Advanced Automation Lab Opens in CRB

by Martha Ann Stegar, RCO

GTRI unveiled its new Advanced Automation Research Laboratory at an open house April 10. The state-of-the-art facility is equipped with two robots, three machine vision systems, and a variety of industrial and computer support tools. It will be used for a range of initiatives in manufacturing technology and will be a resource for all of GTRI. The new laboratory is set up in the high bay area on the ground floor of the Centennial Research Building.

Current research in the facility principally involves robotics research and machine vision inspection for the poultry industry and use of commercial vision technology to detect fabric flaws in automated apparel fabrication plants. One of the many special challenges engineers are working on is developing "end effectors" (grippers) for robotic handling of poultry, which is soft and slippery—unlike objects robots normally handle. Others include investigating the use of color in machine vision for both food and fabric inspection, as well as three-dimensional and X-ray imaging of deboned poultry meat.

"While the two robot systems in our lab are being used commercially in other industries," says Craig Wyvill, director of the Agricultural Technology Research Program, "they have never been used in the poultry industry before. We're trying to adapt them to the speeds and operating environment of poultry processing while meeting the industry's economic constraints—not an easy task.

"As for the vision area," he adds, "inspection demands in both the poultry and apparel industries are very taxing to human workers. We believe the quality of the inspection process can be improved with the introduction of computer vision. The challenges in image acquisition and analysis are substantial, however, and our studies are defining new frontiers in these unique application areas.

Dignitaries attending the open house included State Senator Terrell Starr, who was instrumental in securing a $250,000 funding improvement package for the robotics research, and Abit Massey, the Executive Director of the Georgia Poultry Federation. Robert Hobbs, from the Legislative Budget Office, and Bill Tomlinson and John Brown, from the Governor's Office of Planning and Budget, along with key members of the Georgia poultry industry also were in attendance. Demonstrations of key systems capabilities in the lab were given by Tom Single and Gary McMurray (SCARA robot), Chris Thompson and Wiley Holcombe (articulated arm robot), Wayne Daley and Richard Carey (machine vision development), and Chuck Ross (advanced sensors).

New Programmatic Units Named

GTRI has designated the initial alignment of programmatic units under the restructuring scheduled to take place July 1. According to Bob Shackleford, initial assignments of staff and programs to the new units are being finalized and will be announced soon.

"Selections for leadership positions will be based on assessments of leadership skills and effectiveness," Shackleford says, adding "it is anticipated that the initial leadership positions for many of these units will be the same as those for the Division predecessors. For new units, assignment will be announced shortly."

The heads of off-site units probably will report to OOD for coordination of program development activities, Shackleford says. Their staffs will be assigned to program areas/units on the basis of program continuity subject to constraints dictated by sponsor relationships.

The programmatic units are named below. They will operate as partial cost centers, except for the Program Incubators, which may or may not be partial cost centers.

DIVISION-LIKE UNITS

- Systems Programs
  Radar Systems Applications
  Radar Modeling and Analysis
  Radar Systems Development

- Science and Technology Programs
  Physical Sciences
  Materials Science and Technology
  Environmental Science and Technology
  Communications
  Electromagnetics
  Environmental Effects
  Electromagnetics Science and Technology

Electronic Support Measures
  Engineering Sciences
  Concepts Analysis
  Countermeasures Development
  Threat Systems Development
  Advanced Threat Technology
  Microwave and Antenna Technology
  Development

Electro-Optics
  Computer Science and Information Technology
  Aerospace Science and Technology
  PROGRAM OFFICES
  EW Techniques Analysis
  Special Operating Forces Observables

TECHNOLOGY TRANSFER/OUTREACH
  Economic Development
  PROGRAM INCUBATORS
  Acoustics/Vibration/Flow Control
  Manufacturing Technology
  Technology Policy
Spauschus Assesses Years at GTRI

In his ten-year career at GTRI, Dr. Hans Spauschus was one of its key players, both as a laboratory director and as Director of Internal Research. Following are some of his observations about GTRI that came out of a CONNECTOR interview prior to his retirement.

**Connector:** Dr. Spauschus, in looking back over the past ten years at GTRI, what are some of the major changes you have seen?

