

The GTRI Connector

Thoughts on research

• Every science has been an outcast.
— R. G. Ingersoll

• People rarely succeed at anything unless they have fun doing it.

• Thinking is the hardest work there is, which is the probable reason why so few engage in it.
— Henry Ford

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Windshear Processor Team Wins NASA Award

Six GTRI employees were among a group recently honored by the National Aeronautics and Space Administration (NASA) for work on windshear radar signal and data processor development.

The six were part of a team including personnel from NASA and the Research Triangle Institute that was awarded a NASA Group Achievement Award on April 16 at Langley Research Center in Hampton, Va. Other supporting contractors included Lockheed Engineering and Sciences Company, Adaptive Technology, Inc. and Clemson University.

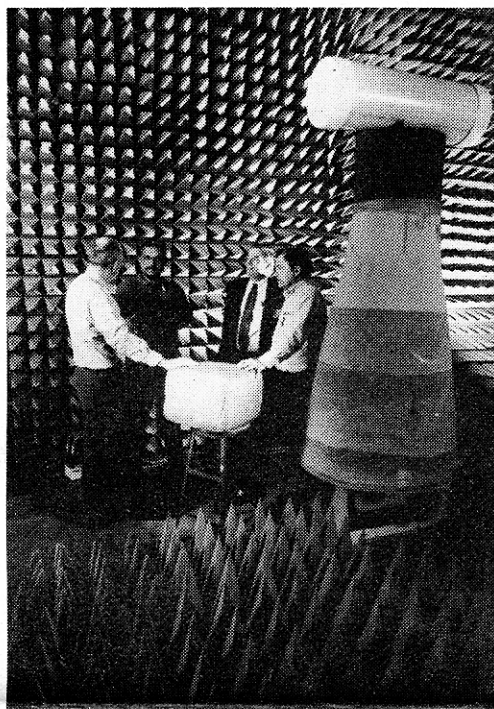
The recognition was for developing and successfully operating a real-time signal processor, and then integrating it with an airborne radar sensor that detects and displays hazardous windshear ahead of an aircraft.

Those recognized were Senior Research Engineer Dr. Mark Richards (MAL), project director; Research Engineer Dr. Chris Barnes (MAL); Research Engineer Byron Keel (MAL); Senior Research Engineer Mike Brinkmann (RIDL); graduate student Francesco Nesci (MAL); and co-op student Tim Shelling (MAL).

Richards commended his colleagues for their work on the project.

"GTRI can be very proud of the work done by (the GTRI team)," he said. "Their extraordinary efforts delivered a critical component of the windshear flight experiment equipment, and gained GTRI the respect of the NASA/Langley Research Center Antennas

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Researchers Apply A Familiar Technology To A New War

By Lea McLees, RCO

A radar system used by the Russian military is now employed in a new battle: the war on drugs. The Russian TOR ground-to-air radar system is being investigated by GTRI researchers as a tool for detecting and locating illegal drug packages dropped from aircraft.

Findings generated by this project could

make it easier for the sponsor, the U.S. Customs Service, to intercept drug-carrying planes, said Principal Research Associate Gene Greneker (RIDL), the project's director.

"To have probable cause to search a plane, the authorities must know something was dropped and then picked up," he said. "If we know the radar cross-section of the package, we can tell people how good their radars have to be to pick up the object as it is dropped from the plane. The goal is to find radar manufacturers who can meet the necessary requirements."

Greneker and Principal Research Engineers George Ewell and Larry Corey (MATD) are working on this cooperative program with Russian researchers. Research Scientist Gene Weaver (MATD) is assisting in making measurements in the Baker Building's compact range on two types of packaging commonly used by smugglers. One is a plastic pipe capped at both ends, a container often used to transport marijuana. The other target consists of 32 one-kilogram blocks of sugar wrapped together with duct tape, the form in which the same amount of cocaine is often dropped. Plans for constructing the packaging were provided by the U.S. Customs Service.

"It took three days to pack the cocaine substitute — powdered sugar — in a 32-kilo brick configuration inside Plaster of Paris cocoons and waterproofing materials," Greneker said. "This packing task is usually performed by well-trained South American drug lab workers in 30 minutes."

One of the key pieces of information required to determine the capabilities of the TOR radar in this application is the radar cross-section of each drug package. The cross-section is a measure of the power re-

Continued on page 6

George Ewell, left, explains to Rajiv Singh, Syscon Manager for the Joint Aerostat Project Office (JAPO), the work he and his colleagues have done developing radar cross-sections for drug packages. Syscon has operated JAPO for the U.S. Customs Service, which sponsored the research. Joining Ewell and Singh are Gene Greneker and Gene Weaver. (Photo by Gary Meek)

Observed & Noted

The president of Sandia National Laboratories spoke at Georgia Tech recently and shared some of his thoughts on the need for cooperation between the national research labs and U.S. universities. *An account of this talk is on page 2.*

The first project funded through

GTRI's Senior Technology Guidance Council has resulted in the publication of a book on coherent radar. *The story is on page 3.*

Are buildings on the Georgia Tech campus too cold, too warm, or appropriately heated and cooled? *See page 4 for informa-*

tion on a survey that asks this question.

A post-doctoral fellow at GTRI is studying the transition of businesses to a private sector economy in her native country in eastern Europe, Bulgaria. *A story on her research appears on page 4 of this issue.*

Part of GTRI's research program involves illustration and graphic design. *Several artists talk about their work in a story on page 5.*

A number of GTRI employees come from families who have sent many of their members to school at Georgia

Tech. *Read about them on page 6.*

Approximately a third of GTRI employees earned at least one of their academic degrees at Georgia Tech. *The story appears on page 6.*

A reader's survey of The Connector appears on page 7

of this edition. Please fill it in, so that this newspaper can serve the people of GTRI to the greatest possible extent.

Longtime GTRI employees were recognized at the recent Faculty/Staff Honors Luncheon. *The list of honorees appears on the back cover.*

**News
&
Notes**

**Quality Reigns
in Augusta**

By Lincoln Bates, EDL

Fostering quality is not solely the function of factories. Quality plays a role in everything from school dropout rates, poor mail delivery and defective products to slow response by government agencies, inadequate health care or shoddy service at a drive-through. Essentially, quality means satisfying customers' needs.

Based on that premise, entire communities can undertake measures to generate quality in business, education and government, making their areas better places to live and work. Augusta, Georgia is one community that is doing just that.

In September 1991, officials from the Metro Augusta Chamber of Commerce, the Central Savannah River Area Regional Development Commission, local colleges and companies decided to launch their city on the total quality management (TQM) path. The effort was to be an attempt at continuous improvement touching all aspects of the community, said Elliot Price, director of Georgia Tech's Augusta Regional Office and a key player in the effort.

"A community of excellence is a concept that has taken roots, and all signs indicate it will have a positive effect on our community's economic development," he said. "Trainers from Augusta College, Augusta Tech and Georgia Tech have exposed hundreds of people to TQM concepts of customer focus and continuous process improvement."

