

The GTRI Connector

Food for thought

The next time you feel like complaining, remember that your garbage disposal probably eats better than do 30% of the people in this world.

—Robert Orben

Volume 7 • Number 1

Published Monthly for the Georgia Tech Research Institute Family

October 1990

Boats that fly

By Ginger Pinholster, RCO

Wind tunnel simulations and analytical studies at GTRI's Aerospace Laboratory have already helped improve the stability of racing boats, and scientists believe similar work could result in more efficient cars, aircraft, or even high-speed military cargo vessels that 'fly' over the water.

"At 200 miles per hour, an unlimited-class hydroplane racing boat is basically a low-flying aircraft," Dave Schuster explains. "Current designs remain stable as long as they stay very flat and level with the surface of the water, but a wave or a gust of wind can quickly cause them to blow over, flipping end over end."

Schuster and Bob Englar are performing computational and experimental simulations using Georgia Tech's Model Test Facility, a subsonic wind tunnel donated by Lockheed-Georgia's Advanced Flight Sciences Department and modified by GTRI scientists. They are conducting the research under the direction of Douglas Ford, president of Douglas Ford Engineering, Northridge, California.

Englar presented the team's latest findings during the SAE Aerotech '90 conference, held October 1-4 in Long Beach, California. An additional presentation is planned as part of the AIAA Aerospace Sciences Meeting, scheduled January 7-10, 1991, in Reno, Nevada.

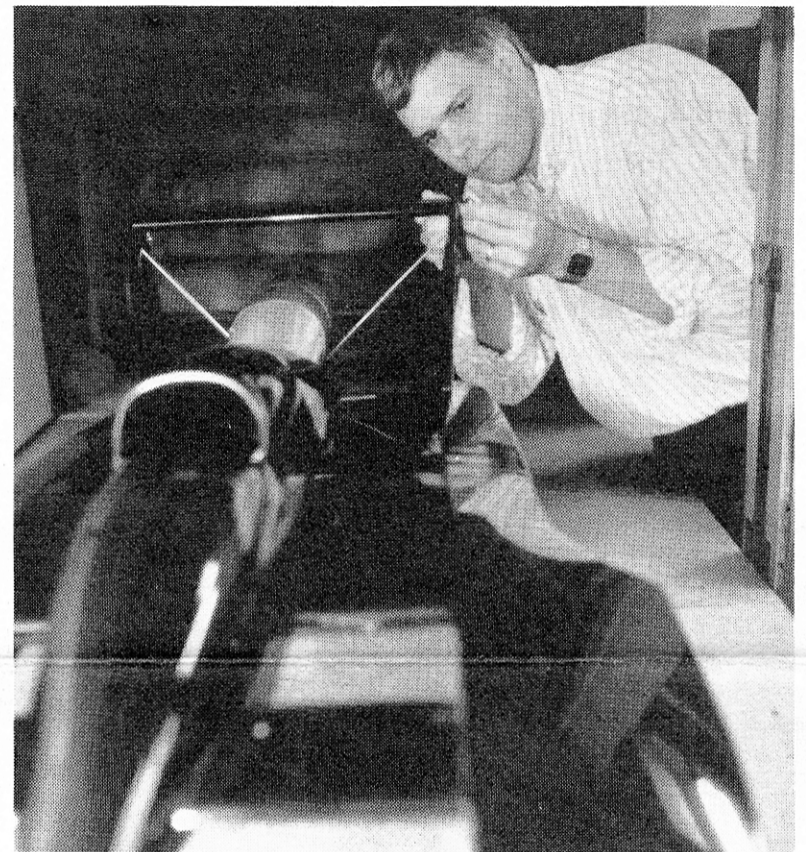
Racing boat modifications

Researchers have already suggested design changes which dramatically improved the stability and safety of the 2,650-horsepower Miss Budweiser racing boat spon-

sored by the Budweiser Brand/Anheuser-Busch Corporation. Design modifications involved adding aerodynamic control surfaces to help offset any shift in the boat's aerodynamic center of pressure. At top speeds, Englar notes, hydroplane boats literally 'fly' over the water, with only an aft propeller, fin and rudder immersed in the water. But during a blow-over, he says, these boats pitch upward as the center of pressure rapidly moves forward along the craft.

Last year, Ford and GTRI scientists recommended adding wing-like surfaces known as 'tiplets' which help the boat remain level if it leaves the water surface. "These changes have added much more stability to the boat while giving the driver a larger operating window," says Ron Brown, team manager with Hydroplanes, Inc., which manufactured the Miss Budweiser boat. Continued research should result in additional design improvements, he adds.

To examine the characteristics of a blow-over, scientists must simulate the 'ground effect,' or the aerodynamic relationship between the boat and the water surface. Traditionally, Englar says, ground-effect vehicles such as cars have been studied in wind tunnels, using a rapidly moving belt to simulate the ground, but this configuration is inappropriate for hydroplane boats. So Englar and Schuster simulated a one-eighth scale model of the Miss Budweiser racing boat on a hydraulic table inside the wind tunnel. By moving the hydraulic table up and down, Schuster said, the team could measure any physical forces acting on the boat at various positions above the surface. Load sensing devices in the wind tunnel data system deliver measurements to Georgia Tech's computer database, and experimental conditions are displayed instantly on a color monitor for



analysis.

With a maximum wind velocity of 200 feet per second, the Georgia Tech wind tunnel is 30 inches high by 43 inches wide, with a test section measuring 90 inches in length. "As the air flows over the boat, it tends to lift the boat out of the water, and we can measure those forces," Schuster explains. "In our experiment, the floor represents the surface of the water, and the wind simulates the speed of the boat."

Wider applications

Englar hopes this special simulation configuration will lay the foundation for "a whole

Continued on page 2

David Schuster places a scale model of a racing boat inside a wind tunnel at the Cobb County Research Facility used to simulate the conditions encountered by a boat running close to the surface of the water. (Photo by Joe Schwartz)

Observed & Noted

GTRI researchers help the Air Force save time and money in analyzing the susceptibility of integrated circuits to electromagnetic interference. *Read page 2 to find out how.*

Georgia Tech's Office of Technology Licensing assists with marketing

Tech inventions. And GTRI inventors have been awarded 7 of the 17 patents assigned to Georgia Tech so far this year. *Read about it on page 3.*

Also on page 3, GTRI gets an award from the poultry industry for its research on the use of computers and au-

tomation in the industry.