**Spauschus:** In 1980, when I first heard that GTRI, then the Engineering Experiment Station, was looking for a laboratory director, the sponsored research base was about $35 million annually. It’s now over $100 million. The decade of the 80’s has been one of spectacular growth for GTRI, largely because we had the right services available to offer to a strong and growing DoD (Department of Defense) market. I know of no other R&D organization that has fared as well during this time period.

**C:** Looking ahead, what do you foresee for GTRI?

**S:** Looking ahead to the 90’s, GTRI will need to broaden its base of sponsor support as DoD requirements for R&D change or diminish. It’s doubtful that other federal agencies such as DOE and EPA, where we can compete, will offer significant new opportunities. Although we have been proud of our level of funding from industry, the percentage is very small and has, in fact, fallen off in the last year.

**C:** Why is that, and how can GTRI better serve the technical needs of industry?

**S:** This is due in part to our lack of in-depth expertise in technologies important to industry in part to contract practices that are not compatible with industry requirements. Industry is unlikely to fund work at GTRI unless it fits into their short-term or long-term plans and unless the GTRI capabilities in that field of technology are recognized as truly outstanding and unique. We can’t equate our offerings to those of the academic schools that have the advantage of recruiting as a basis for interest.

Regarding contractual requirements, industry is interested in a fixed price, a prompt initiation of work and a firm commitment to produce timely results. Contrary to prevailing opinions, I believe that industry is generally fair in terms of ownership of technology rights, when properly approached. The procurement procedures that work when dealing with government agencies are not conducive to establishing industry contracts, although we claim to be flexible in our requirements.

**C:** What are Georgia Tech’s special strengths in technology?

**S:** Georgia Tech has a unique opportunity to establish a broad technology network ranging from basic research through industrial implementation. If our resources are effectively integrated. The existing elements at Tech include academic faculty and research centers for basic R&D; GTRI for applied research, development and testing; the field offices for maintaining direct relationships with large and small state industrial firms; and the Advanced Technology Development Center for nurturing new technology-based enterprises. Each of these units is busy pursuing its own interests, and little progress has been made in forging the linkages that would help the Institute achieve recognition as the leader in fostering superior technology.

**C:** What goals would you recommend that GTRI set for the future?

**S:** Restructuring is under way in GTRI and it would be irresponsible to comment critically on the occasion of my departure. After ten years within the organization, however, recommendations of future goals would seem appropriate. I see three areas as especially worthy of attention:

- Diversification of capabilities and funding base by strengthening the organization in applied science and engineering disciplines such as physics, chemistry, materials science, mechanical engineering, and aerospace engineering. These areas won’t grow or survive without advocacy at the director’s level.
- Promotion and management of intellectual property as a source of income through licensing and technology transfer to industry.
- Flexibility in cost of GTRI services to sponsors to reflect market and competitive variances.

**C:** Give us your assessment of the Internal Research Program and STGC.

**S:** The GTRI Internal Research Program and its monitoring through the Senior Technology Guidance Council represent outstanding innovations for interjecting new ideas into a mature organization. Internally funded research releases pent-up creativity from a professional staff that has been restrained to follow sponsor contracts. The internal research procedures that have been developed for collecting, screening, awarding and monitoring good ideas through internal research projects are working smoothly. The program encompasses worthy goals such as technology transfer, academic linkages, student participation, and enhancement of professional recognition—all of which are built into the program. I can’t say enough good things about the competence and dedication of the individuals serving on the Council. They are great people.

**C:** What are your views on restructuring?

**S:** GTRI is at a crossroads. The future is uncertain. We are not clear about our role in the new Georgia Tech organization, and our future business base is uncertain. Restructuring offers GTRI the opportunity to reassess its image and mission—to determine what it wants to be and then to go after it. I wish all of you the best in your endeavors to meet the challenges that lie ahead.

Team Characterizes Very-Large-Pore Molecular Sieve

by Martha Ann Stegar, RCO

In a neat bit of detective work, an interinstitutional team led by Rosemarie Sostak of GTRI has succeeded in identifying and characterizing a very-large-pore molecular sieving whose properties had eluded other researchers since it was patented by Union Carbide in 1982. Molecular sieves are used widely in industry as catalysts and absorbents, and large-pore sieves are especially important in the catalytic cracking of petroleum.

