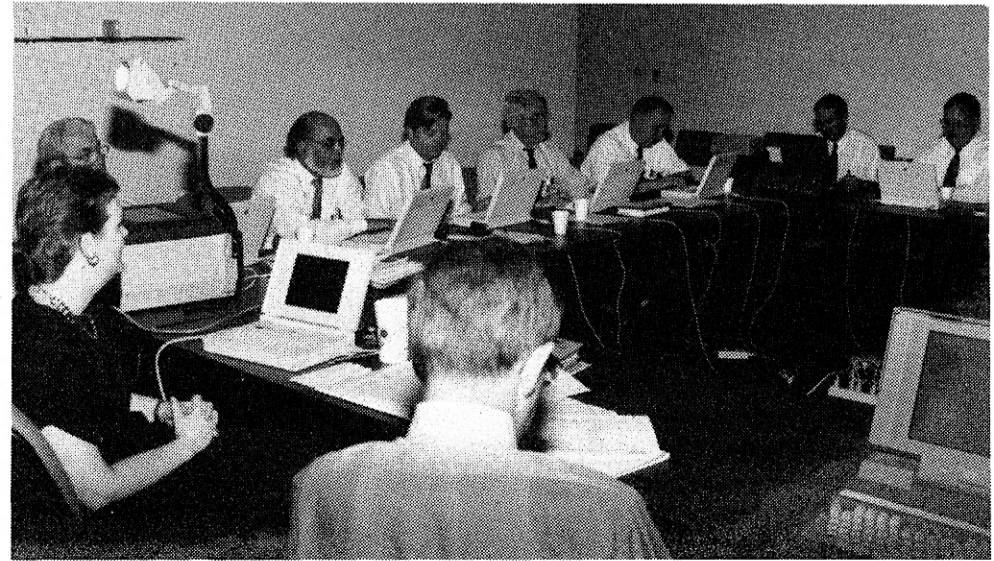
Leininger said. The hardware is set up in a student lab, configurations change frequently and logistics for using the equipment are complicated. Leininger has submitted a proposal to fund dedicated portable hardware for GDSS at Georgia Tech. ARL has a portable system, and has found this provides optimal flexibility and ease of use.

"My goal is to develop an electronic meeting support facility at Tech, linked to research in the College of Computing and other schools," Leininger said. "As other universities, the government and commercial enterprises continue their use and development of groupware, we must ensure that Tech is positioned to participate, lead and contribute."

Among the organizations that use groupware for meetings and projects are Delta Airlines, IBM, Bell South, the Atlanta Project and other universities such as University of Georgia, Arizona, Cornell and California State.

The GTRI Program Development Office recently used the ARL system for a meeting with GTRI lab directors and Fellows. Some ISyE faculty have used it in conjunction with TQM research.

Those interested in using GDSS for a meeting, proposal development, equipment design or other uses may send e-mail to janet.leininger@gtri.gatech.edu.



Janet Leininger, bottom left, leads GTRI employees in trying out GDSS during a meeting. (Photo by Dayton Funk)

News & Notes

Countdown to 1996

In a little less than two years Georgia Tech's streets will be filled with the sights and sounds of the 1996 Olympics. How do we GTRlers prepare both for the excitement of the big event and meeting sponsors' needs during that time?

Perhaps the best way is by thinking ahead and asking questions. Your questions can help shape the plans that Georgia Tech officials are developing right now to handle all aspects of the games, from security and parking to shipping and campus visitors. As William "Sonny" Fletcher of the Research Security Department says, "The best way to refine our plans is to get as much 'what if' from as many sources as possible."

Have an Olympics-related question? Send it to Lea McLees, RCT/GTRI, 0828; fax it to 894-6983; or e-mail it to lea.mclees@gtri.gatech.edu. RCT will get the answers for you and print them here. Among some topic ideas to get you started thinking: receiving equipment, chemicals and supplies; arranging sponsor visits to campus; getting on and around campus; handling security issues; and finding out about service availability on campus (food, for example).