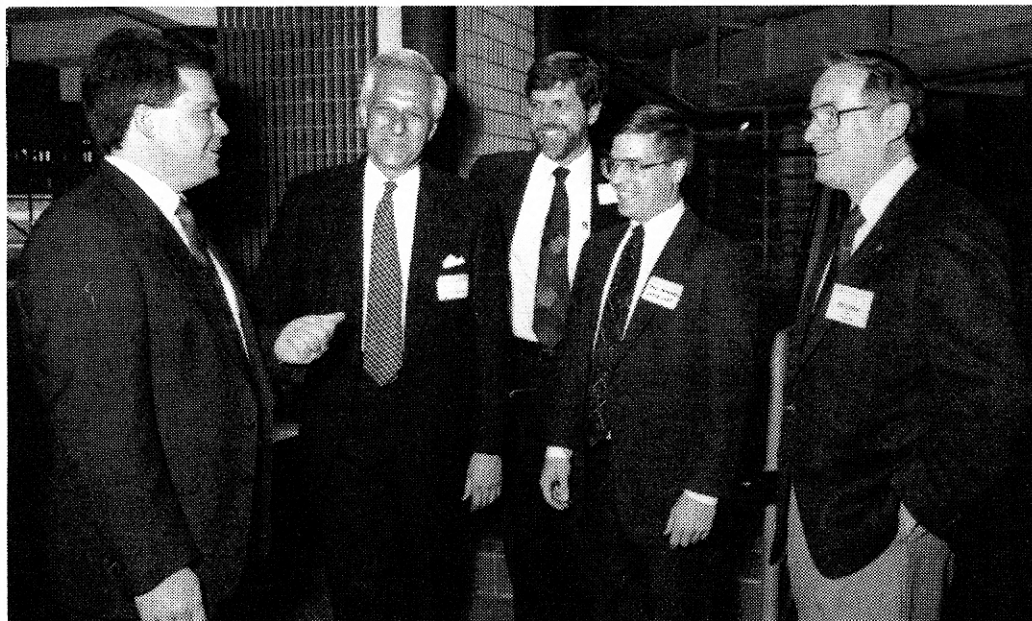
A manual was produced offering common direction for organizations interested in becoming part of a community of excellence by applying total quality philosophies. Issued in November 1992, it covers the principles of quality, the step-by-step implementation of a quality program and vital issues such as training.

Those leading the TQM effort also set up a conference for business and civic leaders, acquainting them with aspects of quality improvement ranging from empowerment and leadership to planning and customer service. "Quality Fest '92" was held November 4, 1992 at the Augusta-Richmond County Civic Center. Some 300 people participated in the event, Price said. A similar conference is planned for October.

As a result of the conference, the Metro Augusta Quality Council has organized a steering committee of local leaders and established goals for the committee, Price said. The response in Augusta has been exciting, he added. Average attendance at a monthly luncheon for learning about TQM and planning further activities is 25 people.

Georgia Tech received funding for its role in this project from the U.S. Department of Commerce's Economic Development Administration (EDA). Art Brown, head of Tech's EDA Center, says he hopes this kind of program can be replicated in any community in Georgia.

For more information, call Lincoln Bates at (404) 894-6091 or Elliot Price at (706) 737-1414.



At a recent ISO 9000 User Network kickoff meeting, David Clifton (center), Director of the Center for International Standards and Quality (CISQ), discusses ISO 9000 with (left to right) Mike Rhinehart of Georgia Power Company, David Levy and David Campbell of Union Camp Corporation, and Phil Calner, CISQ's ISO 9000 Coordinator. ISO 9000 is a set of international guidelines for quality management that companies will eventually have to meet if they or their customers want to export goods and services to the European Community. ISO, a Greek word, means "same." More than 80 representatives from 60-plus companies joined those pictured above at Georgia Tech's Manufacturing Research Center to hear about Union Camp's experiences with becoming ISO 9000 certified. Sponsored by Georgia Power and hosted by CISQ, the network brings companies together to share their experiences. CISQ is establishing networks around Georgia. Dublin/Vidalia is the next area targeted. (Photo Courtesy of Donna Ennis)

**Sandia Chief
Stresses Action,
Cooperation**

By Lea McLees, RCO

Meeting changing national and global research priorities will require decisive action from the nation's research labs and universities, the president of Sandia National Labs recently told GTRI researchers and staff.

Cooperation and focus among the labs and universities, as well as with government agencies and industries, will also be important, Dr. Al Narath said during his April 21 address in the Centennial Research Building.

"I sense that (in) the relationship between universities and national labs . . . each feels the other is trying to intrude and compete for federal funds," he said. "but our respective, legitimate roles are as complements."

Technologies important to the nation and the world will be developed much faster if labs and universities work together, he said. Sandia regularly contracts work out to research universities such as Georgia Tech, and views universities as an important source of new talent.

However, a more active role in technology development is necessary, he said. The nation's technology developers can no longer expect that investments in science and technology will automatically produce economic gain.

"Our competitors have demonstrated that a more nationally focused research and development strategy is required," Narath said.

National labs and research universities have to find ways to move closer to the mainstream of U.S. industry and development, he said. Sandia is doing that in a variety of ways. Officials have recognized the need to operate Sandia more like a business, as national labs are moving from an entitle-

ments existence to a performance-based existence.

"There's very little that we do that serves customers that couldn't be taken elsewhere," he said.

Sandia has therefore embraced TQM principles and adopted Malcolm Baldrige's quality criteria for structure. It is becoming more proactive with customers, he said.

Sandia also is pushing technology transfer through research and development partnerships with industry. It is emphasizing manufacturing technologies, particularly advanced materials and processes, along with microelectronics and photonics.

However, national labs must move beyond small business deals with industry, Narath maintains.

"(Otherwise) we will ultimately fail in having an impact that justifies our existence, and we could fail to make a real dent in the economic battle," he said.

Any research and development agreement should therefore target national technical goals and lead to collaborations including industry, government and universities, he said. Such agreements should lead to development of intellectual property shared by the entire industry.

"I also believe that executing such road maps with federal assistance will require cooperation among federal agencies," he said. "That way, we don't all invent the same wheel."

Among the many issues Narath says national labs and universities must address are how to team up on more assignments than they have in the past, and how to shift federal funding resources without requiring growth in incremental appropriations the country cannot afford.

"I think we will find answers," he said. "In the end our major technological institutions will figure out a way to beat the foreign challenge. It's certainly an exciting thing to work on."

Spotlight on Internal Research

First STGC Project Results in Book Publication

By Lea McLees, RCO

This is the eleventh in a series of articles reporting on projects funded by GTRI's Senior Technology Guidance Council (STGC).

The first STGC project ever funded has resulted in publication of a book edited by two GTRI employees and written by 12 of their colleagues.

Coherent Radar Performance Estimation, edited by Principal Research Engineer Jim Scheer (RIDL) and former Senior Research Engineer Jim Kurtz (RIDL), was published in April. Its 446 pages examine and explain coherent radar system contaminants, their effects, and how to test for them. The research was featured in the April 1992 issue of THE CONNECTOR.

