To err is human

• Hindsight is how we explain the mistakes that foresight could have avoided.
— *Herbert Daniels*

• He who never made a mistake never made a discovery.
— *Samuel Smiles*

• Better to trust the man who is frequently in error than the one who is never in doubt.
— *Eric Severeid*

New clearinghouse connects jobs with job seekers

By Lea McLees, RCO

Laboratories with open positions and GTRI employees seeking those jobs will soon be united through a clearinghouse being set up in the office of Associate Director Pat O'Hare.

The clearinghouse will augment personnel services offered through the Office of Human Resources by matching available GTRI employees with laboratories that need their skills, O'Hare said. It will be particularly useful given the uncertainty in some traditional sponsored research areas, said Executive Associate Director Bob Shackelford.

"Occasionally we can run into situations when program money is deferred, delayed or canceled," he explained. "We need a way to address this, through the clearinghouse and other areas."

The GTRI-wide service will be available for both research and classified personnel — and it will be easy to use. When lab directors realize they have an employee who may need partial or full support in the future, they will provide the following information to Staff Assistant Eunice Kelsey Glover: name, title, skills, interests, date available, amount of time available for work, and whether the person is available for a temporary or permanent position.

Lab directors who have positions available will contact Glover for information about people listed in the clearinghouse. They also will submit to the clearinghouse the required skills, experience, and techno-

Rolling down the road for research

Developing ways to predict auto noise

By Lea McLees, RCO

Atlanta drivers who may have questioned their eyesight after spotting an unusual car driving the city's interstates at unusual hours may rest assured that their vision is fine. A white car wired with microphones, a bicycle tire, wind vane and wind velocity monitor really was cruising Atlanta expressways between 2 and 5 a.m. some mornings during the last year.

The interestingly equipped 1991 Mercury Sable is part of a research project sponsored at Georgia Institute of Technology by Ford Motor Company to study wind noise generation, propagation, control and prediction. Consumers could see the results of this work applied to future automobile design, said Dr. Krishan K. Ahuja, head of the GTRI acoustics branch and a professor in Georgia Tech's School of Aerospace Engineering.

"As the 21st century approaches we will probably start seeing more electric cars," he said. "They will be super-quiet, as far as engine noise is concerned. The key noise will be wind noise, which is the focus of this study."

The bicycle wheel attached to the back of the car helped monitor the vehicle's speed. Microphones taped to the car are visible on the left side doors and windows. (Photo by Gary Meek)

Observed & Noted

GTRI Director Admiral Richard H. Truly is working with laboratory directors to develop a new strategic plan for the Research Institute. *Read about it on page 3.*

■

Research contract awards are slightly higher than they were at the same time last year. *Executive Associate Director Robert Shackelford comments on the trends in a story on page 2.*

■

A GTRI chemistry lab might not appear to be well matched to the needs of a graduate student in history, but Alicia Long has found out other-wise. *The story appears on page 4.*

■

A GTRI radar researcher has shared a national award for her contributions to baseball history. *To find out who and why, see pages 4-5.*

■

GTRI's "original connector," Martha Ann Stegar, has retired after 30 years at Georgia Tech. *A story about her career at GTRI can be found on page 5.*

■

The Advanced Technology Development Center invites faculty involvement in an innovative product development funding program. *See page 7.*

■

A calendar of upcoming events of particular interest to GTRI people can be found on page 7.

■

The grading and inspection of poultry may become much more efficient thanks to a fast, flexible, low-cost system of advanced computer image analysis under development at GTRI. *Read more about it on page 3.*

■

See the back page for a listing of your colleagues' professional achievements and personal news.

News & Notes

December 1992 awards grew 71 percent over December 1991, rising to $6.54 million from $3.83 million — an increase of about $2.7 million.

Job Clearinghouse *From page 1*

logical background for the position they want to fill, the amount of time someone is needed, and whether the position is temporary or permanent.

The Office of the Director set up the clearinghouse for several reasons, O'Hare said.

"We want to avoid ragged edges and try to ensure that people aren't left out of the possibility of staying on here," he said. "We have to be conscious of not hiring someone when a regular employee is available, can do the work and needs the job. Before new hires are made, we want to make sure our own people are looked at."

Lab directors would search for personnel to fill positions within the GTRI clearinghouse and through Georgia Tech hiring procedures. The clearinghouse will provide organization and a central collection point for the type of effort and information that helped Bob Newsom, a 26-year employee, continue his employment at GTRI by filling a position in the Environmental Science and Technology Lab.

When Countermeasures Development Lab Director Harry Andrews realized he could no longer support Newsom, he notified all lab directors via e-mail and at various staff meetings that Newsom would be available. He also distributed Newsom's biosketch and began working through the Office of Human Resources to help Newsom locate another position.

Newsom called lab directors and is now helping set up the plasma technology research center in Area 2, much to the delight of ESTL Associate Lab Director Ken Johnson.

"It is so nice to be able to get someone who knows the Georgia Tech system," he said. "We're keeping good resources here at Georgia Tech, and therefore we don't have to develop that expertise again."

Newsom is the second person ESTL has been able to hire within GTRI. The first was Administrative Assistant Judy Truett, who has 14 years of experience. As of the first of February, ESTL was trying to fill three additional research positions with GTRI employees, if possible, Johnson said.

Andrews recalls he had started looking four or five months in advance for projects that would benefit from Newsom's skills.

"As a lab director, this is something you worry about at least six months ahead of time," he said. "With something central like (the clearinghouse) it would be a lot easier and much less time-consuming."

To submit information for the clearinghouse or check the list of available personnel, you may phone Eunice Kelsey Glover at 894-6792 or send an e-mail message to her at eunice.kelsey@gtri.gatech.edu.

See related story on page 6.

**GTRI AWARDS**			
MONTH	DEC. 1992 $6,544,109	DEC. 1991 $3,830,671	CHANGE +$2,713,438 (71%)
FIRST HALF OF FY 1993	JULY-DEC. FY 1993 $43,357,712	JULY-DEC. FY 1992 $42,782,315	CHANGE +$575,397 (1.3%)
YEAR TO DATE	JULY-JAN. FY 1993 $49,923,372	JULY-JAN. FY 1992 $48,279,904	CHANGE +$1,643,468 (3.4%)

**PROPOSALS**		
PERIOD	NUMBER	VALUE
JULY-DEC. FY 1992	245	$171 million
JULY-DEC. FY 1993	267	$182 million
PERCENT CHANGE	9.0%	6.4%

Contract awards up over this time last year

By Lea McLees, RCO

Contract awards for the first half of Fiscal Year 1993 are up compared to the same period last year, highlighted by an exceptional increase in contract awards at the end of 1992.