GTRI focuses on foundations and other new sources of research funding. *Read about it and plans for an export technical assistance center on page 4.*

For some ideas on how you can do your part in waste

recycling, *turn to page 5.*

Faculty members are responding to GTRI's faculty liaison program to assist Georgia industry. *Details are on page 5.*

For details on Powers Garmon's new patent and Don Clark's EMC Society

award, *see "Professional Activities" on page 6.*

Help the CONNECTOR identify GTRI's unique employees. To enter the contest, *see categories on page 6.*

You'll find Charles McCullough's inimitable "Questions, Anyone?"

column on page 7.

Catch up on what your fellow workers are up to, both on and off the job. *See "Personnel News" and "Personal Notes" on page 8.*

News & Notes

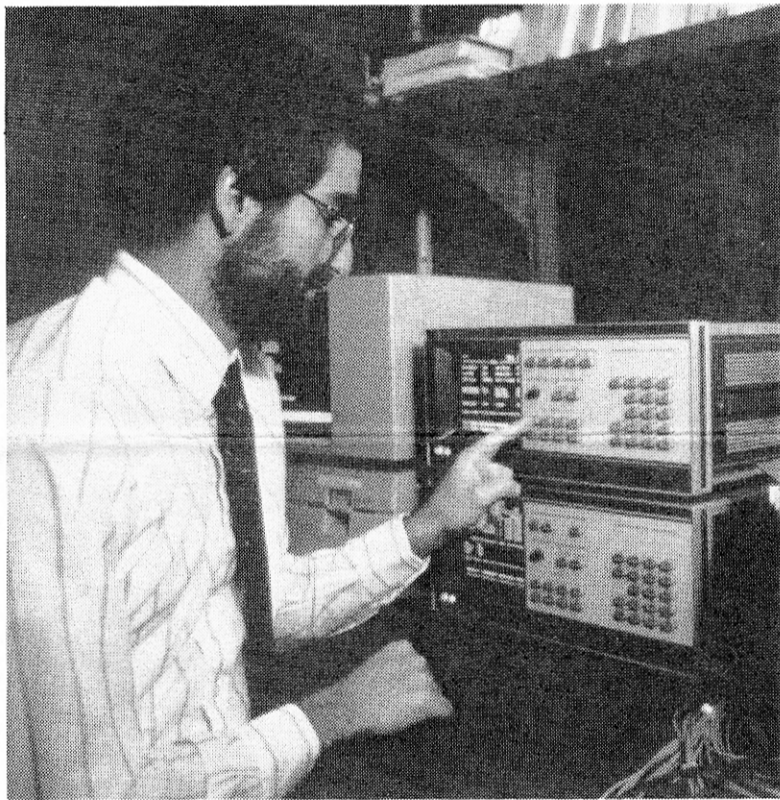
Wind tunnel studies improve the aerodynamics and control of high-speed vehicles.

Boats that fly *From page 1*

new class of transportation." For example, he said, the U.S. military could benefit from a hydroplane concept for rapidly transporting large amounts of cargo worldwide. But more research is needed before the aerodynamics of hydroplane vehicles can be fully understood, he adds.

In recent years, according to Ford, improved safety harnesses and cockpit designs have reduced the risk of injury to racing boat drivers, but blow-overs still occur fairly regularly. While GTRI scientists are helping to build safer racing boats, they also hope to shed new light on the aerodynamics of all ground-effect vehicles.

"We have learned to simulate the conditions encountered by a boat running very close to the surface of the water," Englar says. "The same technology could be used to test a variety of boats, cars, and vertical take-off or short-landing aircraft." □



John Daber studies the electromagnetic susceptibility of an integrated circuit. (Photo by Joe Schwartz)

Built-in test routines analyze chip susceptibility to interference

By John Toon, RCO

As integrated circuit (IC) devices become smaller, faster and more complex, they also become more vulnerable to electromagnetic interference. Under contract to the U.S. Air Force, researchers at GTRI have developed a time-saving method for analyzing the electromagnetic susceptibility of integrated circuits using the test sequences now built into many chips.

Susceptibility data on advanced technology ICs is crucial for ensuring that military electronic systems will successfully operate in their intended electromagnetic environments. The new test method provides a cost-effective way of gathering that data, and could help manufacturers meet electromagnetic interference standards likely to be imposed in the future—without substantially raising the cost of integrated circuits or affecting the time re-

quired to test the devices.

"The newer technology devices have been greatly enhanced from a performance standpoint," says John Daher of the Electromagnetic Environmental Effects Laboratory. "Unfortunately, the changes that help chips perform better functionally also tend to make the devices more susceptible to interference."

Faster, smaller & more vulnerable?

New VLSI and VHSIC devices use smaller geometries to allow placement of more gates on a single chip. Wider bandwidth devices are used to obtain higher data rates, while smaller signal levels cut power needs and reduce heat dissipation requirements. But the smaller internal components offer less resistance to burnout from radio frequency (RF) energy; the wider bandwidths make the ICs susceptible to a wider range of interference, and the lower operating voltages make it more difficult for the devices to distinguish between data signals and interference, Daher notes.

The growing complexity of integrated circuits also has made quality assurance testing more difficult and expensive, accounting for up to a third of the cost of new electronic components. In an effort to control those costs, most VLSI manufacturers now build self-testing capabilities into their chips. The built-in-test capability is designed to determine whether the circuit functions properly, but the GTRI researchers have demonstrated that the capability also can be adapted to measure the circuit's susceptibility to interference.

"Built-in-test allows the susceptibility of a very complex device to be tested with little more than a function generator, oscilloscope, power supply, and a source of RF energy," says Daher. "We have demonstrated that by using built-in-test procedures, one can obtain susceptibility data which is essentially identical to data obtained using conventional test procedures—which are more difficult and costly."

While operating in a self-test mode, the chips typically isolate themselves from external inputs, which limits the number of pins that can be tested. But Daher's group found that the circuit's response to electromagnetic interference could be accurately assessed by studying the response of the clock pin, which is always accessible for susceptibility testing.

Interference problems

Electromagnetic interference can cause two types of problems in digital integrated circuits. The devices may be susceptible to "stuck at" faults, in which the device output is unable to switch from a high logic state to a low logic state, or vice versa. Integrated circuits may also suffer from "timing jitters," which can cause circuit operations to occur at irregular sequences, Daher explains.

Electromagnetic interference can affect all electronic components, but the problem is more severe for the military, which must counter hostile jamming threats and operate multiple electronic systems on the same platform. "On a typical military aircraft, several very high powered transmitters must operate with sensitive electronics on board," he notes. "You can end up inadvertently jamming yourself."

The growing problem of electromagnetic interference has led to discussion of standards that would mandate minimum levels of immunity. If such standards are imposed on manufacturers of integrated circuits, the GTRI test method should prove attractive because it allows measurements to be made quickly using relatively inexpensive test equipment. "What we are doing will make the imposition of specifications more cost-effective and tolerable to the manufacturers," Daher comments. "It would be self-defeating to impose standards that would make the cost of chips too high."

