

Sandia computer scientists help model 75-million-year-old dinosaur skull in 3-D

What sounds came from *Parasaurolophus*' trombone-like crest?

By Chris Miller

Media Relations Dept. 12621

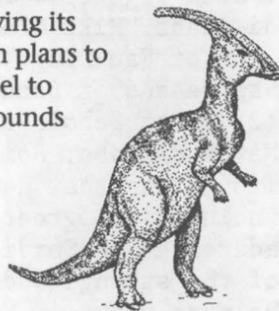
Sandia computer scientists, working with the New Mexico Museum of Natural History and The State Museum of Pennsylvania, are applying computer models developed for DOE to help unravel some of the mystery surrounding dinosaurs, including whether a certain species may have been warm-blooded.

The Sandia team consists of computer scientists George Davidson, Manager of Computer Architectures Dept. 9215; Carl Diegert (9215); and Constantine Pavlakos (9225).

They are using their expertise in 3-D computer imaging to create a detailed model of the skull of a rare, crested duck-billed dinosaur, known as *Parasaurolophus*. Besides helping to solve some of the many unanswered questions surrounding dinosaurs, the project gives the Sandia scientists an opportunity to expand and hone computing skills vital to its research mis-

sion for DOE.

The computerized version of the dinosaur skull will also provide an exciting spin-off: In the same manner scientists can tell the character of the sound a trombone makes simply by studying its shape, the Sandia team plans to use the 3-D skull model to simulate a variety of sounds consistent with the observed shape of the *Parasaurolophus*' approximately 4.5-foot, trombone-like crest that rose from the back of its skull. The crest contained a labyrinth of chambers connected to the dinosaur's breathing passages. Most paleontologists believe the crest served as a resonating chamber and allowed the dinosaur to make loud, low-frequency sounds. The crests probably also acted as a means for visual identifica-



tion by other hadrosaurs, or duck-billed dinosaurs.

A rare find

Parasaurolophus, one of the dinosaurs portrayed briefly in the film *Jurassic Park*, lived during the Late Cretaceous Period, about 75 million years ago. Although hadrosaurs were the most abundant of the large plant-eating dinosaurs of that period, fossils of a few kinds of hadrosaur dinosaurs, including *Parasaurolophus*, are very rare. The animals remain relatively poorly understood. Remains of two or three species (the exact number is still disputed) of *Parasaurolophus* have been discovered, and little is known about the amount of variation present within each species.

Thomas Williamson, curator of paleontology at the New Mexico Museum of Natural History, says the computer imaging also may help answer whether *Parasaurolophus* was warm-

(Continued on page 4)

Budget shortfall curtails some Labs cooperative work with industry

A smaller-than-expected DOE Technology Transfer Initiative (TTI) budget for FY96 has forced Sandia to take a second look at its portfolio of some 120 ongoing cooperative research and development agreements (CRADAs), reduce its involvement in 62 of the agreements, and cancel seven more.

Dave Larson, Manager of National Security Partnership Development Dept. 4231, says Sandia had planned to spend as much as \$84 million on TTI-funded cooperative work with industry during FY96. Instead, the Labs is authorized to spend only \$68 million — a 19 percent reduction that allows for no carryover funding for next year.

Recent debate in Congress over the focus of technology transfer and questions about the nature of the national laboratories' relationships with private industry are responsible for the budget shift, says Dave.

Decisions based on mix of factors

Because of the shortfall, DOE Assistant Secretary for Defense Programs Vic Reis notified Sandia's management team in November that it needed to submit an adjusted TTI spend plan for the current fiscal year. Labs vice presidents were asked to evaluate Sandia's ongoing TTI-supported CRADAs with the goal of reducing each division's CRADA spending by 21 percent.

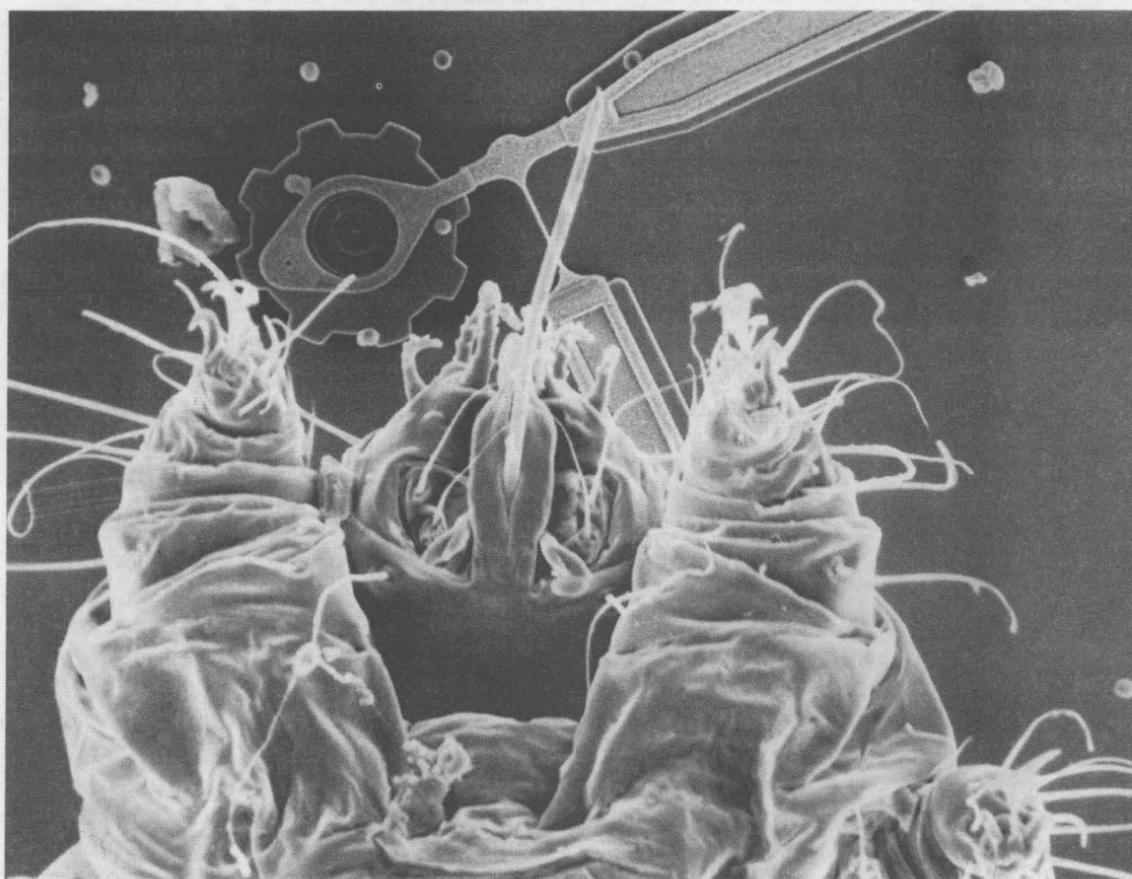
In December, Sandia compiled the VPs' recommendations and resubmitted a \$68 million spend plan, which DOE Headquarters approved with minor changes Feb. 16.

In determining which CRADAs to cancel, which to curtail, and which to continue at

(Continued on page 4)

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INVASION OF THE MICROGEAR-SNATCHERS? — A dust mite, no bigger to the human eye than a tiny dot, crawls over one of Sandia's micromachines. The machine turns gears, each smaller in diameter than a human hair and one-hundredth the weight of the dust mite, at hundreds of thousands of revolutions per minute. The latest Sandia micromachine is a smart one, incorporating microelectronic "brains." See story on page 5.

Filmless digital imaging provides better microscopy images quickly

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Make the Net and Web work for you: InfoDay '96 is March 28

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Hartley: Futurists are helping top management prepare for 2016

This & That

Lotsa weird names and addresses - As promised in the last issue, here are some strange spellings and addresses on incoming Sandia mail: Doug Nicholls (5933) says he received a "fishy" letter addressed to him at Sardina Labs. Steve Hatch (5413) received a package to Sandia Nult Cabs. Dick Thomas (7512) received a solicitation addressed to Sandia National Laboratorium - a cross between a laboratory and a sanitarium, he assumes. Ellen Cook (2665) says her former boss, former Sandian Emil Kadlec, Jr., used to receive mail regularly from one outfit that addressed it to Ahmal Kabalc at Sandi Alabs. Mike Clough (12613) received an express package addressed to him at San Diego Laboratory Communications. An anonymous Sandian was addressed at Sabdua Natl. Labs. A company sent a letter to Kevin Eklund (2102) at Saboia Labs. A number of Sandians get mail addressed to Saudi National Labs. Some folks in Payment Processing Dept. 10504 sent a solicitation that came addressed to Laboratori E. Sandia National, which included the greeting: "Dear Laboratori." They also sent an envelope addressed to Sundia National Labs in Alberkery. This is roughly half of the strange addresses and spellings sent to me; look for more in the next issue.

A correct address, but... - Marion Wilde (5931), a 19-year Sandia employee, may be wondering about his job security these days. He received a piece of business mail at the office, with his current mail stop and otherwise correctly addressed. The only problem was the top line: Marion Wilde, or current resident.

Sometimes, you really need a hyphen - Writers can actually get in some pretty heated discussions about when a hyphen is and isn't necessary. Some say you need one in all compound modifiers, such as "world-class laboratory." Others say you don't need the hyphen in this or similar phrases in which the meaning is clear without one.

There are, however, some phrases that can have completely different meanings with and without hyphens. One classic example: A man-eating tiger is a killer tiger, but a man eating tiger is a fellow with pretty strange tastes in meat. We have another such phrase at Sandia for which I try hard to remember that the hyphen is a *must*. I sometimes send significant news items to all "Large-Staff Secretaries" and ask them to distribute the news within their groups. (These are secretaries to Sandia's so-called Large Staff: directors and above.) If I ever forget the hyphen, several Large-Staff Secretaries may tell me where I can file my news!

Lab News in new offices Monday - The Employee Communications, Media Relations, and Community Relations departments and other staff from Public Relations and Communications Center 12600 move this weekend (March 16-17) into Bldg. 811, outside the tech area, immediately northwest of Bldg. 800. (Note that the new mail stop number for the *Lab News* and *Weekly Bulletin* is 0165; see brief story below for more info.) I'm also moving to 811 from my current office in Bldg. 802. I'm somewhat reluctant to move because I worry who our upper management will turn to now when they need good, fast, free advice. While it's true they haven't asked me for much, I'm sure they felt more secure just knowing I was nearby.

- Larry Perrine (845-8511, MS 0165, lgperri@sandia.gov)

APS strongly defends labs: Universities and labs 'complementary'

In late November a committee headed by Frank Press told the Senate Appropriations Committee that federal science and technology funding would best be allocated to academic institutions rather than the national laboratories. This was seen by many within the national labs community as an unfortunate and uncharacteristically divisive peremptory strike for advantage in the budget wars.

Press's committee represented the National Academy of Sciences (of which Press is a former president), National Academy of Engineering, and Institute of Medicine. Its report ("Allocating Federal Funds for Science and Technology") addressed a far broader set of issues than the national labs and has been praised for its arguments that the US must develop more coherent budget processes for science and technology while maintaining leadership. Nevertheless, there has been much concern about its "universities vs. labs" tack.

Now strong support for the national labs has emerged from J. Robert Schrieffer, President of the American Physical Society (APS), and Alan Bromley, former presidential science adviser and now President-Elect of APS.

In testimony about the Press report to the House Committee on Science on Feb. 28, they concurred with many of the Press panel's recommendations but added, "However, we strongly disagree with Recommendation 7 that funding should generally favor academic institutions..."

"We believe that this recommendation is based on the specious assumptions that universities and national laboratories have similar capabilities and address similar problems. In truth, the two sets of institutions are complementary... Rather than pitting universities against national laboratories... we believe that the federal government should reinforce cooperation between the two sets of institutions."