Fingers

From page 1

\$20,000. Mechanically they are less perfect than existing systems, but we compensate by giving them more intelligence."

The system was built by McMurray, EOEML colleagues Wiley Holcombe, Loren Kallenbach, John Ray, John Messenger, Marlon Moses and Richard Carey, and Mechanical Engineering colleagues Wayne Book and Steve Dickerson. It uses a computer algorithm to determine the position of an object on a conveyor belt, based on information provided by five low-cost photocells.

The system fires beams of light across the belt from sources at different angles. By knowing when the object on the belt blocks light to each photocell, the system's computer determines the object's shape and location with enough accuracy for the arm to find it.

The team designed a compliant gripper as the hand. It has four inflatable fingers, each consisting of a bellows material constrained on one side by a metal strip. When inflated, the rubber bellows expands around and sometimes under the object to grip it. Because the fingers are compressible, they can make up for the imprecise grasp of the robotic arm.

Ultimately, McMurray hopes to produce a modular robotics system that can

be wheeled to a conveyor belt and put to work the same day, operated by an average manufacturing employee without special training.

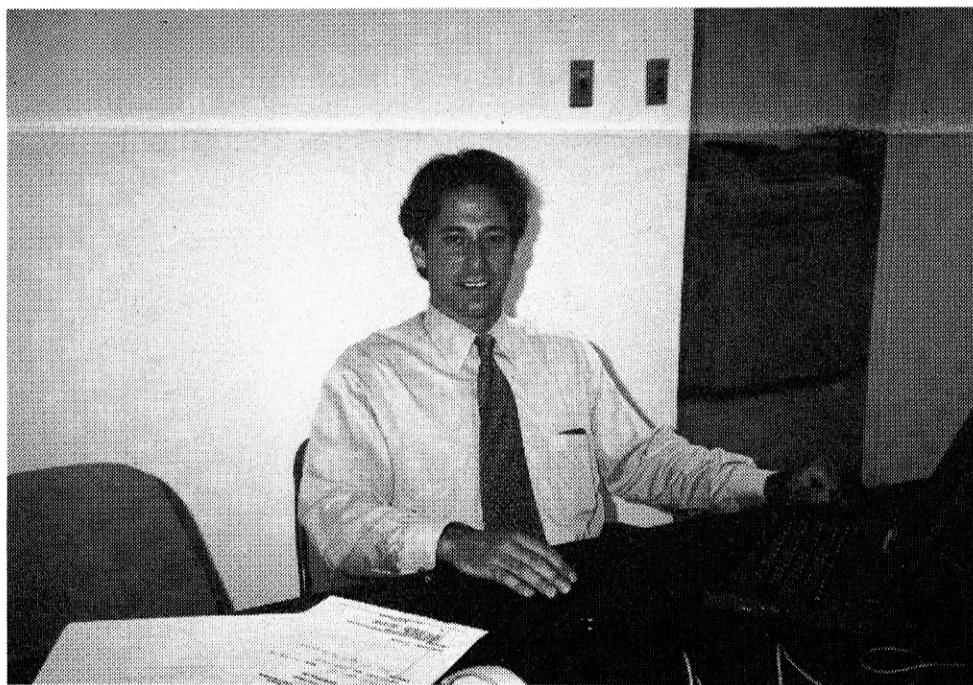
The belt manipulator was originally designed for the poultry industry, to pick up chicken legs, thighs and breasts from a conveyor belt for packaging. Existing commercial robotic systems can't handle the slippery, flexible and irregularly-sized poultry parts, and have trouble with a mix of items on one belt.

"Anywhere you have a human doing a simple task, you have potential for some kind of human-level performance robotics," McMurray explained. "This particular type of belt manipulator can handle one of the most common tasks in any manufacturing environment."