December 1992 awards grew 71 percent over December 1991, rising to $6.54 million from $3.83 million — an increase of about $2.7 million. Year-to-date totals for the first half of FY 93 also were up slightly, increasing 1.3 percent from totals for the first half of FY 92, said Executive Associate Director Bob Shackelford. Awards for the first six months of FY 92 totaled $42.78 million, while awards for the first half of FY 93 are at $43.35 million.

The news is good, but is not a definite predictor of performance for the rest of the fiscal year, Shackelford said. Contract awards for the first six months of most years are almost always within the same range. The differences that distinguish one fiscal year from another usually become apparent during the final six months, he explained.

"You almost can't predict based on the first six months — but having said that, we're glad the figure is where it is," he said. "We are almost $600,000 ahead of last year at this time."

Differences in funding tend to develop later in the fiscal year because of the way the GTRI and government fiscal years overlap each other, and because of the way Congress works. The GTRI fiscal year begins on July 1, while the government's does not begin until October 1. Congress usually approves allocations for money to finance new programs and projects in November or December. Consequently, that new money does not usually become available until about six months into GTRI's fiscal year.

Other mid-year news of interest is the percent change in outstanding proposals for the first half of FY 93. Outstanding proposals are those that sponsors have not decided whether to accept — they thus represent potential funding.

The first six months of FY 93 saw an increase of 9 percent in the number of outstanding proposals, from 245 in FY 92 to 267 in FY 93. Similarly, the dollar value of these proposals is up 6.4 percent over the value of such proposals for FY 92, having risen from $171 million to $182 million.

"The higher the number and dollar value of outstanding proposals, the higher the potential for future awards," Shackelford said.

However, all possibilities for future awards cannot be determined from looking only at outstanding awards.

"Many of our awards come from incrementally funded programs, and from task order agreements," Shackelford said. "For funds flowing through these kinds of contracts, a proposal is often turned around so quickly it doesn't get picked up as an outstanding proposal."

Contract awards for the second half of the fiscal year look promising. Awards for January 1993 totaled $6.56 million, up $1.06 million from January 1992 awards of $5.49 million. Year-to-date totals through January 1993 are $49.92 million, up $1.64 million from $48.27 million for the same period last year.

Emory/Georgia Tech biomedical research funding available

Researchers interested in biomedical studies, take note: The application deadline for collaborative research grant funding through the Emory/Georgia Tech Biomedical Technology Research Center is approaching.

An original and 12 copies of the application must be submitted by March 29, 1993 to be eligible for July 1, 1993 funding, according to the grant announcement.

The program is designed to stimulate joint research between Emory and Georgia Tech investigators. Each proposal must include at least one co-principal investigator from each institution.

Proposals for seed grants, established collaborator, center of excellence and Medtronic's synergy programs may be funded. Awards can be issued for up to one year, and some grants may be renewed for a second year if progress is demonstrated.

Investigators must be full-time permanent faculty members who hold the rank of assistant professor or higher, or the equivalent research rank.

No investigator will be funded simultaneously by more than one grant from the Emory/Georgia Tech Center, and multiple proposals from the same research group naming different co-investigators are not likely to receive support.

Applications may be submitted to Ajit P. Yoganathan, Professor of Chemical and Mechanical Engineering here at Georgia Tech; or to Ernest V. Garcia, Professor of Radiology and Director of the EUSM PET Center at Emory University School of Medicine.

For more detailed information, contact Yoganathan at 894-2849 or ajit.yoganathan@che.gatech.edu.

Improved poultry inspection possible with advanced image analysis

By Lea McLees, RCO

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

Poultry inspectors may one day more efficiently grade and inspect the poultry we put into our casseroles, pot pies and barbecue thanks to an STGC project.

The work has involved developing a fast, flexible and low-cost system for advanced computer image analysis. The researchers modified existing algorithms and used a parallel computer architecture to make their system work.

Image analysis could be useful in poultry grading and inspection because that work is based primarily on visual information, said Research Engineer II Richard Carey, EOPSL. Grading birds as A, B or C takes into account whether otherwise quality carcasses are partially bruised, have tears in their skin or are missing limbs. Federal inspection involves detecting diseased or contaminated carcasses and culling affected birds. As a result, plant graders and U.S. Department of Agriculture inspectors must look at every single bird processed at every U.S. poultry plant, Carey said.

The GTRI system has the potential to automatically grade product and eventually might monitor carcasses' quality, culling diseased and contaminated birds for viewing by an off-line inspector. This potential is significant because it could help extend the capability of the federal workforce to meet a meteoric rise in demand for poultry products. The researchers' big challenge in working toward this goal? They had to find a quick way of processing all the information contained in a single color image.

A typical color image takes up 768,944 bytes of computer memory. Each byte is approximately one character (letter, space, symbol, number) of information. Performing just one typical image processing function — a 3x3 convolution, for example — requires 27 multiplications and 27 additions per byte.

"That is a lot of data that you have to crunch," Carey said.

The researchers began by analyzing image processing algorithms, most of which are used in sequential processing. They modified the algorithms for use with color on parallel systems, which perform several processing functions at once and thus are faster than sequential systems, which perform one function at a time.

The researchers made these lower-level algorithms generic, so that they could be applied to image processing in everything from radar work to database processing. They then developed more specialized, higher-level algorithms for poultry imaging, which rely on the information gleaned by the lower-level algorithms.

The parallel architecture the researchers chose consisted of a 25Mhz IBM compatible 486 machine with a transputer card. The card held four 25Mhz T800 transputers with 4 MBytes each of RAM data and code. The transputers were connected by serial links that allowed researchers to control the directions of data flow. This system, improved since it was built between 1988 and 1991, was less expensive than the typical, off-the-shelf parallel processing system. It was fast, too.

"Most of the low-level algorithms were running in real time," Carey said. "Real time is 33 times per second. Some of the higher-level algorithms took maybe 50 milliseconds or 200 milliseconds."

Adding more processors could speed up image processing for faster applications, Carey said.

The system was used successfully in database feature extraction to give a computer parameters and have it find and recognize the specified object. It worked four times faster than a standard database system. One potential application might be in developing cars that drive themselves.

The poultry inspection and grading application was successful, as well, and raised additional issues that researchers are now exploring, Carey said.

"There were other questions we had to address, like lighting, to get the correct colors for the image, and little things like how wet the bird is and how much the skin glistens," Carey said.