In another development, a staff member at the Institute of Scientific Information (ISI) in Philadelphia, curious about the Press panel's recommendation, compared citation rates (a measure of research impact) for papers from 1990-94 in the physical sciences and engineering from 110 research-intensive universities with those from DOE's 10 multipurpose national labs. The average DOE paper was cited 6.41 times, compared with 5.32 for those from academia (see *Science*, Feb 2). The national labs' papers also scored 14 percent more citations than the norm for all papers of a similar year, type, and publication; the academic papers scored only 7 percent above the norm.

Take Note

This year, All Faiths Receiving Home celebrates 40 years of service in providing for the care and protection of abused and neglected children in the Albuquerque area. A number of special events to mark the anniversary are planned. On April 10, a luncheon at the Marriott Hotel beginning at 11:30 a.m. will feature keynote speaker actor Mike Farrell, co-star of the television series *M*A*S*H*. A reception will follow. Tickets are \$35 for the luncheon alone and \$50 for lunch and the private reception with Farrell. For ticket information, contact Jill Criswell at 268-6648.

Retiring and not seen in *Lab News* pictures: Kenneth Adams (4022), 36 years; Donald Bates (7618), 26 years; Erhard Eisenmann (1523), 28 years; Gabriel Garcia (7815), 28 years; Richard Jones (9753), 45 years; Dorothy Jordan (7734), 32 years; Edward Martinez (1411), 32 years; Howard Sanchez (1412), 31 years.

Sandia LabNews

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LOCKHEED MARTIN

Lab News moving into new Bldg. 811

This weekend the *Lab News* staff and all other members of Employee Communications Dept. 12622 will move next door into Bldg. 811. This new building is immediately south of our present location in MO-172/173 and just north of Bldg. 800. It is outside the tech area.

Our telephone and fax numbers remain the same, but we have a new mail stop number: MS 0165. That number will also serve as our extended zip code for mail from outside Sandia (such as from retirees).

Also moving into the building are Media Relations Dept. 12621; Community Relations Dept. 12671; and Larry Perrine, Bruce Hawkinson, and Neal Singer from Dept. 12620. This is the first time in memory that all these related departments will reside in the same building.

All people moving in are keeping their present telephone numbers. Media Relations keeps its present mail stop number (0167); Community Relations will have a new mail stop (0166). Larry and Bruce will use Dept. 12622's new mail stop (0165).

Sandians and retirees are welcome to stop by and see us.

Filmless digital imaging system is faster, better, less costly

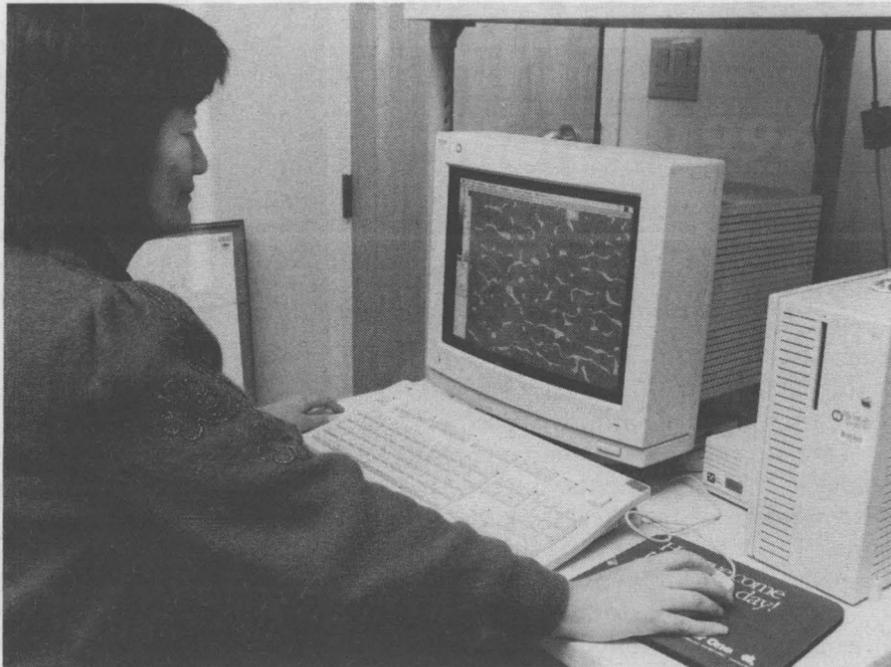
George Thomas, Manager of Physical Properties of Materials Dept. 8715, was surprised to discover how efficient the switch to digital imaging proved to be.

Scanning electron micrographs taken to support most materials characterization on site had been recorded on Polaroid film until a new \$8,000 digital system was installed on one of the facility's scanning electron microscopes two years ago. In the course of gathering information about associated waste reduction for Environmental Safety and Health, he learned that the digital system saved about \$20,000 a year in film costs.

It also has provided better images more quickly and conveniently, adds Nancy Yang (8715), who operates the system with technician Chris Rood.

"We would often have to take 10 to 15 pictures to get one or two usable ones. The rest were discarded," Nancy says.

Under the old system, each high-resolution, slow-scan photo took one to two minutes to expose. With this quicker digitized approach, filmless electronic images are taken of all areas of a sample. Contrast and brightness can be easily controlled to provide a clear image.



A new real-time networking capability allows researchers to observe online from their desktop computers and provide guidance about what aspects of a sample to record as images are being gathered. Images are archived and transmitted electronically, making it easy to include them in articles, viewgraphs, and other presentations.

The imaging equipment supports most materials projects at Sandia/California. The digital upgrade was undertaken to keep in line with the current state of the art, George says, but "we ended up with a much better process . . . I was astounded by the numbers."

— Nancy Garcia

"We would often have to take 10 to 15 pictures to get one or two usable ones. The rest were discarded."



A SINGLE SAMPLE can be viewed by both Nancy Yang, above left, and technician Chris Rood, above, at the same time on separate workstations using the new digital microscopy system.

Fusion researcher controls experiment from afar

Bandwidth of Energy Sciences net — ESnet — allows rapid data transmission

By Nancy Garcia

California Reporter

Physicist Dean Buchenauer of Sandia's Advanced Materials Research Dept. 8716 faced a dilemma recently. He didn't want to miss a series of magnetic fusion experiments on the General Atomics DIII-D tokamak in San Diego, the largest facility in the United States capable of exploring his area of research. He also wanted to attend a meeting in Virginia regarding the relatively new, speedy portion of the Internet that accommodates energy researchers, the Energy Sciences (ES) net.

Sandia California News

His solution? He used the ESnet after his meeting (based at the Continuous Electron Beam Accelerator Facility) in Newport News, Va., to control his experiment in San Diego, paving the way for other researchers to make use of research facilities from remote locations. He was able to watch experimental count-downs and control data acquisition on a computer screen, while communicating by phone with people running the experiment.

"It's only going to get easier," Dean says. His manager at the time, Art Pontau (8801), was impressed by the large sets of data Buchenauer handled — 12 megabytes of information are generated during each shot in the tokamak, which is usually fired every 15 min-

utes. This volume of data would still move excruciatingly slowly on most of the Internet, Dean says. He used to have to wait overnight for experimental data to be transmitted, and even then, the transmission was unreliable.

By operating his equipment remotely, Dean says he has been able to make better use of Sandia resources, including his time. "I can participate in more experiments without having to be physically in the tokamak control room." Another Sandia fusion researcher, Jon Watkins (6428), works on other parts of the experiment and lives in San Diego. Being on-site, Watkins helps maintain the equipment. Although remote operation doesn't eliminate travel, Dean estimates that he'll save about three weeks of time each year. The increased flexibility has also allowed him to work on other projects.

Remote experimentation requires both data acquisition and analysis. Dean has written analysis software for many of his magnetic fusion experiments at Sandia (including DIII-D). His technician Josh Whaley wrote the control and acquisition software for the data set.

Fusion occurs when two hydrogen atoms are joined to become a heavier helium atom. This process powers the sun, and may one day provide a net energy gain in manmade power plants.

Dean is studying how to divert the plasma inside the tokamak so components of the reactor walls don't vaporize and consume energy during the reaction. The DIII-D is the largest tokamak in the United States with a diverter structure. It supports development of the

planned International Thermonuclear Experimental Reactor.

Collaborators at General Atomics (a DOE contractor) and Lawrence Livermore National Laboratory recently installed video conferencing at the San Diego control center, enhancing the "virtual experimental facility" atmosphere and better enabling others to follow Dean's remote example.

"It's going to explode," Dean predicts about the use of the Internet for remote experimental control. The wider bandwidth available on the ESnet makes this avenue of the information superhighway nearly the next best thing to being there, since it accommodates the audio and visual transmission requirements of video conferencing. "Two years ago, I couldn't do any of this," he adds. "It's only now being recognized as useful."

The wider bandwidth available on the ESnet makes this avenue of the information superhighway nearly the next best thing to being there.



TTI funding

(Continued from page 1)

current funding levels, Dave says, the VPs considered "a mix of factors," primarily how close each of the CRADAs matched Sandia's Defense Programs mission and helped sustain its core competencies.

"Clearly, the Galvin report told us that we should stick to our traditional missions," he says. "A key consideration was whether our involvement in each CRADA is helping maintain our national security mission requirements."

Other factors included potential hardship to the industrial partner, damage to Sandia's relationship with the partner, how difficult scale-down procedures might be for each CRADA, and Labs organizational and staffing impacts.

"Currently, TTI-funded CRADAs are supporting the work of about 250 FTEs [full-time equivalents]," he says. "Obviously we are going to think twice about eliminating a project and in doing so damaging our ability to carry out our primary missions."

Sandia was able to schedule an early completion for most of the seven CRADAs that were canceled, he says.

Sandia's principal investigators (PIs) — CRADA points of contact — have been briefed and are working with individual industrial partners to modify the agreements.

"The PIs are being encouraged to amend the agreements so that the bulk of the work may still be completed, either by asking the partners to fund a greater portion of the work, or by scaling down the projects by choosing certain deliverables over others," he says.

Tech transfer isn't dead

In addition to the 69 CRADAs either scaled back or eliminated, six were recast as weapons support agreements (WSAs). WSAs are a relatively new technology transfer mechanism whereby core Defense Programs dollars, rather than TTI funds, are used to support a cooperative Labs-industry project that directly benefits the weapons program.

Dave predicts that budgets for FY97 and beyond will bring deeper cuts to the TTI program, possibly to the point of eliminating TTI funding altogether. But technology transfer isn't likely to go away, he says.

"Sandia and the weapons complex unmistakably benefit from industrial partnerships, and a recent DOE survey shows that private industry values its interactions with the national labs," he says.

"The TTI budget is going to shrink, but overall the Labs' national security budgets look

Tech transfer metamorphosis: Center 4200 sports a new name, a new building, and a new approach

Although reduced federal spending for technology transfer activities probably will be the prevailing trend in Washington for the foreseeable future, 4200 Center Director Warren Siemens wants Sandians to know that tech transfer is not dead — it's just undergoing a metamorphosis of sorts.

To start with, 4200 has a new name: the Technology Partnerships and Commercialization Center. It also has new offices at the Lockheed Martin Building (1155 University Blvd. SE).

In the "new approach" category, Warren has outlined five thrusts he believes will steer the Labs' tech transfer program along a successful course during the next few years:

Strategic partnering — Engage only in collaborations with industry, universities, and foreign entities that support Sandia's traditional mission requirements. Also, pay Sandia's share of such collaborations using program funds, and expect Sandia's partners to foot more of the bill for work that directly benefits them. "We need to enter more of a give-and-take relationship with our industrial partners," he says.

Intellectual property management — Build Sandia's portfolio of royalty-earning technology licenses and patents, and use Sandia's Royalty Awards Program to apply Labs' royalties toward future technical work that supports Sandia's core competencies and primary missions. "The goal by [the year] 2000 is to increase Sandia's royalty earnings to \$10 million annually," he says. (FY95 total was \$351,000.)

Regional economic development — Expand Sandia's Small Business Initiative and other programs that support small, locally owned businesses. Encourage entrepreneurial start-up companies.

