

# The GTRI Connector

## Think about it...

Why is it so hard for us to believe in "out of body" experiences when we witness so many "out of mind" experiences?

Contributed by Harold Engler

Vol. 8 • No. 10

Published Monthly for the Georgia Tech Research Institute Family

September 1992

## GTRI makes major administrative changes

**G**TTRI Director Dr. Donald Grace has announced that, effective October 1, there will be some realignment of the responsibilities within his office. The moves are being implemented to take maximum advantage of the time, talents and activities of the individuals within the Office of the Director, he explains. There also will be some changes in the laboratory groups.

The Executive Council will undergo two major changes. Don Wilmot will join the council as he assumes responsibility for one of the laboratory groups. Bob Shackelford will become chairman of the Executive Council, with the Director utilizing the council from an ex-officio vantage point.

Among other changes, Devon Crowe will be freed up to pursue his responsibilities as GTRI's chief scientist. Jerry Carey will assume responsibility for the line management of the Program Development Office and the federal field offices. Pat O'Hare will become an associate director and will take line responsibility for the Economic Development Laboratory.

Ed Reedy and Charlie Brown will continue as laboratory group directors, but the alignment of the labs will change as follows:

### Laboratory groups

**Don Wilmot, director:** Countermeasures Development, Electro-Optics/Physical Sciences, Environmental Science and Technology, Modeling and Analysis, Signature Technology.

**Ed Reedy, director:** Concepts Analysis, Electronic Support Measures, Microwave and Antenna Technology Development, Ra-

dar and Instrumentation Development, Radar Systems Applications, Threat Systems Development.

**Charlie Brown, director:** Aerospace, Communications, Computer Science and Information Technology, Electromagnetic Environmental Effects, Materials Science and Technology, Huntsville.

### New councils

Four new councils are being formed, with membership coming from the Executive Council and the laboratory directors. They are:

- Lab Operations Council—Ed Reedy, chairman.
- Strategic Initiatives Council—Devon Crowe, chairman.
- Program Development Council—Jerry Carey, chairman..
- Academic Liaison—Devon Crowe, chairman.

The councils will be reported on in future GTRI CONNECTOR articles. □

## Tech Charitable Campaign begins

**T**he 1992 Georgia Tech Charitable Campaign began with a kickoff breakfast September 30 and will conclude November 13. Janice Porter is the campaign chair for GTRI, and Peg Shelton of External Affairs is the campus-wide chair. Each laboratory and service unit has designated a representative.



Detailed information and pledge cards should begin arriving October 1. Last year, the Georgia Tech community pledged \$169,664 to the Charitable Campaign, of which \$48,828 came from GTRI. Remember to watch for your pledge cards and participate in this year's campaign.

Please call Janice Porter at 894-3401 if you need more information. □



*These two summer student helpers in the Materials Characterization Branch have other Georgia Tech connections as well. They are (L-R) Colleen Starr, daughter of Tom Starr (MSTL), and Laura Brown, daughter of Tom Brown (MATDL) and Donna Brown (Chemical Engineering). Laura is a Tech freshman planning to major in mechanical engineering, and Colleen is a student at the University of Georgia. (Photo by M.A. Stegar)*

## Observed & Noted

This year's "GTRI—Present and Future" meetings will be October 8, 9 and 12. See page 2.

Jerry Carey and Gary Poehlein testified on the effects of reduced defense spending on universities at a recent Defense Conversion Commission hearing. Highlights are

on page 2.

■ Brian Stevens' work on developing an algorithm for better control system design is featured in this month's **Spotlight on Internal Research**. Details are on page 3.

■ Welcome home to Tech grad Dr.

Henry Paris, the new director of the Materials Science and Technology Lab. See page 3.

■ Research assistance provided by Georgia Tech co-ops is valuable to both the students and to GTRI. Read what co-ops and researchers have to

say on pages 4 & 5.

■ This summer, Rob Michelson found that truth can be as strange as fiction. Read about his adventure on page 5.

■ It's now official: PROFS is fading away as of December 31. Information Technology describes the replace-

ment e-mail programs it will support on pages 5 & 6. Training classes to ease the transition are listed on page 6.

■ Congratulations to Don Clark, who has been named an honorary life member of the IEEE-EMC Society; to Ben Slocumb,

now in Australia on a nine-month research fellowship; and to Rosemarie Szostak, who has been awarded a Norwegian visiting fellowship. It's all in **Professional Activities** on page 7.

■ The stork has been busy again. See news of five babies and picture on page 8.

Georgia Tech  
RESEARCH INSTITUTE



# News & Notes

## GTRI employee meetings scheduled in October

The annual "GTRI—Present and Future" meetings will be held during the second and third weeks of October, as follows:

**Campus:** Thursday, October 8—Georgia Tech Theatre for the Arts

**GTRF/CC:** Friday, October 9, and Monday, October 12—Building 1 Auditorium

All meetings will be held from 3:00 to 5:00 p.m. Campus employees should attend the October 8 meeting. Cobb County employees whose last names begin with A through J should attend the October 9 meeting, and those whose last names start with K through Z should attend the October 12 meeting. *If you cannot attend the meeting on the day scheduled for you, please plan to attend one of the other meetings.*

The meeting will follow the usual agenda: comments from the Director's Office on matters of general interest, highlights from individual units, question-and-answer period, montage of GTRI people, followed by refreshments and socializing.

The procedure for submitting questions and comments is being revised this year. All employees are invited to submit their questions and comments in advance, either by PROFS or by mail, addressed to Donald J. Grace. They may be signed or anonymous, and must be submitted by Friday, October 2. They will be grouped into broad topic headings for summary and response by the appropriate individual in OOD during each employee meeting. At that time, the audience will be invited to go to a microphone and ask further questions on the same general subject from the floor. □

## Carey, Poehlein testify at Defense Conversion Commission hearing

GTRI Associate Director Jerry Carey and Georgia Tech Vice President for Interdisciplinary Programs Gary Poehlein testified before the Defense Conversion Commission July 30 at the Fulton County Courthouse.

The seven-member commission is reviewing the effects on the economy caused by reduced defense spending. Its review will include recommendations for retraining Defense Department personnel and assisting companies in converting from defense to commercial activities. The commission is conducting hearings and gathering information and views from a wide variety of sources, including industry, labor, and academia, and will report its findings to the Secretary of Defense on December 31, 1992.

Mr. Carey and Dr. Poehlein gave Georgia Tech's viewpoint on the capabilities and challenges facing the university sector due to the defense drawdown. They stressed the vital role that the university sector plays in the U.S.'s ability to maintain the technological advantage in its military systems. Specific points related to Georgia Tech included:

- In a report to Congress in 1989, the Department of Defense (DoD) spelled out certain "high priority university research programs" critical to national defense and mentioned Georgia Tech's "nationally recognized capability in electronic warfare."