"The motivation for this project was for GTRI to develop a core of people with understanding of coherent radar," Scheer said. "Until now, the information existed, but it wasn't available all in one place. Though the STGC concept has resulted in mostly basic research activities, I think it is significant that a book was published based on an applied research topic."

Coherent radars differ from older, classical radars in that they measure signal phase, as well as amplitude and time delay. The information in a signal's phase, combined with appropriate processing, can allow a radar system to detect a target in clutter, image it, or determine its speed. Contaminants, however, can reduce the performance ability of such radars — producing "ghost" targets, for example.

Before the book was published, information on commonly recognized contaminants and their effects on radar system performance was known — but a lot of the knowledge base was in private companies. The information wasn't advertised or disclosed, and was not reported very thoroughly. As a result, engineers who wanted to design, improve or test coherent radar systems had to conduct tedious literature searches, hoping that the information they needed was available.

The researchers involved in the project conducted extensive literature searches, talked with experts, used the information they collected to predict radar performance, and then tested their predictions.

The researchers developed a short course and an informal software program that was given to course participants, as well as others who requested it.

Scheer sees the book as a marketing opportunity for GTRI.

"It gives us visibility, and I believe people will call the authors because they know they have expertise in certain areas," he said.

Authors who contributed chapters to the book are Principal Research Engineer George Ewell (TSDL); Senior Research Engineer

Mark Richards (MAL), currently on sabbatical with DARPA; Research Engineer Bob Kerr (TSDL); Senior Research Engineer Guy Morris (RSA); Senior Research Engineer Melvin Belcher (RSA); Chief Scientist Ted Lane (RIDL); Associate Lab Director Sam Piper (RSA); Senior Research Engineer Joe Bruder (RIDL); Senior Research Engineer Tracy Wallace (RIDL); and Research Engineer Rob Pauley (RIDL). Principal Research Engineer Jim Echard (MAL) and Senior Research Engineer Eric Sjoberg (RSA) contributed to the short course; Echard also contributed to the STGC project. Those completing artwork for the book were Administrative Assistant Phyllis Hinton (RIDL) and Research Technologist Kay Lindsey (TSDL).

Scheer also credits now-retired Hans Spauschus, the first STGC chairperson, and Chief Scientist Devon Crowe (OOD), the current chairperson, with assistance on the project. Principal Research Engineer Josh Nessmith (RSA) was a motivational force behind the book publication, Scheer said.

"Josh Nessmith was on STGC when I got funded to do this," he said. "He inspired me to keep going for three years. It was important for GTRI to complete this, to build our knowledge base."

The book is available from Artech House, 685 Canton Street, Norwood, Massachusetts 02062, or by calling 1-800-541-5970.

Reducing On-the-Job Injuries: OSHA Training Courses Now Available at Georgia Tech

By John Toon, RCO

Training courses designed to help private companies and government organizations understand and meet U.S. Occupational Safety and Health Administration (OSHA) regulations are now available at Georgia Tech.

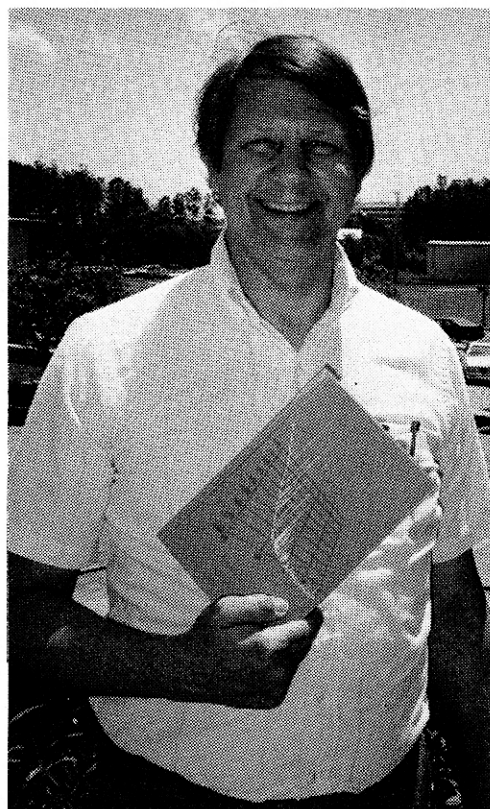
GTRI is one of four institutions — and the only one in the eastern United States — chosen to teach the OSHA courses, which previously were available only at the agency's own training institute. Oriented toward manufacturing and construction industry personnel, the courses explain OSHA standards and teach how to protect workers against occupational hazards.

The new offerings are part of an OSHA pilot program to make its training courses more readily available.

"These courses were in great demand by general industry, so much that OSHA's Training Institute could not always meet the need," explained Daniel J. Ortiz, director of Georgia Tech's OSHA Training Institute Education Center. "OSHA's two-year pilot program was implemented to see if these courses can be effectively offered by other institutions."

The courses are aimed at managers, safety and health professionals, industrial hygienists, industrial engineers and human resource managers from both the public and private sectors. They teach the basics of OSHA regulations and describe how companies and agencies can comply with them.

"These courses are designed to get information about the standards into industry," Ortiz added. "The emphasis will be on the standards and the regulations."



Jim Scheer displays COHERENT RADAR PERFORMANCE ESTIMATION, a book published as a result of the first STGC project ever funded. A total of 12 GTRI employees authored chapters of the book. (Photo by Lea McLees)

He said occupational safety and health issues have grown in prominence over the past several years as companies have understood the true costs of on-the-job injuries.

"There is a cost associated with accidents and injuries, and tremendous savings can be realized from providing a healthy and safe work environment," Ortiz reported. "Increasing the awareness of the people responsible for safety-related changes makes them more likely to develop an attitude of prevention toward injuries."

So far, Georgia Tech is teaching the following courses, which accommodate 40 students each:

*Machinery and Machine Guarding Standards: August 2-12, 1993; February 14-18, 1994 and August 8-12, 1994.

*Basic Instructor Course in Occupational Safety and Health Standards for the Construction Industry: December 6-10, 1993 and June 6-10, 1994.

*A Guide to Voluntary Compliance in Safety and Health: December 13-17, 1993; May 16-20, 1994 and August 15-19, 1994.

*OSHA Guide to Voluntary Compliance in Industrial Hygiene: July 12-16, 1993; February 7-11, 1994 and July 18-22, 1994.

*Collateral Duty Course for Other Federal Agencies: September 20-24, 1993; March 21-25, 1994 and September 12-16, 1994.

Other colleges and universities chosen to teach the courses include the University of California at San Diego; Red Rocks Community College in Lakewood, Colorado; and Maplewoods Community College in Kansas City, Missouri.

For registration assistance or other information, you may contact the Georgia Tech Training Programs Office at 1-800-653-3629.