Third phase begins

With additional support from the Air Force's Rome Air Development Center, GTRI engineers have recently begun a third phase of the project: exploring the electromagnetic susceptibility of interface devices used to electronically modulate optical signals.

Fiber-optic components offer several advantages over their electronic counterparts. One important advantage is relative immunity to interference — but that immunity may not be complete. "People are beginning to realize that photonic components aren't necessarily immune to interference because at any electronic interface, the potential exists for interference to be coupled into the circuit," Daher explains. "No systems in operation today are totally optical." That portion of the project, assessing electro-optic, acousto-optic, and magneto-optic components, will continue for approximately two years. □

GTRI in the news

Below is a summary of significant GTRI national publicity that appeared during the month of July.

- Ergonomics research by Mike Kelly, Dan Ortiz, Ted Courtney and others gained attention in *Apparel Industry* (circulation of 18,600), *The Atlanta Journal-Constitution* (438,000), *Human Resources Magazine* (49,614), and *The Tampa Tribune* (275,000). Total circulation has reached 1.1 million readers.
- The laser-induced fluorescence technique developed by Tony Hynes was described in *Research & Development* magazine (120,111). Total circulation for this story is now more than 375,000.
- MIT's *Technology Review* (90,000) included comments from Dan O'Neil concerning alternative fuels.
- *Microwaves & RF* (60,500) wrote about the world's largest outdoor compact range, developed for the U.S. Army by GTRI researchers. □

GTRI meetings rescheduled

The "GTRI—Present and Future" employee meetings, postponed because of Dr. Grace's recent illness, have been rescheduled for October 29 and 31 on campus and for November 1 and 2 at Cobb County. The meetings will be held from 3 to 5 p.m. as follows:

- October 29 & 31: Textile Engineering Building Auditorium
- November 8 & 9: CCRF Building 1 Auditorium

All GTRI employees are expected to attend one of the meetings.

Technology licensing seen as primary goal

“Patents are important, but even more important is the commercial potential of an invention,” says Barry Rosenberg. As head of Georgia Tech’s Office of Technology Licensing (OTL), his goal is “to enter into arrangements with industrial partners for the development and commercialization of technology emanating from the research work of Georgia Tech.”

At the October 1 GTRI senior staff meeting, he explained that his office was set up as a separate division of the Office of Contract Administration (OCA) in January 1990, after termination of the marketing agreement with USET. At that time, they had 421 inventions in their portfolio. After culling out those which no longer had apparent commercial potential, they now have 171 inventions that they are attempting to market.

“Since we started our marketing program last February,” Rosenberg says, “we have received 236 expressions of interest in, or requests for information on, Georgia Tech inventions. During the same period, we have entered into agreements with eight firms regarding six new technologies. And we are currently having serious discussions with 33 companies on 12 technologies, four of which involve GTRI inventors. They deal with rapid chemical vapor deposition (Jack Lackey), chemical ionization with mass spectrometry (Fred Eisele), oil from biomass (Dan O’Neil and Jim Knight), and polymer phase-change materials (Dan O’Neil).”

Since its reorganization, OTL has revised the Invention Disclosure form to make it more user friendly. Rosenberg says they will acknowledge receipt of a disclosure within 48 hours and aim to schedule a meeting with the inventors within 30 working days to discuss the invention and agree on a course of action.

Rosenberg and his colleague, Dr. Lowell Netherton, are available to make a presentation to any laboratory or center or to speak with any individual about the office’s activities. They are located at 310 CRB, telephone 894-6287. □

Tech awarded 17 patents this year

Georgia Tech has been awarded 17 patents during the first nine months of 1990. GTRI inventors were responsible for seven of them, including a reissue. The patents (all USA), brief titles, and inventors are listed below:

- 4,891,337 Process for Making Shaped Refractory Products/Titanium Diboride—Kathryn Logan (GTRI)
- 4,891,459 Oil Production by Entrained Pyrolysis—James Knight (GTRI-retired), Charles Gorton (ChE)
- 4,906,668 Aminoalkyl Phenyl Selenides for Treatment of Hypertension—Heath Herman (Chem), Sheldon May (Chem), Steven Roberts
- 4,915,988 Chemical Vapor Deposition of Metals and Precursors—Ahmet Erbil (Physics)
- 4,924,097 Monodisperse Aerosol Generator Device—James de Haseth (UGA), Richard Browner (Chem), Ross Willoughby



Ron Bohlander (center) and Craig Wyvill (right) accept the plaque recognizing GTRI’s research with computers and automation from program chairman Larry Dodd (left) of the Southeastern Poultry & Egg Association.

- 4,927,670 Chemical Vapor Deposition of Mixed Metal Oxide Coatings—Ahmet Erbil
- 4,929,172 Stabilization of Combustion in Rijke Type Apparatus—Ben Zinn (AE), David Reiner (AE)
- 4,940,328 Optical Interferometer—Nile Hartman (GTRI)
- Re.33,273 Modification of Surfaces by Deposition of Fluorinated Amphiphilic—Lois Speaker (former GTRI)
- 4,945,546 Visible Pulsed Chemical Laser—James Gole (Physics), J. Woodward (former GIT), S. Cobb (former GIT)
- 4,946,239 Optical Power Combiner/Isolator—Powers Garmon (GTRI)
- 4,946,459 Length Adjustable Intramedullary Nail—Anthony Bradshaw (former CRT), Raymond Morrissy, Christopher Ketchum (CRT), Riley Hawkins (CRT)
- 4,950,042 Integrated Optical Givens Rotation Device—Thomas Gaylord (EE), Erik Verriest (EE), M. Mirsalehi (former GIT)
- 4,951,297 Visible Continuous Chemical Laser—James Gole, J. Woodward, S. Cobb
- 4,952,385 Ferrisilicate Molecular Sieve—Rosemarie Szostak (GTRI), V. Nair (former GIT)
- 4,954,519 Heterocyclic Inhibitors for Serine Proteases—James Powers (Chem), Chi-Min Kam (Chem), Steven Oweida, David Ku (ME)
- 4,958,638 Non-Contact Vital Signs Monitor—Steven Sharpe (GTRI), Joseph Seals (former GTRI), Anita MacDonald (GTRI), Scott Crowgey (GTRI)

Recognized for work with computers and automation

Poultry industry lauds GTRI research efforts

Poultry industry data processing managers have recognized GTRI for research with computers and automation in the poultry and egg industry. At the Southeastern Poultry & Egg Association’s 1990 Information Systems Seminar, program chairman Larry Dodd of Sanderson Farms, Laurel, Mississippi, presented a plaque to GTRI.