The three principal investigators—Dr. Sostak, Ms. Kristin Sarby of the University of Oslo (Norway), and Dr. Judith Ulan of the National Center for Electron Microscopy at Lawrence Berkeley Labs—revealed their breakthrough discovery at the fifth annual meeting of GTRI’s Multi-Clienze Zeolite Research Program. The meeting, attended by representatives of eight corporate sponsors, was held March 29-30 on the Georgia Tech campus. They are the first to discover that this synthetic material—the aluminum phosphate molecular sieve AlPO₄—8—contains very-large-pore 16-member rings similar to those of a material called VPI-5, which until now had been thought to be the only material with this structure. AlPO₄-8, prepared by mild thermal treatment of VPI-5, had therefore been thought to contain a collapsed structure. The collaborators determined that AlPO₄-8 does maintain its 16-membered ring, but that its molecular layers slip sideways like an earthquake fault, in effect narrowing the pore channel.

Although such thermal transformation limits the usefulness of these materials, an understanding of their structure and instabilities will aid in synthesizing similar large-pore molecular sieves for use in petroleum refining, Dr. Sostak says.
Tech Sails through Security Check

In its first major unannounced security inspection in five years, Georgia Tech came through with fly-by-wire colors. "We didn’t have any deficiencies for the entire facility," says Director of Security Bob Lang. "Compared with our last inspection, it appears we have done an outstanding job in bringing ourselves into conformance with the required rules and regulations."

From March 19 through 29, six inspectors from the Defense Intelligence Agency’s Security and Protection Services team inspected Georgia Tech to a very close evaluation of every aspect of its operations involving classified material. The only deficiencies cited involved: reproduction of working papers without bringing them into accountability, incomplete audit trails on approved classified information systems, transportation of classified documents to CCRF and return without notifying Security, and failure to properly mark this media externally and internally with the proper information. Lang says these deficiencies and some recommendations will be fully explained shortly in The Security Bladket. The inspectors outlined two stages of programs for review from the RFP stage to close-out instructions. Lang says, "Our performance in this area was excellent, Journals all the credit going to our program people knowing what security is and how its implemented."

Lang praised the employees of Tech and GTRI for the "heightened security posture regarding the use of classified material." He called upon everyone to "continue to thank everyone involved. You are security and we know it."

OOD Names Special Assistant

Andrew Harris has joined the staff of GTRI’s Director’s Office effective April 2, as special assistant to the director for legislative and external affairs. To date, he had extensive experience in state government. Prior to coming to GTRI, he served as special assistant for governmental affairs at the Georgia Department of Technical and Adult Education. He also has been a policy analyst with the Governor’s Office of Planning and Budget and a research analyst for the Legislative Budget Office.

Harris has a bachelor’s degree in political science and a master’s in public administration, both from the University of Georgia. He recently was elected to the Decatur City Commission. Harris will work through the President’s and Chancellor’s offices to serve as liaison between GTRI and federal, state, and local components of state government. He will work with the Georgia congressional delegation, municipal officials, and civic, community and professional associations as appropriate. He also will assist in coordinating GTRI public and community relations through the Research Communications Office and the News Bureau.

PROFESSIONAL ACTIVITIES

ECONOMIC DEVELOPMENT LAB

Melanie Largin has earned registration as a Certified Industrial Engineer and Rick Duke designation as a Certified Industrial Developer. At the Globo ’90 International Environmental Conference, Eddie Valentine presented a paper, "Managing Environmental Challenges in the Food Processing Industries.

Nancy Davis received a Distin- guished Service Reviewer newsletter, "Environmental Spectrum, in the Society for Technical Communication’s annual competition. She and Stephanie Babbitt earned an STC Award of Achievement for "Computer Control of Poultry Houses," one in a series of Engineering Research Reviews.

