The GTRI Connector

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Relationships

• Wear a smile and have friends. Wear a scowl and have wrinkles.

— *George Eliot*

• To be humble to superiors is duty; to equals courtesy, to inferiors nobleness.

— *Ben Franklin*

• We probably wouldn't worry about what people think of us if we could know how seldom they do.

— *Olin Miller*

Expanding industry-university cooperation: MHRC celebrates ten years of technology transfer to industry

By John Toon, RCO

The Material Handling Research Center (MHRC), a decade-old federally initiated effort to stimulate cooperative research between universities and private industry, has boosted the productivity of participating companies and reduced the time required to put research results into action, says its director, Dr. Ira Pence.

Launched in 1982 with support from the National Science Foundation, the MHRC helps companies solve costly and complex inventory, warehousing, materials supply, and related problems. Dr. Pence says corporate involvement in setting the Center's research priorities and monitoring the results speeds up the transfer of new technology to member companies, which each pay $40,000 a year to share the information.

"If we have people from industry here working with the researchers, the results of the research become immediately known and the company people understand the technology, so they are able to take it back to their manufacturing operations and immediately put it into place," Pence explains.

Headquartered at the Georgia Institute of Technology, the $3-million-a-year Center involves researchers at Florida Atlantic University, the University of Arkansas, and the University of Cincinnati. In addition to its research program, the MHRC trains the graduate students who will be the industrial engineers of the future, and teaches short courses to personnel already working in industry.

Those responsible for leading the Material Handling Research Center to success pause after the 10th anniversary dinner. Left to right, MHRC Director Ira Pence, NSF Program Director Alex Schwarzkopf, MHRC Assistant Director Dale Atkins, and former Director John White. (Photo by Karen Gurty)

As the multi-university research center celebrates its tenth anniversary this month, its list of members includes AT&T Technologies, Chiquita Brands, Inc., the Coca-Cola Company, the Defense Logistics Agency, Digital Equipment Corporation, E.I. du Pont de Nemours & Company, Inc., Eastman Kodak Company, Florida Power and Light Company, Ford Motor Company, General Motors Corporation, IBM Corporation, Levi Strauss & Co., Litton IAS, Manville Corporation, the National Science Foundation, the U.S. Naval Systems Command, Pine Bluff Arsenal, Red River Army Depot, SCA Research, A.B., the U.S. Postal Service, and the Xerox Corporation.

Regardless of their product line, all the MHRC members share common needs to efficiently move raw materials to their production lines, to manufacture mixed models efficiently, and to distribute the products to end users, Pence notes.

"We don't get involved with how you put soft drinks into bottles or install carburetors on engines," he explains. "We move back one step to the problem of shipping and managing cartons of soft drinks, or making the right carburetor available at the right place in the manufacturing operation."

Because these issues are generic in nature, competitors like Ford and General Motors can apply the research results to their own specific operations without compromising company secrets.

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Observed & Noted

GTRI's Dale Atkins was honored at the Material Handling Research Center's tenth anniversary dinner. *To find out why, see page 2.*

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This month, the internal research spotlight falls on atmospheric chemistry research using a tunable diode laser spectrometer to study sulfur species in the infrared. *See page 3.*

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New GTRI Director Richard Truly shares his thoughts on Georgia Tech and GTRI in an interview with John Toon. *Read it on page 4.*

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Former Director Don Grace spoke about University/Industry Cooperation for Development in six Brazilian cities in October. *Details are on pages 4 and 5.*

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The Middle Georgia Technology Development Center celebrates a successful first year. *Read about it on page 5.*

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Prominent GTRI retiree J.D. Walton receives Japanese medal for his pioneering work in combustion synthesis. *See page 5.*

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Read about GTRI's new Washington office *on page 6.*

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The Research Communications Office details the services it provides to GTRI and Georgia Tech *on pages 6 and 7.*

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EDL provides leaders for the National Association of Management and Technical Assistance Centers, wins award in project competition. *Details are on pages 7* and 8.

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Enjoy the Hallowe'en pictures *on page 8!*

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Happy Holidays!

Georgia Tech
RESEARCH INSTITUTE

News & Notes

"We are internationally recognized as the leading institute for material handling research in the United States, and we want to be the best in the world."

—Ira Pence

MHRC

From page 1

What kind of advantage each company gets from the new technology will depend on a number of factors, including the capabilities of the individual applying the technology. In one case, the Center helped a company reduce its inventory costs by $100 million through adopting a new distribution system. In another, a company cut its expenses by $300,000 a year by smoothing out material flow to a flexible manufacturing cell.

While most companies have improved the processes used to manufacture their products, many still rely on outdated methods of handling raw materials and finished products.

"The manufacturing process itself has been the object of a great deal of technological attention," Pence noted. "But we have sadly neglected the infrastructure and the logistics network, the material handling structure that supports the process."

In the textile industry, for example, air-jet and water-jet looms have dramatically increased production rates. Yet in many companies, the yarn needed to weave the fabric is still brought to the looms in the same way it was 100 years ago.

Because little attention has been given to material handling issues, they may offer the most important opportunity for improving manufacturing productivity in the future.

"In the process area, people are struggling for another 1% of improvement. In the material handling arena, it is fairly common to see 20% or 30% improvements, simply because the latest technologies haven't been employed."

International competitors have blazed the trail in material handling changes, Pence notes. Japanese companies, for instance, popularized the "just in time" schedule for delivering components to reduce inventory costs.

One of the Center's goals has been to develop techniques for analyzing the complex issues involved in managing the supply chain: "Part of our mission is to convert what is now an art into a science so people can come to conclusions on a sound economic basis," he says.

MHRC members pay annual dues for the right to the exclusive use of research results for a specified period of time. Each participant provides one member of the industrial advisory board, which sets the research priorities.

The Center celebrated its tenth anniversary November 18 with a reception and dinner given by the affiliate universities for the MHRC members.

For the future, the MHRC hopes to explore the information handling that must accompany material handling, along with the human resource issues involved in material handling. The Center is developing relationships with other organizations involved in similar research. ❑

Tenth anniversary dinner a festive occasion

By Martha Ann Stegar, RCO

"Would the *real* originator of the Material Handling Research Center please stand up!"

This was the introduction to a special award given to Dale Atkins at the MHRC tenth anniversary reception and dinner November 18. Dean of Engineering John White presented him with a blown glass Tech yellow jacket, saying, "Without Dale, who had the idea in the first place, there would have been no MHRC."

Dr. White, who was the Center's first director, reminisced about the day in 1981 that a young unknown came to his office and introduced himself as Dale Atkins, saying, "I think we need to start a material handling research center at Georgia Tech and the National Science Foundation has promised me the money to do it. I checked around the campus to see who I might enlist and was told I should talk to you and get your help. Do you know anything about material handling?"

Dr. White allowed as how he *did* know something about material handling; indeed, he had been teaching academic and continuing education courses on the subject for years. Intrigued, he collaborated with Atkins on a formal proposal, then shepherded it through NSF and successfully solicited charter memberships among the nation's leading industries.

Atkins is assistant director of the Center and a senior research engineer in the Economic Development Laboratory. He says he came up with the idea of material handling research while providing technical assistance to Georgia food processing firms. "Many of their problems were related to material handling," he recalls. Atkins presented a 17-minute video history of MHRC's first decade at the dinner.