The plaque acknowledges GTRI’s “valuable contributions and cooperation with the poultry and egg industry and . . . their continuing research in the field of computer applications and automation.” Ron Bohlander, director of the Manufacturing Technology Program, and Craig Wyvill, director of the Agricultural Technology Research Program, accepted the plaque on behalf of Donald Grace, director of GTRI.

“Georgia Tech Research Institute is doing extensive research and continues to make significant advancements toward automation and increased efficiency for our industry,” Dodd noted. “The program committee for Southeastern’s Information Systems Seminar wanted to recognize their fine work, and we felt it was appropriate during the seminar attended by the industry’s computer specialists,” he said.

Researchers at Georgia Tech have several ongoing projects relating to automation and computing in the poultry industry. These projects include machine vision systems to grade and size poultry in processing plants and to aid in quality control; robotics to automate the processing line; and PECS (Poultry Environmental Computer System) to assist the poultry growout manager in maintaining optimum environmental conditions for poultry. □

“Since we started our marketing program last February, we have received 236 expressions of interest in, or requests for information on, Georgia Tech inventions.”

—Barry Rosenberg

**Profile
&
Insight**

**GTRI goes after
new funding
sources**

By Martha Ann Stegar, RCO

GTRI is seeking to diversify its sponsor base by courting new funding sources, primarily foundations for research grants. A concerted effort was begun last November, when GTRI Director Don Grace hired consultant Dr. James W. Kolka to look at GTRI's prospects for foundation support. (Foundation gifts will be handled by the Development Office.)

In January, Kolka delivered a report on what other research organizations do to promote external research funding, comparing Georgia Tech with the University of Georgia, Stanford, University of Illinois, MIT, University of Wisconsin, Cornell, Florida State, and others.

"Their operations vary from rather simple to very sophisticated," Kolka says. "Cornell, for instance, has a large office to screen foundations for possible support and to help researchers write winning proposals. At the University of Georgia, they do free computer searches to match up research areas where funding is needed with foundations interested in supporting research in those fields."

Georgia Tech presently has no such organized effort. "OCA provides assistance once a research proposal is ready for submission," Kolka points out, "but the researcher is more or less on his or her own until then." He recommended that the Tech administration create a unit to serve all research across the campus—not just GTRI.

Since the first of the year, Kolka has been helping researchers locate foundations and agencies to approach for funding, using the UGA approach as a model. He first met with lab directors, who identified possible areas of research. He currently is working with individual research teams, helping them conceptualize the framework for their grant proposals and identify likely sources of funding, whether it be foundations, corporations, government agencies, or trade associations.

"I'm doing it for the first year to demonstrate how it can be done," Kolka says. "My goal is to phase in a structure that will continue the service on its own." He is assisting Charlene Bayer with projects involving indoor air quality research with other universities, Jim Clark with a pulp and paper proposal, Lanny Feorene with a grant for a conference on "enabling technologies for high-definition systems" (including HDTV), Hugh Denny with finding funding for a study of the use of electromagnetic technology to remove zebra mussels from water intake valves, and Tech's multimedia telecommunications task force with development of a center on campus. Most of his time in recent months has been spent assisting with an innovative and far-reaching concept for an Export Technical Assistance and Quality Assurance Center which has the support of Tech President John P. Grecine.

Kolka came to Tech in 1987 as a visiting scholar in international studies after a four-year stint as vice president for academic affairs at Kennesaw College. Prior experience includes vice president-academic administration at Drake University in Des Moines, Iowa, and several positions in the University of

Wisconsin System, among them senior academic planner, senior budget planner, and developer of international interdisciplinary research/teaching programs with European and Latin American universities. Among his many professional affiliations, he is a Fellow of the American Council on Education. Dr. Kolka received a B.S. degree in political science and a J.D. (law) degree from the University of Wisconsin, and his Ph.D. in political science from the University of Kansas.

Kolka's innovative efforts are driven by his fascination with a tantalizing question: How do you promote new ideas with potential that don't fit into the conventional framework or the existing mold? And how do you create a climate to foster interdisciplinary efforts in areas of mutual concern? "This is the area where real problem-solving takes place," he says. □

**Tech plans new
export technical
assistance center**

By Martha Ann Stegar, RCO

To be globally competitive, American companies must be able to meet the technical standards requirements and quality assurance specifications of every nation where a product might be sold. This presents a significant barrier for small to medium-sized American companies wanting to export. So says GTRI consultant Jim Kolka, in explaining why Georgia Tech is attempting to establish an Export Technical Assistance and Quality Assurance Center for Georgia and the Southeast.

The hurdle will become even more difficult to surmount in 1992, when the European Community presents a unified face to the world, becoming the single largest market on the face of the Earth. "If they set the standard, we'll have to follow," Kolka says. "The U.S. will find itself in a position similar to that of two centuries ago; we'll be a 'colonial' exporter to a world centered in Europe."

When Kolka began consulting with GTRI several months ago in an effort to increase foundation funding of research, one of the researchers who came forward for assistance was Mike Roberts, a consultant for the Economic Development Laboratory's Trade Adjustment Assistance Center (TAAC). He had an overseas background as an exporter and product developer with IBM, and had come up with the concept of a center that would help companies wanting to export with technical questions as well as general business assistance. He asked for guidance in drafting a white paper that could be used to attract outside funding to help get such a center started at Georgia Tech.

"For at least a quarter-century, many European countries and Japan have had national centers where firms could obtain not only information on standards in other countries, but also, on a user fee basis, specific help on how to modify their products to comply with these standards," Roberts says. "In the United States, although the National Institute of Standards and Technology compiles information on foreign standards, there is no agency that provides assistance on technical questions."

The center that he proposes is aimed at filling this gap. It would be limited to serving Georgia and the Southeast, initially focused on the European Community, and targeted on a pilot basis to the chemicals, microelectronics, telecommunications, textiles, and wood, pulp and paper industries. The Tech center would serve as a model for similar centers that hopefully would be established nationwide.

The center would provide five kinds of services:

- Technical consultation, using GTRI's unique network of 12 industrial extension offices throughout the state, as well as the academic and research faculty for in-depth assistance;
- Information services, including a technical standards database;
- A quality assurance program, primarily through the School of Industrial and Systems Engineering;
- An applied research and development program complemented by the Manufacturing Research Center, Microelectronics Center, Material Handling Research Center, ATDC, and the Institute of Paper Science and Technology;
- Training courses and seminars.