The project resulted in two presentations and three related papers, as well as two class project papers written by graduate students. Future plans include incorporating the system and software into a color image processing project sponsored by the Agricultural Technology Research Program. The researchers continue to develop and test software for the algorithms, and are talking with a firm that wants them to develop the image processing system for poultry inspection.
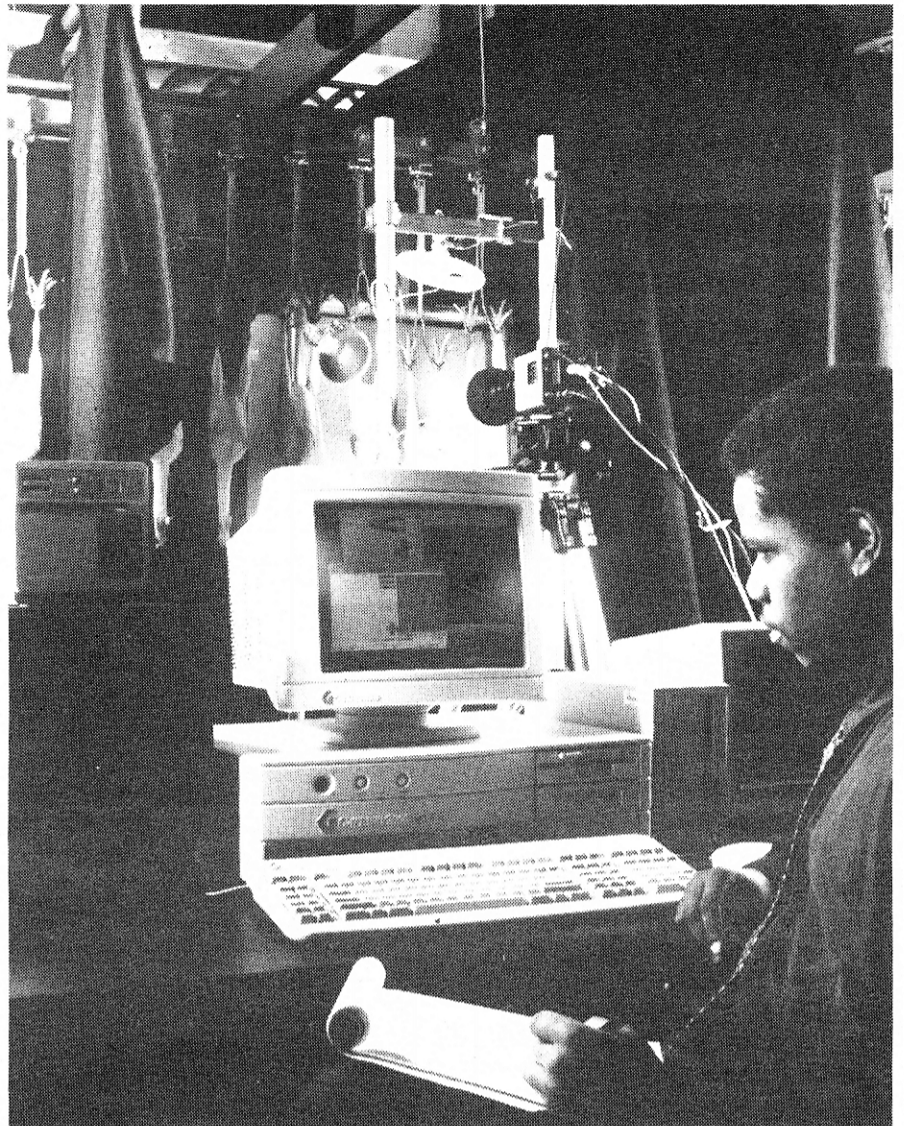
The original project team included Carey; Senior Research Engineer Wayne Daley, EOPSL; Research Scientist II Steve Tynor, CSIT; former Research Engineer II Scott Parker, RAIL; and Senior Research Engineer Mike Brinkmann, RIDL. Electrical engineering post doctoral student Yim Kul Lee contributed to the work, as well as electrical engineering graduate research assistants Anu Kahwas, Mike Lahmon, Jon Linberg, Mohamed Peyravian, and Mike Tinskey, and Physics graduate research assistant Steve Nichols.

Student Rodney Smith, a senior computer engineering major, helps maintain software as part of work spawned by the STGC advanced computer image analysis project. (Photo by Billy Banks)

GTRI strategic planning process is underway

By Mark Hodges, RCO

GTRI has begun its 1993 strategic planning cycle.

In a series of January meetings, Admiral Richard H. Truly and the Executive Council hammered out a draft framework for GTRI's new strategic plan.

Truly is working with laboratory directors on the proposed plan, which includes statements of GTRI's vision and mission, as well as a set of goals in five focus areas. Focus areas include: Quality, Human Resources, Campus Collaboration, Economic Development, and Research.

The lab directors have divided into working groups and will give the results of their work to the Executive Council in late February; the results will be more specifically written statements of these goals, along with sets of recommended strategies for reaching each of them.

"We have no pride of authorship," Truly told the lab directors at their monthly meeting February 1. "We just want a better product."

The GTRI strategic plan will not be lengthy. In fact, Truly and the Executive Council are structuring the document so that it can be contained on the front and back sides of a single flyer.

"We want a very accessible plan," Truly explained. "We intend to present GTRI's goals in a clear, succinct form."

In draft form, the plan emphasizes GTRI's role as an integral part of Georgia Tech, which will be "a vital force" in establishing the university as "the premier technological university of the 21st century." The document's vision statement adds that GTRI will be the most respected university-based applied research institute in the nation.

"For this to happen, GTRI must have an aggressive but realistic plan of action," Truly said. "The competition for research funding has never been more intense."

Truly intends to present a single plan for GTRI to the Georgia Tech administration. However, he strongly encouraged laboratories to undertake internal strategic planning under the umbrella of the GTRI plan.

GTRI zeolite synthesis work sets stage for academic career

By John Toon, RCO

This is the first in a series of articles focusing on student employees who are making important contributions through their work at GTRI.

A GTRI chemistry laboratory might seem an unlikely place for a graduate student studying history, but for Alicia Long, it's all part of her plan.

Alicia Long at work in MSTL's zeolites laboratory. The Georgia Tech master's student is preparing for an academic career that combines chemistry, history, and an understanding of technology.

Working with Dr. Rosemarie Szostak in the Materials Science and Technology Laboratory (MSTL) of GTRI, Long synthesizes zeolite compounds in between her graduate classes in Georgia Tech's School of History, Technology and Society.

