

Bell Labs News

MARCH 30, 1992

Exptools Celebrates Tenth Anniversary

BY FRANK MYERS

On March 18, about 50 AT&T Bell Laboratories developers celebrated the 10th anniversary of Exptools with a "virtual" party held simultaneously in Murray Hill and Indian Hill. Using videoconferencing facilities, the celebrants, including some originators of Exptools and current tool providers and administrators, linked cakes at each location by video to form one "cake."

Besides marking the creation of an AT&T resource that allows developers to share their best techniques with colleagues, the party also provided an opportunity for the volunteer providers and administrators to meet each other, some for the first time, and recall the early days of Exptools.

Exptools are a collection of grassroots software programs that reside on AT&T computer systems. Ranging in complexity from simple utility programs to powerful shells and programmable editors, they are maintained by individual authors, called providers. Providers are responsible for developing, updating, and supporting the tools, which they do outside their regular duties. At present, there are some 160 pro-

grams and 300 commands that offer capabilities not available under the UNIX® system. Some of these, such as the *vi* screen editor, were eventually adopted as company-supported tools.

Although Exptools were first offered officially in 1982, they actually were launched about 18 months earlier when a UNIX system administrator covertly created a global directory on several Indian Hill systems. It contained the *ex* line editor and the *vi* screen editor. Before long, other developers began contributing their tools for installation and the number of machines offering these grassroots tools grew to 20.

When the system administrator was about to move to a new assignment, he disclosed his secret to his supervisors. The Indian Hill UNIX Support Group quickly realized that removing the tools would be impractical because so many people were using them to meet software development schedules. So, in February 1982, the UNIX Support Group reached an agreement with four leading tool providers. The agreement included defining a standard set of software tools to reside on Indian Hill machines, increasing security, and starting administrative procedures



Exptool Administrator George Otto (above) in Murray Hill, and Ralph Loura (on screen) in Indian Hill, simultaneously light candles on cakes during the tenth anniversary celebration of Exptools, a collection of grassroots software programs.

for updating and supporting the tools. The original founders were Greg Guthrie, Warren Montgomery, Joe Steffen and Mike Veach.

Initially, this agreement covered only about two dozen Exptools on a score of Indian Hill machines. Some time later, Paul Lustgarden

and George Otto were instrumental in bringing Exptools to Bell Labs machines in New Jersey. Today, about 50 megabytes of Exptools are available on about 1,600 machines throughout AT&T. They have become so popular that some organizations have

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Security Team Halts Spread of Virus

BY CHRISTINE WARING

Friday, March 6, 1992, was a typical, uneventful day for most Bell Laboratories employees: They arrived at their offices, turned on their personal computers, and went to work. But a few unfortunate souls will remember the date for a long time. When they turned on their PCs, they unknowingly triggered the deadly Michelangelo computer virus, which destroyed all the data on their hard drives.

Only seven Bell Labs employees reported being affected by the now-famous computer virus, which struck on Michelangelo's 517th birthday. The low casualty rate can be attributed to national media coverage and to diligent efforts by the Bell Labs Computer Security group at Murray Hill.

"We began warning employees about the Michelangelo virus in late January through our 'Security Alert' e-mail service," recalled Bob Garrity, an MTS in the group. The service, free to AT&T employees, advised PC users to purchase software to detect and remove the virus from their personal computers.

The entire Bell Labs Computer Security group then geared up for the panic in early March by sending a second "Security Alert" electronically, and distributing a desk-to-desk

bulletin just before Michelangelo's birthday.

"We came across a free anti-virus program offered by Symantec Corporation the week of March 6, so we distributed a desk-to-desk notice to let people know about it," explained MTS Diana D'Angelo. The group's efforts paid off: Over 250 people called the Bell Labs Computer Security Helpline telephone number two days before the virus was scheduled to strike, requesting the free software and asking how to prepare their PCs. According to D'Angelo, hundreds of additional copies of the software were distributed throughout Bell Labs, through a network of contacts her group established at each location.