Roberts' and Kolka's startup efforts are being supported by the Director's Office of GTRI. Roberts also has received support from GEMINI (Georgia Export Marketing Incubator Network, Inc.), based at Georgia State University, which was established to help potential exporting firms with the business side of foreign trade. GTRI Director Don Grace is on GEMINI's board. The project has the backing of President Grecine, who has drafted a letter of support for interested multinational companies.

The National Science Foundation has already announced its support, offering to match, dollar for dollar, any project up to \$100,000 that Tech receives under this program. "They also are willing to sponsor a workshop to uncover the needs in this area, and will help us refine our initiatives," Roberts says.

Other indications of support include the following: The National Association of Manufacturers has expressed its willingness to sponsor seminars and workshops for the entire national industrial community. Interest also has been shown by the Defense Logistics Agency. Several large and mid-size national corporations have indicated willingness to participate in beta testing of the pilot project. The British Standards Institution and other foreign agencies have offered their assistance as well. □

Georgia Tech wants to establish an Export Technical Assistance and Quality Assurance Center to help American companies be globally competitive.

Annual Report Here

The 1990 GTRI Annual Report has been distributed to employees, and extra copies are available for contract development and public relations purposes. Jim Kloepfel was the editor and chief writer. Martha Ann Stegar and Mark Hodges were contributing writers, and Joe Schwartz the photographer. Graphic design was by Everett Hullum. Contact Research Communications, 894-3444, for copies.

Faculty liaison program helps industry

By Lincoln Bates, ESTL

GTRI's faculty liaison program has boosted Georgia Tech's assistance to Georgia industry. Launched last January, the program counted nine projects during the last fiscal year, with an average funding of \$1,424 per project. Ten projects have been undertaken already this year at approximately the same funding level.

Faculty members have provided a wide range of assistance through the Industrial Extension Service. For example, John Muzzy in Chemical Engineering evaluated the type of plastic most feasible for manufacturing a new product. Steve Dickerson and Harvey Lipkin in Mechanical Engineering provided guidance and design assistance in building an automated loader/unloader for textile dyeing package carriers. And Wallace Carr in Textile and Fiber Engineering evaluated methods for quicker glue drying in a bag manufacturing operation.

According to Charles Estes, associate director of the Economic Development Laboratory, the program typically responds to requests from the regional offices for a particular faculty expertise. For instance, in August the Rome office sought assistance with recycling carpet waste which totals some 40 million pounds annually. Youjiang Wang and colleagues in the School of Textile and Fiber Engineering are helping two recycling companies in Dalton by evaluating processing operations and new products from carpet waste.

The program provides faculty with nonsalary-related discretionary funds for teaching and research needs such as computer software and conference participation, says Estes. He adds that EDL staff have been assigned as contacts with each school in the College of Engineering to develop a better understanding of research under way and expertise available.

"I'm encouraged by the number of faculty responding to work with industry throughout the state," says EDL Director David H. Swanson. "I feel the program is working well, and I think it's establishing important links between faculty research and Georgia's industry." □

Waste management and recycling revisited

By Kathie Coogler Prado, CAL

Why should the throw-away lifestyle so prominent in contemporary America be abolished? The most critical reason is the rapidly expanding amounts of waste and shrinking landfill disposal capacity. Few can forget the garbage flotilla off the shores of New Jersey. So, who wants this garbage? Not in my backyard, everyone exclaims.

Food and yard waste

Garbage, however, when called waste is another story. Waste isn't repugnant when

broken down into its valuable parts and managed early. For instance, the Environmental Protection Agency (EPA) reports 23.4% of municipal waste per year is food and yard waste.

Food consists of table scraps and leftovers. Table scraps, especially meats, are tasty treats for household pets. And, if there's no pet in the house, here's an experiment. Put table scraps out on the back porch after dinner, and see if the container is empty the next morning.

Yard waste consists of leaves, branches, twigs and pine straw. But wait, how much does the local nursery charge for the compost that is often purchased to improve the condition of the soil? Compost is made from food, exclusive of meats, and yard waste. And who can't use a little soil conditioner?

Designate an inconspicuous area in the yard, shovel it over occasionally, and voilà, rich soil. This eliminates the need to buy compost or cow manure that always seems to spill out in the family auto. And if you don't have an inconspicuous space, designer compost boxes are available.

Metals

Metals make up approximately 9.2% of the problem. A common consumer item in this category is aluminum cans. The EPA reports that about 55% of all aluminum cans sold are returned and recycled. Good job, America. However, approximately 7.4% still finds its way to the local landfill or flotilla.

Glass

Glass is a remarkable item. According to the EPA March 1989 study, it contributes 9.4% to the waste problem. But it is 100% recyclable. It does not suffer any loss in quality when metamorphosed into another container, and it can be recycled over and over. Like aluminum cans, used glass melts at a lower temperature than what is needed to produce new glass, thereby reducing energy consumption—and this process extends the life of melting furnaces.

Interestingly, this 9.4% glass contribution to the municipal waste problem translates into approximately 85 pounds of glass per year that is consumed by the average American. Recyclable glass containers include all types of food jars, beverage bottles (all glass), and cosmetic bottles. Excluded are light bulbs, ceramic glass dishes, plate glass, safety and window glass, heat-resistant glass, and lead-based glass (such as crystal or TV tubes). Recycling receptacles are located generously throughout the city. Another consideration: reuse jars yourself. It's amazing how many uses can be found for clean baby food jars, for instance.

Plastics

Plastics make up 6.5% of the problem and are also recyclable. Plastics include polyethylene (milk, water and juice containers), polyvinyl chloride (vinyl), and polystyrene foam (foam cups and plates, plastic cutlery, and packaging materials). Recycled items from plastics include traffic barrier cones, carpet backing, and flower pots.

Paper

Paper is also intrinsically inoffensive, but it contributes a disgusting total of 42.1% of the municipal waste problem. Paper is broken down into high-, medium-, and low-grade. Not only would recycling cut down on the municipal waste problem, but one ton of low-grade paper (or newsprint), for example, saves about four barrels of crude oil when



Sharon Mattson's dog, Casey, recently paid the Cobb County Research Facility an official visit and was issued a red Visitor badge in compliance with GTRI regulations. (Photo by Anita Edwards)

recycled. The higher grades would conserve more.

Some suggestions for personal paper waste management include changing procedures whenever you're in a position to do so. Glue-binding for report covers, for instance, should be minimized to those reports that have a permanent shelf-life. Use staples or ring binders on reports and documents that can be taken apart and recycled easily when superseded by new versions.

Other waste

In case you're wondering what happens to the other 9.4% of waste—well, that's just garbage. Who knows? Perhaps when individuals limit waste disposal to this 9.4%, the landfill problem may be manageable; or a focus on this last unit called "other" may produce the proper place for its use. For example, tires can be used to produce asphalt pavement, industrial fuel, or rubber mats; or they can be used "as is" for soil erosion protectors.