Zeolites — a special type of molecular sieve — are oxides of silicon and aluminum with microscopic pores. These materials are finding application in the chemical processing industry, where they are used as sieves to sort molecules by size. GTRI researchers have gained international recognition for their work on clay catalysts and zeolites, and are working now with a number of industrial clients on real-world applications of the materials.

Long finds the exacting chemistry required by the synthesis process to be both satisfying and beneficial to her studies.

"What I like most is getting to see what comes out of the work that I do," she explained. "There is a real thrill when something comes out like it's supposed to, or when you make something new."

Long receives credit for synthesizing a new zeolite tentatively called "Babelite" because its unique crystalline structure is chaotic in a way that theoreticians did not predict. The new material is currently being analyzed by Szostak and her collaborators at the University of Oslo in Norway.

"It is completely ordered in one direction and completely disordered in the other, much like a deck of cards that has been shuffled," explained Szostak. "The deck constitutes order, but the individual cards are not ordered, shuffled into random stacking."

Szostak also credits Long with developing a new non-organic synthesis method for producing an important zeolite structure called zeolite phi. This work will be presented to a meeting of the American Chemical Society.

"Alicia has been an indispensable member of my lab," said Szostak. "The talents she has due to her liberal arts background have also turned out to be quite useful in editing reports and manuscripts."

Szostak says students play a key role in the work of her lab, and as a result, receive preparation that will boost their own careers.

"I try to encourage the students to think and work independently, and to try novel things during their free moments," she said. "They are treated as respected colleagues and actively participate as co-authors on the technical manuscripts. In this way, we are more adequately preparing them for their future roles as successful and innovative scientists and engineers."

With Dr. Szostak working temporarily at the University of Oslo, Long has been working directly with industrial sponsors of the lab's zeolite research. That has given Long new insights into the needs of GTRI's industrial clients, and a better understanding of the chemical business.

She hopes this real-world chemistry experience, coupled with the master's degree and her undergraduate training in history and chemistry at Agnes Scott College, will ultimately lead to a college teaching career. And Long believes the lab experience, which blossomed from a Christmas break "externship" five years ago, has already helped give her a better perspective on the technology issues she now studies.

"Having the knowledge of chemistry puts me on a slightly better footing than a lot of students looking at the subject without the technical knowledge," she said. "Working here gives me a better understanding of what goes on in an industrial lab setting."

The chemistry experience and history study will combine in her master's thesis, which will focus on how the expanding role of women helped change the chemistry work force after World War I. She believes those changes are part of a continuing process that has brought more women into engineering and the sciences.

"Having more women in the sciences and engineering is going to have an impact," she said. "To a certain extent, women have a different style of doing things, and that is going to affect the way classes are taught and the way work is done."

For Alicia Long, those differences are already reflected in the way she has contributed to GTRI— and is preparing for a future academic career combining chemistry, history and an understanding of technology.

If you would like to suggest an outstanding student employee for this series or contribute an article about that person, please contact Lea McLees (894-3444) or the associate editor in your area.

GTRI researcher wins baseball research award

By Mark Hodges, RCO

A GTRI radar specialist has won a national award for her contributions to baseball history.

Linda Harkness of RSAL shared the annual McMillan-Sabr Baseball Research Award with her partner, baseball uniform collector Mark Stang of Smyrna. The two were honored for the publication of ROSTERS, a set of guidebooks to Major League uniform numbers for the years 1929-1971.

At first glance, the interest behind such a project might seem purely arcane, but it was based on a compelling economic trend in the world of baseball memorabilia collecting. Unlike most professional sports uniforms of today, those of yesteryear did not include the names of players. As collectors' items, the value of uniforms depends on the athletes who wore them. Identifying the player who wore an old baseball uniform depends on: 1) the collector's knowledge of uniform styles over the years, and 2) knowledge of the numbers that particular players wore.

"Every other baseball statistic in the world is documented in publications such as The Baseball Encyclopedia, but for some reason this one wasn't," Harkness says. "Mark was manually accumulating hundreds of old scorecards for use in his research. I suggested that a database would provide more flexibility in managing and cross-referencing the individual data entries."

Harkness and Stang were well matched for the task. Stang had a large collection of baseball cards but no experience with computers. Harkness knew next to nothing about baseball but had extensive knowledge of database design through her radar simulation work in RSAL.

It took them three years to locate hundreds of old scorecards, design the database, and complete the data entry of more than 28,000 player listings. The uniform guides now fill four loose-leaf notebook binders totaling 1,600 pages. Hundreds of players who may have only played a single game wearing a specific flannel may be found in the guidebooks.

ROSTERS focuses on the years 1929-1971 for two reasons, Harkness says: 1) no team wore numbers prior to 1929 (the New York Yankees were the first), and 2) Major League teams switched from flannel to knit jerseys in 1971, and the interest of most "hard-core collectors" is limited to flannel uniforms.

While it is a trivial task for the ROSTERS database to scan every uniform number over 42 years, it was no small job to enter the raw material into a computer. Harkness says that, for a full year, she spent several evenings a week and a number of weekends making all the entries. By contrast, she needed several months of intermittent work to complete the software portion of the project.

"When we started, I didn't understand the time that would be needed," Harkness says. "But once we got into the project, it became a challenge and I couldn't stop."

In gathering material for ROSTERS, Harkness and Stang relied on private scorecard collections along with the resources of the National Baseball Hall of Fame
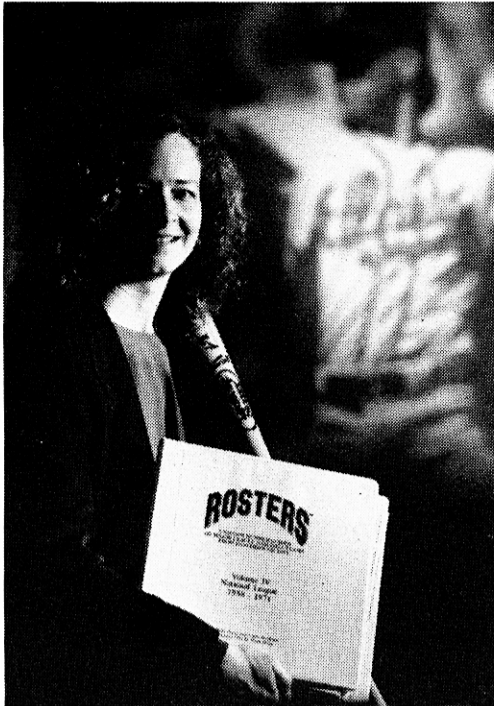
Radar specialist Linda Harkness was co-developer of a guidebook to Major League baseball uniform numbers from 1929-71. (Photo by Gary Meek)

Library in Cooperstown, New York.