Best business practices — Attack the perception that it's difficult to do business with the national labs by reducing Sandia's internal costs and the paperwork necessary to engage in partnerships. Also, expand the variety of partnership mechanisms (other than CRADAs) by which partners can enlist the Labs' capabilities, including greater use of user facility agreements, short-term technical assistance options, and leave-of-absence and business-expansion programs for Sandia employees who want to apply their expertise directly to private industry. "We would like to be the lab of choice for potential partners, not just for our technical capabilities but for our business practices as well."

Marketing — Communicate better with employees and partners about Sandia's technology transfer successes and mechanisms.

relatively stable for FY97," he says. "I think we'll see more industrial partnerships being paid for by core-mission funding rather than through a separate line-item budget. We are working on a strategy to make that transition.

"In fact, I believe partnerships are increasingly becoming an inherent way we do business in order to leverage our diminishing resources," he adds.

Warren Siemens, Director of Technology Partnerships and Commercialization Center 4200, says the Labs' involvement in future partnerships may depend on the extent to which industry will bear the cost of their collaborations with the national labs. The Labs also is trying some nontraditional approaches to technology transfer, he says. (See "Tech transfer metamorphosis . . ." above.)

"We used to look first at industry needs and determine matches with work going on at the Labs," he says. "This led to mutually beneficial but industry-driven collaborations. Now we must look first at Sandia's mission and commit to partnerships that are clearly relevant to our primary work. We don't partner for the sake of partnering." —John German

Experts available to help Sandians with technology transfer issues

Three teams have been formed to help Sandians with invention disclosures, patent applications, technology licenses, and other technology transfer-related issues.

Warren Siemens, 4200 Director, says each team includes experts in licensing agreements, patents, copyrights, invention disclosures, trade secrets, and other intellectual property development activities. "We've learned the art of negotiating licenses," he says.

Contact the following technical line liaisons for more information:

- Information and computation: Gordon Leifeste, 843-4144
- Electronics, microelectronics, photonics, and pulsed power: Angelo Salamone, 843-4146
- Manufacturing, materials, and engineering sciences: Walter Schimmel, 843-4147

Parasaurolophus

(Continued from page 1)

blooded. There has been long-standing disagreement over the possibility of warm-blooded dinosaurs. Williamson says he will be looking for turbinate bones in the air passages of the dinosaur. Almost all warm-blooded animals have turbinate bones, and no existing cold-blooded animal has them.

The project began by using a CT (computed tomography) scanner at St. Joseph Medical Center in Albuquerque to produce about 500 thin-sliced X-ray images of the dinosaur skull. The slices of every part of the skull are then assembled into a 3-D computer model that can be viewed inside and out, and from any possible angle. The images are used to

determine the density of the bone and to sort through what is not bone, which in this case is primarily sandstone.

Williamson works closely with the Sandia team to make those determinations.

The *Parasaurolophus* skull was discovered in August 1995 in the De-na-zin Wilderness area of the San Juan Basin of northwestern New Mexico. Williamson was leading a party that was conducting research on Late Cretaceous animals under permit from the Bureau of Land Management. The skull was first noticed by Robert Sullivan, senior curator of paleontology and geology at The State Museum of Pennsylvania in Harrisburg. The find included the 4.5-foot-long nasal crest and the lower left jaw with all 43 rows of teeth. The bone is jet-black and glossy. However, some of the elements are fractured and the crest is somewhat distorted by crushing.

Recent Patents

Howard Stephens (6212) and Robert Dosch: Thin Film Hydrous Metal Oxide Catalysts.

Carol Ashby and G. Allen Vawter (both 1322), John Hohimer (11500), and Daniel Neal (1128): Monolithically Integrated Solid State Laser and Waveguide Using Spin-On Glass.

Carol Ashby (1322): Surface Passivation Process of Compound Semiconductor Material Using UV Photosulfidation.

Paul Cahill (1811) and Craig Henderson (8230): Process for Fullerene Functionalization.

Albert Baca and Perry Robertson (both 1342), Timothy Drummond and Thomas Zipperian (both 1322): Complementary Junction Heterostructure Field-Effect Transistor.

Douglas Drumheller (6111): Downhole Pipe Selection for Acoustic Telemetry.

Sandia team produces intelligent micromachines

Tiny new microelectronic machines are small, smart, cheap

By Neal Singer

Media and Employee Communications Dept. 12620

Sandia has garnered worldwide recognition in the past two years for developing a succession of increasingly powerful micromachines. Now it has made a smart one.

A smart micromachine is better than a dumb one, just as a car with a fuel gauge, speedometer, and cruise control is better than one that merely runs.

An intelligent micromachine can signal for more power, communicate that it is operating too fast or too slow, or even perform actions on an automated basis.

These machines — tiny motors fabricated along with integrated circuit "brains" on individual silicon chips — now have been designed and mass produced for general applications by Sandia's enterprising micromachine mavens.

The compact design, made possible by sinking the motors into tiny etched trenches, enables the fabrication of entire electro-mechanical systems on a chip.

'A substantial advance'

"This is definitely a substantial advance they've come up with," says Roger Howe, director of the University of California at Berkeley's Sensor and Actuator Center. "A lot of people are champing at the bit to access this technology. We hope to be early in getting adapted so that talented graduate students — not just in Berkeley but anywhere in the country — can invent new circuits to play around with. Once the process is tuned up, there's no shortage of people who will dive in to try it out."

Says Richard Payne, director of the advanced accelerometer team at Analog

Devices, Wilmington, Mass., the largest producer of automated airbag sensors in the US: "We're talking with Sandia in a preliminary way to use their technology to prototype devices. The technology they've recently demonstrated is what we're working on. It's the right direction." Analog Devices interleaves the steps of circuit and microsensor creation on a single chip but focuses on the application of airbag accelerometers.

"This will be a big enabler for a variety of new products to be produced that are small, smart, and cheap," says Dept. 1325 Manager Paul McWhorter, manager of the effort in Sandia's Microelectronics Development Laboratory. By using the semiconductor industry's fabrication methods, he says, "We've created a generic manufacturing process."

Medical possibilities include the creation of tiny drug-delivery devices. Other possibilities for the general-purpose process include the creation of tiny, inexpensive, long-lasting gyroscopes for civilian and military uses.

The process was developed to enhance the safety and security of nuclear weapons by providing smarter, more reliable locks for the devices.

Past difficulties, successes

The difficulty with joining a microcircuit to a micromachine on a silicon chip has been that aluminum circuit interconnectors, if formed first, melt when the micromachines are heat-treated. If the gears are not heated to approximately 900 degrees Celsius, says Sandia scientist Jeff Sniegowski (1325), "Like potato chips, they curl."

If micromachines are fabricated first, their elevation above the chip surface creates bumps

that distort the delicate process of etching accurate microcircuits. "You can't have fine undulations or striations in the photoresist," Jeff says. "At that scale, five microns is a mountain, and a micromachine is five to six microns high."

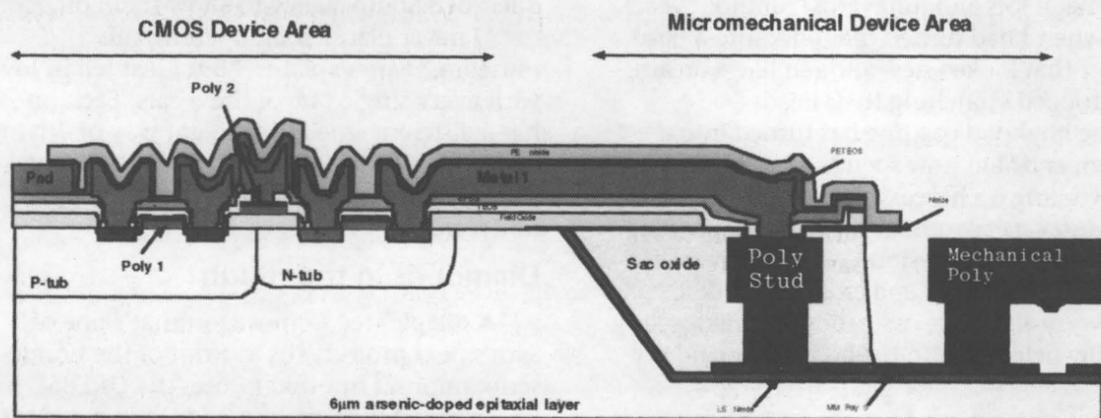
Analog Devices was one of the first to demonstrate the advantage of integrating micromachines and electronics. Even earlier work by Roger Howe in the mid-1980s at UC Berkeley served as a motivation for the Sandia work. Howe chose to build the circuits first but make the interconnected circuit wiring of tungsten, which resists heat better than the cheaper industry standard of aluminum.

Latest in a series of Sandia advances

Sandia's micromachines are approximately one millimeter square. The machines currently are embedded in chip trenches six microns deep, producing a single-level structure suitable for accelerometers and other sensors. Three-level structures have been fabricated to a depth of 18 microns. These are capable of turning external gearing and are completely compatible with the new integrated technique.

The smart micromachine advance is the latest in a series by Sandia scientists. Last September, the Laboratories announced that its team — using methods similar to those of the integrated circuit fabrication industry — had succeeded in mass-producing micromachines that could perform work (*Lab News*, Sept. 15, 1995). The machines turn gears each one-hundredth the weight of a dust mite — itself seen by the human eye as a tiny dot — at hundreds of thousands of revolutions per minute. Each gear is approximately one-hundredth the thickness of a sheet of paper, and smaller in diameter than a human hair. The advance was selected as one of the five best technological innovations of the year by the magazine *Industry Week*.

In 1994, Sandia researchers announced the creation of a microsteam engine; however, modern day micro-devices that produce enough output to do work are powered by electrostatic forces.



LITTLE INNOVATION, BIG RESULTS — Trench, far right, only microns deep, makes possible fabrication of a wide variety of smart micromachines. Microcircuitry, left, connected directly to micromachine stud, helps make automated control possible by eliminating ghost signals caused by long wiring.

Making an intelligent micromachine

The Sandia process etches tiny trenches in the chips and fabricates the machines within these depressions like pool tables in sunken living rooms. The machines, heat-treated, are then submerged—like the Alpine Iceman preserved in the interior of a glacier—in a tiny hardening sea of silicon dioxide.

"If you first sink the machine in a trench and then fill in around it, in effect you've recreated a pristine wafer for doing electronic processing," says Steve Montague (1325), inventor of the approach.

The hardened silicon dioxide recreates a level chip surface upon which circuitry is fabricated by photolithography. Removal of the silicon dioxide at the end of the process frees the microengines.

Working systems are manufactured with a

78 percent success rate — a reasonably high measure of production yield.

The process can produce a wide range of micromachine systems because it allows independent optimization of micromachine and microcircuit performances, achieving the "paradoxical but desirable result of larger, more powerful micromachines with smaller transistors," says Paul McWhorter (1325).

While the machines and electronics now are completely fabricated at Sandia's Micro-electronic Development Laboratory, another option is to continue fabrication of the machines and chips at Sandia but permit novel circuitry to be added at other integrated circuit facilities. An effort also is under way to transfer the technology to industrial partners for large-scale production.

The inexpensive manufacturing process can be used either to produce "tens of thousands of units a day, reducing costs significantly for government or industrial users, or to do specialty work making unique motors and circuits for university or medical researchers," Jeff Sniegowski (1325) says.

Circuits fabricated only microns from a machine eliminate ghost signals — parasitic currents — created by excess electrical capacitance in long connecting wires.

"Without this interference, by applying a mechanical load you can measure the capacitance change in the drive gear teeth as they move in and out," says Sandia engineer Ernest Garcia (2643). "Then you know how fast the machine is moving. The sequence allows you to understand velocity."