Georgia Tech also offers training courses in a wide range of other industrial health and safety issues, including asbestos abatement, lead paint abatement, construction safety, applied ergonomics, respiratory protection and industrial hygiene. Some of them are offered through a program sponsored by the U.S. Environmental Protection Agency.

**Profile
&
Insight**

Krassimira Paskaleva reviews a report on research she is doing in Bulgaria. Paskaleva, a native Bulgarian, is studying how the changeover from state ownership in a Communist society to private ownership in a free-market society is affecting industries in one region of the country. She is particularly interested in the environmental implications of the changeover. (Photo by Lea McLees)

Paskaleva Studies Regional Changes in Bulgaria

By Lea McLees, RCO

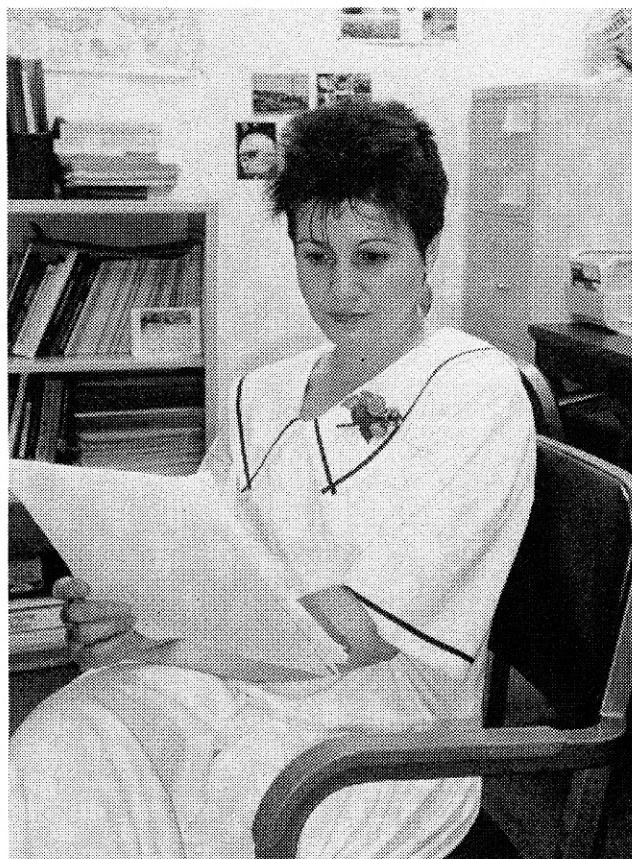
The evolution of former Communist-bloc, state-owned industries into private, market-oriented businesses competing in a global market is much like the voyage of a ship into uncharted waters. No one aboard knows quite what to expect, says post-doctoral fellow Dr. Krassimira Paskaleva (ESTL).

She and colleague, Dr. Philip Shapira, an Associate Professor in the School of Public Policy, are trying to learn more about how Bulgarian firms are navigating this unknown territory. They are studying how industries in the Burgas region of Southeastern Bulgaria are facing the changeover from state to private control. Their survey is the first comprehensive industrial assessment done in post-Communist Bulgaria, Paskaleva said.

"It's a phenomenal period," she said. "We've not had anything like this in world history. Research in the Burgas region is especially interesting, because of the severe confrontation of heavily polluting industries with tourism and agriculture."

Paskaleva has a personal interest in this research, as well. She grew up in Bulgaria, living there until 1989. She came to the United States at that point to do research in regional development at West Virginia Regional Research Institute, moving to GTRI in 1991.

The researchers administered a survey to all 69 identifiable industrial enterprises in the region, and Shapira followed that with personal visits to 20 plants in October 1992. Chet Askey, a public policy graduate research assistant, assisted in analyzing the survey results. Based on responses from 70 percent of the plants, the researchers learned that most are large, averaging 620 workers each. That size, coupled with over-centralized management strategies, encouraged in-



efficiency, waste and excessive inventories. Because of inconsistently available supplies, most firms had developed their own ways of filling all their needs — including building individual thermal power plants, which raises production costs and pollutes the environment. Finally, some companies have not upgraded certain aspects of their technologies in 40 years.

The plants have responded to changing economic and political conditions in many ways. Employment has dropped by 33 percent since 1989, with most of the newly jobless being women and young people.

"Elderly people who are about to retire are protected by law and cannot be let go," Paskaleva said.

In a few cases, manufacturers have developed new product lines, although none have marketing departments. Many, tired of the years of rigid Communist five- and ten-year plans, have developed no general strategic plan.

Company managers are more aware of and sensitive to the environmental impacts of their work, Paskaleva said, but they are not acting more frequently.

"They care about surviving and paying wages," she said. "They don't have the luxury of putting aside money to improve their environmental behavior."

Bulgarians associate improvement and progress with capital investment — but Paskaleva sees less costly things they could do to help their companies.

NASA Award From page 1

and Microwaves Research Branch (AMRB)."

The GTRI technical team was responsible for a big part of the signal processor development effort, Richards said. The group was also responsible for a critical portion of the around-the-clock effort ensuring that work was complete in time for flight tests of the system during summer 1992.

"I also believe the working relationship established during this program has helped position GTRI for extensive involvement in AMRB's work in synthetic vision and wake vortex detection," Richards said. "I am very pleased that NASA has recognized their contributions."

"Few of them are looking for other ways of gaining growth, such as improving the quality of products and training of employees, as well as creating marketing departments," she said. "They don't have knowledge of or access to markets."

Firms that are adapting well to the changes, such as apparel and plastics plants, are those that are not dependent on just a few materials suppliers and/or buyers. Their activities require little capital investment.

Paskaleva and her colleagues faced many challenges in their work. Some company managers believe that some information should be kept secret, and refused to provide it. Because of rapid political and economic changes, many companies' files were in total disarray, making location of information difficult. Other firms never recorded certain data. Finally, many managers were so preoccupied with basic problems like paying

wages that completing the survey was not a high priority. Nonetheless, the researchers received a 70 percent response rate.

As a native Bulgarian, Paskaleva had her own personal challenge to surmount, as well.

"It was very dramatic for me to observe the situation of the people in the plant, the uncertainty and the economic difficulties," she explained. "This is my Bulgarian challenge. It is hard when you see your people suffering."

Paskaleva and Shapira will travel to Bulgaria this summer to study the environmental effects of restructuring in the region and document changes that firms have made in the last six months. With the help of Senior Research Engineer Jim Walsh (ESTL), they will choose the five or six plants that should be good case studies, and then interview employees of those firms.

This work is sponsored by the John D. and Catherine T. MacArthur Foundation.

Too Hot? Too Cold? Just Right?

The Environmental Forum, an organization of students, faculty and staff that educates and involves the Georgia Tech community in environmental issues, would like your thoughts on indoor temperatures around campus. The group is distributing a survey to find out if students, faculty and staff think Georgia Tech buildings are too hot, too cold, or just right. The Forum will share its findings with the campus administration.

Currently, 75 degrees F year-round is the campus policy. The Environmental Protection Agency recommends that temperatures be set at 68 degrees F heating and 78 degrees F cooling for maximum comfort.