"We think the guide is probably 90 per-cent complete," she says. "The early years are tough to find, and we will only add play-ers if we have a working scorecard listing a player wearing that number."

In a year and a half of marketing, Harkness and Stang have recovered their in-vestment, selling the uniform guides to ap-proximately 100 collectors, researchers, base-ball writers, and four major league baseball teams. They were contacted by the authors of The Baseball Encyclopedia, who wanted to include ROSTERS in their publication, but elected to remain independent, Harkness says.

The McMillan-Sabr Award honors three individuals a year whose research expands general knowledge of baseball. The awards were announced in St. Louis, Missouri, dur-ing the August 1992 annual meeting of the Society for American Baseball Research (SABR).

Aside from receiving national recognition, the development of ROSTERS has given Harkness a new appreciation for baseball. Before starting this project, she had little knowledge or interest in the sport. Now, she has become such a fan that she holds season tickets for all Atlanta Braves home games and may even be found at baseball card/memo-rabilia shows around town.

Researcher's book becomes play

Sometimes the best way to make science palatable to children is to present the information in a novel way — and that's just what Bioengineering Research Center neuroscientist Philip Kennedy is do-ing. "Get A Move On, Neuron," his book about the brain for 8- to 12-year-olds, has been transformed into a play that can be used in the classroom.

Kennedy, formerly employed by GTRI, expects the play to more effectively teach children that science is fun by presenting the information through an enjoyable activity. Teachers of science and drama and others interested in finding out more about the play may contact Kennedy by fax (894-7025), phone (894-4257) or e-mail (philip.kennedy@berc.gatech.edu).

Editor retires after 30 years at Tech

By Mark Hodges, RCO

GTRI's "original connector," Martha Ann Stegar, has retired after 30 years at Georgia Tech. Stegar's tenure at GTRI included a 20-year association with The Connector and its predecessor publications, first as an associate editor for her laboratory unit and as editor since 1981.

In this position, Stegar has written about nearly every phase of research at GTRI, a job that she says has led to many rewarding friendships.

"What's meant the most to me is meeting the people who do the work here," Stegar says. "I've met many interesting individuals and unique personalities. They're delightful people and so enthusiastic about their work. I've made a lot of friends doing stories on them."

A graduate of Agnes Scott College in Decatur, Stegar came to Georgia Tech in 1963 as an editor in the Industrial Development Division (IDD), the forerunner of today's Eco-nomic Development Lab. For 16 years, she was chief editor and head of report process-ing and publicity for IDD, EDL, and the Office of International Programs (an offshoot of EDL). She also co-authored a number of reports.

Her proudest achievement in the Office of International Programs was the creation of a quarterly newsletter funded by the Agency for International Development (AID) called the Small Industry Development Network Quar-terly Newsletter, which she edited from 1974-80. This publication grew from small begin-nings to approximately 3,900 subscribers in 150 countries. It attracted contributions from industrial development professionals through-out the world. During her editorship, Stegar traveled to Ecuador, Brazil, Ghana, and Nigeria.

Ross Hammond, Stegar's boss during most of this 16-year period, calls her one of his fa-vorite people.

"She did an excellent job in editorial work," he says. "The development newsletter that she edited was very well thought of by AID. I always thought that was one of the best things she did for us, though she did many good things."

After the international programs unit dis-banded, Stegar joined the new Editorial Assis-tance Office, whose mandate was to set up and implement consistent editorial standards for the then-Engineering Experiment Station (EES). In 1981, after a year and a half, she came to Research Communications, the office where she has worked for the past 12 years.

Stegar became editor of Station News in May 1981. The newsletter was broadened into a tabloid and began publication as The GTRI Connector in October 1984 when EES celebrated its 50th anniversary and changed its name to the Georgia Tech Research Insti-tute.

As Connector editor, Stegar not only ex-panded and reformatted the publication, but she also broadened coverage to emphasize student work at GTRI, human interest fea-tures, and GTRI interactions with Tech's aca-demic departments. She edited and solicited news, wrote many of the publication's ar-ticles, and provided graphic design for each issue. In recognition of this and other work,

Stegar won GTRI's 1987 Award for Out-standing Performance in Research Support.

The Connector was not Stegar's only as-signment at RCO. Each year, she wrote a portion of the GTRI Annual Report. In 1991, she served as editor of the first GTRI Techni-cal Journal. She also authored numerous articles for Research Horizons magazine and the Georgia Tech Alumni Magazine.

"Working on The Connector has been the most satisfying job I've had at Tech," Stegar says. "It used to be a newsletter, but it's grown and changed and improved. Now I think it's got something for everyone in it."

To Stegar, the proof that these changes have worked is in the response she has re-ceived from readers. "More and more people call up and ask if they can put items in," she says. "They're not as passive as they used to be. We've been able to lighten up the news, and I think people appreciate that."

RCO Acting Director Lee Hughey concurs
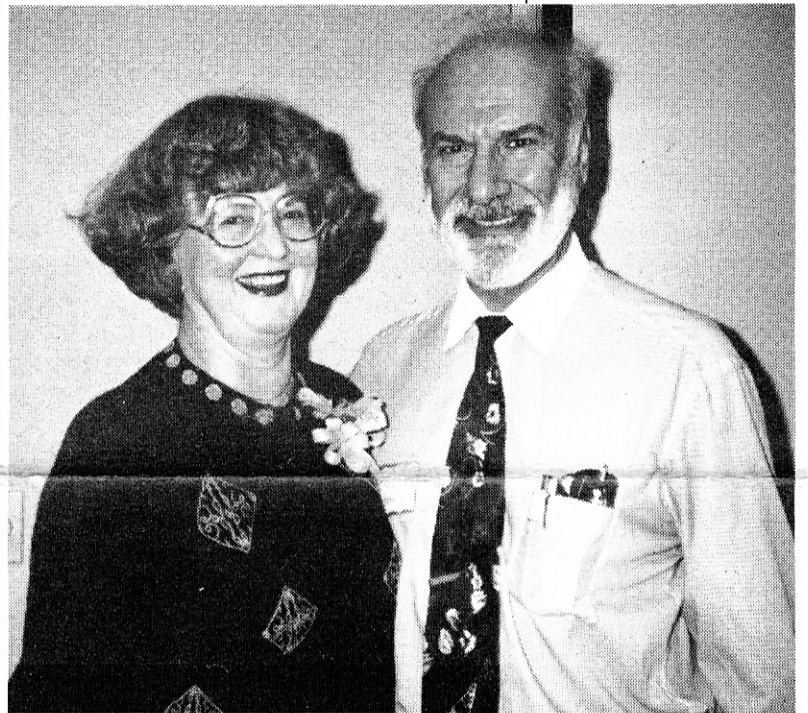
in this assessment. "As GTRI has grown, Martha Ann has done an outstanding job of making The Connector more useful and en-joyable to its audience. Her commitment and enthusiasm will be difficult to replace."