ARE YOU JEALOUS YET? — Sam Griego (2483-3), surrounded by (from left) a 1963 Bentley Silvercloud, a 1930 American-La France fire truck, and a 1946 Lincoln Zephyr, sits in his favorite cruiser, a restored Radio Flyer Wagon. (Photos by Randy Montoya)

Sandia blacksmith turns hobby into retirement plan

Old 85 Autoclassic Museum is 'coolest place in Albuquerque'

By Mary Hatheway

Lab News Intern

You'd never guess Sam Griego's hobby judging by the rusted-out, beat-up truck he tools around town in. His friends like to call it an "incinerator on wheels," this '72 Chevy pickup with busted out windows and dents-to-spare. He calls it reliable transportation, but admits with a wink and a grin, "It's not the nicest vehicle I own."

Not by a long shot. Sam, a blacksmith in Precious Metals, Metal Prep, and Explosives Dept. 2483-3, has been collecting and restoring classic automobiles for 30 years. During that time, his collection has grown to include 28 cars and trucks, a motorcycle, even a fire truck.

In fact, he's collected and restored enough cars to fill a museum.

"I started restoring cars when I was 16," Sam says. "My folks used to wonder, 'What's wrong with this guy, dragging junk home from scrap metal lots and junkyards?' But four years later, when I had turned that junk into a beautiful car that looked new and ran like a dream, they stopped scratching their heads."

The boyhood pastime has turned into a passion, and Sam now spends most of his free time working on his cars.

"Most cars take about two years, depending on if it's a frame-up restoration or a minor job. I do all the mechanical and electrical work first, then worry about the cosmetics. My friends Jerry and Billy help out with the body work, and my

wife, Evelina, helps me with the detailing."

Sam says there was always some reason why he couldn't part with any of the cars he restored. So he never did. Instead, he opened a car museum behind his house in Albuquerque's South Valley to show them off.

"I never planned on opening this museum," Sam explains, "But I just fell in love with every single one of these cars. Each one has a different smell, a different way of driving. Pretty soon, I had so many cars, I knew I had to display them somewhere. So we built the museum."

Diamonds in the rough

A dilapidated farm wagon that's one of Sam's next projects sits in front of the nondescript quonset hut that houses the Old 85 Autoclassic Museum, named for the old Isleta Highway. When someone casts a skeptical eye at the heap, Sam just smiles knowingly and says, "This one's going to be a beauty when we get done with it."

And once you set foot inside the 5,200-square-foot museum, you know he's right. "This is the coolest place in Albuquerque," an amazed visitor murmurs as he wanders in.

At the front of the museum are Sam's "diamonds in the rough," the untransformed, trashed-out caterpillars waiting to be metamorphosed into butterflies. You can tell they excite Sam just as much as their restored siblings glimmering beyond them.

"This baby belonged to Al Capone," Sam explains, gently caressing the hood of an unrestored '34 Chrysler CB. "His upholstery guy sold it to me. I can't wait to get started on it."

Just about everything in the museum is a classic or an antique. As he strolls down the 10-foot-wide aisle that separates two rows of cars, Sam rattles off fun facts about each of the different accoutrements in the place. The old-fashioned light that now bathes sparkling chrome fenders in red, yellow, and green was

(Continued on next page)



LABOR OF LOVE — Sam polishes his father's 1942 Ford pickup. The truck first belonged to Sam's father, then to each of his brothers, and finally to Sam, who restored it to near-perfect condition.

How to make the Net and Web work for you: Come to InfoDay '96 on March 28

InfoDay '96, scheduled for March 28 at the Technology Transfer Center (Bldg. 825), will provide Sandians and contractors a second-annual opportunity to learn more about the Internet, the World Wide Web, and how Sandia is keeping one step ahead of the worldwide information technology explosion. Two complete 3 1/2-hour sessions are scheduled, one beginning at 8:30 a.m., the second at 1 p.m. Employees and contractors can attend all or any part of either session. At Sandia/California, InfoDay '96 will be held April 9.

Sandia's first InfoDay, held last February,

gave many Sandians an introduction to the Internet. This year's InfoDay will focus more on how far we've progressed and how the net will continue to change the way we work.

"As we become more sophisticated about the Internet, Sandians want to know, 'How can this help me?' and 'How can I use it as a tool?'" says Dru Popper-Lopez of Software Integration Technologies and Standards Dept. 4612.

A year ago, about 1,500 Sandians and contractors had access to the Labs' Internal Web site. Now nearly 10,000 Sandians and contractors are accessing more than 18,000 documents

on all Sandia Web servers. In February, there were an astonishing 1 million transactions on Sandia's Web pages.

And the explosion continues to grow. While it took nearly 22 months from the time the Web was installed at Sandia to reach 1 million transactions a month, a 2-million-a-month rate probably will be attained this spring, says Fran Current (4612).

Documents that probably will go on-line this year, greatly easing the labs' paper load, include Sandia's timecards, travel vouchers, ES&H manuals, and a project data interface tool. Many departments will make greater use of the Web for training, and some might even include on-line examinations. Many departments are using the Web to electronically collaborate on projects with other departments. And it won't be long before Sandians begin using more video and audio enhancements on the Web, including videoconferencing.

Of the approximately 800 Sandians who responded to a recent on-line survey on their use of the Labs' Internal Web, 90 percent said they use the Web anywhere between one hour a day and one hour a week. Among the enhancements Sandians want are a better Web index and search tools, more consistency in department pages, a better phone directory, and short tutorials.

InfoDay '96 will consist of 12 different mini-sessions, each lasting about 15 to 20 minutes. Session speakers will answer questions and conduct demonstrations of new technologies in the TTC lobby throughout the day.

Additional information about InfoDay '96 is on Sandia's Internal Web at <http://www-irn.sandia.gov/infoday/96info/infoday.htm>.

Here's the agenda for InfoDay '96

8:30-9:00	Mike Eaton, CIO	"Creating an Enterprise Information System"
9-9:10	Roger Adams, 4617	"Sandia's Telecommunication Cabling Infrastructure"
9:10-9:20	Steve Gossage, 4616	"The Backbone — Why an ATM Upgrade?"
9:20-9:35	Fran Current, 4612	"Sandia's Internal Web: Staying One Step Ahead"
9:35-9:55	Pat Milligan, 4813	"Web Application Development and all the Java Hype"
9:55-10:15	Rick Harris, 4423	"Desktop Support: The Role and Status of Customer Service Units"
10:15-10:30	Break	
10:30-10:45	Rich Graham, 9782 Jeff Jortner, 8920	"Multimedia Training on the Web"
10:45-11	Bruce Hawkinson, 12620	"Webchecker's Delight: Sandia News While It's Still News"
11-11:15	Charles Shirley, 4423	"External Web — Where We Are, Where We Want to Be"
11:15-11:30	Ed Marek, 9234	"VRML — Toward a 3D Graphical Web"
11:30-11:45	John Mareda, 9225	"Multiscale User Interface Technology"

All sessions will be repeated starting at 1 p.m.

(Continued from preceding page)

the first stoplight ever hung on downtown Main Street in Silver City, N.M., he says. The red and blue neon Hudson sign that stands like a beacon in the front of the museum is the oldest in the US.

His eyes light up

And then there are those cars. A black-and-white Ford Fairlane convertible. The '46 silver Lincoln Zephyr with push-button doors and burgundy velvet interior. A two-door mint-green-and-cream Chevy Nomad Belair, the coolest beach wagon ever. A dandy '78 Dodge Li'l Red Express truck.

There's the '63 Bentley Silvercloud that

Sam chauffeured Rod Stewart in when he visited Albuquerque. And the '42 Ford pickup that belonged to Sam's dad and all of his brothers before he inherited and restored it. And the most valuable vehicle in the museum — an American La-France fire engine that Sam bought from a collector three years ago.

Sam's blue eyes light up as he tells each vehicle's story. "You get attached to these vehicles after spending so many hours working on them. I found that Li'l Red Express on an abandoned farm in Leyba, N.M. The front right end was smashed. The gate was every shape but straight. And now look at it."

But old automobiles aren't the only vintage vehicles the museum boasts. Hanging from the rafters is a circa 1957 metallic green Stingray bicycle with a banana seat that Sam found in a dumpster. There's a 1930's red Radio Flyer wagon in a corner that sparkles like it was just wheeled out of a toy store and probably weighs more than many modern economy-size vehicles. And a horse-drawn sleigh dating back to 1887, which Sam loans to the Elks Club for the holidays.

"If it's got wheels and it's more than 30 years old, I've probably

got one," Sam jokes.

And just when you think things can't get any cooler, Sam says, "Let me take you upstairs to the Harley Room." And there it stands, amid the old-fashioned barber chairs and gas-pump signs. "It" is an amazingly unrestored 1917 army green, World War I GI-issue Harley Davidson motorcycle, the oldest one of its kind that still runs.

"There's one like it at the Imperial Palace in Las Vegas, but it's been restored, of course," Sam says proudly. "This one had 30 miles on it when I got it. It came to me in mint condition, no restoration required."

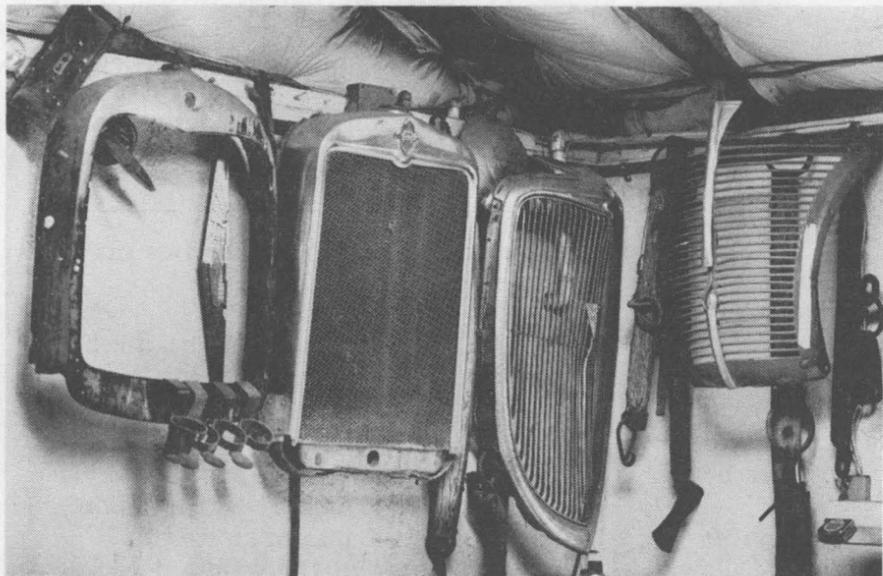
How Sam acquired the Harley is another one of his famous stories. "A woman who visited the museum said to me, 'My son has a green motorcycle you should see—we had it shipped here from San Jose, Argentina,'" Sam says. "So I went to take a look at it. I couldn't believe my eyes when I saw it. It took me eight months to convince her son to sell it to me."

Sam's friends and family helped him build the museum back in 1982, and it opened in 1990.

"I followed the classic car show circuit for a while," Sam says. "My cars have won awards and been published in international magazines. But I got tired of that scene. This museum is my own show now. It's a labor of love."

For now, the museum is open only by appointment. Sam, or the museum curator, Sandia retiree Doug Bacon, host tours of the museum about once a week. Once he retires from Sandia, Sam plans to have it open daily. And he plans to keep on collecting cars.

"Why do I do this? Well, there's just never anything good on TV," Sam says.



ALL IN GOOD TIME — Ages-old radiator grilles wait their turn in Sam's workshop. "I've got a million parts for everything," he says, "but ones that fit, that's a different story."

Sandia VP Dan Hartley looks into the crystal ball, reveals predictions for 2016

Twenty years from now, magnetically read microchips implanted in people's limbs may contain their drivers' licenses and credit cards. Interpreters will attend corporate board meetings so that a company's execs can speak to one another. And Sandia researchers will be stationed in Beijing, London, and Moscow.

Predictions of a tabloid psychic? Nope. Strategic thinking by Sandia's upper management? Yup.

"And in the year 2016, Congress will meet to discuss balancing the budget," joked Dan Hartley, VP of Laboratory Development Div. 4000, before a gathering of some 350 employees at the Technology Transfer Center during the first in a series of Management Town Meetings at Sandia/New Mexico Feb. 27.