- This electronic warfare capability was used significantly in the recent Desert Shield/Desert Storm combat.

- Georgia Tech has demonstrated basic and applied research capabilities in 20 of the 21 Defense Critical Technologies set forth by DoD.

- The School of Industrial and Systems Engineering recently was awarded a contract to develop and conduct a graduate course leading to an MS in Test and Evaluation.

- During FY92, Georgia Tech conducted \$168.7 million of research, of which \$106.2 million or 63% was for DoD. This represented a 20% drop in DoD funding from the previous year.

The Georgia Tech spokesmen stressed that the main challenge to university research is the 26% cap on administrative overhead cost recovery imposed by the federal Office of Management and Budget. "This overhead recovery freeze and resultant underrecovery adversely impact a university like Georgia Tech, which has large equipment investments in computing, antenna and anechoic ranges, and the like," Carey and Poehlein stated. It will significantly decrease the capability of universities to maintain cutting edge research capability needed to support national security objectives, they added.

Their testimony further pointed out that the OMB regulation makes no differentiation between grants and contracts although contracts are administratively more costly to conduct than grants. They also noted the inequity whereby the industrial sector is permitted to deduct full IR&D, bidding and proposal costs. They recommended that the commission support full recovery procedures for university research and permit differentiation of grants from contracts in governmental directives.

Carey and Poehlein also indicated Georgia Tech's capability and desire to participate in many of the programs in the Defense Reinvestment for Economic Growth package sponsored by the House Armed Services Committee. They include: Teachers from Troops, Dual Use Critical Technology, Job Training Opportunities, Assistance to State and Local Governments, Removing Business Barriers, Extend R&D Tax Credit, and funding of the following:

- √ Regional and State Manufacturing Extension Services
- √ Regional Technology Alliances
- √ Grants for Regional and State Industrial Services
- √ Trade and Export Assistance
- √ Critical Technology Partnerships with Industry □

Two members of the Senior Technology Guidance Council who are rotating off the Council recently received GTRI plaques from STGC Chairman Devon Crowe recognizing their outstanding contributions. Top: Crowe (left) presents plaque to Josh Nessmith (RSAL), a charter member who served 1987-92. Bottom: Crowe (right) presents plaque to Larry Corey (MATDL), who served 1988-92. (Photos by Dayton Funk and M.A. Stegar)



## GTRI research in the news

During May and June, GTRI research received the following national publicity:

- The broad-band antenna developed by Vic Tripp and Johnson Wang gained more attention with articles in *The New York Times* (circulation 1,209,225), the *Minneapolis Star-Tribune* (413,237), and *RF Design* (40,000). It also was included in the Science News distributed on the Prodigy on-line service. Total circulation for this story now tops 2.2 million.

- Krish Ahuja's sonic boom simulator continued to gain widespread media attention. *The Wall Street Journal* (1,857,131), *The Atlanta Journal-Constitution* (505,000), the *San Jose Mercury-News* (289,918), *Design News* (170,000), and *Mechanical Engineering* (122,112) all carried articles, bringing total readership to more than 4.8 million.

- *Popular Mechanics* (1,623,000) ran an article and graphic on Jim Beletic's research into speckle imaging used to see dust storms on Mars. *Designfax* (110,185) also reported on the work, which would help future space missions to the planet.

- *Aviation Week & Space Technology* (150,000) described the new type of acousto-optic radar warning receiver developed by Harold Engler, David Hartup, and Allen Garrison.

- Research on electromigration by Bill Livesay, Jim Hubbard, Allen Garrison, and Mike Harris was the subject of articles in *Industry Week* (288,000) and *The Atlanta Journal-Constitution* (505,000). Both articles included photographs provided by Georgia Tech.

- The 1992 Aerial Robotics Competition, held at Georgia Tech and organized by Rob Michelson, gained attention twice from Cable News Network, three times from *The Atlanta Journal-Constitution* (505,000), and once each from *The Chicago Tribune* (1,131,226), *Mecanica Popular* (Spanish Language Popular Mechanics—235,000), *New Orleans Times-Picayune* (272,000), and Prodigy Interactive Services. □



## Spotlight on Internal Research

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

### Taking control of control systems: New algorithm adds certainty to process

By Lea McLees, RCO

You have more in common with your oven, your auto, and the airplanes that whisk you to vacation and conference destinations than you might think. Your body and most appliances and vehicles rely on groups of interacting components called control systems to perform basic functions, says Dr. Brian L. Stevens of the Modeling and Analysis Laboratory.

Stevens and co-investigator Frank L. Lewis, a former faculty member in the School of Electrical Engineering, have developed an algorithm for designing better control systems for electrical and mechanical processes and equipment.

"There's still a lot of trial and error in control system design," Stevens says. "We wanted to eliminate some of that."

Control systems move, point, position and regulate equipment and processes. They control everything from human body temperature and cholesterol levels to kitchen oven warmth, automobile power steering, and aircraft stability. The control system that oversees the power steering in your car, for example, ensures that the vehicle responds as you expect it to when you turn the steering wheel. It prevents the car from overshooting right and left turns, thus keeping it on the road.

Control systems in aircraft, autos and other equipment respond to an operator's commands by comparing the operator's command with feedback from various sensors. Feedback variables such as velocity, acceleration, linear and rotary motion represent what the vehicle actually does. The control systems calculate error signals which indicate the difference between what the operator wants the vehicle to do and how the feedback shows it is actually responding.

Engineers who design control systems must decide how much feedback from which sensors will generate the response an operator desires, thus eliminating or reducing the amount of error. In the past, this determination has been very much a trial-and-error process. If feedback from only one or two instruments must be considered, engineers can easily use trial and error to figure out the amount of feedback needed from each instrument. But when the number of feedback variables gets as high as three or four, that no longer works. Stevens offers an analogy.

"Say you had a box with four knobs on it attached to a meter," Stevens says. "You have to turn the four knobs to get the highest possible reading, and all the knobs interact with each other. You wouldn't be able to do it by trial and error. With one, it's easy. You just turn the knob until the meter hits

its highest reading. But with three or four, it begins to get difficult."

#### Eliminating trial and error

The algorithm the researchers developed eliminates the need for trial and error because it can manipulate several feedback variables in computer models of processes engineers want to control. But it also provides a significant improvement upon past algorithms because it is more interactive, Stevens explains.

"You have a better feel for when you are improving the answer, when you are going in the right direction," he comments. "You have a better idea of what to do to make improvements."

The algorithm succeeds in this respect because the researchers have reduced "the number of knobs to twiddle," Stevens says, referring to his analogy. In effect, they replaced some of the "knobs" with "switches"—making some variables binary and thus reducing the number of options an engineer must test.