The EPA reports that "by 1991, one third of the nation's landfills will be closed, with few new ones to replace them. The economic and environmental costs of disposing of these increasing volumes of refuse are escalating along with our generation rates. Astonishingly, trash disposal is costing approximately \$10 billion a year." Let's see what we, as individuals, can do to alleviate this problem. □

(Special thanks to Sylvia K. Lowrance, director of the Office of Solid Waste, EPA, who compiled *EPA Region IV Recycling Project Fiscal Year 1990 Report*. Other EPA sources used include *Recycling and You* and *Developing a Comprehensive Federal Office Recycling Program*.)

"By 1991, one third of the nation's landfills will be closed, with few new ones to replace them.... Astonishingly, trash disposal is costing approximately \$10 billion a year."
—EPA Report

News & Notes

Professional Activities

Aerospace Lab

Bob Englar presented a paper, coauthored by **Dave Schuster**, at the SAE Aerotech '90 Conference in Long Beach (CA) October 2. The title was "Experimental Evaluations of the Aerodynamics of Unlimited Racing Hydroplanes Operating in and out of Ground Effect."

Economic Development Lab

Phil Wofford of the Rome Regional Office received a first-place award for technology transfer at the annual meeting of the National Association of Management and Technical Assistance Centers (NAMTAC), held September 26-29 in Arlington (VA). **Art Brown**, who was instrumental in developing the program for the NAMTAC meeting, is the new president of the organization. **Charles Estes** is chairman of NAMTAC's Project-of-the-Year Award Committee for 1991. All three, plus **Dave Swanson**, attended the meeting.

The National Institute of Standards and Technology has awarded a \$65,700 grant to the Industrial Extension Service to demonstrate various methods of technology transfer in different regions of the state. The grant was one of nine selected from a total of 43 proposals from 30 states to enhance the transfer of federally developed technology to domestic industry.

Environmental Science & Technology Lab

Paul Schlumper presented a session on lockout procedures at the September branch meeting for Kemper Insurance Companies.

In early October, **Nancy Davis** and **Stephanie Babbitt** gave a preconference tutorial workshop at the 2nd Annual Government Technology Conference and Exposition at Inforum. They and **Rae Adams** presented a paper, "Maintaining File Compatibility between Mac/MS-DOS and Mac/Mac," at the Practical Conference on Communication at Oak Ridge (TN).

Electromagnetic Environmental Effects Lab

At the Awards Luncheon of the IEEE Electromagnetic Compatibility (EMC) Society in Washington (DC) August 22, **Don Clark** was presented the Laurence G. Cuming Award. He received this major award "for sustained contributions to the administration and overall success of the . . . Society." He was president of the Society for two years, 1988-89.

Electro-Optics Lab

Jim Beletic, who has been attending the Hubble Space Telescope Image Processing Working Group meetings, on July 30 presented a seminar on "Photo Noise Limitations to Information Recovery with the Hubble Space Telescope" at the Space Telescope Science Institute in Baltimore (MD).

James Sowell has published a paper, "A Survey of Balmer-Line Profiles and IRAS Fluxes in Forty Yellow Supergiants," in *The Astronomical Journal*. He also is one of the narrators of the current Fernbank Science Center Planetarium Show, entitled "The Birth of the Cosmos."

Physical Sciences Lab

A paper by **Dave Hughes**, "Oxide-Isolated Integrated Circuits for High Frequency Applications," was published in the *RF Design 1990/1991 Directory*.

Tony Hynes recently spent two months as a visiting scientist in the Chemistry Department of the University of Leeds, England. He presented a paper on "Laser-Induced Fluorescence of Silicon Monoxide in an Atmospheric Pressure Flame" at the 23rd International Symposium on Combustion in Orleans, France, in July. His paper, "Laser-Induced Fluorescence of Silicon and Silicon Monoxide in a Glow Discharge," was published August 24 in the proceedings of the Materials Research Society Symposium on "Characterization of Plasma-Enhanced CVD Processes."

Tony Hynes and **Paul Wine** attended the 11th International Conference on Gas Kinetics in Assisi, Italy, September 2-7. Hynes presented papers on "Kinetics and Mechanism of Acetonitrile Oxidation under Atmospheric Conditions" and "Laser-Induced Fluorescence of Silicon and Silicon Monoxide in a Glow Discharge and an Atmospheric Pressure Flame." Wine coauthored the paper on acetonitrile and presented a paper entitled "Kinetics Studies Relevant to Understanding the Halogen Initiated Oxidation of Atmospheric Dimethylsulfide," coauthored by **Ed Daykin**, **Mike Nicovich**, **Kevin Kreutter**, and **Mian Chin**.

A paper by **Ed Daykin** and **Paul Wine**, "A Study of the Reactions of NO₃ Radicals with Organic Sulfides: Reactivity Trend at 298K," appeared in the September issue of *The International Journal of Chemical Kinetics*.

Radar Systems Applications Lab

Mel Belcher presented an invited tutorial on "Phased Array Radar System Concepts" at the 27th Annual Association of Old Crows EE symposium in Boston (MA) September 26.

Powers Garmon received U.S. Patent No. 4,946,239 in August for his "Optical Power Isolator."

Ed Reedy (OOD) and **Guy Morris** presented an invited paper, "A Methodology for ECCM Development and Testing," at the NATO AGARD Conference, held in Munich, Germany, October 1-4. □

GTRI: who are we?

We're a motley crew—diverse in size, marital status, talents, interests, backgrounds and personal goals. But we are all part of the GTRI family.

GTRI is nothing without its people. In recognition of you—our most important asset—THE GTRI CONNECTOR is soliciting nominations for unique employees (current or former) in the following categories:

1. Tallest person
2. Shortest person
3. Most children
4. Most grandchildren
5. Longest daily commute to and from work
6. Highest mileage on vehicle driven by original owner
7. Oldest living GTRI retiree
8. Most years of service
9. Most supervisors in GIT career
10. Most different jobs in GIT career
11. Most moves (from one office to another location)
12. Oldest employee still on the job
13. Youngest full-time employee
14. Least sick leave taken (related to length of service)
15. Most helpful
16. Most unforgettable (current or former) employee
17. Most unusual hobby
18. Woman with the longest hair
19. Man with the longest hair
20. Man with the least hair
21. Best brush with greatness (chauffeured famous person, etc.)
22. Open category: unique, interesting person who doesn't fit into the above categories

Please nominate yourself or someone you know. We'll publish the results in future issues of the CONNECTOR. On a sheet of paper, list the category, the nominee's name, GTRI address and phone number, and information to support your nomination. Sign your name as nominator. Send to: GTRI Connector Contest, RCO, 227 CRB. Deadline: November 15.