D'Angelo and Garrity noted that all the publicity and precautions were not unfounded, as some employees did detect and destroy the virus before March 6. In addition, a significant number of other viruses also were discovered by employees as they ran virus detection programs while searching for Michelangelo. Unfortunately, seven employees reported discovering the virus too late.

"It's hard to say why some PC users still got hit by Michelangelo, despite all the warnings," Garrity said. "We know a few people were away at the time the Information

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HDTV Premiere Showcases Technology



As FCC testing of the AT&T/Zenith high-definition television system began in Arlington, Va., 15 journalists from national media visited the HDTV development labs in Murray Hill to see the system's theater-quality pictures and hear its CD-quality sound. Bell Labs HDTV project director Arun Netravali discussed the system's unique video compression algorithm. Vice President Don Leonard and Zenith Vice President Wayne Luplow also addressed the group.

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LETTERS TO THE EDITOR

Women's History Month

The article entitled "A Patchwork of Many Lives," (March 16) was very interesting and I was certainly impressed by the achievements of these women. But I was very, very disappointed that not one administrative/support staff female was included in this piece. Are there no achievers in this area? I doubt that. Perhaps the article should have been entitled, "A Patchwork of Technical Lives," as it certainly did not reflect achievements and leadership abilities of the women in the administrative/support functions of the company.

Ludmilla L. Lawnicki, Indian Hill

Speech Recognition

I was very disappointed at the article about the Speech Recognition System (March 16). While you justifiably gave significant attention to the fundamental speech technology in back of the application (and to the research and Conversant® development that made it a reality), you totally ignored our organization's role in this project.

Voice Response Call Prompting will be an adjunct of the 5E/OSPS switch. My group has spent the past

two years working to interface the Conversant to the 5ESS switch and prove in the application. Other groups here at Indian Hill have also played a major role. None of this was even mentioned in the article. You fell into the same trap that the national media did, i.e., "Bell Labs=New Jersey." Please dig a little deeper next time!

Sam Salchenberger, Indian Hill

Don't Ask

Udaya Shankar's poem "You Shouldn't Ask That, Kid" (Feb. 3) vividly reminds us that pressure to mindlessly follow along poisons the questing spirit, the spirit which keeps asking "why?" Let us take heed. Questing spirits drove the pioneering research that made Bell Laboratories world famous, and are still needed today to keep it technologically thriving.

However, I submit that asking "why" and following needn't be mutually exclusive. In fact, they can fit together like a glove upon a hand. Asking "why" about beliefs and practices expresses our intent to discover whether something worth following stands behind them.

Daniel R. Levy, Indian Hill

Attention U.S. Savings Bond Holders!

The *Bell Labs News* wants to talk to employees who purchase U.S. Savings Bonds with specific goals in mind. If you buy U.S. Savings Bonds, we'd like to hear from you by April 6. We welcome responses ranging from the practical (i.e., funding education,

buying a house) to daring and unusual ambitions.

Please send your response to: Loren Osterman, HL 1A-425; attmail@losterman; or fax (201) 564-4104. Please include your name, title and location.

EXPTOOLS

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refused to be moved to new computers unless the tools are installed first, according to Otto.

During the party, several anecdotes were recounted to underscore the importance of Exptools as an AT&T resource. Alan Hastings, a former Exptools administrator in Indian Hill, recalled he once inadvertently introduced a bug into the *lf* command. "I realized it as soon as I finished the reference file and quickly sent out an update. Meanwhile, the PBX at Indian Hill went into overload because everybody picked up the phone at once to call the Help desk," Hastings said. "I got a call from the supervisor of the Help desk, who was very irate that I would do this during business hours," he added.

Otto, currently a central Exptools administrator, recounted an incident when his supervisor wondered whether enough people in New Jersey really used the tools to justify the system space they occu-

ried. "With his approval, I sent out an e-mail message that said, 'My boss wants to remove Exptools from the machine and if you don't agree with this, please send your comments to his e-mail address.'"

Early the next morning, Otto's supervisor complained he was inundated with messages and could not get his work done. Exptools stayed on the machines.