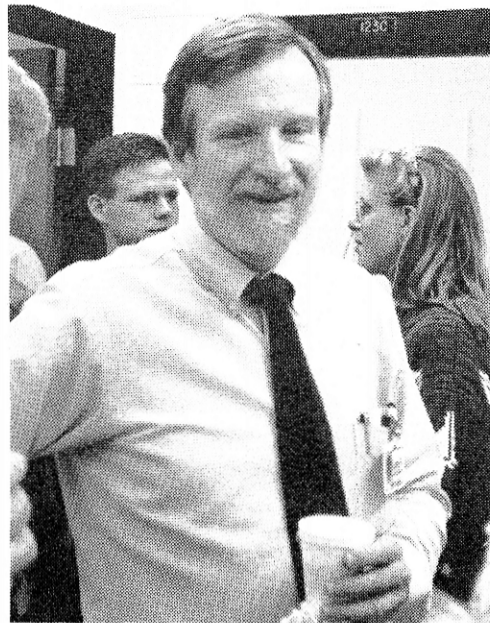
The researchers have refined the algorithm and used it in antenna control for radar, other aircraft situations, and different kinds of dynamics. This research is most applicable to complicated control systems, such as those used to fly and stabilize aircraft, rotate radar antennas, run television and infrared scanners, and increasingly, to control and power cars, Stevens says. It can help achieve and improve upon what operators want from electrical and mechanical control systems: quick, accurate response.

"If a human operator pulls back a lever, he doesn't expect the vehicle to go up and down before settling out on some heading," he said. "The operator using a control system expects to have a response that is smooth and doesn't overshoot, settling down to its final value quickly."

Thus far this research has been presented at two conferences and published in two journals, including the 1991 *GTRI Technical Journal*. Two additional papers are scheduled to appear in upcoming publications. Lewis, who is now at the University of Texas in Arlington, and Stevens included some of the work in their book *Aircraft Control and Simulation*, published by John Wiley and Sons, Inc., in February; and Stevens will present some of the ideas in an upcoming short course at Georgia Tech on aircraft guidance, navigation and control. Theoretical contributions to the project were also made by Dr. Lewis' research student, Fouad Al-Sunni.

Stevens also uses the research in work he has completed for other GTRI programs. It has been included in several proposals, one of which is currently under consideration by a potential sponsor.

"There is a gap between theory and engineering," Stevens says. "We were bridging a gap here—it was a fairly applied piece of work, and it's a useful addition to one's kit of design tools." □



#### Materials Lab has new director

Dr. Henry Paris, a triple Georgia Tech graduate, joined GTRI September 14 as the new director of the Materials Science and Technology Laboratory.

For the past four years, he has been director of the Materials Science Department of McDonnell Douglas Technologies, Inc., San Diego, California. There he supervised major R&D and implementation activities in ceramic matrix composites, high-temperature materials, thin-film development, organic composites, and the measurement of basic RF properties of materials.

He was named MDC Fellow in February 1991 in recognition of his contributions to McDonnell Aircraft Company's high-temperature, low-observables materials technology.

At Georgia Tech, Dr. Paris received his B.S. in physics in 1970 and his M.S. and Ph.D. in metallurgy in 1973 and 1975, respectively. While at Tech, he was president of the Graduate Student Body and was inducted into ANAK, the honorary leadership society. He was a post-doctoral fellow at Carnegie-Mellon University 1975-1977.

Dr. Paris then joined Alcoa Laboratories, where he worked as a scientist in the Alloy Technology Division until 1984. There he supervised a rapid solidification team that developed the first high-temperature Al-Fe-Ce alloy. He also worked on the team that achieved production implementation of the first two high-strength powder metallurgy (P/M) alloys.

While at Alcoa, Dr. Paris developed and received a patent on a P/M 2XXX alloy with the highest combination of strength and toughness ever produced. In addition, he developed a novel synthetic, or composite, P/M alloy microstructure to produce high toughness and fatigue resistance, work that also led to a patent award.

In 1984, he transferred to Alcoa Defense Systems, Inc., where he was the primary technical liaison between ADSI and Alcoa Laboratories and served as director of ceramic materials. During this tenure, he worked to establish a composite and monolithic armor business venture for Alcoa, and structured and supervised the R&D programs at both locations in ceramic matrix composites, resonant metal radomes, and ceramic coating technology.

Dr. Paris is a member of the American Society for Metals, the American Ceramics Society, and the Metallurgical Society of the AIME. He chaired the last-named society's Nonferrous Metals Committee 1987-1990. □

*Dr. Henry Paris, new director of the Materials Science and Technology Lab, meets the troops September 15 at an informal coffee and doughnuts reception in the Baker Building. (Photo by M.A. Stegar)*

*"There's still a lot of trial and error in control system design. We wanted to eliminate some of that."*  
— Brian Stevens



**Profile  
&  
Insight**

**Co-op program  
contributes to  
GTRI research**

By Mark Hodges, RCO

During the first few weeks of July, Georgia Tech senior Tim Hamel pulled four all-nighters.

Hamel wasn't studying for exams; he was running an experiment for GTRI research scientist Dr. Krish Ahuja. From roughly 1 to 5 a.m., Hamel and one of Ahuja's other student co-ops drove a specially outfitted Mercury Sable on Atlanta area highways, recording noises generated as the car ran at different speeds.

The measurements are part of a Ford-sponsored study of the sources of automobile noise. Hamel not only has collected noise readings and analyzed data, but the aerospace engineering major has been responsible for much of the project's day-to-day management.

He is one of many college students—even undergraduates—who take an active part in GTRI research as co-op employees. Through this program, students alternate work and study terms, often spending as many as seven or eight quarters with a company or research lab on the Georgia Tech campus. Over time, many become the virtual equivalent of entry-level research scientists or engineers.

**Benefits of the research environment**

Participation in research has a number of advantages for co-op employees, according to some of the students who have worked at GTRI. One benefit is the help it gives in illuminating classroom learning.

"It's very helpful to visualize some of the concepts that the professors discuss," says Hamel. "We learn how air flows over cars and about air flow in general. Instead of it being an abstract concept, I've had some idea of how aerodynamics physically works."

Rodney Smith, a co-op in Wayne Daley's Intelligent Machines Branch, puts a slightly different twist on the same point. The computer engineering major says that during his four years at GTRI he has sometimes encountered problems at work *before* he learned about them in class. "It helps to have five or six engineers to go to here to ask questions," he says. "It's better than just having textbooks, which are so general."

Some co-ops want to learn how to conduct professional research, and GTRI offers them good experience. In Jack Lackey's chemical vapor deposition program, student co-ops carry out many of the experimental trials. "It's been very satisfying to me doing research that nobody's done before," says one of these co-ops, Tom Moss. "Jack's been one of the best influences I've had at Tech."

Jeff Farley, a co-op from Southern Tech, conducted an experiment 'from start to finish' in GTRI's microelectronics lab, says his supervisor, Mike Harris. The results obtained were "better than anything we'd done before and comparable to the best reported in the literature," Harris adds.