(Thanks to the Southern Bell Connection for the idea!) □



We're having a contest to identify unique employees at GTRI. Send in your nominations today! (See column 3 on the right.)

Questions, Anyone?

By Charles McCullough, HRD

Why did GTRI revise its timesheets for biweekly-paid employees? The old ones were perfectly fine as they were, and the new ones are more paperwork and probably a lot more expensive. Besides, I don't like having to put my social security number on yet another piece of paper.

Is that a question or a reaction? Let's assume it's a question; otherwise, there wouldn't be an answer and, therefore, there would be no *Questions, Anyone?* this month.

First off, the timesheets were revised to address some of the problems that we've identified during the last five or six years that the old timesheets have been in use. For example, adding another color for biweekly-paid student employees (pink) different from the color for biweekly-paid temporary staff (blue) makes timesheet preparation much clearer to our biweekly-paid students when they change from student to staff or vice versa during, say, summer quarter. You try to explain to a student employee whose status has just changed that they stop filling out one blue timesheet at the end of one pay period's Week 1 and start filling out a different blue timesheet for the next day that's a different pay cycle's Week 1 and you'll be the first to jump on the bandwagon to celebrate a different color for biweekly-paid student employees.

More paperwork you say? Nonsense. No one is reporting any more information than they have in the past. For the green timesheets there are, indeed, two different forms to complete, but most biweekly-paid permanent employees who are charging to a variety of sponsored projects had to prepare multiple timesheets anyway just to enter their daily detail. With 30 lines on the attachment for the daily detail, many biweekly-paid permanent employees who were turning in as many as six of the old timesheets are now accomplishing the same thing with one timesheet and one daily detail attachment.

As for the idea that these are more expensive, it depends on how you look at it. The new multi-part timesheets are a greater printing expense than the old ones; but when you add in the cost of all the copies that were being made of the old ones, at 6 cents per copy, the new multi-part timesheets are far more cost effective. On top of that, the beleaguered soul in your lab or department who has been having to make three sets of copies no longer has to spend half of every Wednesday slaving over a hot copier: the timesheets go intact (and uncopied) to your MAPS group (if you're in a laboratory), and your lab's copies come back to you in a tidy bundle, probably bound with grosgrain ribbon tied in a little bow. How many times in the past have you waited (and waited and waited) to make just one copy while somebody shoved endless pile after endless pile of green and blue timesheets through the one office copier in this hemisphere that has your ID number and your project number in its memory? No more of that nonsense.

As for having to show your social security number on the timesheet, there's no way around that little problem. Few people realize that GTRI timesheets for biweekly-paid employees are now being used as the source document for HRD to enter those employees' time directly into Georgia Tech's payroll system to generate their paychecks. And like all things paycheck-oriented, the social security number is necessary so Uncle Sam gets his fair share. And what even fewer people realize is that HRD's direct-entry of timesheet data into the Institute's payroll system was the contributing factor that allowed Tech to finally initiate direct deposit for permanent biweekly-paid employees. That, alone, should offset the minor inconvenience you have of showing your social security number on your timesheet.

Personnel tip of the month #1: Exercise caution when you're working with the new multi-part timesheets because the self-carbon on these timesheets is extremely sensitive. If you stick a timesheet in an interoffice envelope and then address the envelope, the address will likely appear on the copies. Or if you stick a Post-It Note on your timesheet and write a note on it, the note you wrote is going to reproduce itself on the copies. (Speaking of reproduction, if you're that employee whose timesheet was under the piece of paper that you used to pen a quick but very provocative note to your sweetheart, rest assured that your secret fantasies are now known to only three-quarters of the GTRI employee population who read, lingered over, and memorized every word. Fortunately, only a couple of us needed treatment for hyperventilation. By the way, was that last item in your note a promise or a threat?)

Personnel tip of the month #2: Now that you've put your new Georgia Tech parking sticker on your windshield, how do you get the old ones off your bumper? Depending on what type of surface your old parking sticker is on, here are some suggestions. If you have a lot of patience, a single-edge hardware-grade razor blade can be used to scrape it off. Exercise caution to ensure that you don't scratch your car's bumper or rear window glass or cut off most of your hand. Another suggestion (which sounds logical but is, as yet, untested by our panel of experts) is to use a blow dryer on its highest setting to warm the old parking sticker. When warmed, the top surface of the sticker should be easy to peel off. Then, use some type of solvent to dissolve the old adhesive that remains. Again, use common sense if you decide to use any chemical solvents on your automobile. □

Tech's Charitable Campaign —down to the final days!

By Maggi Harrison
GTRI Campaign Coordinator

This year's Georgia Tech Charitable Campaign (formerly United Way) is almost over and, once again, GTRI employees are being generous in their financial support. On behalf of David Clifton (GTRI campaign chairperson), Charles McCullough (who is assisting in coordinating the GTRI campaign), and myself, a big "muchas gracias"! The final figures and details of the money collected will appear in the next GTRI CONNECTOR.

There are a few days remaining for those of you who still wish to make a contribution. If you need to know where to turn in your money or pledge card, here are the names of the representatives in the various units of GTRI who are handling this function:

Cobb County: AST—Frances Shiflett (Bldg. 2); ATL—Charlotte Irvine (Bldg. 4); MAL—Debbie Bragg (570 CRB); MATD—Sharon Tabor (Bldg. 3); RIDL—Lucien Bomar (Bldg. 5); RSA—Sandra Saxon (Bldg. 5); TSDL—Helen Hunton (Bldg. 3).

Campus/Labs: CAL—Ann Duneheew (648 CRB); CMDL—Rob Kossler (518 CRB); COM—Jeff Evans (232 ERB); CSIT—John Wandelt (162 ERB); EDL—Charles Estes (223 O'Keefe); EEE—Bettye Dulaney (253 ERB); EMST—Tanya Robbins (115 ERB); EOL—Jim Sowell (312A Baker); ESL—Adrienne Harrington (427 CRB); ESML—Kevin Torres (482 CRB); ESTL—Valli McNear (42 O'Keefe); MAL—Debbie Bragg (570 CRB); MSTL—Kaycee Logan (101D Baker); PSL—Dave Hughes (133C Baker); STL—John Meadors (614 CRB).