Otto recalled another meeting in which one committee member, the communication center manager for an AT&T manufacturing plant, described an episode when he discovered Exptools were on his works' machines.

The manager told his people that he never authorized these tools and to remove them. After his instructions were carried out, the manager told the committee, "all manufacturing stopped. Then I told my people to put the tools back and the factory started working again." Then, Otto recalled, the manager told the committee, "This was my first lesson in the importance of Exptools." ■

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Numbers

It is estimated that AT&T's network transmits more than 3.7 billion fax pages a year, and that the fax service industry as a whole will grow by some 250 percent during the next five years.

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PRODUCT NEWS

Country-to-Country Calling Service

AT&T announced World Connect® Service that allows Americans traveling or living abroad to place calls to and from 34 countries using their AT&T Calling Card or Universal Card. The service, which is accessed through the AT&T USADirect® Service number, lets users place calls with the assistance of an English-speaking operator.

Callers using the service give the AT&T operator the country code, city code and local number of the person they wish to reach, along with their AT&T Calling Card or Universal Card number, and the operator completes the call. In countries with touch-tone capabilities, callers will be instructed in English to enter the dialing and billing information themselves.

The service makes it easier for Americans to place calls in foreign places because it eliminates language

barriers and the need to understand country-specific calling procedures. In addition, users will have a single record of calls on their AT&T Calling Card or Universal Card bills, including the day and time a call is made, the originating and terminating countries, and the length and price of the call.

AT&T World Connect will be available on April 29, pending FCC approval, in the following countries: **Caribbean Region:** the Bahamas, St. Maartin, Saba, St. Eustatius, Curacao, Bonaire; **Pacific Region:** India, Korea, Taiwan, Guam, Hong Kong, Philippines, Malaysia, Saipan; **Europe:** Austria, Sweden, Finland, Norway, Denmark, Hungary, Turkey, France, Luxembourg, Portugal, Belgium, the Netherlands, Israel, Egypt, Ireland and the United Kingdom; **Americas:** Guyana, Bolivia, Colombia, and Surinam.

Safari Slims Down

NCR has introduced the NCR System 3170 Notebook Computer, a 25-megahertz mobile computer that is 30 percent lighter, 25 percent smaller and 50 percent faster than the NCR Safari NSX/20. Designed for use by mobile sales and service representatives, the 4.9-pound computer features communications capabilities that allow users to send and receive wireless faxes and mail messages.

The lightweight computer is available as an 80-megabyte disk system or a 120-megabyte disk system. The 80-megabyte model includes two megabytes of random access memory and an integrated 2,400/9,600 bit-per-second data/fax/cellular modem.

The 120-megabyte model features four megabytes of random access memory with an integrated 14,400/9,600 bit-per-second data/fax/cellular modem.

Software programs installed on both models' hard drives include MS-DOS 5.0a; Microsoft Windows* 3.1; BitFax 2.0/SRR, which allows a user to send a fax from any windows application; AT&T Mail Access PLUS 2.3 for Windows;™ an on-line tutorial to the computer's use; a guide to the Windows environment; and utilities.

The 80-megabyte model costs \$5,399 and will be available in April.

*MS-DOS and Windows are trademarks of Microsoft Corporation.

CorporateLink Program Introduced

AT&T and American Express Travel Related Service will provide enhanced expense management and telecommunications services through a program called "CorporateLink." The program adds the capability of the AT&T Corporate Calling Card to the American Express Corporate Card. The service is targeted at small businesses.

Beginning in late April, small businesses that are American Express Corporate Card members can automatically charge all of their travel, entertainment and business expenses, including AT&T telecommunications charges with select discounts, on a

single card. The CorporateLink program is also available to qualifying small businesses that are AT&T Corporate Calling Card customers.

Some of the benefits available with the new program include detailed expense tracking from American Express Quarterly Management Reports, and a 10 percent savings on AT&T Language Line® Services and AT&T Message Service. In addition, Corporate Card accounts that spend at least \$30 a quarter on AT&T Corporate Calling Card calls will receive a 10 percent saving on their total AT&T long-distance charges.