To request a copy of the survey you may leave a message at 894-1710, send e-mail to wendy@penguin.gatech.edu, or send a note through campus mail to The Environmental Forum, Student Organization 0283.

The survey must be completed and returned to the Forum by June 30.

Promotions

Congratulations to the following recently promoted GTRI employees!

NAME	LAB/UNIT	FROM/TO
Collins, Thomas R.	CAL	REII/SRE
Daher, John K.	EEEL	SRE/PRE
Downing, Chris C.	ESTL	REII/SRE
Fertig, Louis B.	CMDL	REII/SRE
Haines, Walter R.	ESML	REI/REII
Hurst, Joseph C.	TSDL	REI/REII
Israel, Timothy D.	EDL	REI/REII
Keel, Byron M.	MAL	REI/REII
Logan, Kathryn V.	MSTL	SRE/PRE
McMurray, Gary V.	EOPSL	REI/REII
Moore, Ricky L.	STL	SRS/PRS
Raboud, Jr. Robert A.	ESML	REI/REII
Riall, Benjamin W.	EDL	SRS/PRA
Richards, Mark A.	MAL	SRE/PRE
Roberts, Russell L.	TSDL	REII/SRE
Ross, Charles C.	ESTL	REII/SRE
Schlag, Katharine L.	ESML	SRE/PRE
Sheffer, Jr. Albert D.	EOPSL	RSII/SRS
Slappy, Ashley L.	TSDL	REI/REII
Thompson, Stephen	TSDL	RTI/RTII
Von Ohsen, Harold	EDL	REII/SRE
Wandelt, John F.	CSITL	RSI/RSII

"Visualize, Visualize, Visualize!" Artists Say

By Lea McLees, RCO

A researcher who brings a project assignment to the sixth floor Centennial Research Building office of Judy Wiesman and Kathy Gilbreath may feel at first as if he or she holds the answers in a game of Twenty Questions.

Wiesman and Gilbreath, artists in the Concepts Analysis Lab, ask about everything from deadlines and format to design details when a researcher requests artwork for a project.

"We are very visual and they are very mental," Wiesman said. "We have to ask a lot of questions to get on the same plane."

Engineering Drafter Rick Hoffner and Graphics Technician Sheree Collins (MAPS), both of whom work out of the Baker Building, agree.

"The biggest challenge of our job is to understand exactly what a researcher wants," Hoffner said. Added Collins: "We need for them to tell us visually what they need technically."

Wiesman, Gilbreath, Hoffner and Collins are among several artists who work throughout GTRI both on campus and at the Cobb County research facility. They prepare everything from proposals and reports to poster papers, logos, brochures, viewgraphs, bulletin boards and computer-generated art for researchers all over campus, not just at GTRI — and they stay busy.

"Most of our projects are due within 48 hours," Gilbreath said. "We are usually juggling three to four deadlines a day."

Hoffner and Collins have spent many an evening building bulletin boards from scratch for conferences and presentations, or for lab visits by important dignitaries. Hoffner recalls one bulletin board that almost met its demise in the middle of a street.

"I bought all the stuff we needed and was driving down North Avenue when everything slid out of the back of my truck and fell into the road," he said. "Luckily I was able to stop and pick it all up before anyone ran over it. Then we worked on the bulletin board all night to have it ready for the next day."

Wiesman began work with the Engineering Experiment Station (EES), GTRI's predecessor organization, more than 10 years ago. She was brought in to help EES researchers meet the often last-minute deadlines of government contract work. Once while Wiesman was home with phlebitis, a researcher on deadline called with an urgent request for artwork.

"I was confined to bed with my foot propped up," she said. "He came to my house with the information, and he sat there while I did the artwork for him."

Wiesman's help freed co-op students to concentrate more on research, and less on designing artwork.

"We're trained in composition and layout," she said. "Hopefully, when we do it there is more balance and composition."

Those interviewed have a variety of artistic experience. Wiesman holds a B.S. in design and a B.S. in art education from the University of Cincinnati, has taught art and has provided graphics support for corpora-

tions in the United States and Thailand. Gilbreath, who came to GTRI in 1987, has a B.A. in art with a concentration in commercial design from West Georgia College. She has designed packaging and worked in quality control in the printing industry.

Hoffner arrived at GTRI in 1982 with a background in photography and technical drawing, along with courses in electrical engineering from Georgia Tech and in physics from Georgia State University. In addition to his artwork, he also provides computer support for the Baker Building. Collins, who joined GTRI in September 1992, is a graduate of the Ringling School of Art in Sarasota, Fla. and previously worked as an artist at companies and local advertising agencies.

These artists enjoy their work for a variety of reasons. Collins enjoys helping people, and is fascinated by the work her research colleagues do. Gilbreath enjoys the creativity of her job.

"Some people know exactly what they want, but others will trust you as an artist to design something," she said.

Both Wiesman and Hoffner enjoy the element of surprise.

"The real challenge is never knowing what kind of assignment will come through the door," Wiesman said. "It's exciting, really."

Some of the artists hone their talents after work, as well. Wiesman paints with watercolors and acrylics in a variety of styles, has won numerous awards for her work, and is featured in *Living by Your Brush Alone* by Edna Wagner-Piersol. Gilbreath draws a cartoon called "Kay Singlemom," has written and illustrated *The Twilight Zoo*, a children's



Artists Kathy Gilbreath, standing, and Judy Wiesman, seated, design a detailed graphic that will illustrate a research project. The two say they enjoy the creativity of their jobs, as well as the excitement of not knowing what new assignment will come through the door each day. (Photo by Lea McLees)

book, and designed and painted a life-sized, nine-piece plywood Nativity scene for her church. Collins enjoys computer graphics, weaves cloth by hand using a 36-inch wide floor loom and is a member of the Chattahoochee Hand Weavers Guild. Hoffner is a musician and computer programmer.

All four artists say the rapport they have developed with researchers, along with the appreciation and respect the researchers convey, are among their greatest rewards.

"One researcher said, 'You drive me crazy with questions, but you always have things ready on time' — and then he thanked me," Wiesman said.

News In Brief

Aerial Robotics Competition Planned

A total of 23 student teams from around the world, including three from Georgia Tech, have signed up to participate in the 1993 Aerial Robotics Competition sponsored by the Association for Unmanned Vehicle Systems. The competition will start bright and early June 25 at a location to be announced on the Georgia Tech campus, says event organizer and Principal Research Engineer Rob Michelson (AERO). A prize of \$10,000 will be awarded to the team that builds a flying robot which autonomously finds metal disks, retrieves them, and navigates airborne across a barrier to drop them in a designated spot. No team has completed the task since the competition began in 1991.

Along with the Georgia Tech teams, 16 other teams from around the United States are participating. One team each from Beijing University of Aeronautics/Astronautics and Technische Universität Berlin, and two from the University of British Columbia, also are scheduled to compete.