Dan's presentation, titled "Seeing Our Future — And Getting Us There," highlighted some of the recent thinking of Sandia's top management as it attempts to anticipate the changes of the next 20 years. He said Sandia's executives are considering the views of a select set of "futurists" — authors and pundits who

divine events in coming decades by examining today's prevailing social, economic, and military trends — in their quest to develop a new strategic plan for the Laboratories.

"I guarantee you that most of what's going to happen between now and 2016 we have no idea about — but there are trends we can look at," he said. "We're trying to spend some time thinking these trends through."

To illustrate how difficult predicting the future can be, Dan recalled the mid-1970s.

"How many of us thought in 1975 that [in 1996] we wouldn't have the Soviet Union? That there wouldn't be a Yugoslavia? That East and West Germany would be one country? We knew none of these things, and yet these are the things that are driving what we're doing."

"I guarantee you that most of what's going to happen between now and 2016 we have no idea about — but there are trends we can look at."

which likely will be driven by health issues to a much greater extent than it is now.

Advances in information technologies indicate that by 2016, people may have body implants for identification, or for enhancing their cognitive abilities. "People have laughed at that, but I'm not laughing any more," he said. "We've seen too much change."

Information technologies may change the workplace most by making telecommuting a feasible alternative. (He said Sandia is now beginning to develop formal policies that may allow many New Mexico Sandians to telecommute, although there's no policy against employees telecommuting now. Watch future *Lab News* issues for more.)

India's emerging economy

In geopolitics, he said, "the general consensus among futurists is that China will most likely emerge as the number one economy in the world, the US will slip to second, and Japan and Germany will both struggle to stay up there."

He said India, with 18 percent of its population enjoying a standard of living comparable to the American middle class, and with an enormous population of well-educated people, may prove to be the dark horse economy in the coming decades. Many US companies are already doing software development there, cheaply, he said.

He predicted that the international conflicts of the future will increasingly be over natural resources — oil, food, and water.

How will all this change affect Sandia? In 2016, he said, the Labs' top management will be made up of employees hired in the last five or six years — members of the so-called "Generation X." (He mentioned a focus group of Sandians 35 and younger Div. 4000 is forming that may give today's management a different perspective on the future.)

In 2016, Sandia also will be more dispersed, with only one-third of the staff located in Albuquerque, another third doing joint research at "maybe a dozen Sandia-university institutes," and the remaining fraction at international sites: Beijing, London, Moscow.

Computers will be at petaflop speeds (10¹⁵ operations per second), the same as human beings, and "we'll be doing lots of knowledge-based research," including lots of software development, he said. "We will have a life sciences program."

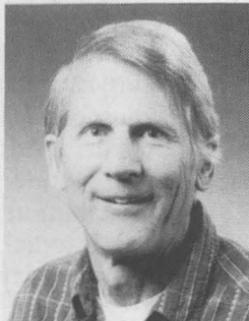
Sandia will still have small nuclear weapons and energy programs, but the environment program will have grown due to environmental crises. Information technologies will replace people in some jobs, driving down the Labs' operation costs.

"And Sandia will be less expensive, finally," he said. — *John German*

Recent Retirees



Richard Petersen 40
7447



Jake Kelly 31
9363



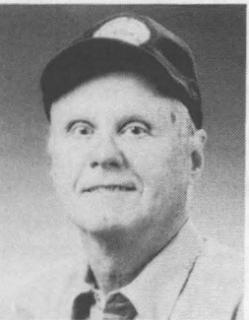
Dean Davis 38
6400



Bill Abel 26
2615



Margaret Chavez 10
10506



Ron Cheek 36
7614



Tom Cordova 32
7601



Wayne Vine 29
1500

Fuzzy borders

One of the clearest trends in the world today, he said, is the transition toward globalization. As more people begin to talk to each other electronically, and as world economic markets continue to consolidate, "borders get fuzzy," he said.

An example of globalization, he said, is Germany's Fraunhofer Institute, which stations German scientists and engineers near industry and universities in 47 facilities in Europe and around the world. Dan believes the Fraunhofer Institute could become a model for Sandia's future.

"Germany seems to have developed this view that national laboratories, with the base of technology they bring, are a strategic asset to their country, and they are playing it out in an international role," he said. "My personal belief is that we're going to do the same thing. We may even partner with Fraunhofer. I think there are some roles there that we'll be playing that we don't even understand yet."

One manifestation of fuzzy borders, he said, is that companies will be more international rather than national, and executive boards will be more cosmopolitan. "To climb the corporate ladder, you'll need to speak more than one language," he said.

International armies

It's also likely that the multinational military "peacekeeping" partnerships of today will become a more common, and more formal, method of dealing with the international crises of tomorrow, he said. The Gulf War and Bosnia are recent examples.

Also in 2016, biosciences and information technologies are going to play greater roles at our laboratories and in our federal budgets, he said. "Sandia historically has not been involved in the life sciences," he said. "But everything you see or read talks about the incredibly important role that's going to play in the next 20 years."

He said some futurists believe that in 50 years the technology will be available to allow some people to live to be 300 years old. But greater life expectancies would place "tremendous pressures on our federal budget system,"

Reminder: A phone number on TOP ID card wrong

The Benefits organization has asked us to remind Sandians and Sandia retirees that, as reported in the Jan. 19 *Lab News*, the phone number for Value Behavioral Health (VBH) on the back side of the new Prudential Triple Option Plan ID card was printed incorrectly. If the number for VBH on your card reads 1-800-522-1886, cross it out and apply the correct number of 1-800-522-1865.

Conference assembles managers from all levels to scope out Sandia's future

Up to 900 managers expected to attend April 2-3 meeting

It's probably the biggest Sandia management conference ever: Up to 900 department managers, directors, and VPs will meet April 2-3 in Albuquerque for two days of tightly scheduled meetings, presentations, and discussions. The meeting, called "Sandia 2000: United for Success," will focus on the challenges facing Sandia and how managers at all levels can help meet them.

"We believe these action-packed two days will yield significant results as we attempt to move the labs forward in these challenging times," Labs President and Director C. Paul Robinson said in an invitational letter to managers and directors. In his letter, Paul noted that department managers "are perhaps the most important link in the management chain," but added that seldom have they gathered together in a forum along with directors and VPs.

The conference is being organized by a design team chaired by Jo Ann Romero, Manager of Leadership and Management Development Dept. 3526, and made up of representatives from across Sandia. The group created the conference agenda on the basis of input from managers at all levels. Leadership and Management Development Dept. 3526 and the Managers Forum are co-sponsors of the conference. The Managers Forum is co-chaired by Russ Skocypec (9102) and Sharon Trauth (2338).

According to Paul, the conference will provide management staff a chance "to discuss a revision of our strategic plan and key initiatives on which we will all need to focus. This conference can begin the feedback process so that we can all join ranks in an

agenda for the future."

"We've never had anything of this scope before," says Jo Ann. "Of course, we have the annual Large Staff conference and there was a



Department Manager's conference in 1989, but this is the first time we've tried to bring everyone from the entire management staff together at once."

In its official planning, the purpose of the conference is described as "to unite Sandia's management team in

order to maximize Sandia's long-term vitality and contributions to the nation through a common understanding of our changing business environment, strategic direction, and required management actions."

Expected outcomes are to:

- Provide a clear understanding of Sandia's strategic direction and priorities facing Sandia over the next one to three years.
- Identify actions managers can take to position Sandia to meet the future.
- Obtain alignment of Sandia management levels by fostering understanding of the man-

ager's role in the overall strategic plan.

- Develop a sense of collaboration, network, and support among managers.

According to Jo Ann, day one of the conference is intended to "garner a common understanding of the current pressures, challenges, and realities we all face and to understand and provide input into our recently revised strategy, direction, and priorities."

Day two, Jo Ann says, will "allow for creation of the actions we need to take to ensure we're aligned as a management team and ready to face the future together."

"Although we've called it a conference, it is more accurately a two-day working session in which all levels of managers will be able to rally together to take Sandia to our next steps," says Sharon. "It's really history in the making."

Conference design team members

The "Sandia 2000: United for Success" conference design team includes members from across the Labs. They are: Jo Ann Romero (3526), Cliff Renschler (1812), Tom Perea (2665), Phyllis Owens (3526), Shanna Narath (4524), Sharon Trauth (2338), Dave Gangel (5831), Ajoy Moonka (6471), Judy Mead (7001), Dorothy Stermer (7584), Russ Skocypec (9102), Victor Johnson (12304), Anna Nusbaum (15102), Gary Ferguson (14309), and Rene Bierbaum (8116).

First-of-its-kind Sandia community outreach effort to help Martineztown neighbor service

'Week of Caring' April 20-25 seeks Sandia, family, retiree volunteers

Sandia's first annual "Week of Caring" is April 20-25, and the focus of this volunteer effort will be the Martineztown House of Neighborly Service (MHNS), a nonprofit Albuquerque social service agency. MHNS, at the corner of Edith and Lomas, was selected because of its emphasis on reaching youth at risk, it is a Sandia/Lockheed Martin-targeted area of community outreach, and it offers a variety of opportunities for volunteer involvement.

"This is the first time in Sandia's history that volunteers and funding have been teamed in a major community outreach effort," says Redd Eakin of Community Relations Dept. 12671. Approximately \$15,000 of Lockheed Martin Corporate Contributions funds will be used during the Week of Caring to supplement and enable the volunteer efforts.

Martineztown House serves the people of the Martineztown/Santa Barbara area of Albuquerque. It serves 80 children, ages 3-15, each day in its before- and after-school programs; offers food and clothing to needy families; provides parenting classes and counseling services; and assists senior citizens at the La Amistad senior center by providing meals, arts and crafts classes, transportation, and assistance with household chores.

The Week of Caring steering committee, chaired by Redd, is in search of volunteers interested in giving some of their time during

the six-day effort. "We already have 46 Labs employees who have come forward offering their assistance during the Week of Caring," says Redd. "We're looking forward to an excellent response from Sandians, their family members, and Labs retirees — we certainly have enough work for everyone."

Saturday, April 20, will be Family Opportunity Day at MHNS. Sandians and retirees are encouraged to get their families involved in community service work at MHNS that day. There also will be opportunities for special group participation projects for offices, departments, or clubs.

Several groups of Sandians have already made a difference at the House: painting, planting flowers, pulling weeds, and teaching CPR. The Week of Caring, planned to coincide with National Volunteer Week, is an opportunity for Sandians to offer their time and valuable talents to an agency that serves the residents of an economic area of Albuquerque where, according to Eugenia Cabiedes, Executive Director of MHNS, the average annual family income is \$7,000.

Areas of involvement for the week include: reading stories to elementary school children, doing home chores for senior citizens, painting, building, performing grounds maintenance jobs, chaperoning field trips for the children, tutoring, mentoring, and participating in drives for items needed at MHNS.

Additional information will go out to all Labs employees and retirees within the next two weeks detailing areas of service available. Redd encourages all to look the information over, share it with their families, and return the form indicating areas of interest. Volunteers will then be "plugged in" to the Week of Caring schedule and notified of their assignments. For activities scheduled during regular working hours, community-service time off will be available with manager approval, says Redd.

— Kathy Kuhlmann

★ Congratulations

To Danelle Tanner (1276), a son, Alexander Vance, born Feb. 28, 1993, adopted from Chelyabinsk, Russia, Jan. 30.

Michele (9400) and Mike (9403) Skroch, a daughter, Caley Bryn, Feb. 13.

To Lori Parrott (12120) and Rick Ormesher (2344), a daughter, Rylen Lynne, Feb. 21.

To Sue Posler and Todd Criel (2526), a son, Stephen Posler Criel, Feb. 25.