In early March, Claudia Huff and Susan Griffin presented a workshop, "Getting in Touch with Your Creativity," for the 2nd Annual Conference of the Village Writers Group. In February, Susan Huff has been selected to serve a three-year term on the Board of Trustees for Leadership Georgia, an organization that provides educational program affiliated with the Business Council of Georgia.


Tech’s industrial extension efforts recently were cited by the National Governors Association and the Congressional Office of Technology Assessment.

ELECTROMAGNETICS LAB

Billy Livesay has won a Gold Standard Award from Four Pi Systems Corporation for the best technical paper on electronics manufacturing written in 1988. The paper was authored by Eugene R. Hnatek of Viking Labs/Honeywell and entitled "Quality Measures of High Pin Count Fine Pitch VLSI Packages," was presented at the IEEE International Test Conference in Washington, D.C. Livesay and Hnatek, along with Dr. Joel Donlin of the Army Missile Command, organized and conducted the first Georgia Tech short course on "Practical Insights into Microelectrode Quality and Reliability Issues." It will be offered for the second time May 6-11.

In January, Dr. Livesay, Andy Gill, and Garth Freeman a paper, "Microphotography of Solder Joints," at the SMART VI EIA-IPC conference in Lake Buena Vista, Fla. Dr. Livesay also presented his paper, "Defect and Stress Degradation of Microcircuit Materials," to the Indiana Chapter of the IEEE ES March 30.

Referred journal articles by members of the Molecular Sciences Branch include: Mike Nicovich, Christie Shackleford, and Paul Wine, "Kinettes of the Br, CH\CHO Photochemical Reaction," Journal of Photochemistry and Photobiology: A, Chemistry, February-March; Nicovich and Wine, “Kinetics of the Reactions of O(3P) and CI(P) with HBr,” and Nicovich, Wine and Kevin Kret- ter, “Kinettes of the Reactions of O(3P) and Br(P) with O3,” Interna- tional Journal of Chemical Kinetics, March; Nicovich, Kretter and Wine, “Kinetics and Thermochromy of Cl Formation from the CI in a Chemica Association Reaction,” Journal of Chemical Physics, March 15; Nicovich, Shackleford and Wine, “Kinetives and Thermochromy of Reversible Adduct Formation in the Reaction of CI with O3,” Journal of Physical Chemistry, April 5. In addition, a paper by Wine and William Chameides (Earth & Atmospheric Sciences), entitled "Possible Atmospheric Lifetimes and Chemical Reaction Mechanism for Selected HCFs, HFCS, CH3CL and Their Degradation Products Against Dissolution and/or Degradation in Sea-


ELECTRONICS & COMPUTER SYSTEMS LAB

In March, Eric Barnhart made two presentations: on communications and direction finding in a short course on Advances in Millimeter Wave Applications and on network environmental in the new generation of Modeling and Simulation of Communications Systems, which he developed at the Illinois Institute of Technology and Prediction Systems, Inc. Barnhart also was invited to the IEEE/DARPA Tactical Communications Conference in Ft. Wayne (IN) this month, Barnhart organized and chaired a session on Air/PLI Systems and Technologies, David Possevitch presented a paper, coauthored by Bobbey Wilson and Bruce Kim, on "Air/PLI Features of Foreign Communications Transm- itters," and Steve Sharpe presented a paper, coauthored by Richard Moss and Bruce Warren, on "Adaptive Communications Systems: The Future." Barnhart also has been appointed to the IEEE Communications Society’s Data Communications Committees staff.

ENERGY & MATERIALS SCIENCE LAB

Three student employees will make presentations at the 57th Annual Meeting of the Georgia Academy of Science May 4-5 at Mercer University in Macon. They are: Alice Long, "Relationship between the Cation Additives and Structure of Alumino-Phosphate Molecular Sieves"; Madulika Chaudhary, "Catalytic Cracking Activity of SAPO-5 and SAPO-11 Molecular Sieves Crystal- lized in the Presence of HF"; and Vicky Smith, "Improving the Effi- ciency of Zeolites for the Removal of CO2 from Air Recirculation Systems."

Joe Whitehead will present a paper, "Role of Angi-Vegetative and Dispersed Liquid Crystals Displays," in May at the Society for Information Display. Coauthors are J. W. Doane, J. L. West, and D. S. Fieldly of Kent State University.