'Live from Bell Labs' Posters

Posters announcing "Live from Bell Laboratories," a television broadcast for the nation's schools to be held during National Science and Technology Week (April 26 - May 2), have been disappearing at a rapid rate from bulletin boards.

If you would like to obtain copies of the poster and the accompanying curriculum guide, send a self-addressed label to "Live from AT&T Bell Labs," HL 1L-421. Indicate on

the label how many sets of posters and guides you would like. These materials are appropriate for 5th- to 10th-grade science classes.

"Live from AT&T Bell Laboratories" airs Wednesday, April 29, 10:00 to 11:00 a.m. (EDT), and is produced as part of AT&T's commitment to science and math education in the nation's schools. A story about the program will appear in the next edition of the *Bell Labs News*.

INDUSTRY WATCH

Japan's
R&D
Spending
Slows

Major industries in Japan have begun to freeze, or even to reduce, what they spend on research and development. The cutbacks suggest that the global recession that has so dominated Western economies has begun to reach Asian shores as well. A survey of five of Japan's major electronics companies — Hitachi, Toshiba, Fujitsu, Sony and NEC — shows them holding R&D spending in 1992 to current levels. The decision to hold down spending is a response to plummeting sales brought about by the recession in the United States and Europe, and by rapidly declining growth in the Japanese domestic market as well. The cutbacks will be felt most keenly by researchers in the semiconductor industry who are close to the production line. The outlook, says a research manager in the microelectronics section of one major electronics company, "gets worse and worse every day." (*Nature, March 12*)

Motorola's
Gamble

Motorola's ambitious proposal for a global cellular telephone network that entails building the world's most complex satellite system engenders both awe and skepticism in the telecommunications industry. Called Iridium, the system calls for a constellation of 77 satellites arranged in an orbital scheme of Copernican complexity. The system, supported by 20 or more ground stations, would represent an intimidating logistical departure from most current communications satellite systems, in which orbiting spacecraft seem to hang, like Goodyear's blimps, at fixed positions 22,300 miles above the equator. Motorola wants to launch and synchronize the orbits of more than six dozen satellites, which would encircle the earth at an altitude of 500 miles, like so many electrons buzzing around the nucleus of an atom. (*The New York Times, March 18*)

5ESS Switch
Award Upheld

Collins Licensing said the U.S. District Court in Midland, Tex. has upheld a \$34.6 million jury award in its favor in a patent infringement suit against AT&T. The jury had found that AT&T's 5ESS® switch products infringed on a patent that had been issued to the late Arthur A. Collins. (*Reuters, March 24*)

Kazakhstan
Calls

AT&T, continuing its aggressive push overseas, signed another huge contract to supply the former Soviet republic, Kazakhstan, with switching systems to connect one million phone lines over the next ten years. With digital switching systems currently fetching more than \$200 a line, the contract would easily bring AT&T more than \$200 million in revenue. Analysts said the agreement firmly establishes AT&T as an important supplier to the technology-starved former Soviet republics and Eastern Europe. In just the past six months, AT&T has signed orders with Armenia, Ukraine, Russia and has won expanded equipment orders in Poland and Czechoslovakia. (*The Wall Street Journal, March 18*)

MCI Wins
FAA Contract

MCI scored a victory over rival AT&T by snagging a \$558 million Federal Aviation Administration contract to provide air traffic control communications links. The new communications system will be designed to increase reliability and to prevent the kind of outage that occurred last September, when AT&T's long-distance network was jammed by an equipment failure in New York City. The 10-year contract is a major public relations coup as well as a financial boost for MCI. The company can now boast that it will be the architect of one of the most important and sophisticated communications networks in the country. (*The Wall Street Journal, March 16*)

IRS Taps
AT&T

The Internal Revenue Service selected AT&T for the second time for a \$1.43 billion contract to provide 50,000 personal computers to modernize the agency's tax collection system. The winning AT&T proposal is twice as expensive as IBM's \$708 million bid and 59 percent costlier than Lockheed's \$900 million proposal, but the IRS said AT&T's was by far the best buy for the government. Last September, a government board invalidated the IRS's original July 1991 selection of AT&T for the contract. (*Washington Post, March 21*)