Dr. Donald J. Grace, former GTRI director, sees Stegar as the Research Institute's "origi-nal connector."

Grace adds: "Martha Ann is a truly remark-able person, whom I'll always remember: writer, grandmother, archaeologist, world traveler, singer, bon vivant, and heaven only knows what else that I just haven't discov-ered yet. I'm sure that in retirement she'll continue her exciting life, but she'll be sorely missed by the people she leaves behind."

Over the years, Stegar has pursued many interests—singing in the Atlanta Symphony Chorus, traveling to Israel on Biblical ar-chaeological digs, singing early American shape note music, learning Russian and other languages, and traveling to countries as di-verse as Kenya, South Korea, and Hungary.

In retirement, she plans to be no less ac-tive. She intends to perform volunteer work, do more traveling with her new husband, Yalcin Peker of GTRI/MAPS, and keep up with her friends from Georgia Tech.

More than 100 friends, family members and co-workers recog-nized retiring CON-NECTOR editor Martha Ann Stegar (RCO) at a January 27 reception honor-ing her 30 years of service to Georgia Tech. Well-wishers gave her a Tech bookstore gift cer-tificate and a print of "Grey Morning at Tech" by Travers Green, TE '50. Earl Cagle, Georgia Tech Purchasing, framed the print. Mary Wolfe of the Office of Human Resources catered the event. Pictured celebrating with Martha Ann is her husband Yalcin Peker, Cobb II MAPS Director. (Photo by Mary Ann Burke)

Car noise

Researchers led by Ahuja want to develop ways to predict the noise levels drivers hear inside their vehicles while on the road. No way of completely predicting noise inside automobiles has been developed. This is the first study during which a detailed ranking of automobile wind noise sources has been made, Ahuja said.

To prepare the car for its 25,000 miles of road study and a myriad of additional tests, student team leader Tim Hamel and colleagues Brian Miller and Julia Robinson used clay to mount hearing-aid microphones at 41 locations on the car. The locations were chosen by their potential to be noisy: around the mirrors, near crevices and recesses, around corners and on the underside of the car, for example.

As the car traveled the interstates, data from each microphone was fed separately into tape recorders and an onboard computer. Later, the information was transferred to a lab computer for detailed digital signal

Noise data was collected in a wind tunnel with the car engine off before road tests were begun. (Photo by Gary Meek)

processing. This provided a time history of the noise recorded, as well as the frequency content of noise at each of the 41 microphone locations.

The driver of the car also looked a little unusual. He donned a pair of eyeglass frames with a microphone dangling in front of each ear, recording the sound that was reaching him.

Other data was being compiled during the road tests. A wind vane and a wind speed monitor attached to a special frame on the front bumper recorded flow direction and velocity. A bicycle wheel attached to the rear bumper monitored the car's speed using a magnetic pulsing device available at bicycle shops. The data on wind direction and velocity and car speed also was fed into the onboard computer and later analyzed, along with the noise data, as a function of time, Ahuja said.

The tests were conducted between 2 and 5 a.m. to avoid noise generated by other traffic. Any data collected when other vehicles were nearby was discarded, Ahuja said.

The road tests were just one in a series of studies that Ahuja and 10 of his students are conducting to help them predict noise levels in automobiles. To predict, they must know the sources of noise, where noise is produced, how the sound propagates from where it is produced to where it is heard, and how to control it.

Prior to the road tests, noise data was collected in a wind tunnel with the car engine off and the vehicle facing at different angles to the wind flow. A mannequin head equipped with eyeglass frames and microphones was used to record noise detected in the front passenger seat on some studies, Ahuja said.

The wind tunnel data will provide a comparison for the road test data, and allow the researchers to rank by decibel level the noise produced by the wind — excluding other factors such as engine noise — at the 41 different locations, Ahuja said. Wind tunnel tests also verified that the extra equipment mounted on the car was not increasing the amount of noise the microphones were recording.

Next the researchers studied noise paths in a portable semi-anechoic chamber to find out whether, and at what levels, noises created outside the car entered the driver's area. They sent sound into the car through tubes attached at each of the points where a microphone had been placed, and recorded the noise level that reached a microphone at the driver's location. The semi-anechoic chamber simulated road test conditions.

The researchers are making their first attempts at predicting noise generated by flow around the antenna of the car.

"The noise produced by flow around antenna-like bodies has been known for years," Ahuja said. "Our object is to predict the frequency and the amplitude, and we are doing that right now."

Ford is interested in aero-acoustic research for several reasons, says William Quinlan, manager of the company's Aerodynamics Design Engineering Department.

"One of Ford Motor Company's missions is to continually improve our products to meet our customers' needs and expectations," he said. "Our customers expect an overall quality sound when driving our vehicles; this is an area of vehicle engineering that offers the potential to surprise and delight them with a high value product. The work performed at GTRI is forming the building blocks of basic understanding from which we can engineer the improvement of our vehicles' sound quality."

Some unusual, useful developments have come from this study. The researchers developed molded rubber microphone mounts that can be stuck to a vehicle, eliminating the need for drilling holes in its body to position microphones. The mounts are shaped like the clay ones used in the study, but are easier and less messy to use. The researchers also made the semi-anechoic chamber they used by filling inexpensive wire frames with rolls of fiberglass.

Some of the pages and pages of results, which are proprietary, have been analyzed and presented to Ford. More study and analysis lie ahead, Ahuja said. In addition, the researchers will add another area of study: How much and what frequency of sound is absorbed or deflected by the car before the remaining noise reaches the driver.

Personnel unit links people with positions

By Lea McLees, RCO

The clearinghouse (see related story on page 1) is the newest addition to a variety of personnel services offered to GTRI traditional and student employees by GTRI's Office of the Director and the Office of Human Resources.

Personnel Manager Russ Cappello makes a concerted effort to help all Georgia Tech personnel find work on campus. As soon as he knows an employee's services are available, he sends biosketches and resumes to school, department, and lab heads, including the Office of Interdisciplinary Programs. He also lets employees know about available off-campus positions.