Also recognized at the commemoration was Alex Schwarzkopf, manager of NSF's Industry/University Cooperative Research Centers Program. "Without Dale's idea and Alex's strong support, the MHRC wouldn't have happened," John White commented.

Schwarzkopf pointed out that the Georgia Tech center was the fifth one started under the NSF program. "The Industry/University Program is one of our most successful activities, "Schwarzkopf said, "and our most highly leveraged research program. There are now some 50 centers, all primarily funded by industry."

MHRC Director Ira Pence individually honored the chairmen of the Industry Advisory Board over the decade with commemorative gavels. Each member company received a plaque.

Reflecting on MHRC's influence, Patrick Early of General Motors said: "American industry has been on the defense too long. It's time for us to go on the offense, and MHRC is providing us with the tools."

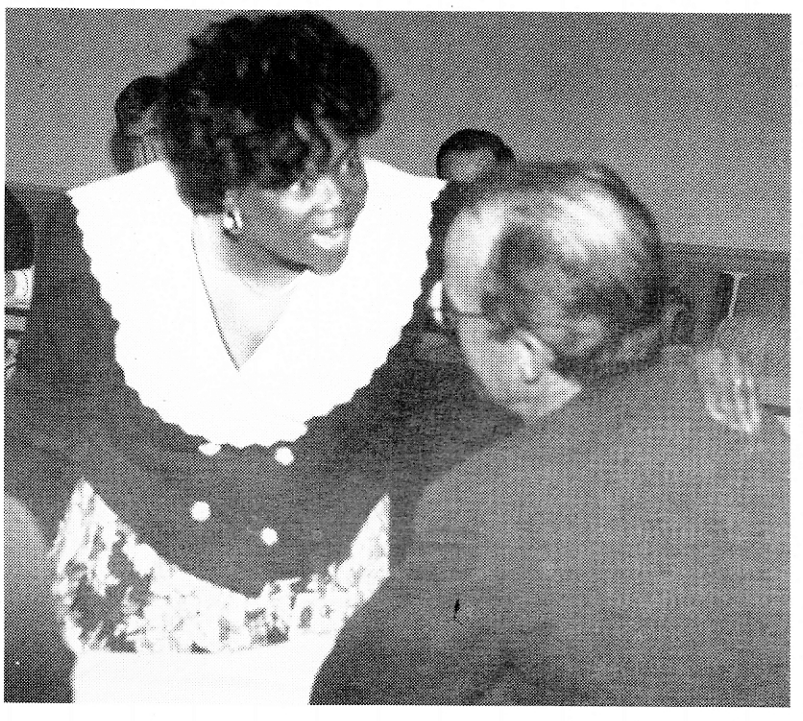
Current chairman Joel Wilson of Eastman Kodak said: "MHRC has a tremendous platform of research that didn't exist 10 years ago. We've added three universities to our center, which has enabled us to greatly expand our horizons. Only our imaginations will limit where we'll be 10 years from now."

In his formal remarks on MHRC's achievements, John White said: "Ten years ago, material handling wasn't even considered a legitimate area for research; now it's taken for granted. MHRC has had a strong impact on Georgia Tech. For instance, the School of Industrial and Systems Engineering's recent #1 ranking from *U.S. News & World Report* is partly because of MHRC."

He added that MHRC is a direct result of Tech's continuing education activity. "This year marks the 43rd annual offering of the Material Handling Short Course. Over the years, this course, which started long before I took it over, enabled us to build strong industrial ties that were crucial to MHRC's success."

Executive Vice President Mike Thomas added: "In most universities, the different disciplines don't talk to each other. At Tech, MHRC has helped reduce the height of the barriers. It's been a catalyst for CIMS and the Manufacturing Research Center—the foundation on which they have built."

Looking to the next 10 years, Dr. Pence says, "We are internationally recognized as the leading institute for material handling research in the United States, and we want to be the best in the world. The combination of talent from the University of Arkansas, the University of Cincinnati, and Florida Atlantic University is one step. Another is to establish technology programs with similar centers in other nations; the first, a technology exchange agreement with the Fraunhoffer Institute in Dortmund, Germany, should be in place by the end of the year. Whatever the future holds in store for material handling technology, we plan to be at the cutting edge." ❑



At a recent Sexual Harassment Seminar for GTRI senior management, Deborah Covin Wilson (Human Resources) shows Ed Reedy what NOT to do. Lab directors, group lab directors, executive council members, and service department managers have attended these classes, and future seminars will be announced shortly for all GTRI staff members. The 2 1/2-hour seminar, conducted by Jerry Dark and Deborah Wilson of OHR, discusses what behavior constitutes sexual harassment, what is considered a hostile environment, and how management should handle these situations. (Photo by Dayton Funk)

Spotlight on Internal Research

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

Tunable diode laser technology aids research in atmospheric chemistry

Helps GTRI scientists improve understanding of air quality problems

By Lea McLees, RCO

Enter one of the third floor labs of EOPSL's Physical and Atmospheric Chemistry Branch in the Baker Building this overcast October morning and you'll find bustling activity that belies the sluggish skies. Beams from a bright blue cadmium lamp and a warm red helium neon laser bounce off mirrors and pierce glass disks as visiting research scientist Robert E. Stickel and graduate student Zhizhong Zhao closely observe oscilloscope and computer screens. The two are monitoring the performance of a piece of lab equipment that has opened up a whole new world of important atmospheric chemistry research for EOPSL scientists during the last three years.

The equipment is a tunable diode laser spectrometer, purchased with National Science Foundation and GTRI funds in 1989. Researchers use short flashes of light from an ultraviolet laser to initiate chemical reactions in a glass cylinder. They then follow the progress of the reactions using the infrared tunable diode laser spectrometer. The reactions they study are those they could not monitor as well—or at all—using older equipment that emits visible light, says Dr. Paul Wine, head of the Physical and Atmospheric Chemistry Branch.

"We decided it would be very useful to have a detection capability in the infrared, because in that frequency range most species we'd be interested in trying to detect have some absorption," he explains.

The reaction rates and mechanisms under observation are those involved in atmospheric sulfur chemistry, an area of study that is important in understanding and addressing many environmental air quality dilemmas, Wine says. "Sulfur plays a critical role in a lot of important problems—things like acid precipitation, visibility reduction, and climate modification," he says. "It also happens to be very interesting from a pure chemistry point of view."

Among the reactions researchers have used the tunable diode laser technology and/or an STGC grant to study are the following:

• **Hydroxyl radicals and carbon disulfide.** The oxidation of carbon disulfide by hydroxyl is thought to be an important source of a compound called carbonyl sulfide—the most concentrated sulfur compound in the atmosphere. That compound eventually diffuses into the stratosphere, where it breaks down into sulfuric acid, a precursor for aerosol particles which can affect the earth's radiation balance and climate. The researchers have found that the reaction of hydroxyl and carbon disulfide forms carbonyl sulfide 80% of the time. General thinking when the study began was that carbonyl sulfide was formed in all hydroxyl/carbon disulfide reactions.