RADIATION & INSTRUMENTATION LAB

In March, Guy Morris was guest lecturer at the IEEE course, "Aspects of Modern Radar," held in Atlanta. He spoke on EECM and selected topics from his book, Airborne Pulse Doppler Radar.

Jim Scheer organized and Evan Chasial chaired a session on "Coherent Radar System Performance" at the IEEE Southcon’90 conference in New Orleans. In March 20, they presented a paper on "Coherent System and Sub-System Performance Estimation and Implementation," and Mark Richards gave a paper on "Amplitude, Phase, and Mismatch Error in the Discrete Fourier Transform Processing."

Employees who received degrees in March include: Scott Bostater, MSEE; and Mark Wasikowski, PhD in AE.

Fred Edgil recently invited to give the keynote address at Radarcon 90, held in Adelaide, Australia, April 18-20. He spoke on new developments and emerging applications in radar. He is well known for his book, Radar Design Principles, Signal Pro- cessing and the Environment, and has a wide range of experiences in U.S. military radar projects.

RESEARCH COMMUNICATIONS

John Truesdell received the Medal for "Excellence in News Writing" from the Council for the Advancement and Support of Education (CASE). RESEARCH SECURITY

Ed Gilmore recently received his GA Board of Regents’ Award in Engineering.

SYSTEMS ENGINEERING LAB

The 12th Annual Electronic Warfare Conference and Workshop will be held April 10-12 at the Cobb County Research Facility.

At the Biennial Conference on Psychology in the DOD, held this month at the Air Force Academy, Ted Dell presented a paper on the "Psychophysical Requirements for Three-Dimensional Auditory Displays," and Mike Kelly presented a paper on "Human Factors in the Manufacturing of Military Uniforms." Dell also recently had an article on "Enhanced Detection with Bimodal Sonar Displays" published in The Journal on Human Factors.

Phil West will present a paper entitled "Approximate Switching in Markov Filtering for Nonlinear Systems" next month at the American Control Conference.

Ivan Howitt’s paper, "Radar Warning Receiver Emitter Identification Proceedings of the 1990 Joint Conference on Neural Networks," has been accepted for presentation at the SPIE CE-7 Conference on Neural Networks. The Georgia Tech Student Government Association named Mike Purman Fellow of the Year for his dedication to teaching, in both classroom and laboratory.

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QUESTIONS, ANYONE?

by Charles McCullough, HRD

I'm a research engineer and there are several options I'm considering to speed up completion of my advanced degree: going on a leave of absence, going on reduced time, and/or becoming a GRA. Which is the best course of action?

This is a perfect application for that all-purpose personnel answer: "It depends." That's because there are vast differences in the effect these three events have on everything from insurance to retirement to what your education will cost you. The best one for you is the one that is best for your personal circumstances. To help you make an informed decision, we will look at these options in the next two issues of the Connector. This month, we'll cover the leave of absence.

Leave of Absence

If you go on a leave of absence without pay to finish up your advanced degree, it would be an educational leave of absence without pay. Generally, educational leaves are granted for a maximum of one year, but only if there is a reasonable expectation that you will return to your faculty position at the end of the leave. While approval is granted for most educational leaves of absence requested by members of the faculty, a leave is not something to which you have an undeniable, automatic right: you must request it and obtain all necessary approvals — up through and including the Board of Regents — before it becomes a reality.

Salary: Naturally, your salary stops on Day 1 of a leave of absence without pay. You still continue to occupy a position in the GTRI budget and that budget position's funding will remain the same as your current salary; but your position will not receive any new fiscal-year salary increases.

Vacation and Sick Leave: You won't accrue vacation and sick leave during your leave, but all of your unused vacation and sick leave will remain "on the books" and available for you to use when you return.

TRS: Your Teachers Retirement System (TRS) account remains active. Because you are earning no salary, neither you nor the State make any contributions to your leave; however, all time during which you are on an educational leave of absence is applicable toward your "years of service" with TRS.