Rifle Team Places

Dave Gifford, Harold Knouse, Dave Price, Ashley Slappy (all of TSDL) and Larry Sollars (EE co-op) placed in the top ten teams at the Georgia Service Rifle Championships in Dawsonville (GA) April 30 through May 2. Their five-person "Georgia Tech Yellow Jackets" group shot against teams from all over the Southeast region, including the prestigious U.S. Army marksmanship teams.

Intramurals Update

The Co-Rec Volleyball Team made up of Matt Bradley (ESML), Wendy Hanigofsky (ESML), Lou Fertig (CMDL), Michele Brown (MAPS), and Cheri Wiesman (EWTA) completed its regular season with three wins and one loss. The team is seeded number two in its group, and as of presstime, was preparing for its first playoff game on May 19. Look for more news about the team's playoff performance in the next issue.

News & Notes

The largest number of Georgia Tech degrees earned by a single family and shared with THE CONNECTOR belongs to the Schlags. Six members of this family have earned 11 Tech degrees in subjects ranging from electrical engineering to biology over the past 23 years.

All in the Family

Many GTRI employees come from clans with collections of Tech degrees that started with themselves, or with generations before. Several people took time this month to share with us the traditions of Tech degree-earning that have developed over the years in their families.

The largest number of degrees earned by a family and shared with THE CONNECTOR belong to the Schlags, led by Senior Research Engineer Kathy Schlag (ESML) and her husband Jay, an electrical engineering professor here at Georgia Tech. Six members of this family have earned a total of 11 Tech degrees in subjects ranging from electrical engineering to biology over the past 23 years. Kathy and Jay hold two degrees each; their daughters, Elizabeth Schlag Stuff and Diane Schlag Winter, hold three and one, respectively; and sons-in-law Ron Stuff and Eric Winter, one and three.

The family of Research Engineer Ralph Herkert (EEEL), gets the productivity award for earning a large number of Tech degrees in an incredibly short period of time.

"Eight degrees from Georgia Tech for six people in my family in a six-year time span ... It sounds like it should be some kind of record," he wrote to THE CONNECTOR.

Herkert's sister's husband, Greg Cole, started the family trek toward Tech diplomaship in 1985 with a bachelor's in electrical engineering in 1985. Ralph added the eighth degree, a master's in electrical engineering, in 1990, after finishing a bachelor's in electrical engineering. In the meantime his wife, Cathy Steiner Herkert; his wife's brother, Kurt Steiner; and his brother Art added one degree each to the collection, while his sister, Marion Herkert Cole, added two.

Research Engineer Paolo Chiappina of the

GTRI Employees Take Advantage of Degree Programs at Tech

Not only do many GTRI employees work as a part of Georgia Tech—many of them have earned college degrees here, as well. About 33 percent of all permanent and active GTRI employees have one or more Tech diplomas, according to data from the Office of Human Resources.

The maximum number of Tech degrees any employee holds is three. One percent of permanent, active employees, or 16 people, hold a bachelor's, a master's and a doctorate from Tech. Thirteen additional employees hold different combinations of three degrees.

The most common subject area for a GTRI employee to have a Tech degree in is electrical engineering. A total of 169 employees, or about 19 percent, have one to three Tech degrees in that subject. Behind electrical engineering is physics, with 31 holders of one or more degrees, or about three percent of employees.

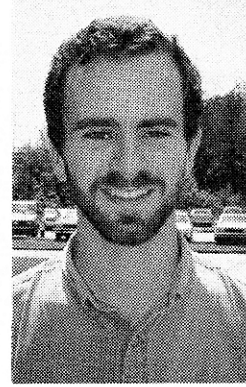
Following are some additional highlights of Georgia Tech degree achievement at GTRI.



Kathy Schlag



Carolyn Mahaffey



Matt Homiller



Ralph Herkert

Augusta Regional Office comes from a six-degree, four-brother generation. He and his brothers, Marco, Massimo, and Federico, have earned degrees in mechanical, electrical and industrial engineering, as well as in architecture, during the last 15 years.

Another eight-degree family is that of Research Scientist Robert Goodman IV (TSDL) — it includes him, his dad, three sisters, a first cousin, a brother-in-law and a third cousin. Five additional family members attended Tech, although they did not complete degrees — his brother, nephew, one uncle and two great uncles. Goodman could be the GTRI employee with the relatives who attended Tech earliest: The two great uncles, William Northcutt Stephens and Thomas Hill Goodman, attended classes here in 1917 and 1922, respectively.

Although she does not have a Tech degree, Group Manager Carolyn Mahaffey (MAPS) claims several Tech degrees through marriage and motherhood. Her first husband, Jack Whatley, earned a bachelor's degree in chemical engineering and a doctorate from Tech. After his death Mahaffey married her current husband, Jim Mahaffey, who has Tech bachelor's, master's and Ph.D. degrees. Their daughter, Jennifer Whatley, earned a Tech degree in 1990, and married fellow engineer David Fletcher, who holds two Tech degrees.

Male Employees with First Tech Degrees:

Principal Research Engineer Josh Nessmith (RSA), and Financial Manager Milton Bennett (OOD) earned their Tech degrees before anyone else at GTRI. Nessmith earned a bachelor's in electrical engineering in 1947 and Bennett earned a bachelor's in industrial management in 1953.

Female Employees with First Tech Degrees:

Senior Research Engineer Kathryn Logan (OOD and MSTL) and Virginia Jory hold the first Tech degrees earned by current female employees. Logan earned a bachelor's in ceramic engineering in 1970, and Jory earned a bachelor's in applied mathematics in 1971.

Most Recent Degrees Earned: Research Engineers Walter Haines (ESML) and Keith Vaughn (MAL) earned the most recent Tech degrees in 1993, both masters' in electrical engineering. Among female employees, Logan and Research Engineer Despina Soteres (CSIT) earned the most recent Tech degrees, both in 1992. They were awarded a doctorate in ceramic engineering and a master's degree industrial engineering, respectively.

Labs with Highest Percentages of Tech Degrees Among Employees:

The Concepts Analysis Lab (CAL) and Computer Science/Information Technology Lab (CSIT) lead with 48 percent of their employees holding at least one Tech degree.

"This adds up to eight Tech degrees for 'my' four engineers," Carolyn wrote.

Acting Director Lee Hughey (RCO) and his wife, Linda Jordan Hughey, combined their families' Tech degree traditions into one. Lee and his brother, Richard each hold bachelor's degrees in industrial engineering. Lee holds a master's in industrial engineering as well. Four of Linda's uncles hold bachelor's degrees in industrial management. Highlights of the Jordan brothers' careers at Tech include the following: One was the first president of an independent student organization, and one was Coach Bobby Dodd's first end coach. All four plus Linda Hughey's father, who did not attend Tech but has supported the institution and his brothers' attendance here, were honored as a group by Tech in 1979.

And finally, co-op student Matt Homiller (RIDL) is one GTRI employee who is in the process of continuing his family's Tech degree tradition. In 1994 he will add a bachelor's in electrical engineering to the collection of nuclear engineering, health physics, electrical, industrial and mechanical engineering degrees his brothers and their wives hold. His brothers Frank, Dan and Stephen, Frank's wife Sandra and Dan's wife Annette have earned seven bachelor's and/or master's degrees among themselves.