Labor
Negotiations
Begin

Job security and wages will be among the top issues when AT&T begins negotiating a new contract with 121,600 workers this month. Talks begin March 30 to replace a three-year pact with the Communications Workers of America and the International Brotherhood of Electrical Workers that expires May 30. (*New York Daily News, March 18*)

NEWSMAKERS



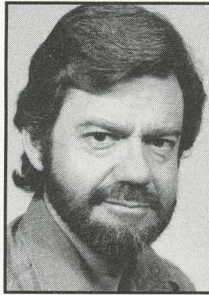
Burton

Herb Burton, executive director, General Business Systems, Small Systems Laboratories, was recently honored for outstanding contributions to the AT&T and African-American communities. He was presented an award by the South Jersey African-American History Month planning committee during its Kickoff/Awards ceremony on Jan. 31.



Flanagan

Jim Flanagan, former director of the Information Principles Research Laboratory at Murray Hill and now director of the Center for Computer Aids for Industrial Productivity at Rutgers University, is the recipient of the 18th Marconi International Fellowship Award. He was cited for his pioneering contributions to speech technology. Flanagan retired from Bell Labs in 1990 after 33 years of service.



Haddon

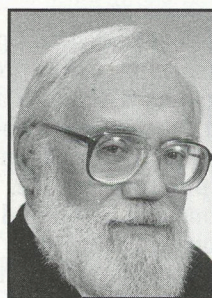
Robert Haddon, MTS, has been named *Superconductor Week's* Person of the Year for 1991. He was honored for his discovery that carbon fullerenes are superconducting. Also, Donald Murphy and Art Hebard received honorable mention from the publication for their contributing work. All three researchers are in the Research, Materials Science, Engineering and Academic Affairs Division at Murray Hill.



Stillinger

Frank Stillinger, DMTS in the Materials Chemistry Research Department at Murray Hill, is the recipient of the Peter Debye Award in Physical Chemistry. The award, sponsored by Du Pont, acknowledges Stillinger's research in physical chemistry. In particular, he developed an inherent structure theory that largely unifies and extends current understanding of condensed phase structure and dynamics.

NAE Elects New Members



Dudderar

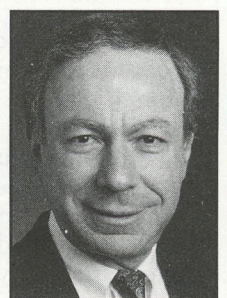
Three Bell Labs engineers and former Sandia Vice President Venky Narayanamurti were among a group of 79 elected to membership in the National Academy of Engineering. Election to the Academy is among the highest professional distinctions accorded an engineer. The newly elected members and their principal engineering accomplishments are:

Thomas Dudderar, MTS in the Electronics Packaging Research Department at Murray Hill, "for significant contributions to the development of optical metrology and its applications to packaging of high-performance electronic systems."

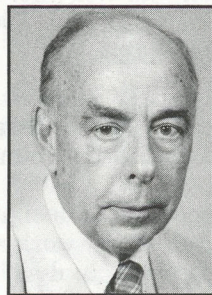
Ralph Logan, DMTS in the Semiconductor Electronics Research Department at Murray Hill, "for contributions to the development of solid-state lasers."

Karl Martersteck, Bell Labs vice president, "for exceptional leadership in the development of electronic switching in global telephony."

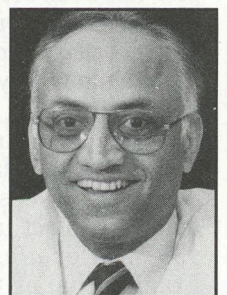
Venky Narayanamurti, dean of engineering at the University of California, "for developments in the field of phonon optics and leadership in electronic materials and device research development." He retired from Bell Labs last December with more than 23 years of service.