Health Insurance: Your health insurance will remain intact and in effect during an educational leave of absence. The good news is that Georgia Tech will continue to pay its portion of your health insurance premiums during an educational leave, while you continue to be responsible for only your portion of the health insurance premiums, usually via quarterly invoices sent to you from the Benefits Section of the Personnel Division. The potentially bad news is that if you are a participant in one of the Health Maintenance Organizations (HMOs) and your educational endeavors will take you out of your HMO's service area, you may very well have severe limitations in what type of health care you may seek while you're away. Read your HMO benefits booklet carefully to determine how well you'll be covered if you're moving away.

Life Insurance: There's no change in your Tech-paid basic life insurance coverage, and the supplemental life insurance, based on 1x, 2x or 3x your salary remains the same as long as you continue to pay the premiums.

Educational Costs: While on leave of absence, you are not eligible to participate in the Tuition Assistance Program for Research Faculty. If you are recognized as an out-of-state student, you will also lose your eligibility to register at Georgia Tech or any other unit of the University System of Georgia on the payment of in-state fees.

Other Options

If you're thinking of reducing your time to devote more efforts to your educational pursuits, refer back to the May-June 1999 Connector or PROFS CMCCULLO and I'll send you a reprint of that column. The Graduate Research Assistantship option will be the subject of next month's column.

PERSONNEL NEWS

ECONOMIC DEVELOPMENT LAB
Barbara Call is a new administrative secretary in the Environmental Monitoring and Research Branch.

ELECTRONICS & COMPUTER SYSTEMS LAB
Welcome to newcomers Philip K. Kelly, RE II; and Charles Albert and Lois Sawiour.

RADAR & INSTRUMENTATION LAB
The Technology Development Division welcomes Brian Miller, student assistant; John Middleton, laboratory helper; and Matthew Homiller, co-op.

SERVICE GROUPS
New employees are Michael McCaskill, mail clerk; and Ann Redwine, clerk IV, both in Human Resources.

SYSTEMS ENGINEERING LAB
Ken Thompson was named employee of the month for January for playing a key role in contract development and defining the original system concepts of what today is a multimillion-dollar project. He served as lead software developer, and later was associate project director and leader for LRU testing and subsystem integration.

The Concepts Analysis Division welcomes RS II Dana R. Stocks, who came in January from Pratt & Whitney. She earned her master's in mathematics from Auburn University. Charlene Reid has returned to CAD as a word processor specialist.

Timm Floyd began work March 26 as a RE II.

Resignations include Jean Swank, Chris Hall, Tanja Judy, Todd Calhoun, Mary Ann Cooper, and Patti Morgan.

Personal Notes

EDL: The work was busy in March. Ted and Patti Parkhill had a baby boy, Shane; Lydia and Alan Barfoot also had a son, John; and Martha and Rick Tate had a baby girl, Erin.

ECISL: Rose and Brian Farris are the proud parents of a baby son, Dillon.

HRD: Lynn Gay was married to Kevin Burt March 24.

RAIL: Condoitons to Sandra Saxon, whose mother passed away in early April. Congratulations to Bill and Jim Byrum on the birth of Julie Hope in March.

SEL: Marianne and Nick Pomponio welcomed their third son, William Thomas, born February 7.

One of the Georgia Tech basketball team's most enthusiastic fan-clubs — EMSL — wore Tech T-shirts to watch games on game days. We have no scientific proof of cause and effect, but it is a fact that they fell to wear these T-shirts the day of the UNLV game. Some of them are shown in front of the Baker Building before the Michigan State game. Left to right, Joe Harris, Sheron Meyers, Garth Freeman, Tom Starr, Ginny Myers, David McAvoy, Ruth Thompson, Fred Consiglio, Elesse O'Neill, Joe Lichtenwanger, and Jack Lackey. (Photo by Joe Schwartz)

Picnic Coming Up

GTRI will have its annual Spring Fling picnic Thursday, May 24, 11:00 a.m.-2:00 p.m. It again will be at the Burger Bowl, across from the Police building on Homphill. There will be good food, games, prizes galore, and a surprise event not held before. Picnic chairman Lee Hughley says lots of volunteers are needed. In case of rain, the picnic will be held on the following Tuesday, May 29.