For Moss, Hamel, and others, work at GTRI has led them to plan research careers—and in some cases gave them a competitive advantage for moving in this direction. ESML co-op John Spillane has received an Air Force scholarship for his doctoral training in electrical engineering which pays him a full-time salary. For every year he receives this grant, he will have to work two years in civilian research for the Air Force at Wright-Patterson AFB.

"Ninety percent of the reason I got into the Air Force program was that my work at GTRI was in areas of interest to the Air Force," Spillane says.

For some students, co-op experience has led to professional positions at GTRI after graduation. One example is Kathy Petty, an electrical engineering graduate who now works in electronic defense research at CMDL and ESML. "There's a lot of interesting research being done here," Petty says. "It's an atmosphere conducive to continuing to learn, and that's important to me."

Whether a student goes into research or some other field, David Emmerick believes that work at GTRI has been a good preparation for the professional world beyond graduation. "I think the co-op program is the best thing for any student," he says. "I can't comprehend what it would be like not to have done this. I'd know nothing. I feel that when I get a job, it'll be a smooth transition."

Scott Bard, another of Wayne Daley's co-op students, thinks that the variety of tasks he is exposed to at GTRI will help him after graduation. "Every work quarter," he says, "I learn so many new things."

The benefits of co-oping at GTRI aren't all purely professional. Emmerick finds that working on campus is a "big advantage" because he can take courses that are offered only once a year during work quarters. He also is able to live in the same place year round, rather than have to move every other term.

Gina Hardin has found that interspersing

study and work quarters helps her to stay fresh. "With the rigors of Tech," she says, "you'd go crazy without a break."

Though co-ops generally need five years to graduate, this limitation can be a plus, says Lee Joyner, a senior who just finished her co-op career at ESML. "Extra time in school is important during the growing-up period," Joyner says. "It gives you a feel for working with different sorts of people, in making that transition from being a kid to an adult."

Like any experience, co-oping on campus has its downsides. While stressing that she has enjoyed her time at GTRI, Hardin thinks that the students who co-op in private industry may have an edge in absorbing the corporate culture. She adds that industrial co-op jobs generally pay higher salaries.

Lee Joyner also found the GTRI atmosphere stimulating and enjoyable; however, she believes that students are asked to do professional work while not being privy to the same benefits as professional employees. For instance, she says, they do not have access to parking lots near GTRI buildings or have electronic mail accounts. Neither, she adds, do they get vacation and sick leave like co-ops accrue when they work at corporations.

**Benefits to GTRI researchers**

Students aren't the only beneficiaries of the co-op program. Access to high-quality student employees is an important advantage for GTRI research laboratories. Most of these labs survive by winning contracts on a competitive basis, and they could not afford to replace all of their students with professional engineers or scientists.

At any given time, MSTL's chemical vapor deposition (CVD) program employs three undergraduate co-ops and three graduate research assistants.

"We find them extremely helpful in our research," says program director Jack Lackey. "They essentially operate and modify the CVD equipment we use. They're able to do that after a few weeks training."

Students become involved in the analysis of data, then later deliver presentations at technical meetings and write professional papers.

"We can see them change over their time here," says John Hanigofsky, assistant director of the program. "By the time they leave, they're essentially stand-alone researchers. They offer fresh insights that can help us solve our problems."

In GTRI's microelectronics program, researcher Mike Harris finds that co-op students of today are better prepared than they once were, especially in the computer area.

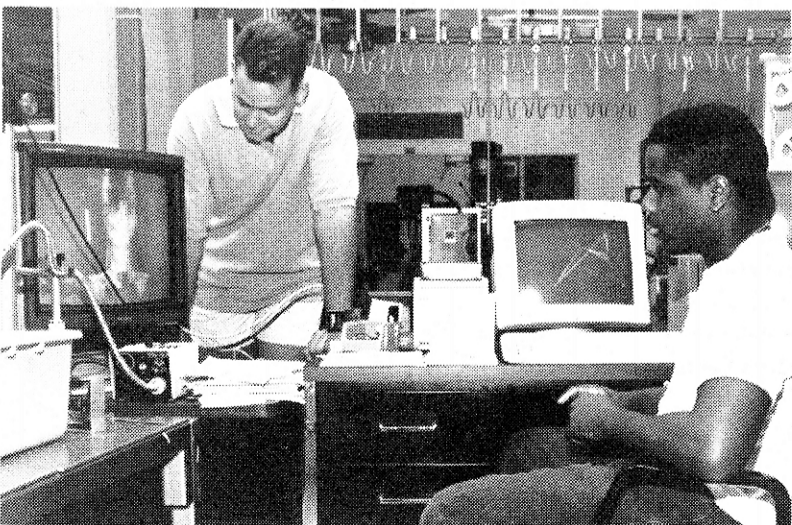
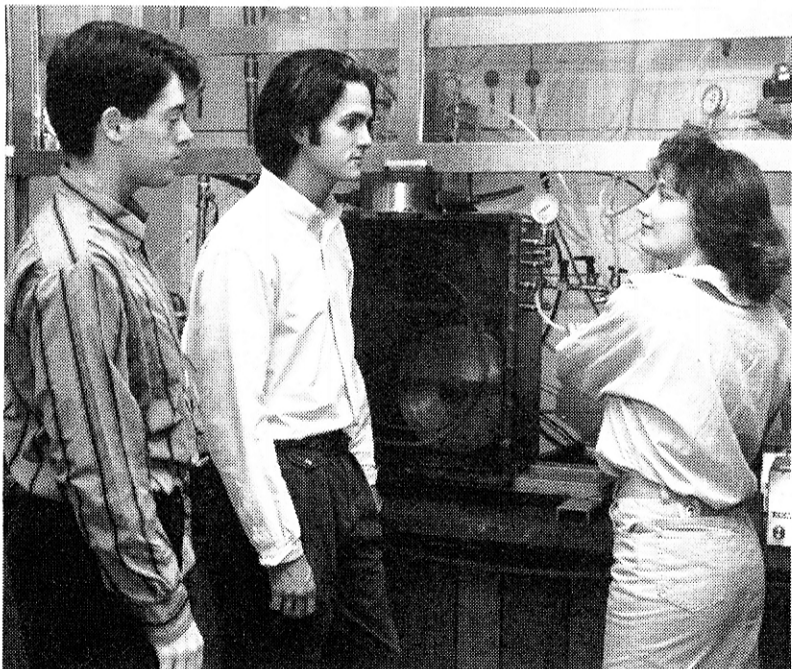
Harris believes that his co-ops need at least one quarter to "get up to speed."

"This is very technical work, and we demand a lot from our co-ops," he says. "I look for someone who will stay multiple quarters."

Wayne Daley of the Intelligent Machines Branch says that a successful co-op needs to thrive on independence. "To get the most out of it, the students have to be self-motivated," he explains. "We really don't have time to spend with them doing a lot of hand-holding."