Funded by the State of Georgia, the Agricultural Technology Research Program supports research to improve productivity of Georgia's important poultry industry. This research was done in Georgia Tech's interdisciplinary Manufacturing Research Center.

Georgia Tech
RESEARCH INSTITUTE

Jonathan Baliff's initiative and momentum make him a valued member of the Arlington Office's team. (Photo Courtesy Ann Killea)



Jonathan Baliff: A Great Asset to GTRI's Arlington Office

Contributed by the Arlington Office Staff

Ask Jonathan Baliff's colleagues at the GTRI Arlington Office about him, and the first thing they mention is his remarkable energy level.

Ask Baliff how he keeps up his remarkable pace and he laughs: "I move at a comfortable pace — everyone else is just slow!"

Baliff works part-time at the GTRI Arlington Office, while pursuing full-time an MS degree in foreign service at Georgetown University. He is a cum

laude graduate of Tech's School of Aerospace Engineering.

In addition, he and wife Barbara initially maintained a marriage that spanned the Atlantic. Now in Washington as a general counsel for the Secretary of the Air Force, Barbara Baliff used to work in Germany. Jonathan traveled to Germany one week of every month while producing for GTRI and keeping up with Georgetown's rigorous academic requirements.

After graduation from Tech in 1985, Baliff logged 1,200 hours of flying experience with the F-4G Wild Weasel or "Radar Killer." He earned the Distinguished Flying Cross for heroism and the U.S. Air Force Air Medal for heroism for his Gulf War service; Baliff also was decorated for service during Kurdish relief operations.

Baliff attributes his productivity and en-

joyment of his work at GTRI to Ed Eagar's flexibility in allowing him to juggle projects, school and travel to Germany. Baliff's first accomplishment at GTRI was an impressive requirements analysis study on defining electronic combat test facility requirements. Baliff also worked with researchers Tom Miller (ELSYS) and Arlington manager Ed Eagar developing a methodology that can be used by the average Air Force planner or decision maker.

In other work, he developed education and training materials for a short course on the Electronic Combat Test Process, currently used by the Air Force. Baliff also has worked closely with researcher Ken Haynes on a special study for the Air Force. That project explored using hardware-in-the-loop laboratory facilities to augment other electronic combat test areas, such as installed system test facilities.

Baliff's energy, keen intellect and good nature have impressed his colleagues, who agree that his academic, engineering, and recent operational experience are great assets to the office.

"Jonathan has the ability to bridge the gap between technical staff and the customer, presenting the product in a way the customer can understand," Haynes said. "He's a very personable individual who contributes a lot to projects both technically and in terms of initiative and momentum."

This summer Baliff headed to Wall Street for an internship in Standard and Poor's International Project Finance Department, using his technical knowledge and his studies of international finance. He will finish his MS at Georgetown in 1995. After that?

"I'd like to use my Georgia Tech degree and GTRI experience to make a difference globally," he said.

GTRI Employee Visits Vietnam with Friendship Force

Maggi Harrison (AERO) recently toured Vietnam with the Friendship Force of Atlanta. She wrote about her experiences and submitted this article to THE CONNECTOR.

Vietnam is on the brink of enormous change. Overseas companies and investors are arriving — soon skyscrapers, hotel chains, golf courses, and tourists will be popping up everywhere. When I heard that the Friendship Force of Atlanta was visiting Vietnam to move beyond the past's trauma and see the people, country and culture as they are now, I wanted to participate.

Among our group for the two-week trip were three Vietnam veterans, one of whom

was a "Hanoi Hilton" prisoner for more than six years; a WXIA photographer and reporter; a World War II veteran; an anti-war protester; and our tour leader, who works with Vietnam veterans and has visited the country five times in two years.

We left Atlanta just before Memorial Day on a 23-hour flight to a country where the average monthly salary is \$10. Vietnam is a little larger than Italy with a mainly rural population of 70 million.