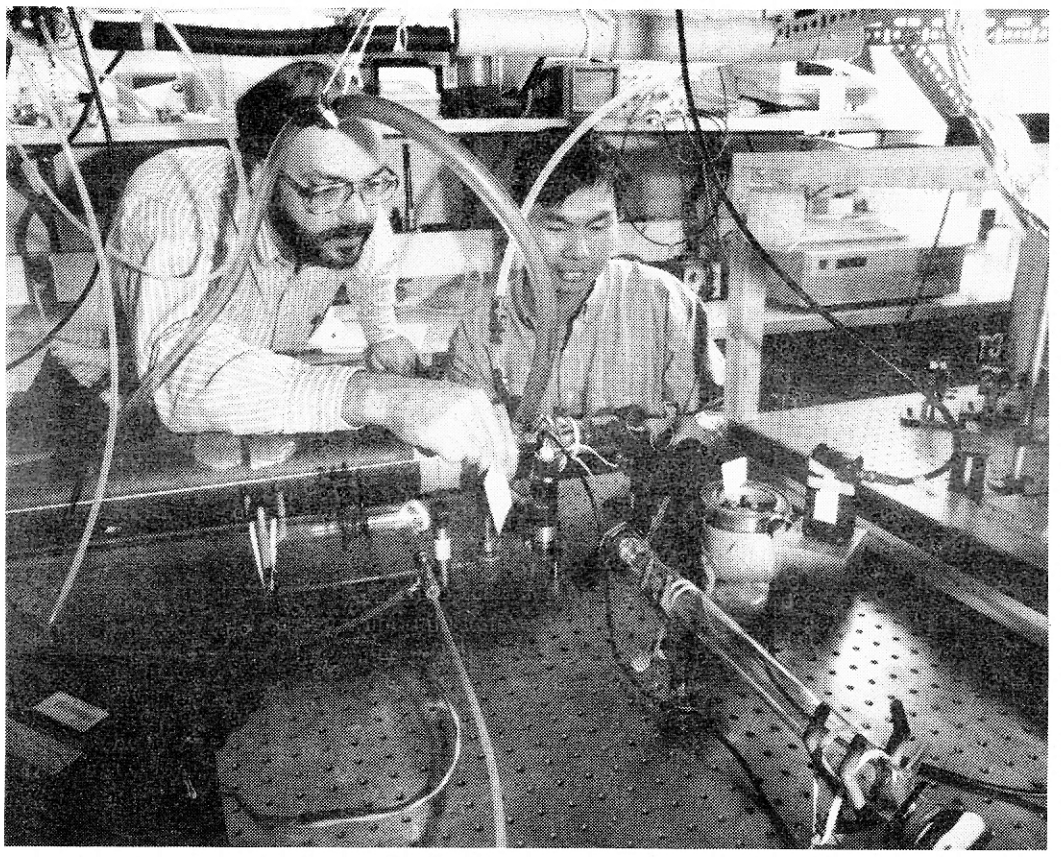
• **Atomic chlorine and dimethyl sulfide.** The latter evaporates into the air from the ocean, depositing from 10% to 40% of all atmospheric sulfur. Oxidation of dimethyl sulfide may actually counteract the greenhouse effect, according to one theory, by increasing the earth's cloud cover. Chlorine may play a role in initiating dimethyl sulfide's oxidation in the atmosphere. The researchers found that the chlorine/dimethyl sulfide reaction is very fast and follows two different pathways that form two different sets of products.

• **Deuterated hydroxyl and dimethyl sulfide.** Hydroxyl is thought to be the most important initiator of dimethlysulfide oxidation in the atmosphere. GTRI research is demonstrating that partially deuterated water is formed 80% to 85% of the time when deuterated hydroxyl and dimethyl sulfide react. This finding resolves a controversy about which of two possible pathways is more important to the hydroxyl/dimethylsulfide reaction.

STGC investment in tunable diode laser technology and its use has resulted in two refereed and four non-refereed journal publications, as well as seven conference presentations, three of which were invited. In addition, work carried out under STGC support has been discussed in seven invited seminars presented at major research universities and government labs. Wine says most of the proposals that he is submitting now involve research that uses the diode laser technology. Current sponsors include the National Science Foundation, the National Aeronautics and Space Administration, and the Environmental Protection Agency. A number of other governmental agencies are potential sponsors as well.

Former Earth and Atmospheric Sciences graduate student Mian Chin used her work on this project in part of her dissertation. She is now a post-doctoral fellow at Harvard University. Zhao, also an Earth and Atmospheric Sciences student, will use his work in a portion of his dissertation, too.

Those who worked on the project include Wine, Stickel, Zhao, Chin, Cornelis A. van Dijk, visiting senior research scientist in EOPSL, and former GTRI technician Edward P. Daykin. ❑



Dr. Robert E. Stickel and graduate student Zhizhong Zhao prepare the tuneable diode laser spectrometer to run another test. (Photo by Gary Meek)

GTRI research in the news

During July and August, GTRI research received the following national publicity:

• Bill Livesay's research on electromigration continued to gain attention with stories in *The Chicago Tribune* (circulation 1,1131,226), *The Indianapolis Star* (228,565), *The New Orleans Times-Picayune* (272,280), the *Toronto Star* (530,000), *Design News* (170,000), *Semiconductor International* (43,012), and *Engineering Times* (75,000).

• Dr. Livesay's study of hydrogen fuel also gained attention with mentions in the *Newark Star-Ledger* (485,362), *Mecanica Popular* (235,000), and the *Portland Oregonian* (350,000).

• The seven-telescope array being developed jointly by Georgia Tech, Georgia State University, and the National Science Foundation received attention from *Business Week* (975,000), *Aviation Week & Space Technology* (150,000), *Design News* (170,000), *Photonics Spectra* (80,000), *Research & Development* (120,111), and *The Scientist* (23,500). Allen Garrison of GTRI is the Georgia Tech principal investigator for the project, which has now been seen by 1.5 million readers.

• The sonic boom simulator developed by Krish Ahuja and others in the Aerospace Lab was reported in *The New York Times* (1,209,000) and the *Baltimore Sun* (402,242). More than 6.4 million persons have now seen articles about this work.

• Johnson Wang's and Vic Tripp's paste-on antenna received note in *The Wall Street Journal* (1,857,131) and *Design News* (170,000). The inventors are now commercializing the antenna, developed in GTRI, and are shipping small quantities to potential customers.

• The acousto-optic radar warning receiver developed by Dave Hartup, Harold Engler, and others continued to gain recognition in *RF Design* (40,000) and *Defense Electronics* (53,000). ❑

GTRI scientists are studying atmospheric sulfur chemistry to better understand air quality problems.

Profile & Insight

LOOKING AHEAD:
New director Richard H. Truly sees bright future for GTRI

By John Toon, RCO

When Richard H. Truly was graduated from Georgia Tech in 1959, reusable spacecraft, orbiting laboratories, and man's first steps on the moon were dreams far into the future.

During his 33-year career in the Navy and the National Aeronautics and Space Administration, Admiral Truly helped make those dreams come true. And when he departed from NASA last March, he left behind plans for a permanent manned space station, a return to the moon, and a daring mission to the planet Mars.

Chosen November 11 to be the new director of the Georgia Tech Research Institute, Truly says he'll continue his focus on the future, helping Georgia Tech's engineers, scientists and students realize their dreams and plans.

"Georgia Tech is changing and looking toward the future, and that is attractive to me because I have always dealt in the kind of work that looks toward the future," he said. "I'm absolutely delighted to have the opportunity to come back to Georgia Tech."

Though funding for research organizations like GTRI has been uncertain in recent years, Truly believes the United States will continue to make the investments needed to maintain a technological advantage and help its industries remain competitive in the world economy.

"This country was built on the tradition of investing in the future, which is why we have a space program and why we have poured so much research into technologies that either defend us or help us have better lives," he said. "I think it is critical today that we don't turn away from research, so that in future years we will have the benefits of new technology that research can bring to bear."