CAL and CSIT are followed closely by the Modeling and Analysis Lab (MAL), with 46 percent, and the Communications Lab (COML), with 45 percent.

Thanks to Angelle Hammond, who provided data for this feature, and Lee Hughey (RCO) and Dirk Holcomb (RCO), who analyzed the data.

Radar

From page 1

turned by the radar target and is used in determining system performance. Surprisingly enough, it appears that such data have never been measured for drug packages.

In applying radar technology to the drug war, the researchers are working with their former Cold War competitors in Russia. Radar specialists from the Russian firm ANTEY, headquartered in Moscow, are performing some much-needed basic radar measurements as part of the project using the radars of the Russian TOR system. ANTEY produces an excellent radar that can detect and track an aircraft with very high resolution.

"They have some unique radars — there are none with similar capabilities in the west," Greneker said. "This could help the U.S. effort in the drug wars, and both U.S. and Russian efforts at defense conversion, as well."

The researchers expect to finish the year-long project at the end of September.

Reader Survey

Those of us who produce THE CONNECTOR would like to know what you think about the publication's content. Please take a moment to share your thoughts below. When you are done, please send the survey by June 30 to: CONNECTOR SURVEY, RCO/GTRI Rm. 223, mail code 0800. Thanks for responding.

1. Please check the items you read in each issue of THE CONNECTOR:
 - GTRI policy stories
 - GTRI research funding stories
 - other news-related GTRI stories
 - calendar
 - stories on research projects
 - feature articles on job-related travel, hobbies or other pursuits
 - articles on outstanding GTRI student employees
 - professional activities
 - personal notes
 - personnel news
 - I read or skim the entire issue.

2. Please rate the importance of the following CONNECTOR items. Importance can be defined as "I'd miss this item if it weren't in THE CONNECTOR." Mark the most important item 1, and the least important 13.
 - photos of colleagues and co-workers
 - feature stories that highlight things colleagues/co-workers are doing that are work-related, but not strictly GTRI-oriented
 - articles on research projects at GTRI
 - GTRI research funding stories
 - GTRI policy stories
 - professional activities
 - personal notes
 - personnel news
 - other news stories, i.e., about reorganization, strategic planning, defense conversion efforts at GTRI, etc.
 - calendar of events
 - articles featuring GTRI student employees
 - "helpful tips" articles, such as those on purchasing deadlines, using the telephone economically, rotations in facilities management personnel
 - intramural team updates

3. What have been the subjects of up to three of your favorite CONNECTOR articles during the past year?
 - a) _____
 - b) _____
 - c) _____

4. Why was each of these articles important to you?
 - a) _____
 - b) _____
 - c) _____

3. Do you read THE CONNECTOR electronically on the gopher server?
 - yes
 - no

4. If yes, do you read it there instead of reading

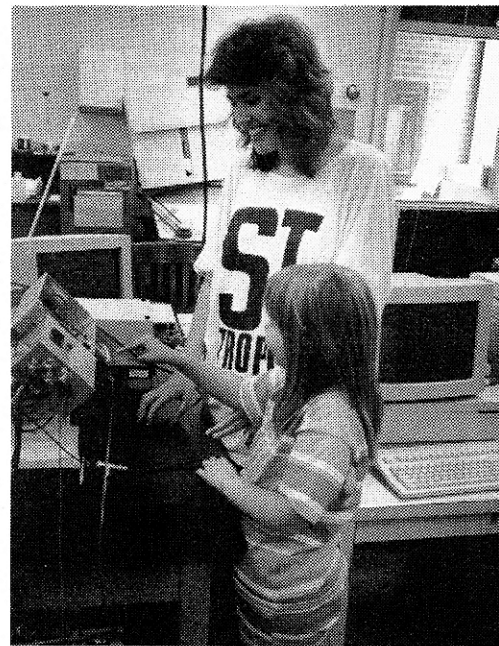
the paper copy, or in addition to it?
 instead of paper copy
 in addition to paper copy

5. What general types of stories would you like to see included more often in THE CONNECTOR?

6. Please feel free to suggest specific story/photo ideas below. You may suggest that we do stories about your colleagues, your lab, yourself — anything GTRI-related. Among the topics you might suggest are:
 *interesting research topics a lab is addressing
 *GTRI policy stories
 *GTRI research funding stories
 *experiences had while traveling abroad for GTRI
 *work-related hobbies or extra-curricular activities that an employee is pursuing
 *tips on how to save time and money in the lab/office
 *services offered within GTRI that employees may not be aware of and might benefit from
 *interesting photo opportunities
 *GTRI traditions
 *work-related social events

This is just a short list to get you started thinking. Thanks for taking time to share with us! We're looking forward to hearing from you.

Remember: Return your survey by June 30 to CONNECTOR SURVEY, RCO/GTRI Rm. 223 CRB, mail code 0800.



Jenna Beletic, 8, the daughter of Leslie and Jim Beletic (EOPSL), joins physics graduate student Hanna Witzgall (right) in preparing EOPSL's CCD camera for use with two telescopes near Tucson, Ariz. Jenna came to work with her dad on April 28th, a day the MS. Foundation for Women designated for exposing young women to career opportunities. Beletic and his daughter soldered circuit boards, attended project meetings and swam at the Student Athletic Center (SAC). When she's not examining future careers, Jenna is attending second grade at High Meadows School in Roswell. (Photo by Lea McLees)

Calendar						

Events of Interest

June 1
 "Active Hypertext Support for Software Requirements Definition," noon, Room 201/ College of Computing. Presented by Kenji Takahashi, College of Computing. Part of the Software Engineering Brown Bag Series.

June 2
 "Introduction to the UNIX Operating System," 1 to 5 p.m., Room 239/Rich Building. Continuation of "Basics of Using Hydra." For users who want a better understanding of the UNIX file system, shell basics and the 'vi' editor.

June 3
 GTRI Director Richard Truly speaks at the Sigma Gamma Tau Senior Banquet, 7 p.m., Sloppy Floyd Building.

June 4
 Craig Zimring, Georgia Tech College of Architecture, noon to 1:30 p.m., Room 102/ Microelectronics Research Center (Pettit Building). Part of the Cognitive Science Colloquium Series.

June 14
 "Implementing and Auditing to ISO 9000," taught by Carol Aton (EDL). Georgia Tech Continuing Education course. Runs through June 16. For more information, call 894-2457.

"MicroSoft Excel for the Macintosh," 9 a.m. to noon, Room 239/Rich Building. Presented by MicroSoft. Functions of this spreadsheet software will be demonstrated in a hands-on environment. Students are encouraged to bring a 3.5 disk.

Richard Truly speaks at the Downtown Rotary Club's lunch meeting, 11:30 a.m.

June 17
 "Preparing Quality Manuals," taught by Carol Aton (EDL). Georgia Tech Continuing Education course. Runs through June 18. For more information, call 894-2457.