Our trip began in the capital, Hanoi. The people eat, sleep, socialize and do business on the streets. The "Hanoi Hilton" prison was being torn down eventually to be replaced by a hotel. Its grim outer prison walls still stood.

People were eager to speak to us. Most of our hosts were students meeting Americans for the first time. Their living quarters had little furniture — maybe a low table with stools, a simple couch, a cooking area, a separate room

for the family to sleep in, and stone floors. Some did not invite us to visit because they were embarrassed about their living conditions. We also delivered donated medical supplies to two hospitals. I saw beds with no mattresses, an old, rusty surgical table, and dirty, dusty walls and floors.

After several days we flew to Hue, an important cultural, religious, and educational area. Our hotel was the scene of intense Tet Offensive fighting, and bullet holes were visible in the walls. Next we drove to Da Nang past water buffalo and rice paddies, then into mountainous terrain. The road led to white beaches along South China Sea, and to Da Nang, where we met an ex-Viet Cong commander who fought for 15 years against the United States. It was rather unnerving to learn how well-informed he and his units were regarding various movements and planned attacks by U.S. forces.

Our final destination was Ho Chi Ming City, formerly Saigon. We stopped outside the former American Embassy, now occupied by a Vietnamese government-owned oil corporation, then drove to the Cu Chi Tunnels. Dug in the 1940s by Vietnamese people using only hoes, the tunnels run underground on three levels. Jungle growth covers their openings. Unaware of the tunnels' existence, the Americans built their base above them and as a result suffered severe casualties and assaults in regular nighttime attacks.

Throughout our visit, we were surprised to see so few signs of war. Hotels in Hue and Da Nang had newly installed televisions and telephones. A few banks were beginning to handle travelers checks, and credit card advertising was appearing during our visit. Traveling there is incredibly cheap — I spent as much money in 1 1/2 days in Bangkok, Thailand, as I did during 10 days in Vietnam. However, that is bound to change with an influx of tourists and investment.

return home for Tom and his wife Elaine, a realtor with Harry Norman. He graduated from Tech in 1969 with a management degree, and Elaine is an Agnes Scott College alumna. He also worked on projects with GTRI colleagues while he was in the Air Force.

5. Tom is a career information and communications systems specialist. He worked with switched systems and long haul radio systems in Europe for seven years.

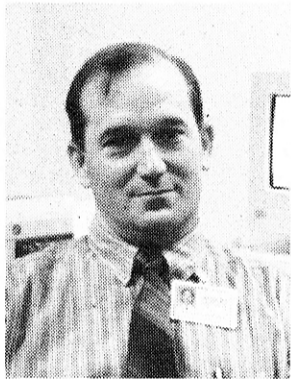
6. Tom's career includes work in Washington with the Air Staff, the Joint Staff and the Defense Information Systems Agency.

7. At Ft. McPherson he ran a liaison office covering Forces Command, Atlantic Command and the Defense Information Systems Agency.

8. Tom and Elaine are glad to be nearer to friends and their children now — one of their twin daughters is enrolled at Agnes Scott and the other recently graduated.

9. He loves working, and also jogs, collects antique English china, and reads avidly.

10. Tom is delighted to be back, and his enthusiasm is contagious!



Sonny Fletcher



Tom Horton

GTRI Greetings!

Welcome to two of our newest employees!

Ten Good Things We Know About William "Sonny" Fletcher

1. Sonny began work in June as a program specialist for security education in the Research Security Department.

2. He comes to GTRI with more than 20 years of Army experience, leaving the service as a Lieutenant Colonel with the Military Police Corps. His last assignment was with Headquarters, Third Army, as chief of Organization Design. Third Army directed the ground war during Desert Storm.

3. His security experience includes work with the United Nations, the Yorktown Bicentennial Celebration, Ronald Reagan's presidential inauguration, and the Mariel Boatlift (Cuban Alien Relief). He was also director of conventional security for Army forces in Europe.