He expects Georgia Tech, particularly GTRI, to play a significant role in building the future, though he predicts competition for research dollars will remain tight as long as the nation's economic problems linger.

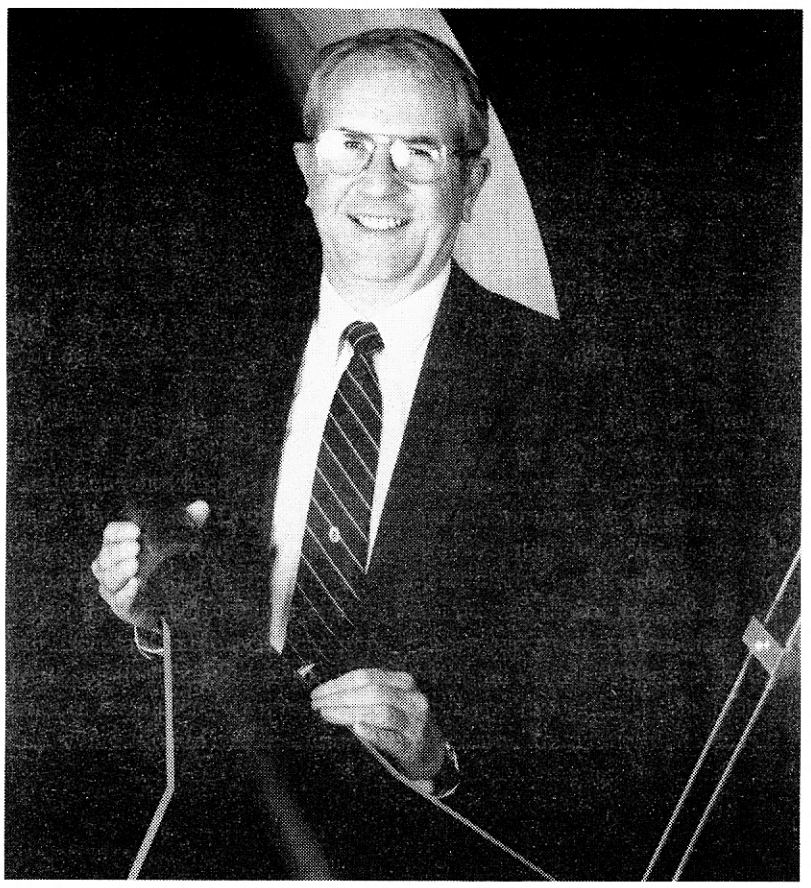
"I think in the long term, the future of Georgia Tech and GTRI research is very bright," he said. "I don't ever see an easy flood of money for researchers to be able to do all of the things they imagine, but the things that they can show to be relevant and important will be funded. Universities will continue to play a strong role in the competitiveness of industries."

Truly says GTRI's researchers, staff and administrators have excellent reputations in the nation's research community, while Georgia Tech graduates play key roles in the corporate and government worlds, thanks to the preparation they receive.

"I'm a great admirer of the people in GTRI: the faculty, the research staff, the students, the co-ops, and all of the people who make the organization go," he said. "Georgia Tech is a great engineering school, and GTRI is a well-known research organization that has important roles to play in several areas, including national defense, civilian technology, and the competitiveness of Georgia business."

From GTRI faculty and staff, Truly says he will expect "high quality research performed in a totally ethical manner."

"Georgia Tech is changing and looking toward the future, and that is attractive to me because I have always dealt in the kind of work that looks toward the future. I'm absolutely delighted to have the opportunity to come back to Georgia Tech."
—Richard Truly



New GTRI Director Richard Truly in the wind tunnel at the Aerospace School, of which he is one of the more famous graduates. (Photo by Gary Meek)

The first astronaut to head the U.S. space agency and one of Georgia Tech's best-known graduates, Truly was nominated to head GTRI by Georgia Tech President John Patrick Crecine.

"Admiral Truly brings a wealth of leadership experience in an organization that emphasizes scientific and engineering research and development, with an extraordinary concern for developing technologies that have commercial and civilian uses as well as scientific, military and space-related merit," Crecine said.

"Dick Truly is a man who has exhibited humanity, calm, and decency in the high-pressure world of the federal government," he added. "He represents exactly the kind of seasoned leadership we need for GTRI and Georgia Tech research."

Truly's appointment as vice president of the Georgia Institute of Technology and director of the Georgia Tech Research Institute was approved November 11 by the University System Board of Regents, which administers Georgia's system of publicly supported colleges and universities.

As Associate Administrator of NASA's Office of Space Flight from 1986 to 1989, Truly led the space agency's recovery and return to space flight following the Challenger tragedy. He served as administrator of the $14-billion-a-year agency from April 1989-March 1992.

Truly began his career as a Navy carrier fighter pilot, and served in the U.S. Air Force's Manned Orbital Laboratory Program before joining NASA in 1969. As an astronaut, he commanded two Space Shuttle flights, participated in early Shuttle testing, and was capsule communicator for earlier NASA space programs, including Skylab and the 1975 Apollo-Soyuz mission. He retired from the Navy as a vice admiral.

Truly started work on December 1, following retiring Dr. Donald J. Grace, who led GTRI through a 16-year period of growth.

Grace, who has served as GTRI's director since 1976, announced plans for retirement earlier this year. Before becoming GTRI director, he held a similar position at the University of Hawaii and served as associate dean of engineering, associate professor of electrical engineering, and senior research associate at Stanford University. ❑

Grace shares experience in university/industry cooperation on Brazil tour

GTRI Director Don Grace went on a speaking tour to six Brazilian cities during the last two weeks in October. His topic: University/Industry Cooperation for Development.

At the invitation of the U.S. Information Agency (USIA), Dr. Grace shared Georgia Tech's experiences and his insights with audiences ranging from university professors to entrepreneurs and industrialists, as well as a sprinkling of government officials.

USIA's mission is to promote greater understanding between the people of the U.S. and the peoples of the world. One of the principal ways the agency tells America's story to the world is through its U.S. Speakers Program. They recruited Dr. Grace into the program because USIA officers in Brazil had identified university/private sector interaction as a topic of great interest and felt that his experience would be an excellent fit.

Dr. and Mrs. Grace traveled alone from city to city, but were met at each stop by the local officer of the U.S. Information Service (as it is called overseas). He spoke to groups in the important coastal cities of Rio de Janeiro, São Paulo, Curitiba and Porto Alegre, as well as in Belo Horizonte and the national capital, Brasilia.

"I generally gave an informal lecture of about 45 minutes, followed by 45 minutes to 2 1/2 hours of questions and answers," Dr. Grace said. "Most of my lectures were translated simultaneously; some consecutively."

He usually spoke on collaboration for technological or economic development, Dr. Grace said. "But one city wanted me to deal only with ethical and legal aspects, so I spoke on consulting, conflicts of interest, patents, and related topics," he added.

Audiences varied from only faculty at the University of Campinas (near São Paulo) to industrial federations. He spoke to 30 industrialist in São Paulo—to 115 in Belo Horizonte.

"After giving some historical background on Georgia Tech and GTRI, I went into the

rationale for university/private cooperation for economic development," Dr. Grace said. "I stressed the benefits of collaboration to the state, the university, and to industry."