Focus on Folks

Professional Activities

Computer Science and Information Technology

Charlotte Jacobs-Blecha presented "The Vehicle Routing Problem with Backhauls" at the Second Annual Corporate Liaison Conference on April 16, 1993 in Atlanta.

Countermeasures Development Lab

David Flowers, Tom Pratt, Kathy Petty, Jack Landgren, Don Lewinski, Mike Minardi, Rob Kossler, and Armand Masse gave presentations at the Electronic Warfare Techniques Analysis Program Review. **Harry Andrews** served as session chairman for Countermeasures Development. The program was held March 30 to April 1 at the Cobb County Research Facility.

Economic Development Lab

In early April, **David Clifton** and **Ned Ellington** made presentations to the American Software Users Group in Atlanta. Clifton discussed "The ABCs of ISO 9000 Certification," and Ellington addressed "Using ISO 9000 to Implement TQM." Clifton, director of the Center for International Standards and Quality (CISQ), also recently made a presentation to Thiele Kaolin at its ISO 9000 awards ceremony in Macon. CISQ assisted the company in its efforts to receive ISO 9000 certification.

CISQ conducted "Executive Briefings of ISO 9000" workshops in Dublin on April 20 and in Augusta on May 11. Sponsored by Georgia Tech and Georgia Power, these one-day workshops are held monthly across Georgia.

Electro-Optics and Physical Sciences Lab

"Planar Grid Oscillators for Quasi-Optical Power Combining at 37 GHz" was the topic of a paper presented by **Abbas Torabi** at the Fourth International Symposium on Space Terahertz Technology. The conference was held March 30 through April 1 at the University of California in Los Angeles. Authors of the paper were Torabi, **Mike Harris, Bob McMillan, Stan Halpern, Jim Wiltse, David Gagnon, Donald Griffin** and **Chris Summers**.

Environmental Science and Technology Lab

Paul Schlumper gave a presentation on blood-borne pathogens at the 1993 South-eastern Safety and Health Conference on April 26 in Atlanta.

On April 21, **Mike Lowish** gave a demonstration of common electrical safety hazards for Sentry Insurance Company's regional office in Atlanta. Earlier in the month, as part of Project Safe Georgia and OSHA's voluntary protection program for general industry, he assisted Georgia Pacific's Warrenton (GA) sawmill.

At the American Occupational Health Conference in Atlanta April 30, **David Jacobi** gave a presentation entitled "Respiratory Protection: A Mask-On Learning Session" to some 150 participants. The annual event, sponsored by the American College of Occupational and Environmental Medicine, was attended by more than 6,100 health professionals.

Longtime Employees Recognized for Service

Employees who will complete 10 and 25 years of service to Georgia Tech during 1993 were recognized at the Faculty/Staff Honors Luncheon on May 26 in the Student Center Ballroom. To be eligible for the awards one must have spent 10 to 25 years total in permanent, full-time employment on campus. The years do not have to be consecutive.

Ten-year honorees were awarded a certificate, and 25-year honorees were presented a Gold "T" lapel pin. Following is a list of GTRI employees who were recognized.

Twenty-Five Year Employees

C. Patrick Bums MATD
Robert W. Cash, Sr. Mechanical Services

Ten-Year Employees

Eric N. Barnhart COM
Marsha H. Barton MAPS
Charlene W. Bayer ESTL
Martin H. Brooks MAL
Arthur L. Brown Columbus Reg. Off.
Faye G. Carpenter TSDL
William A. Cochran RSA
Larry E. Corey MATD
Thomas M. Cotter TSDL
Eldridge G. Doubleday EDL
David R. Fentem ESML
Orlando J. Feorene OOD
Carey J. Floyd MAPS

Christopher B. Fowler ESML
John F. Gilmore CSIT
Susan C. Gimmestad EOPSL
Jan W. Gooch MSTL
L. Lamar Gostin RIDL
Holly J. Grell EDL
Willie Harvey, Jr. MSD
Gregory H. Heagerty Supply Services
Cecelia B. Hetrick MAL
Gerald N. Hill, Jr. FMD
Claudia H. Huff ESTL
Robert S. Hyde EOPSL
Calvin R. Jameson TSDL
Kevin L. Kamperman ESTL
Nancy B. Kelley EOPSL
Sandra G. Kirchoffer Research Property
Janet A. Leininger CSIT
Robert A. Loebach RSA
Danial J. Mack ESML
Edward L. Masters, Jr. ESML
John J. Mills Columbus Reg. Off.
Robert L. Mobley, Jr. OOD
John C. Nemeth ESTL
Josh T. Nessmith RSA
Sharon M. Neu CMDL
Daniel J. Ortiz ESTL
Mark W. Pellegrini CSIT
Kirk E. Pennywitt CSIT
Alice D. Price FMD
Melanie H. Price RSA
Mindy J. Rakestraw TSDL
Virginia G. Sandy Huntsville Lab
D.W. Senn RCO
John T. Sparrow MSTL
Lillian L. Spearman Supply Services
Roland A. Stebbins RSA
Rosemarie Szostak MSTL
John M. Trostel RIDL
Tracy V. Wallace RIDL
Paula M. Wilcox Research Security

Claudia Huff facilitated a workshop on sustainable development for the Army Environmental Policy Institute, April 27 and 28 in Champaign, Ill.

Materials Science and Technology Lab

Kathryn Logan attended the annual meeting of the American Ceramic Society in April. She served as Division Program Chair and Session Chair at the same meeting, was installed as Chair-Elect of the Engineering Ceramics Division, and was made a Fellow in the society.

Personnel News

Microwave and Antenna Technology Lab.

Co-ops joining the lab are **Jeff W. Kemp**, who transferred from the Signature Technology Lab, and **Andrew T. Chappell**.

Amy M. Jacoby, Scott T. McBride, Scott R. Crowgey, J. Mark Hudgens and **E. Howard Atkinson** have terminated.

Marlene M. Aldridge has transferred to the Electromagnetic Environmental Effects Lab.

Threat Systems Development Lab

Michael E. McKeon has transferred from the Signature Technology Lab.

Charles T. Christensen has terminated.

Concepts Analysis Lab

Laurie Tucker has terminated.

Personal Notes

Cradle Roll

A son, **Steven Avery Brooks**, was born May 3 to Karen and **Ralph Brooks** (RIDL).

Joe and **Kay Lindsey** (TSDL), are the parents of a son, **Daniel Trent**, born May 1.

Emily Rose Kossler, a daughter, was born to Catherine and **Rob Kossler** (CMDL) on April 7.

Bob McMillan (RIDL) recently welcomed his fifth grandchild, **Hannah Alice Burns**, born April 10.

Ted Lane (RIDL) also has a new grandchild, **Lindsey Sue Lane**, born March 21, 1993.

Our Sympathy

... to **Larry Corey** (MATD) upon the April 20 death of his father.

Georgia Tech
RESEARCH INSTITUTE

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