4. Sonny will conduct the GTRI security briefings, provide a security education instructional program and publish a security newsletter, "The Security Blanket."

5. He also plans to assist Bob Lang in developing a TQM-based Research Security Department. He will help RSD set goals and objectives, teach classes on team-building and TQM within RSD, and help employees identify and coordinate priorities, supporting the GTRI security mission and each other.

6. Sonny holds a B.A. in history from Florida's Stetson University. He has completed numerous special and advanced security, logistics, and management education courses in the Army, culminating with his graduation from the Army's Command and General Staff College.

7. Sonny is glad to be back in the city of his birth — he graduated from Cross Keys High School.

8. He is happy to be at Tech, because he has always enjoyed the academic environment and wanted to work in that setting after completing military service.

9. Sonny also is glad to be putting down roots, after two decades of traveling with the Army.

10. After work he heads for the woodworking shop in the basement of his Alpharetta home. He also enjoys running, playing chess, and spending time with his nephews and nieces.

• • •

Ten Good Things We Know About Tom Horton

1. Tom is a senior research associate in ITL.

2. He comes to GTRI from a 24 1/2-year career in the Air Force.

3. Among his responsibilities here are program management, business development and strategic planning for ITL.

4. The move to GTRI and Atlanta was a

**Focus
on
Folks**

Focus on Folks

Professional Activities

Information, Technology and Telecommunications Laboratory

Eric Barnhart presented a paper entitled "The Need for Indoor Channel Characterization Given PCS Deployment Plans" at the International Union of Radio Science Workshop on Channel Characterization in Stockholm, Sweden, June 13-14.

Electro-Optics, Environment and Materials Laboratory

Steve Hays and **Kirk Mahan** are conducting free construction safety and OSHA compliance seminars around the state. The lectures are sponsored by a grant from the U.S. Department of Labor. Hays also presented "Construction Safety from a General Industry Perspective" at the American Society of Safety Engineers' national Professional Development Conference on June 22 in Las Vegas, Nev.

Bob Newsom presented a paper in April at the American Ceramic Society's 96th Annual Meeting and Exposition in Indianapolis, Ind. The paper, "Waste Remediation Application Using Plasma Arc Technology," will be published in the proceedings this fall. Newsom also attended the Environmental Protection Agency's Industry Technology Partnership Forum for the Department of Energy's Buried Waste Integrated Demonstration Program. The forum was held July 12 at the Georgia International Convention Center.

Roc Tschirhart presented "An Overview of Environmental Regulations that Impact Small Businesses" to the Augusta Chamber of Commerce and to the Thomson-McDuffie Chamber of Commerce in July.

Art Wickman presented "Exposures to Silica Dust in Elberton, Ga. Granite Sheds" to the Georgia local section of the American Industrial Hygiene Association on July 25.

David Jacobi, Paul Schlumper, and Jim Walsh presented an environmental, safety, and health seminar as part of the Georgia Manufacturing Extension Alliance in Savannah on July 26. Schlumper also gave a presentation on OSHA regulations at the Georgia Golf Course Superintendents Association Summer Conference on August 1. Finally, Schlumper was named a certified safety professional on August 1.

Research Security Department

Bob Lang authored "Gold Medal Security for 1996," which appeared in the July 1994 issue of *Security Management* magazine.

Electronic Systems Laboratory

Mike Kelly and **Debbie Mitta** attended the International Conference on Human Aspects of Advanced Manufacturing and

Hybrid Automation at the University of Manchester in England, on July 6-8. Mitta presented "Operator Performance Requirements in an Advanced Traffic Management System," co-authored with Dennis Folds. Kelly presented "Emerging Automation Approaches in Roadway Traffic Management."