For very specialized employees who don't fit the usual job niches, Cappello makes personal phone calls to administrators. In one case, a department head in one discipline provided Cappello five potential campus contacts for an individual with an unusual area of expertise in another. In another case, an academic researcher was able to find a position within GTRI.

In addition, the Georgia Tech Job Bulletin that advertises jobs available on campus is sent every Wednesday to lab and administrative network representatives. They are to copy and post it, but anyone can view the listing on hydra at git.ohr.jobs, as well.

The clearinghouse is a good idea, Cappello says — he'd like to develop such a system to keep track of openings and available employees campus-wide.

"The only problem is that a campus-wide system has to be developed, and somebody has to input the data," he said. "I don't have the resources here to do that."

On the student employee side, GTRI's Student Coordinator Cathy Dunnahoo helps laboratories and departments match their needs with the skills and interests of Georgia Tech graduate research assistants, co-ops, student assistants and others.

Students who want to work in GTRI labs complete an application that highlights their skills, interests and experience. Dunnahoo also asks lab directors what they are looking for in their student help. She then tries to match students to lab positions based on that information. Applications are kept on file in her office for three months.

When she gets a superb student candidate, Dunnahoo may route paperwork to labs that have not indicated a need for additional students.

"They might see that a student has one particular area of interest and say, `Let's talk to this person,'" she explained.

Among her recent transfer placement successes have been the move of a co-op student from the Threat Systems Development Lab to the Concepts Analysis Lab; a co-op student from the Radar and Instrumentation Development Lab to the Communications Lab; and a graduate research assistant from the Aerospace Lab to the Computer Science Lab.

Dunahoo advises GTRI student employees looking for work to stay in touch with the co-op and graduate co-op offices, and their academic and GTRI contacts.

"You never know what will come up once you start looking," she says.

Research commercialization proprosals sought for 1993 awards

The Advanced Technology Development Center (ATDC) invites technology oriented academic and research faculty to submit proposals for innovative product development funding through the Faculty Research Commercialization Program (FRCP).

The FRCP provides financial and business development support needed to move research technology from the conceptual laboratory stage toward a commercially viable product. This support, in the form of ATDC "sponsored projects" valued up to $50,000 each, can be used for equipment, materials, contract consulting, release time and other needs, just like any other research contract. Faculty are encouraged to involve students in these projects whenever possible. The funds are exempt from overhead.

The FRCP was developed and pilot-tested by ATDC in 1991 to help develop promising research technology into a manufacturing prototype of a marketable product. The ATDC traditionally has provided business development support, market research, and business planning to new technology ventures. With the FRCP, ATDC can now provide critically needed funding and support for product-prototype development.

The FRCP program is not intended to fund basic research. Only applied research projects directed at a specific commercial product or technology with a potential market opportunity will be considered. The deliverable will be a "prototype" or "near-prototype" product that could become the basis for establishing a new company.

Solicitation announcement packages were mailed to faculty on February 1. Following is a list of important dates:

March 1　Pre-proposal conferences; open discussion on FRCP requirements. Time and location to be announced.
April 2　Proposals due to ATDC.
May 14　Proposal review completed.
May 31　Awards announced.

All academic and research faculty of the Georgia Research Alliance universities who are involved in research projects with commercial potential are encouraged to submit proposals and attend the pre-proposal conference.

The ATDC was formed in 1980 by the governor and Georgia General Assembly to increase the high technology business base in Georgia. ATDC fulfills this objective by providing business assistance to start-up technology companies, supporting technology commercialization ventures, and assisting in economic development efforts in key technological areas around the state.

For more information on the Faculty Research Commercialization Program, you may contact Sheila Stanley at 894-3575.

Correction

Michael Valletutti (CSITL) was listed as not pictured in a photo of 1992 GTRI Research Awards Recipients. However, Michael was indeed included in the photo. THE CONNECTOR regrets the error.

Five Senior Technology Guidance Council members who rotated off the board were recognized at the Senior Management and Administrative Staff meeting on January 11. Pictured with GTRI plaques are John C. Handley (AERO); Laura J. Turbini (MARC); and Paul H. Wine (EOPSL). Not pictured are Thomas L. Starr, (MSTL) and Carl M. Verber, (EE). (Photo by Dayton Funk)

Events of interest

February 24
Admiral Richard Truly is scheduled to speak at the IEEE Atlanta section meeting, 6:30 p.m., Ferst Place Restaurant in Tech Student Center. RSVP to Leslie Leyes at 894-9290.

March 1
Basics of Using Hydra, 10 to 11 a.m., Room 239 Rich Building. Provides instructions for connecting to the Georgia Tech network, understanding and using your Hydra account for sending and receiving e-mail, reading newsgroups, using the "look-up" feature, and understanding what Unix means on Hydra. To register call the Office of Information Technology at 894-4660.

March 2
Introduction to NuPop, 9 to 11 a.m., Room 239 Rich Building. Hands-on seminar will introduce beginners to NuPop, the electronic mailer for PCs. The class will cover installation, configuration and use of the program. Bring your Hydra account and host information and a double-sided, double-density disk. To register call OIT at 894-4660.

Introduction to ELM and the PICO Editor, 2 to 3 p.m., Room 239 Rich Building. This hands-on class is designed to provide an introduction for terminal users to elm (electronic mail) and the user-friendly editor, PICO. Please bring your Hydra account information. To register call OIT at 894-4660.

March 3
Introduction to Oracle PL/SQL, 9 a.m. to noon, Room 239 Rich Building. This seminar is for those interested in developing more complex data processing or developing SQL*Forms 3.0 using Oracle. Topics covered will include advantages of using PL/SQL, variable declaration, SQL statements within PL/SQL, and error handling. To register call OIT at 894-4660.

March 4
Introduction to Eudora, 2 to 4 p.m., Room 239 Rich Building. Eudora is an electronic mail package that runs on a Macintosh computer. It is supported and highly recommended by OIT as an alternative to PROFS. To register call OIT at 894-4660.

"Learning from Visual Displays: The Effects of Correlational Structure and Redundancy," noon, Room 102 Pettit Building. Presented by Jim Knutson, School of Psychology, as part of the Graphics, Visualization & Usability (GVU) Brown Bag Series. Refreshments will be served.

March 5
Cognitive Science Colloquium Series, noon to 1:30 p.m., Room 102 Pettit Building. Presented by Ben Kuipers, University of Texas. Topic to be announced.

March 9
Oracle Database Administration, 9 a.m. to noon, Room 239 Rich Building. Topics covered in this seminar will include an overview of the Oracle V6 RDBMS and the Georgia Tech environment and support structure, installation and database design and creation, backup and recovery, security and account management, space management, and performance tuning. To register call OIT at 894-4660.