Nonetheless, his branch has taken steps to orient students to the world of research through a series of two-hour seminars. Topics of these sessions have included lab safety, the uses of lab equipment, and computer programming.

**Top: Gina Hardin (right) discusses a chemical vapor deposition test with fellow co-ops (L-R) Matt Langman and Bruce Beckloff. Bottom: Co-op Scott Bard (standing) checks the image on the screen while Rodney Smith sits at the computer controls during a machine vision run in the Intelligent Machines Branch. (Photos by Dayton Funk)**





Like Harris, Daley believes that GTRI student employees benefit most if they spend their entire co-op careers here. "It takes two years before most of them can contribute," he says. "But when they leave, most of our co-ops are able to contribute fairly significantly on our projects. By that time, they're doing what we do, supervised by an engineer." □

## NATO meeting is 'cloak and dagger' experience

By Lea McLees, RCO

Being a GTRI researcher isn't all writing proposals, working in the lab, and rushing final reports to sponsors—just ask Rob Michelson, technical area manager for Battlefield Robotics and Unmanned Systems in the Aerospace Laboratory.

While meeting with an international team in Europe recently, Michelson found himself in a setting that could have come straight from a harrowing "Indiana Jones" adventure movie.

"A massive steel door in the side of a towering mountain opened hydraulically to reveal a dimly lit tunnel cut through solid granite and leading as far as the eye could see," he says of the meeting site. "As the team members moved in, they joked about the similarity between this place and the *Raiders of the Lost Ark* movie. We expected arrows to fly out of the sides of the walls at any moment."

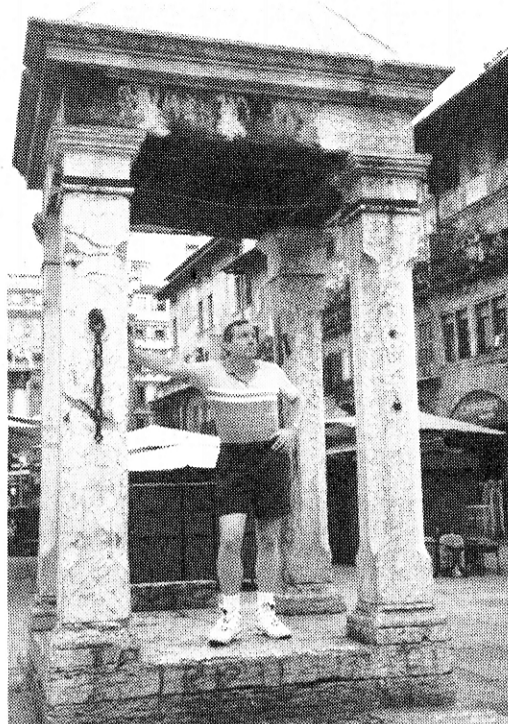
The reason for Michelson's visit was a meeting of the NATO Advisory Group for Aerospace Research and Development (AGARD). Michelson was chosen by the Office of the Assistant Secretary for the Air Force (U.S.) to represent the country's industrial interests on this panel. He and two U.S. government representatives meet regularly with 15 colleagues from NATO countries to predict what sensor technology for unmanned aerial vehicles will be like around the year 2020.

The group has typically held its meetings in secured areas such as the British Ministry of Defense. But this meeting venue was decidedly different, Michelson said. Signs in a densely wooded area near the entrance warned that unauthorized visitors would be shot, and forbade photographing or even drawing the site. A small compound outside the mountain was populated with soldiers toting machine guns.

In the ceiling of the tunnel, large metal doors that were suspended every few hundred meters could drop automatically to prevent further access. After a hike of about a quarter of a mile, the group went into a hatch in the side of the tunnel wall that opened into a small room with a bank vault door on the other side, Michelson said. This was the entrance leading to the underground command center, a three-story cavernous room carved from solid granite, where the group met for a week.

The committee's discussions center on future capabilities of sensors for unmanned aerial vehicles performing maritime missions of interest to NATO. For example, NATO is interested in future use of unmanned aerial vehicles to locate enemy warships, target them, and then assess damage resulting from a pre-emptive strike.

"Forecasting technology is fun," says



**As a member of the AGARD team, Rob Michelson (AERO) has attended meetings in Great Britain, France, Italy, Germany, and the U.S. One way he manages to see the tourist sights is by jogging at sunrise, such as this jaunt through the narrow streets of an Italian town.**

Michelson, "because you can brainstorm about future capabilities. But it can be difficult as well, due to the rapid pace of technological innovation and the desire to make meaningful and accurate predictions. There are so many 'ifs': If we had room-temperature superconductors; if we had sensors of a certain sensitivity; if we had wafer-scale integration (which is putting a whole computer on a single silicon wafer). What is the likelihood of such breakthroughs and what are the implications of improvements in one technology on another?"

The idea behind these predictions is to give NATO members an idea of which technologies they should invest in today in order to have certain capabilities tomorrow. The technologies under consideration hold promise for non-military uses as well, such as drug interdiction.

Michelson sees his work as having several potential benefits to Georgia Tech.

"We get somewhat of an inside track on what the thinking is at NATO and what their critical moves are going to be," he says. "It's also a good opportunity to network with people from other countries. So much of what we do is geared toward marketing with U.S. government agencies. When you spend a week in a room with experts from Great Britain, France, Germany and Portugal, you are making contacts that may lead to a collaboration down the road."

The committee will hold two more meetings and finish its work in December. From there, the group may go on to other work or it may be disbanded, depending on what NATO needs from the committee members.

But despite all the dramatic security precautions taken at the meeting site, the location of the secured hideaway is no secret, Michelson said. After getting totally lost as he drove the study team from a nearby town to the meeting site on the first day, the group's bus driver finally stopped and asked a man digging a ditch by the side of the road where the 'supersecret underground fortress' was. Without hesitation, the ditch digger proceeded to give detailed directions to the group's destination! □

## PROFS transition continues

By Pam Sherry  
Network Services  
Office of Information Technology

The IBM software tool PROFS (Professional Office System), which has been used at Georgia Tech for electronic mail, news, and scheduling for many years, will no longer be supported by the Office of Information Technology as of December 31.

Why? Information Technology's vision for Georgia Tech, as handed down from President Crecine, is distributed computing, and PROFS has limitations in this arena. PROFS has a centralized server and is not easily interoperable with other computer systems, making communication across campus difficult. Many of the problems associated with PROFS, like the "ALL PORTS BUSY" message and an inability to add more concurrent users, have created a reluctance to further expand the system. In addition, beginning with the first quarter of 1993, IBM will no longer offer support for PROFS, favoring its new follow-on product, Office Vision.

Information Technology has been researching possible solutions to the problem of what should become the replacement on campus. While it ultimately will be each department's decision, OIT will be on hand to provide recommendations for the Georgia Tech community. OIT-supported solutions, in-depth training for campus computer coordinators, and introductory end-user training will be offered.