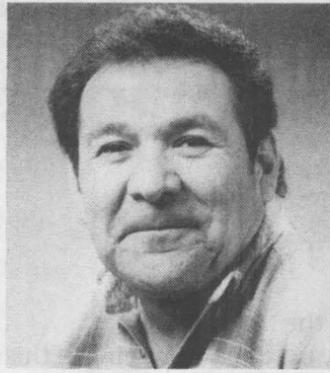
To Kelly (1128) and B.G. (1845) Potter, a son, Collin Jacob, Feb. 26.

To Kristin and Ed (2346) Hanson, a daughter, Elizabeth Rose, Feb. 28.

To Ann Bouchard (5838) and Gordon Osbourn (1155), married in Las Vegas, Nev., March 3.

Mileposts

March 1996



Roque Gallegos 30
9323



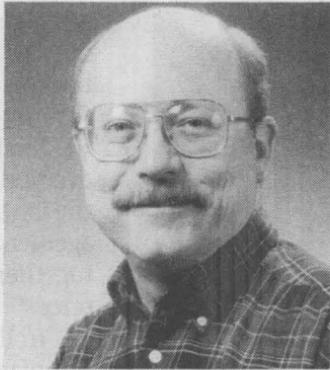
Annie Webb 15
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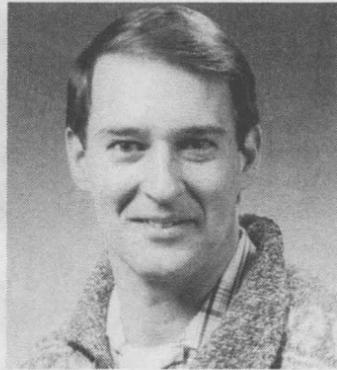
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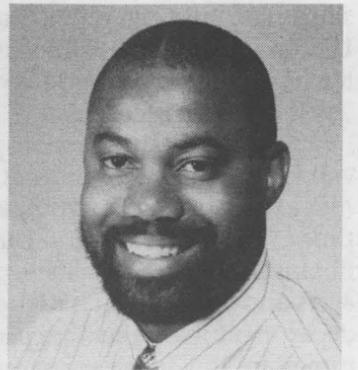
Bill Emrick 35
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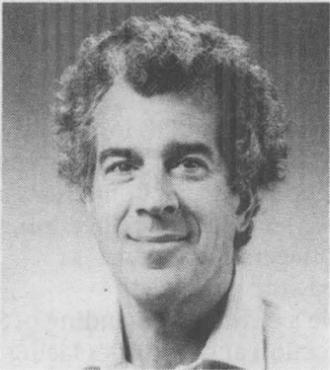
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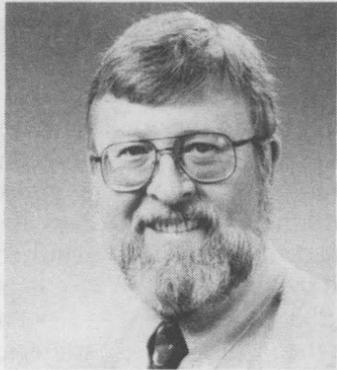
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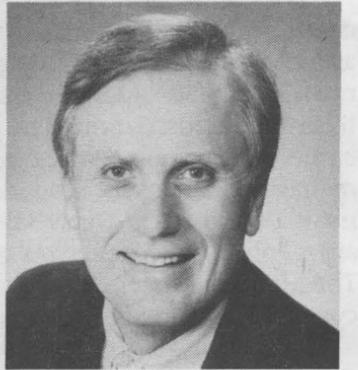
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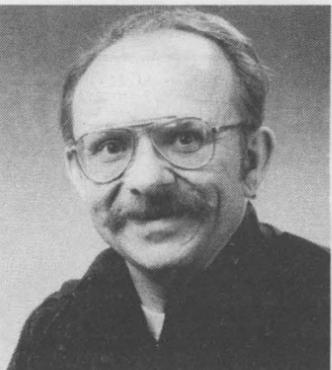
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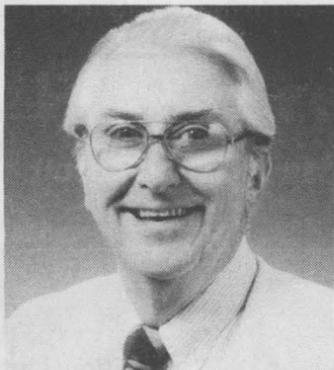
Jeff Everett 15
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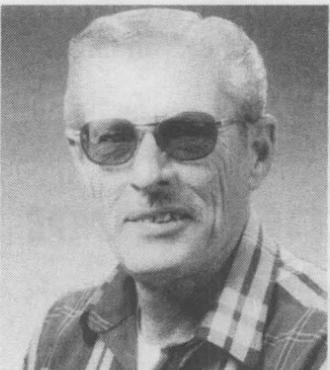
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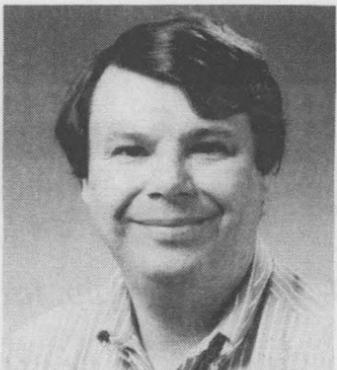
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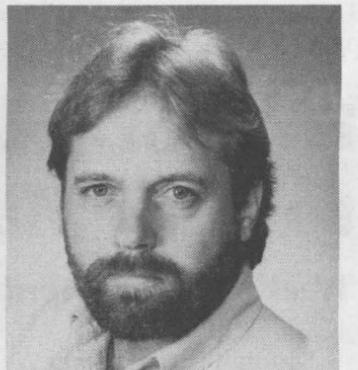
George McLellan 20
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Dennis Hackard 15
7811



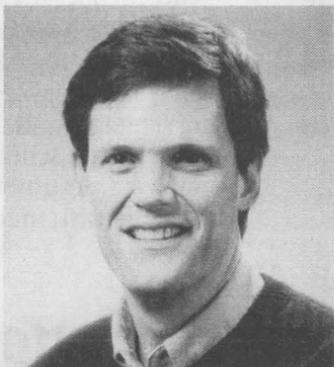
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Ken Stewart 20
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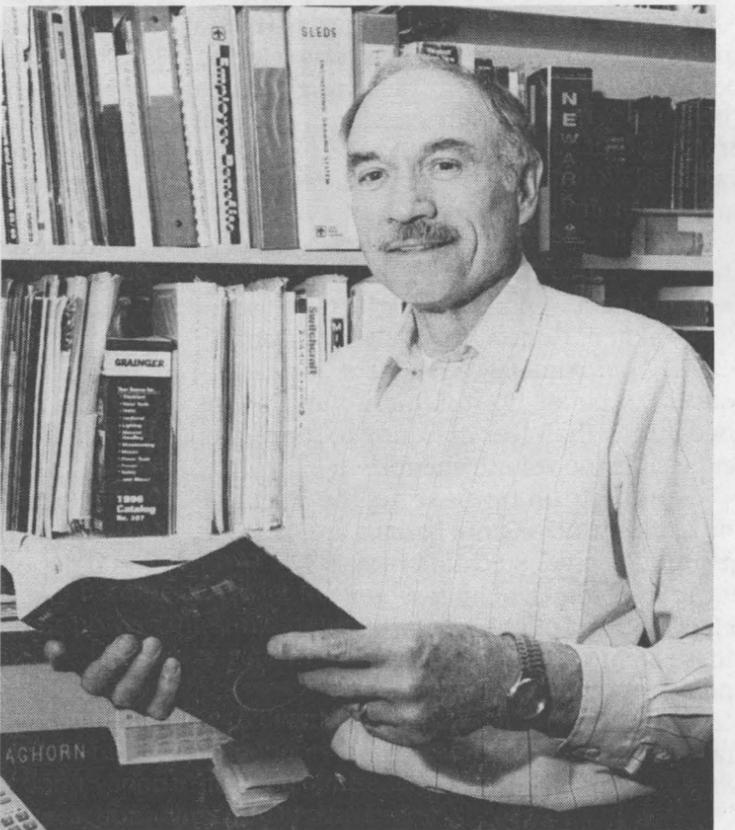
Richard Fitak 20
12365



Kent Schubert 15
6219



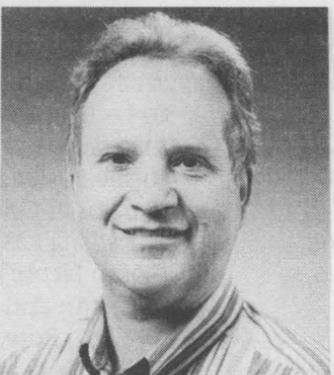
Maurice Gauthier 25
1486



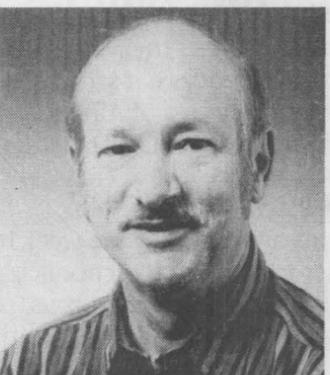
Chester Claghorn 35
2121



Gilbert Muniz 20
7312



Grant Claycomb 20
4811



Ken Bell 20
9419

Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads

MISCELLANEOUS

STAIR-STEPPE, Tunturi-401, like new, \$250 OBO; fiberglass canoe, 19-ft., good condition, \$300 OBO. Chavez, 898-4475.

MOVING SALE, Sony surround-sound stereo, \$600; like-new RCA TV, 27-in., \$350; VCR, \$150; new Pre skis, \$100. Jeantette, 247-4239.

NORDICTRAC "PRO", less than 1 year old, digital readouts, excellent condition, paid \$650, asking \$450. Ricci, 256-7872.

STEREO EQUIPMENT, Yamaha double cassette deck, Yamaha receiver, 2 Corwin-Vega D-1 speakers, \$500. McVey, 890-7543.

TWIN SINGLE BED, wooden headboard, box spring & mattress, all good condition, \$125. Dickenman, 892-9561.

BORNEO BLOOD PYTHON, \$225 OBO. Bayless, 299-4656.

COMPUTER, Epson XT, 640K RAM, 20MB disk, DOS 2.11, Word 5.0, Epson dot-matrix printer. \$100. Campbell, 294-1380.

GIUITAR, Castilla wooden acoustic, hard case, good for beginner, \$70; Mercury 6-hp outboard motor, old, \$225. Van Den Avyle, 898-6474.

TIRES, nylon w/tubes, 15-in., \$25; high chair, \$20; wood playpen, like new, meets safety standards, \$75. Rogulich, 298-5261.

EVENFLO SAUCER, \$30; Century infant car seat, \$10; Snuggli, \$5. McBrayer, 293-4076.

RUGER SINGLE SIX GUN, blue, 5-1/2-in. bbl, .22 & .22 WMR, holster & ammo, little used, \$250. Salmen, 881-8612.

DESK, w/hutch, white laminate, 1 year old, excellent condition, \$50. Meeks, 828-9825.

CAMPER SHELL, black, fits short narrow carpet inserts, \$300; drop spindles, C-10 Chev. pickup, w/1-1/4 in. rotors, \$100. Garcia, 836-0458.

TWO LAMPS, for overhead projector, new, 82V, 250-watt type, EVW, \$20 ea.; free lamp changer module. Stamm, 255-2640.

BURIAL SITES, at Vista Verde Memorial Park, veteran & spouse, w/2 vaults & double marker, beautiful, \$3,200. Waite, 867-5953.

WASHER/DRYER, Maytag, good condition, \$150 for matching set. Girand, 256-0582.

GAS WEED WHACKER, Sears 22cc, just serviced, runs great, used 5 times, \$50 OBO. Branstetter, 292-5978.

DINING TABLE, w/6 upholstered, cane-back chairs, walnut parquet w/tile center, \$200; walnut buffet, \$100. Seager, 299-7629.

CLOTHESLINE POLES, galvanized metal, 5-wire, excellent condition, free if you dig up. Jones, 881-8341.