He also described the various ways Tech helps industry, such as assistance to small and medium industry through EDL's field offices, the poultry research program, and the apparel technology transfer program. "The audiences were very interested in the ATDC incubator idea," Dr. Grace commented.

They also were interested in industry participation schemes such as multiple sponsorship of research centers and the Corporate Liaison program. "Everybody (faculty and industry) must get something out of an activity or it won't work," Dr. Grace stressed.

Dr. Grace found the country relatively stable politically and moving forward economically, despite double-digit inflation. He also found time to see some of its impressive sights, including a side trip to Iguaçu Falls. ❑

Middle Georgia Technology Center has successful first year

By Vivian Chandler, ATDC

The Middle Georgia Technology Development Center (MGTDC) at Warner Robins has had an outstanding first year of operations. Since its opening in May 1991, the MGTDC has been fulfilling its missions of economic development, technical assistance, research and consulting services, business assistance, and educational offerings to the Middle Georgia region.

The MGTDC is a 34,000-sq. ft. facility that houses several Georgia Tech programs:

- ATDC has its local office in this center and manages the facility, as well as the 10,000-sq. ft. incubator. The incubator now houses five start-up technology companies and three landing party companies, and has a 90% occupancy rate.
- The Continuing Education program recently located an interactive video link-up with the main campus. This gives the Center the ability to present classes and programs from the Georgia Tech campus to interested parties in the Middle Georgia region.
- GTRI is involved in contract liaison with the Warner Robins Air Logistics Center (WRALC) and other offices associated with economic development and technical assistance.
- The full range of activities of the Industrial Extension Service also are available through the MGTDC. Primary assistance includes advice on material handling or production control, productivity improvement, industry targeting, facility planning, and information database searches.
- The Georgia Procurement Assistance Center aids companies in their efforts to do business with the government. They were very instrumental in helping one of the ATDC start-ups secure a contract with the WRALC.

The MGTDC also is home to several other programs. Macon College offers regular college-credit day and evening courses for residents of Houston County. Enrollment at the remote campus has increased every quarter since opening. The Houston County Development Authority promotes economic development and growth management in Houston County, including the cities of Centerville, Perry and Warner Robins. The University of Georgia Small Business Development Center provides management assistance and technical information to existing and prospective small business owners.

ATDC spearheaded efforts to establish MGTDC in 1988 to encourage further development of the aerospace and defense industry in Middle Georgia, particularly Warner Robins, which is home for one of the five Air Logistics Centers of the U.S. Air Force. Warner Robins also serves as a maintenance facility for a number of the Air Force's premier aircraft, including the C-141, C-130, H-3 Jolly Green Giant helicopter, and F-15. A tremendous volume of activities associated with radar systems and electronic countermeasures all contribute to procurement of goods and services totaling more than $2.3 billion annually. Today, the WRALC is the largest industrial complex in Georgia.

The Middle Georgia Technology Development Center is a first-class addition to Georgia Tech's education, industry and service delivery capabilities in the state. ❑

Walton awarded Japanese medal

GTRI retiree J.D. Walton, one of the world's pioneers in combustion (thermite) synthesis, received the Prometheus medal from the Japanese National Research Institute for Metals in a lunch ceremony at Georgia Tech November 2.

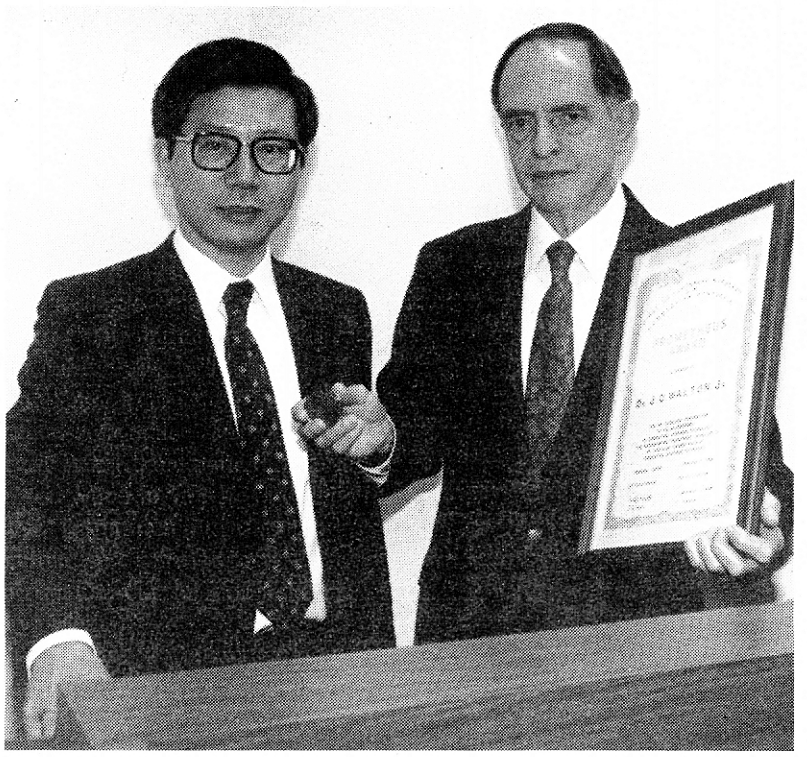
Dr. Yoshinari Kaieda, Director of the Materials Division of the National Research Institute for Metals in Tokyo, presented the medal and certificate. The award was announced in 1990 at the First U.S.-Japanese Workshop on Combustion Synthesis, a meeting that Walton was unable to attend.

The medal is made of tantalum carbide formed by combustion synthesis techniques. The award citation is on the front side and a bas-relief of Prometheus, who, according to Greek legend, brought fire to humankind, is on the reverse.

Walton retired from the Materials Science Laboratory in 1983 after an illustrious 31-year career at GTRI (then EES). He initiated work in thermite synthesis in the 1950s which was the basis for the current thermite program, according to Dr. Kathryn Logan, who directs the program. The first thermite program award came in the day he retired, she says. The ongoing program, originally under contract with the Army Materials and Mechanics Research Center, now is funded by the Army Research Office.

A Georgia Tech graduate with a Bachelor of Ceramic Engineering degree, Walton built the ceramics research activity at EES from modest beginnings into the High Temperature Materials Division, which he headed from 1968 to 1975. His pioneering development of slip-cast fused silica for use in radomes and thermal protection systems for reentry vehicles led to the fabrication of the nation's largest ceramic radome. He edited the *Radome Engineering Handbook* and has been a radome consultant with Selenia in Rome, Italy.

Walton also achieved international prominence in solar energy research, both high-tech solar thermal testing and low-tech applications of solar energy to the needs of developing countries. A Fellow of the American Ceramic Society, he is continuing his ceramic career as a private consultant. ❑



J.D. Walton (right) displays the Prometheus medal and certificate presented to him by Dr. Yoshinari Kaieda, Director of the Materials Division of the National Research Institute for Metals in Tokyo. (Photo by Billy Banks)

Former GTRI scientist awarded medal for pioneering research in combustion synthesis.

Open letter to the Georgia Tech community

Dear Georgia Tech Students, Faculty, and Staff:

At a time when the Georgia Tech community should be looking to the future for changes for the better, we are being reminded of problems which have arisen in the past. These reminders are showing up on local television, in the press, and for me personally with notes, memos, telephone calls, and questions at parties as far away as north Georgia. To say that there is interest in what is going on at Tech with respect to President Crecine would be an understatement.