### OIT-supported e-mail programs

The solutions offered by OIT are in the public domain, so the programs are free and there are different tools for each platform. Some requested capabilities that have been included in each solution are: reply and forward capability, mail groups, ability to save mail messages to a folder, and the ability to edit messages. At this time binary enclosures are supported, but with some limitations.

- For terminal users, "elm" (electronic mail) is available. It has a user-friendly editor, a beginner, intermediate, and expert mode, campus-wide directory service, and a menu interface similar to PROFS's. It can be used from home with a computer or terminal with a modem.

- NuPOP (post office protocol) will be available for PC users. It has a graphical interface, campus-wide directory service, and a menu interface similar to PROFS's. It can be used from home with a computer or terminal with a modem.

POP does have some differences, however. It is windows-oriented, has local editing and printing, is mouse capable (but not necessary), and has pull-down menus. POP will work as a DOS application under Windows 3.0 or 3.1. An implementation for Windows will be available in December.

- Eudora, a modified version of POP, is available for Macintosh users. It has retained the familiar Mac desktop and has a point and click interface, multiple windows, and editing.

POP and elm are easy to use, flexible, reliable, and each system can communicate with the other systems. Logon News is being provided as a separate program now, no longer integrated into the mailer. The ques-

**While meeting with an international team in Italy recently, Rob Michelson found himself in a setting that could have come straight from a harrowing "Indiana Jones" adventure movie.**

Continued on page 6



# News & Notes

## PROFS

From page 5

tion of return receipts (.ak in PROFS) is still being studied, and calendaring will not be offered initially.

### Distributed computing

All the solutions can operate from local servers. This will alleviate several problems: It will eliminate the hazard of a single point of failure, cut down on network traffic, provide hierarchical addressing, and (since it is scalable) allow for expansion in the future. It will also provide greater security, flexibility, and redundancy.

A fundamental part of distributed computing is to move away from PCs as servers to more powerful Unix workstation servers. To help pave the way, OIT will seed the campus with 20 Unix machines at low cost and provide training support. In order to receive one of these machines, the department must be willing to migrate away from PCs as servers, have interest and support available within the department, and demonstrate financial need. After fulfilling these criteria, distribution will be on a first-come, first-served basis. The servers have been ordered with an expected delivery early this fall. OIT began accepting written proposals for servers in September. Selection and installation will begin around the first of October.

Some departments have already made the switch, providing input that has enabled OIT to work out some bugs and add enhancements. For the remainder of the campus, OIT will contact campus computer coordinators to schedule transitions and training for the new e-mail solutions. The coordinator also will provide information on obtaining one of the Unix machines. Any questions can be sent via e-mail to: [profs-questions@gatech.edu](mailto:profs-questions@gatech.edu).

Ron Hutchins, Director of Network Services, envisions his department becoming a clearinghouse of technical information, allowing each department to make fully informed decisions. This should lead to a more unified and flexible Georgia Tech, preparing the Institute for the future. □



## Avoid PROFS withdrawal!! E-mail training classes offered

Panicked at the thought of losing PROFS? Don't despair. OIT Client Services is offering various training classes to assist the Georgia Tech community through the transition.

- **PROFS Withdrawal Seminars** specifically designed for the non-technical end-user will be held beginning in October, with the first ones scheduled for October 9, 13, 21 and 29. These one-hour seminars will inform the end-user of new e-mail options, answer e-mail related questions, and give users the name and number of their Computer Coordinator when applicable. To register, call 894-4660 or stop by Rich Building Room 234. Seminars will be held in Rich 239

at both 10 a.m. and 3 p.m. (October 21 at 1 and 3 p.m.), and seating will be limited to 18 people.

- **Hands-On Introductory Classes** on all of the supported programs (NuPOP, Eudora, POP for Windows, elm) will be offered to end-users. Classes for some of the supported programs will begin in October, with others being added as final revisions are completed.

Once the schedules are completed, they will be posted on PROFS and advertised through the various campus news media. □

## Tech adopts new electronic mail addressing standard for faculty and staff

By Ray Spalding  
Director, Internal Services  
Office of Information Technology

The campus is adopting a standard for electronic mail addressing for faculty and staff. The intent is that every faculty/staff e-mail user be reachable using an "alias" of the form:

`firstname.lastname@group.gatech.edu`

Software on various e-mail servers will automatically route e-mail addressed in this form to a person's actual e-mail system and computer account. All the e-mail systems on campus can be accommodated with this method, including UNIX mail, PROFS, MicroSoft (Courier) Mail, QuickMail, POPMail, Eudora, or any that interfaces with the Internet SMTP mail protocol.

Proposed aliases have been generated for all faculty and staff and are now reported by the campus online directory services—"lu," "whois," "Ph," in Eudora. Servers have been set up to forward mail to a person's last known "real" address.

The new aliases are printed on the annual telephone directory update forms that recently were distributed. On the form, we encourage people to change their standard alias so that it is the same as the name by which they are generally known to their colleagues. For example, people who generally go by a nickname rather than the "firstname" that was generated should make that change on the update form. The new printed telephone directory and the online directory will be updated accordingly. Also, people who are not users of any e-mail system should indicate this in the space on the form so that no e-mail address is published for them.

Using the alias/forward method has some advantages, including:

- Users may change their "real" e-mail account and/or system without having to notify all their correspondents or alter business cards or letterhead;
- Addressing is not constrained by the rules for computer account names on any particular computer;
- A step toward improved security is provided by not prominently advertising valid computer accounts;
- Addresses can be made relatively easy to remember, or even to guess.

We are using e-mail "groups" so that the number of name collisions (i.e., people with the same first and last names) will be reduced; the routing of e-mail can be distributed over a number of independent servers, thus avoiding a single point of failure or congestion; and additional servers can be added

to the system, when warranted by the traffic, transparently to the users. However, we would like the e-mail groups to be relatively easy for everyone on campus to remember; thus, in some cases, we have combined several campus units into a single group. The group name "gtri" has been established for all GTRI personnel.

The new alias is in addition to any existing addresses a person may have—these will continue to work as before. Reasonable requests for additional, alternate aliases can be accommodated, but only the standard-form alias will be listed in the directories.

E-mail users should try sending test e-mail to themselves at their "firstname.lastname@group.gatech.edu" address, to verify that forwarding is being done properly. If there is a problem, contact the administrator of the server for your group name, if you know who it is, or the OIT Helpdesk.

A similar method of improved e-mail addressing for students is in the early stages of planning. □

## RCO provides biosketch service

The Research Communications Office has a new job—maintaining the GTRI biographical sketch database. This task recently was transferred to RCO from the Office of Human Resources because of staff changes.