CHIPPER/SHREDDER, 5-hp, Craftsman, \$200; Trek road bike, 12-sp., white, \$150; both like new. Whiting, 864-6285.

CONTEMPORARY DINING SET, brass-&-glass table, w/4 blue velour chairs, perfect condition, \$300; china cabinet, \$75. Harrison, 897-0658.

LAWNMOWER, Mastercut-21, w/grass catcher, 3.5-hp gas engine, runs great, \$45. Reese, 828-0113.

CAPTAIN'S BED, w/mattress, matching bookcase, \$90. Guerra, 248-1335, after 6 p.m.

METAL OFFICE DESK, \$45; dinette set, w/four chairs, wood finish, \$45. Burgett, 275-0229.

RIFLE, .22 single shot, good condition, used approximately 10 times, \$69. Locher, 256-3406, ask for Mo.

STATIONARY EXERCISE BICYCLE, Tunturi brand, quiet operation, felt-pad resistance, like new, \$130. Umstead, 298-7091.

CHOICE BURIAL PLOTS, Sandia Memorial Gardens & Sunset Memorial Gardens, \$700 ea. Babcock, 299-3121.

CHILD'S PLAY CARPET, almost new, w/design of city, 6' x 4', \$15. Wanya, 294-2050.

DISHWASHER, Maytag, roll-around, 9 months old, used only 6 months, paid \$450, sacrifice for \$325. Wiseman, 299-7089.

VIDEO GAME COLLECTORS, an original Intellivision, w/many game cartridges, excellent condition, \$100. Harrington, 292-1458.

SOFAS, 2 matching, rattan trim, loose cushions back & seat, cream & peach/beige print, \$200 ea. Lange, 856-1952.

HUMMELS: '71 Happy Traveler, \$90; '80 Searching Angel wall plaque, \$75; '85 Guiding Angel, \$50. Johnson, 298-1729.

HEALTHRIDER, 11 months old, paid \$569, asking \$450. Chavez, 823-2335.

BETA VCR, records & plays well, programmable, w/recorder & 100 tapes, most w/movies, \$50. Long, 296-2590.

FURNITURE: triple dresser, \$150; chest of drawers, \$100; Rattan stacking end tables, \$40. Bamard, 856-1952.

SKI RACK, Thule 1050-10-2, \$50; Lifestyler 550, dual-action, ergometer stationary bike, \$100. Coalson, 821-9442.

SHORT JACKET, Alaskan red/silver fox, small, never worn, new \$3,500, asking \$1,000 OBO. Gonzales, 897-9920.

INEXPENSIVE TVs: 13-in. diagonal color Hitachi, \$25; 19-in. diagonal color Sylvania, digital tuner, unreliable, free. Lagasse, 298-0977.

SHOTGUN, 12-gauge Beretta 1201FP1, semi-auto, short barrel, w/pistol grip, \$550. Karnes, 880-1163.

MINK JACKET, stroller-length, appraised \$900, asking \$300. Bass, 856-2407.

BEDLINER, full-size, short-bed pickup, \$90. Arning, 256-9229.

WOMAN'S LEATHER BOOTS, black, size 9M, w/fringe, excellent condition, paid \$120, asking \$50. Greear, 839-4255.

CONCHO BELTS, sterling silver, hand-tooled, bargain priced; certified \$20 gold pieces, MS62-MS64; other rare coins. Duncan, 281-8792.

DAY BED, white metal frame, w/mattress, good condition, comforter, bedskirt, w/shams, great girl's bed, \$100. Silva, 299-8705.

PRINTER, Star 1000, 9-pin, IBM-compatible, good condition, w/cable, ribbon, paper. Duvall, 881-4406.

EVINRUDE OUTBOARD MOTOR, 15-hp, old but good, \$250. Wright, 296-3850.

EXERCISE BIKE, good condition, timer, mileage & work load gauges, \$50. Kinney, 856-1512.

SANYO STEREO MUSIC SYSTEM, double cassette deck, dual-tape transport, AM/FM, turntable, 2 ST-80 speakers, perfect. Kirkel, 899-2770.

TWO PARAKEETS, 4-months old, w/nice cage, plus accessories, perfect pets, free. Hachigian, 262-0331.

CRIB MATTRESS, like new, \$25; bug zapper, \$20; crystal pitcher, w/4 glasses, \$30; Thigh Master, \$5; cash register stand, \$75. Schultz, 881-2434.

WHITE LOVESEAT, hide-a-bed, must sell, \$100 OBO, or trade for a desk w/file cabinet. Gamboa, 764-8212.

ENGAGEMENT RING, 7 diamonds in 14K gold band, total 1.27 carats, center stone less than carat, appraised \$4,495, sacrifice \$2,700. Kuhlman, 271-5870.

MAC+, 1MB, 30MB HD, software, modem, GCC laser printer, \$200; C-64, drive, color monitor, software, \$100. Murphy, 294-1778.

PIANO, Yamaha console, satin walnut, perfect, new \$5,000, steal it for \$2,600. Olsen, 294-2333.

REFRIGERATOR, good condition, \$150; free shade trees, 1-10 ft. tall, you dig. Shaut, 299-8569.

EMERGENCY ELECTRONIC IGNITION, \$35; '84-'86 Subaru shop manual, \$10; mini-air compressor, \$5. Casper, 268-4464, leave message.

GOATS, 2 neutered, de-horned bucks, fun pets, \$50; 2 wool sheep ewes, \$130/pair. Conner, 281-9370.

HEALTHRIDER, latest model, must sell, \$450; Exer-Mate model 250, \$100 OBO; 7-drawer desk, \$100. Hanes, 292-6512.

OLD ENGINE, restored, '26 Cushman, 2-hp, two 12-in. flywheels, owner's manual, \$325. Coalson, 298-0061.

MOTHERBOARD, w/Intel DX4-100, \$275; Fox Pro 2.5 for Windows, \$90; Clipper 5.2, \$90. Keahbone, 831-6177.

.380 SEMIAUTOMATIC, good backup, excellent condition, \$85. Diegle, 856-5608.

DINETTE, House of Kent, 41-in.-plus leaf, 4 swivel/arm chairs, excellent condition, paid \$1,200, asking \$475. Caskey, 298-6428.

TURNTABLE, Technics SL3200, w/ cartridge; Realistic CD-1000 CD player; suede pistol case; organ, Kimball Temptation. Furry, 281-1024.

CALCULATOR, HP485X, w/equation library card, manuals & case, \$150. Hased, 284-3219.

DEADLINE: Friday noon before week of publication unless changed by holiday. MAIL to Dept. 12622, MS 0165, or FAX to 844-0645. You may also send ads by e-mail to Nancy Campanozzi (nrcampa@sandia.gov). Questions? Call Nancy on 844-7522.

Due to space constraints, ads will be printed on a first-come, first-served basis.

Ad Rules

1. Limit 18 words, including last name and home phone (We will edit longer ads).
2. Include organization and full name with the ad submission.
3. No phone-ins.
4. Use 8 1/2-by 11-inch paper.
5. Type or print ad; use accepted abbreviations.
6. One ad per issue.
7. We will not run the same ad more than twice.
8. No "for rent" ads except for employees on temporary assignment.
9. No commercial ads.
10. For active and retired Sandians and DOE employees.
11. Housing listed for sale is available without regard to race, creed, color, or national origin.
12. "Work Wanted" ads limited to student-aged children of employees.

COUCH, full-size, beige, w/blue & mauve highlights, excellent condition, \$150 OBO. Lesperance, 281-0547.

PIANO, Weiler, upright, tuned, \$600; portable dishwasher, \$200; king-size waterbed, w/bookcase, headboard, \$75; 27-in. console TV, \$100 OBO. Estill, 883-1531.

OAK BOOKCASES, adjustable shelves, 7' x 4', \$75; 7' x 3', \$60. Madsen, 856-1530.

FIREPLACE, free-standing, w/interior & exterior (triple wall) chimney, \$70 OBO. Barnard, 256-7772.

SOFA SLEEPERS, La-Z-Boy, queen & full, sleeper condition excellent, sofa, fair, earth tones, \$100 ea. Lappin, 296-3457.

COMPLETE BODY EXERCISER, Soloflex, \$800 OBO; Dell 386SX, color VGA monitor, LX800, \$700 OBO. Everett, 296-8786.

ROCKING LOVESEAT, 58-in., mauve upholstery, excellent condition, \$40; third seat for Taurus stationwagon, never used, \$50. Riggins, 299-7778.

SWINGSET, 2 swing seats & bench gliders, slide, \$75. Zirzow, 281-9896.

TRANSPORTATION

'64 FORD GALAXIE, convertible, 390ci, needs restoration, \$1,000 OBO. Myers, 867-5688.

'71 FIAT, convertible, Spyder, \$1,000. Roybal, 296-8493.

'90 HONDA ACCORD LX, 2-dr. coupe, 5-sp., AM/FM cassette, AC, cruise, burgundy, excellent condition, 73K miles, \$7,900. Hassan, 822-9544.

'88 TOYOTA COROLLA FX, white, AC, PS, 62K miles, \$500. Hendrickson, 262-4887, ask for Dale.

'92 DODGE SPIRIT RT, performance sedan, fully loaded, 25K miles, like new, \$9,500. Campbell, 296-8304.

'66 CORVETTE COUPE, 327/350-hp, Nassau blue, 4-sp., AC, NCRS Award, \$35,000. Cerutti, 299-4658, ask for Brian.

'82 TOYOTA TRUCK, long-bed pickup, new tires, good gas mileage, great work truck, \$995. Barthelmes, 286-1491.

'91 CHEV. SILVERADO, 4x4, extended cab, low mileage, new tires, shell and liner, \$16,000, Ziska, 821-6930.

'92 JEEP CHEROKEE, Laredo, 4WD, power everything, 4.0L/6-cyl., many extras, excellent condition, 51K miles, \$15,500 OBO. Surbey, 823-2843.

'73 SCOUT II, 4x4, 90K miles, \$2,500 OBO. Steigerwald, 344-2765.

'93 VOYAGER, 63K miles, original owner, 3.0L, V6, FWD, airbag, child seats, luggage rack, AM/FM, \$10,000. Courtney, 281-2905.

'91 BERETTA, V6, AM/FM cassette, tinted windows, airbag, AC, AT, nearly new tires, excellent condition, \$7,500. LaFleur, 269-0924.

'93 JEEP GRAND CHEROKEE LAREDO, 5-sp., 6-cyl., 5 new tires, extended warranty, 43K miles, \$20,000. Morris, 296-5826.

'66 VOLVO 122S, red, 4-dr., converted automatic, \$750 OBO. Crafts, 831-5234.

'85 FORD ESCORT, 4-dr., wagon, blown head gasket, AT, AC, 92K miles, \$400 OBO. Blain, 293-3971.

'86 NISSAN SENTRA, 4-dr., AC, AM/FM cassette, new tires, brakes, muffler, battery, runs well, dependable, \$2,500. Sanchez, 292-1982.

'85 PONTIAC GRAND AM, 4-cyl., 5-sp., front-end body damage, economical transportation, good teens' first car, \$800 OBO. Rolfe, 833-1584.

'83 NISSAN TRUCK, 5-sp., AC, new paint, tires, & brakes, excellent condition, \$2,150 OBO. Hayward, 292-2980.

'93 GEO TRACKER, 4x4, hard top, AC, towable, 10,800 miles, extended warranty until January '99, \$10,900 firm. Erickson, 296-0486.

'82 CORVETTE, collector's edition, hatchback, AT, loaded, low miles, runs/looks excellent, \$19,950 OBO. Yeazel, 275-5816.

'85 MERCEDES BENZ 300 TD, turbo diesel, 4-dr. sedan, exceptional, pampered, family car, all service records, garaged. McKinney, 281-9289.

'88 MITSUBISHI MIRAGE, good condition, new engine, needs flexplate, \$1,200 OBO. Smith, 384-5182.

'93 CADILLAC SEVILLE, leather, all power, only 14K miles, below book \$24,500. Romero, 298-8586.