Benjamin Slocumb traveled to Adelaide, Australia, to attend two conferences and to visit the Defence Science and Technology Organisation. He presented five papers. At the International Conference on Acoustics, Speech and Signal Processing, April 17-22, he presented: "A Polynomial Phase Parameter Estimation - Phase Unwrapping Algorithm," co-authored with **John Kitchen** (DSTO); and "Parameter Estimation for Periodic Discrete Event Processes," co-authored with **Doug Gray** (University of Adelaide) and **Stephen Elson** (DSTO). At the Australasian Instrumentation, Measurement, Test and Evaluation Conference, April 26-28, he presented: "Techniques in Test Procedure Development for Validating RF Receiver Requirements," co-authored with **George Wright**; "Parallel Architectures for Electronic Warfare Test and Evaluation Instrumentation," co-authored with **Thomas Collins, Timothy Floyd, Andrew Henshaw, and Thomas Miller**; and "Test-Results Prediction Using an EW Simulation on a Parallel Architecture," co-authored with **Floyd, Brian Keeton, and Miller**.

Systems Development Laboratory

Doug Devine and **Chuck Chapman** presented "A Multiprocessor Architecture for a Threat Radar Simulation System" at the Australasian Workshop on Parallel and Real-Time Systems in Melbourne, Australia, July 7-8.

Stephanie Hardaway (ITL), Clerk III; **Larry Morrow** (ITL), Systems Analyst II; **Douglass Henry** (SDL), RE II; **Dwayne Mills** (SDL), RE II; and **Damon Gallatry** (SDL), Student Assistant.

Retired

Steve Zehner (SDL), SRE, retired on June 30.

Personal Notes

Four children of GTRI researchers recently claimed top honors in the High Power Rifle and International Pistol events in the 1994 Georgia State Games. In the July 23 rifle competition, Emily Knouse, daughter of **Harold Knouse** (SDL), won the Junior Women's gold medal. Beth and Connie Price, daughters of **David Price** (SDL), won the silver and bronze medals, and Christopher Strike, son of **Tim Strike** (ELSYS), won the Junior Men's silver medal. Beth and Connie Price followed their rifle victories with wins in the International Pistol event held July 24. Beth Price won the Junior Women's gold medal and Connie won the silver. The Georgia Games shooting events are held annually in Dawsonville, Ga. and feature Olympic-style shooting tournaments.

Tammy Hicks (SEAL) and **Allan Williams** (SDL) were married on August 6.

Myris and **Patrick Dowdy** (HRO) welcomed their first child, J'Len Patrick James Dowdy, on July 26.

Charlotte Doughty (RCT) welcomed her first grandchild, Karissa Lynne Walters, on July 11.

Personnel News

New Hires

EOEML welcomes RA II **Cathy Clark**.

HRO welcomes Programmer III **Brian Guntherberg**.

ITL welcomes **C. Paige McLaughlin** (RS II), **Dana Ulergy** (SRS) and **Ashley Carrol** (Student Assistant).

Terminations

The following employees have terminated: **Devon Crowe** (CS), PRS; **Melody Hughes** (CSIT), Clerk Typist II; **Michael Coss** (EOEML), Systems Analyst II; **Jeffrey Farley** (EOEML), RT I; **Arvilla Jennings** (EOEML), Word Processor Specialist;

Scholarship Named for Charlie Krebs

Members of the Peachtree Roost of the Association of Old Crows have named a \$1,000 scholarship in honor of Charlie Krebs, a GTRI employee who died May 19. Charlie was the group's treasurer and was known for his work in electronic countermeasures.

The group presented Krebs' widow, Jeanne, and daughter Kathy a plaque detailing his contributions to the Peachtree Roost. While at CRB, the family revealed the long-lived secret of which tree Charlie planted behind CRB. It is the young maple near the big paved parking lot.

The GTRI Connector
Vol. 10 No. 9 August 1994

Published by the Research Communications Office, Centennial Research Building, Georgia Institute of Technology, Atlanta, GA 30332. Georgia Tech is a unit of the University System of Georgia. The deadline for submitting copy is the first Tuesday of each month.

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