The current database contains biosketches for approximately 500 GTRI research staff. Each biosketch gives a brief summary of the staff member's education, employment history, experience, fields of interest, professional achievements and recognition, patents, and publications. The purpose of the database is to support the preparation of proposals and statements of staff capabilities or qualifications.

If you need a copy of your biosketch or those of other staff members, please call RCO at 894-3444. We can supply a hard or electronic copy. RCO provides this service to assist researchers in contract development and marketing.

We invite you to send your revisions and corrections so that we can keep the database current. New GTRI staff members should forward a copy of their biosketch to RCO, 223 CRB, MC 0800. A short-term goal of the project is to capture 100% of the GTRI researchers in the database.

If you have suggestions for improving the biosketch database, or questions about procedures and policies, please contact Mary Ann Burke, 894-6981. Charlotte Doughty, word processing specialist, will be happy to answer your production questions. Her number is 894-6965. □





## Don Clark named life member of EMC Society

Donald E. Clark of the Electromagnetic Environmental Effects Laboratory (EEEL) has been awarded an honorary life membership in the IEEE Electromagnetic Compatibility Society. The life membership was presented at the Society's awards luncheon, held August 19 in Anaheim, California.

Clark received the honor "in recognition of his sustained outstanding service to the Society since 1978, especially as President, 1988-89." The Society is an organization of electrical engineers engaged in electromagnetic compatibility technology and has an international membership of 3,500.

Clark is a principal research engineer in EEEL and has been at GTRI for 17 years. He is currently the project director for an ongoing \$9-million program to develop a special test capability for the Naval Air Warfare Center at Patuxent River, Maryland. The test system, named the Electromagnetic Environmental Generating System (EMEGS), is used to test aircraft in high-level electromagnetic fields.

Clark has led a project team over the last five years on the Phase II program, during which time major EMEGS components have been delivered to the Navy. EMEGS provides a much-needed capability to ensure military and civilian aircraft can operate safely when exposed to intersystem electromagnetic environments. □

## New GTRI reps on faculty committees

The following GTRI representatives have been elected to the **Executive Board** of the General Faculty: Guy Morris (RSAL), Richard Moss (COML), and Charles Wilson (TSDL).

Elected for three-year terms to Standing Committees of the General Faculty were the following:

**Faculty Honors**—Ed Reedy (OOD)

**Faculty Status & Grievance**—James Cox (TSDL)

**Statutes**—Richard Combes (OOD)

**Academic Services**—Nick Currie (RIDL)

**Public Relations**—Jim Cofer (OOD for 2-year term)

**Copyright**—David Millard (EEEL)

**Software**—John Gilmore (CSITL) □

## Professional Activities

### Concepts Analysis Lab

**Ben Slocumb** began a nine-month research fellowship in Adelaide, Australia, September 1. He is performing research for the Defense Science and Technology Organization on pulse train signal processing, a subject area closely related to his Ph.D. dissertation work at Georgia Tech. Slocumb, who has been at GTRI for four years, has his electrical engineering degree from Washington University in St. Louis. He is taking a leave of absence from GTRI and is being paid by the Australian government. He left for Australia in August to give a paper on "Interception of Frequency-Hopped Radar Wave Forms" at The International Symposium on Signal Processing in Brisbane.

### Countermeasures Development Lab

**John Bond** coauthored "Applications of Robust Control to Sustained Oscillations in Power Systems," which appeared in the *IEEE Transactions on Circuits and Systems, I: Fundamental Theory and Applications*, June 1992. Other authors are J.F. Dorsey and J.D. McCalley (EE) and Z. Qu (EE—University of Central Florida).

**Mike Minardi** and Mary Ann Ingram (EE) have had a paper, "Adaptive Crosstalk Cancellation in Dense Wavelength Division Multiplexing Networks," accepted for publication by *Electronics Letters*.

**Kathy Petty** coauthored (with ESML) a paper presented July 29 at the Combat Identification Systems Conference on Requirements, Techniques, and Developments, held at Johns Hopkins University/APL. The paper was entitled "Neural Networks Intrapulse Signal Processing and Analysis."

### Economic Development Lab

**David Swanson** has been appointed one of three at-large members of the Technology Transfer Advisory Committee of Oak Ridge Associated Universities.

The Georgia Procurement Assistance Center has been refunded for another year, according to director **Chuck Catlett**.

In July, **Larry Edens** led a discussion panel—"Developing State-Level Support"—at a meeting in Washington (DC) sponsored by the Southern Technology Council to discuss the progress of manufacturing networks in the Southeast and to interact with members of various agencies such as DoD, NIST, and USDA.

**Charles Duke** is treasurer of the Georgia Society for Textile Training and Development, and **Bobby Cline** is parliamentarian.

In September, EDL completed work on two publications—a handbook on existing industry programs for chambers of commerce statewide and a metalworking directory for manufacturers and state economic development agencies. **Ed Hardison** and **David Chatham** were principal authors of the former; **Deborah Salmund** edited the latter.

### Environmental Science & Technology Lab

**Kirk Mahan** received his MBA from Georgia State August 30.

**Paul Schlumper** recently gave a presentation on hazard communication (employee right-to-know) requirements at the Club Managers' Association quarterly meeting.

The Georgia Chapter of the American Society of Safety Engineers has named **Steve Hays** as its Safety Professional of the Year. The chapter selected him for his contributions to the profession, service to the chapter, professional accomplishment, and leadership qualities.

### Electromagnetic Environmental Effects Lab

At the IEEE-EMC Symposium in Anaheim (CA) August 18-20, **Hugh Denny** and **Don Clark** were elected board members for the coming year. **John Daher** and **Joe Harris** presented papers at the symposium. Daher's paper, "Susceptibility of Charge-Coupled Devices to RF and Microwave Radiation," was coauthored by **Glenn Champion**. Harris' paper, "Far-Field Techniques for Predicting Aircraft Antenna Coupling," was coauthored by **R.J. Levin**.

### Electro-Optics & Physical Sciences Lab

**Jim Beletic**, who was the only non-government invited member of both the NASA and Space Telescope Science Institute committees on how to fix the Hubble space telescope, now is a member of the committee to define the next-generation camera for the space telescope that will be installed in 1999 or 2000. The committee has four European and 10 U.S. members. Beletic will write the strawman definition for the first meeting, thus playing a key role in determining the camera's characteristics for the 2000-2010 time frame.

### Materials Science & Technology Lab

Receiving their doctorates from Georgia Tech in early September were **John Hanigofsky** in materials engineering and **Kathryn Logan** in computational mechanics.

**David Mohr** received his PhD in Materials Engineering in June and is working as a post-doctoral researcher with **Tom Starr**.

The Royal Norwegian Council for Scientific and Industrial Research has awarded **Rosemarie Szostak** its annual Senior Scientist Visiting Fellowship for internationally well-established foreign researchers. She was invited by the University of Oslo, where she will work with an established research group in the area of molecular sieve synthesis and catalysis, lending her expertise in synthesis and characterization of molecular sieves.