'95 OLDS CONVERTIBLE, Cutlass Supreme, AT, PS, ABS, dual air bags, many extras, 5K miles, \$24,300. Lohr, 821-1043.

'84 RED CORVETTE, T-top, power everything, Bose stereo, many extras, 20K miles, mint condition, \$12,500. Washburn, 294-5921 or 263-4076.

'89 FORD PROBE GL, only 51K miles, AT, AC, AM/FM cassette, new tires, \$4,700. Richard, 286-2134.

'95 DODGE DAKOTA SPORT PICKUP, 4x4, X-tra cab, V8, 25K miles, loaded, w/tool box, rails, liner, console w/detector, \$16,000. McKibben, 281-8478.

'67 COUGAR, original owner, beautiful classic, \$6,500. Verardo, 255-6385.

'93 CHEV., extended cab, custom paint, sunroof, CD, buckets, Glasstite topper, 46K miles, \$14,000 OBO. Retelle, 839-0667.

'89 DODGE GRAND CARAVAN, 7-passenger, AC, V6, runs great, \$5,250 OBO. Padilla, 831-8763.

'91 TOYOTA CAMRY DX, fully loaded, 65K miles, excellent condition, will sacrifice (below NADA book), \$8,250. Nelson, 828-2755.

'91 FORD EXPLORER XT, 4x4, 4-dr., 5-sp., AC, new tires, 106K miles, excellent condition, \$12,000 OBO. Lindgren, 265-1390.

'94 SATURN SC1, good condition, \$11,900. McLellan, 299-0266.

'88 FORD, 1-ton diesel, 350 flat bed, goose neck & ball hitch, rebuilt transmission, dual tanks. Gendreau, 268-3436.

'90 CHEV. CAPRICE CLASSIC, small V8, fuel-injected, AT, AC, 68K miles, \$5,100. Martin, 343-9719.

'91 SUZUKI SIDEKICK CONV., 5-sp., 4WD, AC, stereo, new top, 69K miles, many extras, \$6,950. Wickham, 898-7601.

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RECREATIONAL

TEN-SPEED BOY'S BIKE, Schwinn, \$35. Harris, 822-0236.

TWO TICKETS, for March 22-24, Indy Car Phoenix 200, Indy Racing League, excellent seats, w/pit passes, \$220/all. Szklarz, 292-3995.

CAMPER, w/jacks, sleeps 4-6, stove, sink, icebox, portable potty, fits full-size truck, very good condition, \$1,500. Archuleta, 836-3764.

MAN'S TREK MOUNTAIN BIKE, 26-in., 21-sp., hardly ridden, helmet, gloves & more, \$525. Jagdmann, 271-1316.

'78 MOTORHOME, Superior, 29-ft., 5K generator, dual-air, dual-furnaces, vacuum system, rear bath, Dodge 440 engine, 45K miles. McCormick, 869-2879.

'92 JAYCO POPUP TRAILER, sleeps 6, used 4 times, \$3,600. Segovia, 892-3091.

'94 MOUNTAIN BIKE, Cannondale 18-in., Delta V500, excellent condition, Grip Shift, adjustable head-shock, \$650. Gonzales, 294-2425.

'84 RV MOTORHOME, Allegro, 27-ft., new motor & 6 new tires, excellent condition, w/many extras. Tennis, 299-4889.

REAL ESTATE

4-BDR. HOME, 1,950 sq. ft., 2 baths, 2 fireplaces, large yard, great neighborhood, 40-minute commute to Bldg. 800. Kercheval, 864-6549.

4-BDR. HOME, 2 baths, 2 fireplaces, sunroom/hot tub, 2,350 sq. ft., immediate occupancy, far NE Heights, \$157,900. Dawson, 828-0873.

3-BDR. HOME, NE Heights, immaculate, country kitchen, 2 baths, den, sunroom, detached workshop, new roof, \$110,000. Torres, 888-3218.

3-BDR. TOWNHOME, 3 baths, 2-car garage, jacuzzi tub, fireplace, security system, Tanoan, 1,780 sq. ft., \$165,000. Jackson, 821-5315.

3-BDR. HOME, 1,600 sq. ft., 2 story, 2-1/2 baths, 2-car garage, kitchen recently updated, remodeling home, \$135,000. Barnette, 292-5186.

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WANTED

OUTDOOR CHRISTMAS DECORATIONS, Unicycle, pottery wheel. Korbin, 299-9088.

REUNION, Sandia High, Classes of '59-'62, join us for fun & visit old friends. Shoaf, 296-6166.

SEEKING TWO TRAVELING COMPANIONS, retired Sandian, my car, my petro. Sorrell, 292-0874.

SWING SET or childrens playhouse, outdoors for 2-year-old, solid construction. Plut, 298-3060.

DOG HOUSE, for medium-size dog (40 lbs.), reasonable price. Veltkamp, 266-0564.

SWING SET, good condition. Harrison, 899-0193.

ELECTRONIC DIGITAL PIANO, 88-key. Bruce, 897-7416.

DOG CAGE OR KENNEL & dog house, for large dog. Valencia, 294-7367.

Sandia News Briefs

Paul Robinson honored by Joint Chiefs for policy contributions

The US Joint Chiefs of Staff (JCS) has presented its "Outstanding Public Service Award" to Labs President and Director C. Paul Robinson for his "succession of extraordinary, voluntary contributions" to the United States Strategic Command (USSTRATCOM) and the Joint Strategic Target Planning Staff (JSTPS) while serving as a member of the Strategic Advisory Group (SAG). The award citation, presented to Paul in a surprise ceremony during a SAG meeting in Omaha, lauds his policy contributions as being of "immeasurable value in promoting the goals of the Department of Defense, the JCS, and USSTRATCOM." The citation says Paul's leadership "directly resulted in implementation of policy recommendations of enduring value addressing specific and pressing needs confronting US strategic forces. His example of voluntarism and the nuclear weapons programs he explored, analyzed, and guided have instilled continued confidence in the deterrent value of US forces."

Sandia wins Roadrunner quality award

Sandia's "quality journey" was recognized with a Roadrunner award at the annual conference of the New Mexico Quality Awards (NMQA) program. Deputy Labs Director John Crawford accepted the award on behalf of the Labs at the recent conference in Las Cruces. The NMQA program encourages New Mexico organizations to apply the Malcolm Baldrige National Quality Award (MBNQA) criteria to their processes. The criteria are designed to help organizations enhance competitiveness through focusing on dual, results-oriented goals: delivery of ever-improving value to customers and improvement of overall organizational performance and capabilities. The NMQA application was written and compiled by Suzanne Weissman (6000), Jim Clinch (4022), Sharon Sturmoski (4022), and Ken Hanks (4543). Maureen Baca (4022) organized and Dave Bushmire (4021) leads the Sandia Baldrige Improvement Team.

Nancy Jackson named to ACS science committee

Nancy Jackson of Process Research Dept. 6212 has received an appointment to the American Chemical Society's Committee on Science. The committee monitors all ACS activities and suggests innovations at the forefront of chemical science. It is often called on by the private and public sectors to provide advice on issues related to the chemical sciences.

Send potential Sandia News Briefs to Lab News, Dept. 12622, MS 0165, fax 844-0645.

Coronado Club

March 14, 21, 28 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

March 15 — St. Patrick's Day dance. \$6.95 all-you-can-eat buffet, including corned beef and cabbage, 6-9 p.m.; floor show, 8-9 p.m. Music by Midnight Magic, 7-11 p.m.

March 17 — Sunday brunch buffet, 10 a.m.-2 p.m. \$6.95 adult members; \$1 for children 3 to 12; free for children 3 and under. Music for buffet by Bob Weiler, 1-4 p.m.

March 22 — Kids' bingo night. Buffet, 5-8 p.m., with cartoons and movies. Bingo starts at 7 p.m. Free hot dog and soft drink for all kids playing bingo. Cost is \$2.50 for a bingo packet.

April 4 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

April 6 — Annual Easter Egg Hunt, 9 a.m.- noon; cartoons, 9-10 a.m.; Easter Egg hunt and games, 10 a.m.- noon; free for children of Coronado Club members.

April 7 — Easter Sunday Brunch, 10 a.m.-4 p.m.; seating times are: 9-11 a.m.; noon-2 p.m.; 2:30-4 p.m. Seating is limited and reservations are required. \$8.95 for members; \$4.50 for children 3-12 years old; free for children under three.

Fun & Games

Bowling — SANDOE Bowling Association December Bowlers-of-the-Month include: Scratch — Helen "Charlie" Husa, 618; and Barry Hansen (6219); Handicap — Dee Schumpert, 524 and 644; and Pat Sanchez, 611 and 671.

January Bowlers-of-the-Month: Scratch — Tanya McMullen (9401), 534; and Don MacKenzie (ret.), 729; Handicap — Dora Gunckel (6400), 504 and 621; and Ron Husa (ret.), 635 and 659.

Winners of the Four-Person Team No-Tap Tournament at Fiesta Lanes Feb. 3-4 were Reyes Chavez (7433), Trinie Chavez, Dora Gunckel, and Dave Robertson with a 2,871 team handicap series. Special congratulations to Fred Gunckel (ret.) who rolled a no-tap perfect 300.

Employee death

Gerald Depuydt of Operations Engineering Dept. 7816 died suddenly March 4.

He was 48 years old.

Gerald was a technical associate and had been at Sandia since 1977.

He is survived by sons Patrick and David.

Retirement open houses

Sandia is holding open houses in honor of retirees **Frank Comiskey** (7611) in the Area 1 Cafeteria (Bldg. 861) on Thursday, March 21, 2-4 p.m.; **Ken Prestwich** (9503), **Tom Martin** (9511), and **Cliff Mendel** (9573) in the Coronado Club on Tuesday, March 26, 4:30-7 p.m.; **Charlie Barnes** (1323) in the Bldg. 858 break room on Tuesday, March 26, 3 p.m.; **Philip Stanton** (9225) in the Area 1 Cafeteria (Bldg. 861) on Tuesday, March 26, 2-4 p.m.; **Dave Chadwick** (2122) in the Area 1 Cafeteria (Bldg. 861) on Wednesday, March 27, 2-4 p.m.; **Bob Graham** (1152) in Bldg. 822, Conf. Rm. A/B, on Thursday, March 28, 3-5 p.m.; **Jon Barnette** (1535) in the Area 1 Cafeteria (Bldg. 861) on Thursday, March 28, 2-4 p.m.; **Ken Ludwick** (7814) in the Area 1 Cafeteria (Bldg. 861) on Monday, April 1 (no fooling), 2-4 p.m.; **Von Madsen** (1567) in the Area 1 Cafeteria (Bldg. 861) on Thursday, April 4, 2-4 p.m.; **Ed Martinez** (1411), **John Ledman** (1472), **Tommy Spindle** (1472), and **Floyd Salas** (9342) in the Coronado Club Zia Room on Thursday, April 4, 4:30-7:30 p.m.; and **Zora Freeman** (7435), **Mary K. Hampton** (7437), **Mike Corcoran** (7615), **Laura McCarty** (7402), and **Jim Giachino** (7402) in the Coronado Club on Monday, April 8, 4-6 p.m. Refreshments will be served. Friends and acquaintances are invited.



A BIT OF SUNSHINE — Child care provider Khristy Rodriguez reads a story to children at the Shandiin Child Development Center, a new DOE facility at Pennsylvania and M Street, Kirtland Air Force Base. Sandia families are now eligible to apply for child care at the facility. The name of the facility was chosen in a contest among DOE personnel. "Shandiin" was the submission of DOE employee Daisy Nez; it means "sunshine" in Navajo. The center, operated by Bright Horizons under contract to DOE, offers low child:adult ratios and small group settings. Space is limited and is available on a first-come, first-served basis. The facility can accommodate as many as 92 children from infants through five-year-olds. The maximum fee is \$107 a week for full-time infant care. Rates are lower for part-time and for older children. Interested Sandians may visit the facility or call the director, Elizabeth Dabney, at 845-5013.