Martersteck



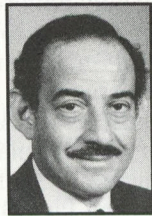
Logan



Narayanamurti

PEOPLE

Promotions



Saleh

Adel Saleh
from supervisor (BL011340) to head, Interconnection Research Department, BL011551), MH

Area BLO51

- Chiuffitelli, A. to MTS ... HR BL051232
- Colon, J. to MTS ... HO BL051291
- Corbett, L.A. to MTS ... CB BL051238
- Cowles, R.H. to MTS ... CB BL051231
- Dawdy, D.H. to MTS ... HO BL051291
- Famula, D. to MTS ... HR BL051231
- Habiby, S. to MTS ... HO BL051271
- Kainoma, L. to MTS ... HO BL051273
- Kelly, L.P. to MTS ... CB BL051234
- Kerschner, L.M. to MTS-I ... HR BL051231
- Laws, E.S. to MTS ... CB BL051234
- Lorber, J. to MTS ... HO BL051291
- Lu, D.H. to MTS ... HR BL051232
- Moghaddan, Y. to MTS ... HO BL051283

- Raganna, S. to MTS ... HO BL051274
- Slango, J. to MTS ... HO BL051273
- Tsim, T. to MTS ... HR BL051238
- Zurovchak, C.L. to MTS ... HR BL051231

Area BLO52

- Bernhardt, S.M. to MTS ... MH BL052891
- Colon, A.O. to MTS-I ... RD BL052829
- Dewitt, M.R. to MTS-I ... AL BL052841
- George, R. to MTS-I ... MH BL052355
- Harris, T.A. to MTS ... ALC BL052852
- Karlaza, S. to MTS-I ... RD BL052714
- Resta, R. to MTS-I ... MH BL052355
- Tang, B.V. to MTS-I ... AL BL052841
- Threadgill, K. to MTS ... ALC BL052852

Area BLO54

- Hearns, K.P. to MTS ... HO BL054624
- Humphreys, J.J. to MTS ... HO BL054625
- Noto, D. to MTS ... HO BL054372

Area BLO55

- Ivinjack, T.J. to MTS-I ... IHP BL055446
- Payne, D.C. to MTS ... IHP BL055434

Area BLO59

- Bowie, W. to MTS-I ... MT BL059467
- Steinberg, A. to MTS ... LC BL059462

Distinguished Technical Staff Appointments

Distinguished Member of Technical Staff appointments for the first quarter of 1992 have been announced. Non-supervisory members of technical staff are appointed to DMTS based on their records of sustained significant individual contributions to AT&T's research and development work.

Each DMTS will receive a one-time honorarium, a permanent private office and

services equal to those provided for supervisors, a metal sculpture and a framed letter of congratulations.

The newly appointed DMTS, their locations and departments are:

- Area BLO45
- Nolte, Diana ... IH BL045269
- Wetzel, Gregory F. ... IH BL045262

- Area BLO54
- Hutchison, William L. ... MV BL054798
- Lan, Lance M. ... WH BL054441

Retirements



Heirman



Mazza



Piekutowski

Thomas Bowen
Senior Electron Device Mechanic (BL052823), MH, April 14, 21 years

Violet Burgess
Secretary (BL059711), HR, April 1, 25 years

Debora Cahill
Clerk (BL055430), IHP, March 24, 14 years

Vincent DiLullo
STA (BL054521), CH, March 14, 39 years

John Dodero
Instrument and Control Mechanic (BL077835), IH, April 4, 26 years

Lois Heirman
Associate Technical Business Operations Administrator (BL054), HO, April 4, 26 years

Martin Jackman
Receiver-Shipper/Storekeeper (BL077823), MT, April 4, 36 years

Frank Mazza
Tool Maker-A (BL077193), MH, April 4, 31 years

Henry Oswald
MTS (BL054451), WH, April 1, 14 years

Joseph Piekutowski
Senior Wiring Mechanic (BL077193), MH, April 1, 25 years

Murray Robbins
DMTS (BL011555), MH, April 4, 24 years

Gordon Walker
Union-Tool Maker (BL063119), INH, March 2, 36 years

In Memoriam

Bradley Barrett, formerly a designer at Indian Hill, died Feb. 20. He retired in 1982 after 28 years of service and is survived by his wife Joyce.