I have been advised by both faculty and other administrators that the negative publicity we have been receiving is hurting Tech, blemishing its image. This may be true on the short term, but on the long term our reputation is secure. The Georgia Institute of Technology is known far and wide as a solid engineering school for the twentieth century and the twenty-first century as well. If something like this can hurt in the long term, our reputation isn't as healthy as most people think. In contrast to athletics, our academic reputation is earned over the long haul by the work of our faculty and students during and after their work at Tech. Our football team can be top ranked one year and unranked the next, but not so with our educational programs. Academic reputations are built up over time. We can feel secure in this knowledge, and in fact, this is part of the Tech tradition, a good self image.

However, the student, faculty, and staff displeasure must be addressed, since this is detrimental to our everyday well-being. The Executive Board has been challenged to define the issues which are at the heart of the unrest and to come up with ways of solving them. We are interested in what you perceive are the issues.

In the next few weeks, at least before the Holiday Break, I am asking that you supply me with written inputs of what your issues of displeasure are. I can assure you that if you wish your identity to be kept confidential, it will be. I am also aware that there are many who totally support the president in his different activities, and I respect these people for doing so, but I also respect those who "see" something wrong and are willing to risk calling it to our attention. I would hope that we can resolve our differences without all the public airing of the dirty linen. Posturing on both sides of the issues needs to be stopped. We will be looking at the issues, and we will come up with a solution so that Tech can get back to pursuing its mission for the students, faculty, staff, and the people of our great State of Georgia.

Very truly yours,
Dale C. Ray
Chair, Executive Board and
Professor of Electrical Engineering

News & Notes

The staff of GTRI's Washington Office includes (left to right) Jim Bertoglio, Ken Haynes, Ed Eagar (manager), and Wayne Taylor. (Special photo)

GTRI has new Washington office

GTRI opens Washington office to support electronic combat test and analysis work.

The Concepts Analysis Lab has established an office in the Washington, D.C., area as a result of a task order assignment to the GTRI Electronic Combat Test Improvement contract. The office provides technical support to the HQ USAF Directorate of Test and Evaluation.

The work in support of the Air Force will focus on the electronic combat test resource and technical analysis areas initially, but will be expanded to include other functional areas later this year. In addition to the working space for personnel assigned to this facility, a visitor's office will be maintained to support government and GTRI needs. The Defense Investigative Service notified the Washington Office on November 12 that they had granted the facility a Top Secret clearance.

Ed Eagar is office manager, and there are three other full-time professional staff members: Wayne Taylor, Kenneth Haynes, and Jim Bertoglio. Other technical staff and administrative personnel will be added later this year.

Eagar retired from the Air Force in 1988 with 20 years of experience in technology development, systems acquisition, technology transfer, and international program management. He received a BS in mechanical engineering from Auburn University and an MS in engineering management from the University of Dayton. He is a graduate of the Defense Systems Management College.

Taylor spent 12 years in the Air Force, where he managed chemical warfare defense, air base operability, and disaster preparedness programs. He received a BS in psychology from the University of Southern Mississippi and an MS in systems management from the University of Southern California.

Haynes retired from the Air Force in 1990 with 20 years of experience in Department of Defense acquisition involving test and evaluation and electronic combat programs. He received his BS and MS in electrical engineering from Georgia Tech and has completed significant post-graduate work at Georgia Tech toward a PhD in electrical engineering. He also is a graduate of the Defense Systems Management College.

Bertoglio retired from the Air Force earlier this year with 20 years of experience as a defense acquisition system professional involving weapon system planning, development, and test and evaluation. He received a BS in electrical engineering from the University of Missouri and an MBA from California State University. He also is a graduate of the Defense Systems Management College.

GTRI visitors to the Washington area are encouraged to contact the office and coordinate activities as appropriate. The facility is located at 1700 North Moore Street, Suite 1910, Arlington, Virginia 22209. Access is readily available by the Washington Metro subway system from Washington National Airport. The facility is located directly above the Rosslyn station, five stops on the Blue Line from National Airport. The office phone is (703) 528-0883, and the fax number is (703) 528-8419. ❑

Ask what RCO can do for you!

By Lea McLees

Making sure that folks around the world and across campus know about cutting-edge research at Georgia Tech is the mission of the Research Communications Office. RCO provides information and assistance to a variety of constituencies: researchers who are submitting contract proposals or are interested in sharing the results they have collected; sponsors and potential sponsors interested in Georgia Tech research; and media personnel who want to print or broadcast stories about Georgia Tech research projects.

The office is assisting with the diversification of Georgia Tech's sponsor base through its work, according to Acting Director Lee Hughey. "We try to target the materials we generate to the sponsors and sponsor bases Georgia Tech wants to serve," he says.

Following is an overview of the services and information RCO offers. If you see something mentioned that you'd like more information on, please stop by the information desk outside Room 223 of the Centennial Research Building, or call us at 894-3444.

Information resources and services

Need to know what types of research capabilities Tech offers? The *Research Projects Database* provides an on-line listing of most projects within GTRI and some from the academic colleges, as well. Armed with a project number, key word or research subject, for example, one can find out who is doing a certain type of research, in which unit or units it is being conducted, and the name of the sponsor. Abstracts of each project are available, too.

In April 1992, RCO began maintaining the *Biosketch Database Service* for GTRI researchers, which was formerly administered by the Human Resources Department. Almost 500 researchers now have biosketches on file, organized by lab unit and available electronically or on paper. RCO is working toward 100% participation and is standardizing the formats of all biosketches, according to Mary Ann Burke, who is directing the project. Ideas for improvement or expansion of the system are welcomed.

RCO is harnessing the power of multimedia by creating an interactive GTRI overview. The overview is menu-based and allows visitors, such as potential sponsors, to choose the areas of research they are most interested in. Multimedia presentations include access to everything from video clips and slides to news releases and technical papers, says Assistant Director Mark Hodges. Other research topics using multimedia technology will be undertaken in the future.

Internally, RCO keeps Georgia Tech personnel abreast of research by mailing news releases to those who request them and making those releases available through hydra and PROFS. *The GTRI Connector,* a monthly newspaper for GTRI personnel, includes research news, routine administrative information, and stories on GTRI employees who are pursuing interesting activities through work or after hours.

Media relations

RCO produces *Research News* releases on projects or research-oriented events that have resulted in interesting or important findings, publications or presentations. These releases are mailed to national and international newspapers, trade publications, and magazines. RCO helps media representatives find Georgia Tech researchers who specialize in areas they are reporting on. The staff also assists researchers preparing for interviews with the media.

This summer RCO began distributing some health-oriented releases electronically via a medical news service on CompuServe. The office plans more extensive use of on-line computer services to reach its audiences in a more timely way, says Assistant Director John Toon.

RCO helps the Georgia Tech Media Relations unit with production of *Video News Releases* that are distributed via satellite and tape to state, national and international broadcast media outlets interested in research news. These video news releases are often used by researchers in presentations or displays on their work.

The office also provides an annual press kit insert on GTRI that explains the organization's mission, highlights research milestones, and lists important contacts and statistics.

Publications

Research Horizons is a quarterly research magazine distributed around campus and also to research sponsors, media personnel, and alumni worldwide. It includes stories on a variety of Georgia Tech research projects, including some features written by faculty members. The *GTRI Annual Report* describes the institute's research performance and activities over the past year. The *GTRI Research Journal,* begun in 1991, includes outstanding papers submitted by GTRI researchers. It showcases the quality of scholarship going on at GTRI and is useful in contract proposals relating to the subjects of the papers. *Research at Georgia Tech,* a flagship publication that describes research going on in all areas of the university, will be revised in the future to include the newest colleges and programs.