March 11
Oracle SQL and SQL*Plus, 9 a.m. to noon, Room 239 Rich Building. Topics will include subqueries, using SQL*Plus to define reports, set commands, SQL script files, substitution variables, using SQL character functions and SQL generating SQL. To register call OIT at 894-4660.

"The Future of Computer Graphics Research," noon, Room 102 Pettit Building. Presented by Jim Kajiya, California Institute of Technology as part of the Graphics, Visualization and Usability Distinguished Lecture Series. For more information, call 853-2682.

March 19
Introduction to Eudora, 2 to 4 p.m., Room 239 Rich Building. See March 4 listing.

Submissions for the calendar may be sent to the associate editors listed in the bottom left corner of page 8, or to Lea McLees, RCO/ GTRI, 0800. The deadline is the first Tuesday of the month before the event is scheduled.

Jim Kajiya of the California Institute of Technology will speak on "The Future of Computer Graphics Research," at Georgia Tech on March 11 as part of the Graphics, Visualization and Usability Distinguished Lecture Series.

Focus on Folks

Professional Activities

Aerospace Lab

Six papers were presented at the 31st American Institute of Aeronautics and Astronautics (AIAA) Aerospace Sciences Meeting in Reno (NV) January 11 through 14:

"Extension of CFD Techniques to Computational Aeroacoustics (CAA): A Comparative Evaluation," by **Marilyn Smith** and **Robert Stoker**;

"An Evaluation of Finite Volume Direction Simulation and Perturbation Methods in CAA Applications," by **Robert Stoker** and **Marilyn Smith**;

"Development of Circulation Control Technology for Application to Advanced Subsonic Transport Aircraft," by **Robert Englar, Marilyn Smith, Sean Kelley**, and **Rick Rover**;

"The Measured Acoustic Characteristics of Ducted Supersonic Jets at Different Model Scales" and "Screetch Tones from Free and Ducted Supersonic Jets," both co-authored by **Krishan Ahuja**;

"Manipulation of Upstream Rotor Leading-Edge Vortex and Its Effect on Counter-Rotating Propeller Noise," by **Becky Squires**, who worked on that project while a graduate student at North Carolina State University.

Computer Science and Information Technology Lab

Charlotte Jacobs-Blecha made a November 17, 1992 presentation entitled "Logistics in the Twenty-First Century: A Revolution is Coming," to the National Industrial Transportation League's 85th Annual Meeting, at the Inforum in Atlanta. She also attended the 1993 Material Handling Focus in Ft. Lauderdale (FL) in January. Jacobs-Blecha served as the chairperson for the Logistics Session, hosting speakers from the Defense Logistics Agency, the Federal Highway Administration, and Saturn, Inc.

Jack Wallace chaired a session on Visual and Graphical Simulation at the 1992 Winter Simulation Conference, December 13 through 16 in Arlington (VA).

Countermeasures Development Lab

Jason Collins and **Bob Kossler** attended the Society for Computer Simulation Western Multiconference January 16 through 20 in San Diego (CA). Collins presented their co-authored paper, entitled "Object Oriented Simulation Design of a Ray Tracing Model of Scattering on a Helicopter."

Economic Development Lab

On February 22, **David Swanson** left Georgia Tech and Atlanta for an assignment at the National Institute of Standards and Technology in Washington, D.C. He will be "on loan" for up to two years, and his assignment will involve helping NIST establish a national industrial extension service. Georgia Tech is viewed as having a model industrial extension program.

During Metro Atlanta Engineers' Week in late January, **George Lee** participated in a "Seminar for Volunteers in Education," speaking on the effectiveness of mentoring students to ensure their academic success.

Almost 200 people attended a January 7 reception honoring GTRI Director Admiral Richard Truly, held at the Georgia Tech Theatre for the Arts. Truly, his wife Cody, and Georgia Tech president John P. Crecine are pictured at the reception in front of an exhibit about Georgia Tech research. (Photo by Karen Gurty)

Sponsoring the event was the Georgia Section of the American Society of Civil Engineers.

Environmental Science & Technology Lab

Ted Courtney presented an invited paper, "Ergonomics Considerations in the Office Environment," at the December annual meeting of NASA's Occupational Health Program in San Jose (CA). In January, he lectured in Savannah and Macon on ergonomics program management for the Georgia Chamber of Commerce. Also that month, Courtney represented GTRI at the meeting of the ANSI Z-365 Standards Committee on Cumulative Trauma Disorder Control in Chicago (IL).

On January 7, **Ken Mahan** presented an overview of construction safety and the hazard communication standard to the National Electrical Contractors Association in Atlanta.

John Nemeth has been asked to join the Executive Advisory Board of Project Safe Georgia, a statewide effort to provide small businesses with effective strategies to improve workplace safety and health.

Radar & Instrumentation Development Lab

Brian Hudson presented a paper entitled "Synthetic Vision Demonstration Project, Tower Test Overview, and MMW Sensor Performance at Tower" during the Eighth Plenary Session of the Synthetic Vision Certification Study Team in Williamsburg (VA), January 13 and 14. He also received an award for outstanding research at an FAA meeting, which was presented at the team's final plenary session. Hudson represented GTRI at an awards dinner held the evening of the second day, accepting wall plaques for **Walter Horne** and himself in recognition of contributions to a successful test program.

Istvan Nogradi presented a paper entitled "Modified Hardfet Modulator" at the Union of Radio Scientist Internationale (URSI) Meeting during January.

Jim Scheer, Nick Currie, Sam Piper, and **Mark Richards** participated in a Small Target Activated Fire and Forget (STAFF) In Process Review (IPR) Team conducted for Picatinny Arsenal (NJ). Their work involved review of Alliant Techsystems' progress in the development of STAFF.

Personnel News

Threat Systems Development Laboratory
Terry Snipes has terminated.
Paul Meeks has transferred to Southern Tech.

Microwave and Antenna Technology Development Laboratory
Fred Kirksey, Michael Horn, John Jones and **Bill Nolte** have terminated.

Radar and Instrumentation Development Laboratory
Rachel Sluss-Ward, Jim Kurtz and **Allan Moore** have terminated.
Frank Williamson has retired.
Wayne Cassady has become associate lab director of RIDL.

Personal Notes

Cradle Roll
Rose Anne and **Dan Hawes** (TSDL) welcomed their second son, Issac Daniel, born January 15.

Barbara and **Rick Moser** (MATDL) are the proud parents of a baby girl, Rachel Leigh, born January 25.

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