Fred Greninger, formerly a staff aide at Whippany, died March 7. He retired in 1978 after 20 years of service and is survived by his wife Anna and three sons.

Ruth Jennings, formerly a senior service clerk in New York, died Feb. 18. She retired in 1965 after 43 years of service and is survived by a nephew.

Walter Patterson, formerly a supervisor in Piscataway, died March 16. He retired in 1979 after 37 years of service and is survived by two sons.

NEWSLINE

If you feel like you're not getting important information fast enough, call AT&T NEWSLINE for late-breaking news about what's going on in the company, the industry and the world.

908-221-NEWS

BULLETIN BOARD

Sixth Yield and Reliability Improvement Workshop, April 15, Reading, Pa.

This forum is a vehicle for exchanging information and ideas on the materials aspects of yield and reliability improvement in the manufacture of integrated circuits; film integrated circuits; hybrid integrated circuits; printed wiring boards; connectors; semiconductor lasers and lightwave devices. A program of papers has been assembled to promote the dissemination of common technologies and to encourage a continuing dialogue on yield and reliability improvement.

The registration deadline is April 9 and attendance is restricted to AT&T employees. For further information, contact James Lory at (215) 939-6284 or *alux5!lory* or Robert Frankenthal at (908) 582-4032 or *clockwise!rpfpr*.

Ninth Annual Manufacturing Systems Engineering Workshop, April 27-29, Bedminster, N.J.

The workshop's goal is to promote communications between the manufacturing and R&D communities. It will consist of presentations on performance improvements, quality,

design and product realization processes, benchmarking, order provisioning and logistics. There will be a combination of presentations about ongoing work, and several keynote talks of an expository nature. On April 28, sessions will be offered on the following topics: Competitive Logistics, Benchmarking and Fundamental of Queueing.

The conference costs \$250 and is limited to 250 attendees. For registration forms and further information, contact Trish Brohan at (908) 582-4972 or *mhuxo!sarah*.

Second Annual AT&T Software Symposium, Sept. 16-17, Holmdel and Indian Hill.

This symposium is designed for the sharing of ideas, work and experiences in research, development and use of software, with emphasis on improving quality and productivity.

The symposium's first day is for presentations at Holmdel, with a two-way simulcast to Indian Hill. The second day, at Holmdel only, is for panel discussions and workshops. Technical papers and suggestions are sought for the discussions and workshops on all areas of software.

Of particular interest are papers relating experiences in the implementation of new processes and technologies in a practical development environment, and their impact on quality and productivity.

Employees should send abstracts, limited to four pages, to John Palframan at MT 3P-440 or *mtgzy!john* by May 8. You will receive acceptance notification by May 29.

AT&T Database Day 1992, Sept. 17, Holmdel.

This forum is for the AT&T database community to get together and exchange ideas in the areas of database research, design and implementation, experience, tools and needs.

Papers are being solicited that address user interfaces; database models; performance; query optimization and languages; indexing and search methods; integrity constraints and triggers; transactions; recovery; distribution; data dictionary issues; database design and spatial, multimedia, text, heterogeneous, object-oriented, and logic databases.

Send four paper copies of your extended abstract to Narain Gehani at MH 3D-414 or Rick Greer at MH 3D-551 by May 8.

Bell Labs News

VOLUME 32 NUMBER 7

Published biweekly by members of the Management and Employee Communications Department, Public Relations Division at AT&T Bell Laboratories. John Mayo, president. ©1992 AT&T, all rights reserved.

Editor:
Marianne Carlton
HL 1A-422
(201) 564-4027
hlwpk!marianne or *attmail!macarlton*

For newsmakers, retirements, promotions, service anniversaries, and obituaries, contact

Jennifer Hammond, Assistant Publications Specialist, HL 1B-418, AT&T Bell Laboratories 101 J.F. Kennedy Pkwy PO Box 1101 Short Hills, N.J. 07078-0996 (201) 564-4246 *hlwpk!jjh*

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