### Microwave & Antenna Technology

#### Development Lab

**Johnson Wang** recently presented a paper, "Multimode Spiral-Mode Microstrip Antennas for Wideband Wireless Telecommunications," in Chicago at the URSI Radio Science Meeting held in conjunction with the IEEE-APS International Symposium. Coauthors were **Glenn Hopkins** and **Vic Tripp**.

## Focus on Folks

*Donald E. Clark of the Electromagnetic Environmental Effects Laboratory has been awarded an honorary life membership in the IEEE Electromagnetic Compatibility Society.*



## Focus on Folks



**Congratulations to GTRI Director Don Grace and his wife, Joan, on their first grandchild, Michael Matthew, born September 23 to Chris and Susan Grace.**

### Calling all bicycle commuters!

We've seen several GTRIers commuting to work by bicycle, either regularly or occasionally. We'd like to know who and how many you are, plus your comments on the pleasures and problems of riding a bicycle to work. We'll compile the results into an article for an upcoming issue of the GTRI CONNECTOR. Please contact Martha Ann Stegar by mail (RCO/GTRI, 0800), phone (894-6988), fax (894-6983), or e-mail (PROFS MSTEGAR or ms17@prism.gatech.edu).

**October 29**—College of Computing Distinguished Lecturer Series. Adele Goldberg, Chair of Board, ParcPlace Systems, "An Architecture for Presentation and Interaction." Reception at 3 p.m., lecture at 3:30 p.m., CoC Room 17. For additional information, call Molly Croft at 3-2682. □

## Personnel News

### Economic Development Lab

**Tim Israel** has transferred from the Gainesville Regional Office to the campus-based Georgia Productivity and Quality Center.

**Peggy Bynum** and **Marsha Seagraves** departed from GTRI in August.

### Environmental Science & Technology Lab

**Susan Farrell** is a new member of the Communications Branch.

### Electro-Optics & Physical Sciences Lab

**Jim Sowell** has been selected to teach an astronomy course in the School of Physics this fall.

Student assistant **Matthew Abakah** has transferred to the MAPS 2 Group in the Baker Building.

### Materials Science & Technology Lab

Dr. **Lisa Detter-Hoskin** joined MSTL in May as a part-time microscopist, coming from the Institute for Paper Science and Technology. **Yolanda Berta**, also a microscopist, began a joint appointment with MSTL and the School of Materials Engineering in September.

### Microwave & Antenna Technology Development Lab

MATDL welcomes: **Michael E. Gray**, RE I; **William H. Carter**, ME; **Timothy F. Patterson**, MT II; **Quimin Lam**, RT I; **Mark A. Gillespie**, GRA; and **Jennifer C. Hsied** and **Christopher D. Ingram**, co-ops.

**Leonard Abbey** has resigned.

### Radar & Instrumentation Development Lab

Congratulations to **Steve Price** and **Gary Cheshire**, both promoted to electronics specialist, and to **Annette Weinberger** promoted to senior administrative secretary.

**Clayton McDonald** is a new GRA in RIDL.

RT III **Kevin Adams** has left for other employment.

### Threat Systems Development Lab

**David Veazie** will take an educational leave of absence to complete his PhD in mechanical engineering under a GTRC doctoral fellowship.

**Scott E. Higgins** and **David Petruska** are new GRAs in TSDL.

**Ari Flechner** and **Adam Bare** have terminated. □

## Personal Notes

### Achievers

Congratulations to co-op **Larry Sollars** (TSDL), who won a gold medal in the Georgia State Games. Larry shot a Springfield M1A in the 300-meter International High

Power Rifle event in Dawsonville July 18.

**Dave Gifford** and **Dave Price** (both TSDL) were selected for the Georgia State Team which competed at the National Championship High Power Rifle Matches in Camp Perry (OH) July 25-August 6.

### Wedding Bells

**Devon Crowe** (OOD) and **Kelly Novia** were married June 27.

**Glenn Hopkins** (MATDL) and **Rose Willis** were married July 11.

**Pat Rose's** (RIDL) son, **John Rose**, was married to **Lisa Harris** June 27.

### Cradle Roll

**Susan** and **Vince Camp** (TSDL) are the proud parents of twins, **Sara** and **Stephen**, born September 21.

**Krassi Paskaleva** (EDL) and husband **Phil Shapira** (Public Policy) are parents of a baby girl, **Milana Pascale Shapira**, born August 18.

**Laura** and **Paul Pritchett** (HRL) and son, **Eric**, welcomed a baby girl, **Samantha**, April 17.

### Milestones

Congratulations to **Steve** and **Kathryn (Kaycee) Logan** (MSTL), who celebrated their 25th wedding anniversary September 9. They met at the beginning of their freshman year at Georgia Tech, and now have two children. **Stephanie** is a sophomore at Tech, majoring in mechanical engineering, and **Bill** is a student at Roswell High School.

### Sick Bay

Your prayers are requested for **Fred Cain** (OOD), who had experimental lung surgery September 29.

### Our Sympathy

... to **Sandra Kirchoffer** (RPM), whose father died June 24.

... to **Tim Drury** (CAL), **Jim Kurtz** (RIDL), and **Ted Lane** (RIDL), whose fathers passed away in August.

... to **Bob Newsom** (CMDL), whose sister passed away in July.

... to **Marguerite Osborne** and **Diane Robertson** (both EDL), who recently lost their mothers.

...to **Vic Tripp** (MATDL), whose grandmother died in August. □

The GTRI Connector  
Vol. 8 No. 10 September 1992

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 submission of copy is the first Tuesday of each month.

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This publication is printed in part on recycled paper.

## ATDC sponsors Corporate Partnering Forum

The Advanced Technology Development Center (ATDC) will hold its first Corporate Partnering Forum October 26-27 at INFORUM in downtown Atlanta.

The forum is designed to bring together companies looking for new products and technologies with entrepreneurial companies seeking partners to aid in the commercialization of their ideas. Invitees include companies wishing to develop new products and markets through strategic partnerships, technology acquisitions, or technology licensing.

A dozen selected high-quality emerging technology companies will make presentations on the first day and will be among the approximately 25 companies that will exhibit their wares. The second day will allow attendees from established companies to meet one-on-one with companies about which they wish to learn more.

For more information, contact **Vivian Chandler**, ATDC, at 894-4904. □

## College of Computing schedules events

Special events at the College of Computing in October include:

**October 15**—Dedication of the Graphics, Visualization, and Usability Center. A full day of activities is planned. Call 3-0672 for more information.



**Bob Willoughby's friends in the Electronic Support Measures Lab gave him a farewell party upon his retirement July 31. After wading through various joke gifts, such as a toilet bowl brush and a humorous diploma, Bob finally bit the jackpot—a lovely portrait of the Tech administration building. (Photo by M.A. Stegar)**