Other RCO services

RCO also:

- Produces fliers on labs and program areas in GTRI that describe each group's capabilities; these are useful in contract development. News releases on specific research projects are also turned into fliers on a regular basis.
- Lends out some types of audiovisual equipment, display systems, and photographs upon request. The office has a Videoshow slide-making system and software for researchers to use in preparing charts and other graphics for professional presentations.
- Helps with special events, including the GTRI—Present and Future meeting and the research awards ceremony. The office helps coordinate the GTRI Spring Fling Picnic.
- Helps labs produce their own printed materials.
- Assists GTRI employees who are up for promotion by editing their promotion papers and providing suggestions.
- Edits technical reports, presentations and proposals.
- Provides assistance to GTRI staff planning professional conferences, workshops, seminars and meetings.
- Assists researchers in editing special articles for publication in various newspapers and trade journals. ❑

Professional Activities

Computer Science & Information Technology Lab

John Gilmore was a keynote speaker at the Soviet Conference on Artificial Intelligence in Tver, Russia, October 19-24. In addition to his presentation on Knowledge-based Autonomous Vehicle Systems, he was a panelist on both the AI in Humanity and the AI in the Future panel discussions.

As conference co-chairman, Gilmore also attended the 4th Annual International Neuro-Nimes Neural Network Conference in Nimes, France, November 2-7.

In October, Gilmore, **Harold Forbes**, and **Rick Peterson** used Georgia Tech's Generic Expert System Tool (GEST) to predict the results of the Braves Playoff and World Series games. Unfortunately, GEST correctly picked the Blue Jays in six games. The GEST system is licensed by Georgia Tech nationally and internationally as an artificial intelligence development environment.

Countermeasures Development Lab

A paper submitted by **Lou Fertig** and Jim McClellan (EE), "Dual Forms for Constrained Adaptive Filtering," has been accepted for publication by the *IEEE Transactions on Signal Processing.*

David Flowers participated in the October meeting of the Georgia Tech Research Advisory Council.

Economic Development Lab

On November 4, **Elliot Price** and **Paolo Chiappina** headed a session, "Tools and Techniques of Total Quality," at Quality Fest '92, presented by the Metro Augusta Chamber of Commerce. **Ken Charon** directed a session on "Strategic Planning for Executives and Senior Managers."

David Clifton made presentations on the Center for International Standards and Quality and on ISO 9000 to the American Production and Inventory Control Society (October 8) and the DeKalb County Chamber of Commerce (October 22). On October 23, Governor Zell Miller named him as a Georgia representative on the Southern Technology Council.

Electronic Support Measures Lab

On October 24, **Kathy Schlag** participated in Futurescape, a seminar at Georgia Tech designed to encourage middle-school girls in math and science.

Richard Ingle and Ahmet Erbil (Physics) presented an invited program, demonstration and round-table discussion at the conference of the southeastern chapter of the Electrical Apparatus Service Association in Savannah October 9-10.

Environmental Science & Technology Lab

In conjunction with their annual International Joint Power Generation Conference, the Institute of Electrical and Electronics Engineers and the American Society of Mechanical Engineers hold an annual one-day seminar for some 200 elementary and high school educators. At this year's seminar on October 22 in Atlanta, **Claudia Huff** presented an interactive session on networking, and **Carol Foley** facilitated a hands-on demonstration of pollution prevention using the Play-Doh Fun Factory as a learning tool.

In mid-December, **Paul Middendorf** will participate in an EPA-sponsored workshop on the development of post-application exposure monitoring and assessment guidelines for pesticides and consumer use products in residential environments.

Microwave & Antenna Technology Development Lab

Robert Howard presented "A Beam Forming Network for Mobile Satellite Communications Antennas" at a meeting of the European EEsof User's Group held in Brighton, England, October 11-14. Coauthors were **Glenn Hopkins** and **Julie Walters**.

"An Antenna Concept for Vehicular Mobile Satellite Communications—A Design in Need of Low-Cost Microwave Substrates," written by **Glenn Hopkins, Eric Myers, Johnson Wang**, and **Vic Tripp**, was presented at the Microwave Hybrid Circuits Conference at Wickenburg (AZ) in October by Dr. Robert Traut of the Rogers Corporation.

At the 14th Annual Antenna Measurement Techniques Association Meeting and Symposium in Columbus (OH) October 19-23, **John Jones** presented two papers written by MATD staff: "A Software Package for Imaging Compact Ranges Using Field Probe Data," written by **Scott McBride** and **John Bradberry**, and "Field Probe for the USAEPG Compact Range," written by **David Asbell** and **Mark Hudgens**. **Pat Burns** also attended the conference.

Modeling & Analysis Lab

Chris Barnes presented a paper entitled "Direct Sum Tree Structured Signal Space Codes" at the DIMACS/IEEE Workshop on Coding and Quantization held at Rutgers University October 19-21. He also coauthored a chapter entitled "Residual Vector Quantizers with Jointly Optimized Code Books" in the Academic Press series journal *Advances in Electronics and Electron Physics: Image Mathematics and Image Processing.*

Office of the Director

Jim Cofer was installed October 13 as a member of the ITEA National Board of Directors, joining 10 other board members representing DoD, NASA and industry. ITEA is a professional organization of engineers, scientists and managers engaged in testing and evaluation of complex systems.

Radar Systems Applications Lab

Mel Belcher presented a paper entitled "Modulation Error in Active-Aperture Phased-Array Radar Systems" at the Radar 92 International Radar Conference held in Brighton, England, October 11-14. Coauthor **Robert Howard** (MATD) also attended the conference.

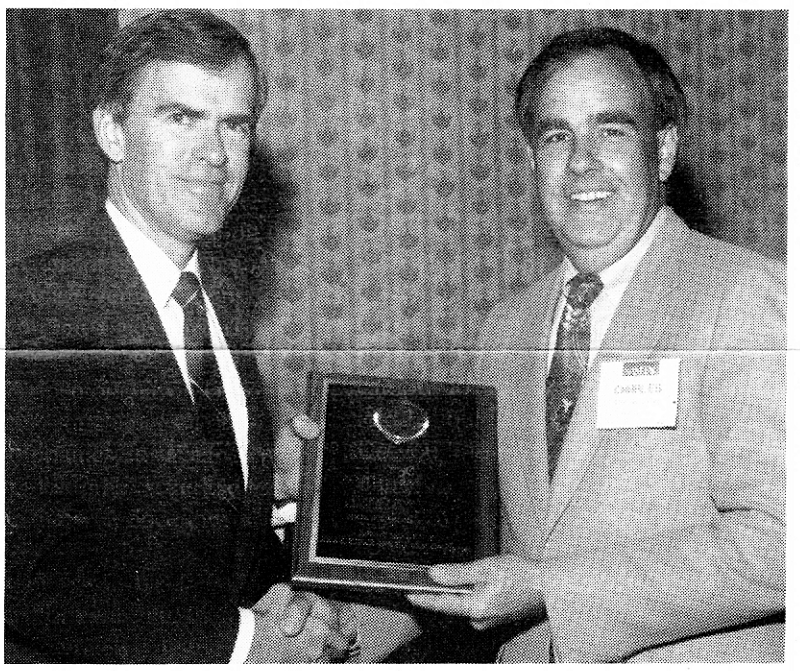
Research Communications Office

John Toon has been named the SysOp of the National Association of Science Writers' new NASW Online bulletin board service on CompuServe.