Campus/Services: ACCT—Stephanie Sodipo (Area II); FMD—Delora Gould (Baker Lobby); HRD—Charles McCullough (Coliseum); MAPS—Janice Davis (219 ERB); MSD—Carroll Garrett (Hinman); OOD—Janice Manders (212 CRB); RPM—Sandra Kirchoffer (Area II); RCO—Lee Hughey (226 CRB); RSD—Ed Gilmore (31A ERB); SSD—Martha Farley (Coliseum).

These representatives and I will be happy to help you or answer any questions you may have. You may reach me at CCRF #1-103, telephone 528-7039. □



Queries & Quotes

Give a piece of your heart through the Georgia Tech Charitable Campaign.

Focus on Folks

The Surveillance Technology Branch has been reorganized into three branches.

The GTRI Connector
Vol. 7 No. 1 October 1990

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.

EDITOR
Martha Ann Stegar, RCO
894-6988

GRAPHICS
Jerry Webb, RCO
894-6985

PHOTOGRAPHY
Joe Schwartz, RCO
894-6980

EDITORIAL REVIEW
Patrick O'Hare, OOD
894-3490

ASSOCIATE EDITORS
Lincoln Bates, O'Keefe
894-6091
Marsha Braswell, Cobb II
528-7750
Janice Davis, ERB
894-8229
Carey Floyd, Cobb I
528-7012
Joanna King, Baker
853-0460
Janice Manders, OOD
894-3401
Charles McCullough, Services
894-3445
Kathie Coogler Prado, CRB
894-7268

Personnel News

Aerospace Science & Technology Lab

Welcome to **Holly Bryan** (GRA), **Alexander Fleming** (research technician I), **Deborah Saliga** (system analyst I), and **Jennifer Seckinger** (GRA).

Computer Science & Information Technology Lab

Jeff Cassanova has received his BS ICS. He plans to attend graduate school and continue working with CSIT as a GRA.

Concepts Analysis Lab

Carol O. Miller is a new word processor operator from Staten Island (NY) who worked previously for American Express.

Electronic Support Measures Lab

Lee Edwards has been appointed associate director of ESML. He is currently phasing out his position with OOD as coordinator of activities for CAL, CMDL, ESML, and ESL, and is scheduled for full-time work in his new position by January.

Dave Plummer, former Surveillance Technology Branch head, formally retired in August, and the Branch has been restructured as three branches "based upon current research contracts and program development efforts." The new branches and their heads are: Systems Integration Branch (to include Special Operations Forces projects)—**Joseph L. Brooks**, head; Advanced Technology Applications Branch (to include the B-1 and B-52 projects)—**Timothy M. Strike**, head; and Radar Warning Receiver Development Branch—**Terry E. Tibbitts**, head. The lab's fourth branch, the Emitter Identification Branch, remains unchanged.

Electro-Optics Lab

Dr. **Jeffrey N. Burch** began working as an RS II October 1. A native of Lexington (KY), he received physics and engineering degrees from the University of Kentucky, University of Chicago, and Rutgers University. His professional interests encompass experimental and computational fluid dynamics (CFD), buoyant plumes and thermals, rotating fluid flows, nuclear reactor engineering, and nuclear physics. He comes to GTRI from BDM International in Albuquerque (NM), where he was involved in CFD studies on the aerodynamics of rocket fairings, laser flow mixing, explosive blast wave modeling, aircraft exhausts, and computer simulations of strategic nuclear weapon exchanges.

GRA **Connie Tritsch** is working with Dr. James Beletic on research that will be used for her PhD thesis in physics. She comes to Tech from the Johnson Space Center in Houston (TX), where she was an optical engineer for Lockheed.

New GRA **Christie Galyean** is working on research under Dr. Gary Gimmestad that will lead toward her PhD in physics.



Two GTRI staffers from the Cobb County Research Facility helped the Portman Companies celebrate the grand opening of their \$195-million Shanghai Centre in Shanghai, China, this month. The companies, founded by world-famed architect and Georgia Tech alumnus John Portman, selected the Indian Summer Band, a bluegrass band of which Mindy Johnson and Jimmy Ross are members, to perform on Sunday, October 14. Mindy, an engineering drafter with the Design Services Group, plays the guitar, and Jimmy, a machinist with Mechanical Services, plays the dobro. In the photo, Mindy is the middle one in the front, and Jimmy is on the left in the back.

Environmental Science & Technology Lab

New staff include RS I **Irene Bennett**, formerly an industrial hygienist with Law Associates in New York, and RS I **Scott Brueck**, who will soon receive his master's in industrial hygiene from the University of Cincinnati.

Brenda Sheffield has transferred to the Microelectronics Research Center, and **Jim Bell** and **Allen Warren** have resigned.

Microwave & Antenna Technology Development Lab

John R. Jones is a new RE II in MATDL.

Modeling & Analysis Lab

MAL welcomes GRAs **Linda Galloway** and **Marc Kolodner**.

Radar & Instrumentation Development Lab

New GRAs are **Roy Meyers** and **Devin Seeley**. **Katherine Taylor** has resigned.

Office of Director

Rhonda Okerberg has terminated her employment, and **Mikko Carelock**, Technical Support, has returned to school.

Threat Systems Development Lab

Craig E. Kirkland is a new RE II, and **Cathryn Sands** is a new word processor operator. □

Personal Notes

Wedding Bells

Susan Griffin (EDL) was married to Gary Shows October 13.

Steve Moore and **Carla Dotson** of RIDL were married September 15.

Congratulations to **George Aboutanos** (RSAL) and his new wife, Cheryle, on their marriage September 8.

Susan Bauman and **Gary Gimmestad** of EOL were married September 22.

Cradle Roll

Congratulations to **Bill Chandler** (Huntsville) and his wife, Jennifer, on the birth of John Patrick on September 25, and to **Deann Reese** (Supply Services) and her husband, Mark, on the birth of Scott William on September 27.

Angela DuBose (RPMID) and her husband, Charles (POD), are the proud parents of Stephanie Marie, born August 2, and Roseann and **Dan Hawes** (TSDL) are the proud parents of Adam James, born October 4.

Our Sympathy

Our deepest sympathy to **Jerry Brown** (Supply Services) on the death of his 19-year-old son, Corey, in an auto accident September 24.

Condolences to **Gary Cheshire** (RIDL) on the death of his father-in-law, and to **Tony Chimera** (MATL) on the death of his mother-in-law.

Sick List

Cecelia Hetrick (MAL) is recovering at home from surgery.

Volunteers

Cheryl Thompson (CSIT), **Tanya Robbins** (ESML), and **Charles McCullough** (HRD) have volunteered to conduct AIDS Awareness classes, a program sponsored by the Office of Human Relations for faculty/staff and student groups. Issues explored in these seminars include AIDS prevention, human relations with those infected with the disease, and the impact AIDS has on society and in the workplace. □