Threat Systems Development Lab

David Harris recently presented a paper entitled "A 100 KW Hardfet Modulator" at the High Voltage Workshop at Wright-Patterson AFB in Ohio. ❑

Focus on Folks



EDL staff play large role in NAMTAC

By Lincoln Bates, EDL

Georgia Tech's prominence in the National Association of Management and Technical Assistance Centers (NAMTAC) was highlighted at the organization's annual conference in October in Albuquerque. Art Brown completed his term as NAMTAC president; Charles Estes was elected to its board of directors; David Swanson chaired the final meeting of NAMTAC's Executive Search Committee; and the Rome Regional Office won an award in NAMTAC's Project-of-the-Year competition.

NAMTAC comprises some 150 university-affiliated centers that transfer academic-based knowledge and information to businesses and communities. The goal is to further economic development and industrial productivity. Georgia Tech belongs through its EDA University Center, a federally funded program directed by Art Brown; Southeastern Trade Adjustment Assistance Center (SETAAC); and the Economic Development Laboratory (EDL).

Continued on page 8

At the annual conference of the National Association of Management and Technical Assistance Centers, Charles Estes (right) accepts a plaque for the Rome Regional Office, which won second place in the business assistance category of NAMTAC's Project-of-the-Year competition. (Special photo)

Focus on Folks

NAMTAC

From page 7

A NAMTAC officer in various capacities since 1986, Brown proved an active president. He made several presentations on NAMTAC, including testimony before a Congressional subcommittee. Working with the board, he moved to strengthen NAMTAC organizationally and pushed through by-law changes to improve the level of participation of membership categories. His administration also created a second-tier group—the NAMTAC Education Association—to promote NAMTAC's capabilities.

Charles Estes, associate director of EDL, will serve a two-year term on the NAMTAC board, where he will chair the Membership Committee, among other duties. At the Albuquerque conference, Estes made a presentation on "Marketing Your Center's Services."

The Rome Regional Office, directed by Bob Springfield and participating through EDL, won second place in the business assistance category of the annual awards competition. Over three years, Rome staff worked with RCW Industries, a nonprofit corporation that provides employment for the developmentally and physically disabled. Assistance included market diversification, sales improvement strategies, government procurement, and help with financing, all of which resulted in an increase in sales, jobs, and capital expenditures. This is the seventh NAMTAC award Georgia Tech has earned.❑

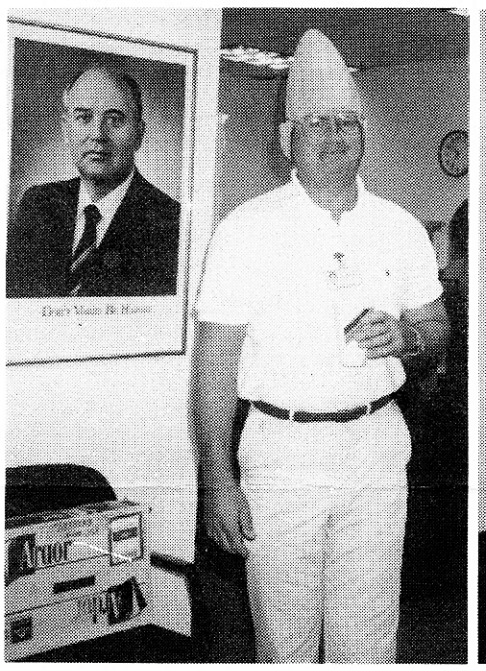
A book for your 8 to 12 year old children...

Get a move on, Neuron!

The author of this 9,000-word children's book is Bioengineering Research Center neuroscientist Dr. Philip Kennedy, formerly of GTRI. The story takes the child on a walk through the brain, spinal cord, and muscles as he or she performs a familiar task. Each chapter describes a "special place," its connections, functions, loss of function if lesioned, and ends with an activity the reader performs alone or with parents, teacher or friends. After each chapter is a quiz.

For more information or to order for Christmas, contact Dr. Kennedy by fax (894-7025), phone (894-4257), or e-mail (Philip.Kennedy@berc.gatech.edu). ❑

HALLOWE'EN AT CRB: ESML staffers Tom Autrey, Dot Baskin, Greg Wright, and Wendy Hanigofsky (front) stop their pranks for a group shot. (Photo by M.A. Stegar)



In Research Security, the original conehead, Bob Lang, poses with one of his best friends, while Barbara Essinger cheers him on. (Photos courtesy of Wendy Hanigofsky)

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This publication is printed in part on recycled paper.

Personnel News

Countermeasures Development Lab

Bob Newsom has terminated.

Economic Development Lab

H. Dirk Gentry is a new RE I in the Gainesville Regional Office. **David Chatham** has transferred from the Macon Regional Office to the Middle Georgia Technology Development Center in Warner Robins. And **Jaime Castro** has gone to part-time status while he pursues his PhD in economics at Georgia State.

Facilities Management Department

Don Davis is a new building attendant working mainly in CRB. He will fill in elsewhere as needed.

Microwave & Antenna Technology Development Lab

MATD welcomes **Donald L. Sherman**, GRA, and **Chrysanthos D. Papanicolopoulos**, SRE, who has transferred from ESTL.

The following have terminated: **Frank Stewart, Timothy Sanders, James Pickelsimer**, and **Keith Edenfield**.

Office of the Director

Carin Burford, a freshman in AE, has begun work as a student assistant.

Threat Systems Development Lab

Douglas Hope has terminated. ❑

Personal Notes

Sports News

The "Wild Weasels" of ESML are third-place winners in the Georgia Tech Flag Football B-league (96 teams) this fall. They went undefeated in the regular season, but lost the semi-final playoff game to The Beasts by a score of 33 to 30. The team has won three consecutive division championships, and their overall games won-lost record for the last three years is 19-3. This year, they outscored their opponents 165-55. Team members include **Jeff Hallman, Lee Evans, Dan Mack, Matt Bradley, Kim Cole, Tom Autrey, Gistand Minor, Robert Raboud, Jeff McDaniel, Keith Hughes, Russell Leath, Mike Gray, Walter Haines**, and **Roy Thompson**.

Jack Wallace (CSITL) won the B division of the GT intramural tennis singles. He says, "I have to gloat because it is the second and probably last tennis tournament I have EVER won!"

Wedding Bells

Martha Ann Stegar (RCO) and **Yalcin Peker** (MAPS) were married November 21.

Cradle Roll

Belated congratulations to **Linda Davis** (OOD-TQM) on the arrival of her baby daughter, Shala Daneene, born August 31.

Our Sympathy

... to **Don Rogers** (TSDL), whose father-in-law passed away October 16, to **Rusty Roberts** (TSDL), whose father died November 2, and to **Harold Knouse** (TSDL), whose father-in-law died November 3. ❑

CETL lecture

The Center for the Enhancement of Teaching and Learning (CETL) has a monthly series of lectures scheduled through April. Each lecture takes place from 12:05-12:55 p.m., with a reception following. Call 894-4474 for a schedule.

Coming up **January 19**—"Academic Advising for Student Success: Freshmen and Other Special Populations," Susan H. Frost, Emory University. Student Center Theatre.