Sandia helps research team study underground disposal of carbon dioxide at New Mexico oil field

Team pumps tons of CO₂ gas into depleted oil reservoir

By John German

Sandia is helping the US government take the first small steps toward reducing net US fossil-fuel emissions by examining how some human-produced CO₂ could be put back where it came from — the oil patch.

Since late December a multi-organizational research team has been pumping CO₂ gas into a depleted oil reservoir near Hobbs, N.M. As the reservoir fills, they listen to what is happening thousands of feet underground with the help of instruments that measure subtle subterranean changes.

The team’s goal is to improve existing models that help researchers predict where CO₂ will go after it is pumped into a reservoir, how far and how fast it will move, and what chemical reactions occur as the gas interacts with underground minerals.

They also want to identify remote sensing techniques that are sensitive enough to measure these changes.

And they want to know what the capacity of the reservoir is and how close that capacity matches their estimates.

“This is an experiment,” says Hank Westrich (1011), former manager of Geochemistry Dept. 6118. “We don’t know if it is going to stay in the reservoir or migrate to an adjacent oil or gas reservoir immediately, or whether it might vent to the surface. We need to know that.”

US power plants each year pump into the atmosphere some 2.4 gigatons of carbon dioxide produced in the burning of fossil fuels. Automobile emissions account for many more gigatons per year.

“[CO₂] is going to stay in the reservoir or migrate to an adjacent oil or gas reservoir immediately, or whether it might vent to the surface. We need to know that.”

CARBON CLUES — Norm Warpinski (left) and John Lorenz are part of a Sandia team contributing to carbon sequestration research, in part by performing lab tests on core samples. (Photo by Randy Montoya)

UNM and Sandia, with Lockheed Martin support, launch new policy center

Office to tackle policy and technology issues linked to international security, strife

By John German

Officials of the University of New Mexico, Sandia, and Lockheed Martin on Wednesday signed an agreement that formalizes a unique collaborative initiative to nurture scholarly thought and research on policy issues linked to national and international security.

The agreement created a new Office for Policy, Security, and Technology at UNM. The office will focus on policy areas where technology and security are related, such as weapons of mass destruction, arms control and nonproliferation, terrorism and homeland security, environment, energy, critical infrastructures, borders, sustainable development, and region-specific issues such as water scarcity.

Signing the office’s charter at a ceremony and news conference on Wednesday were UNM Acting President F. Chris Garcia, Labs President C. Paul Robinson, and Lockheed Martin Executive Vice President Michael Camardo.

Multidisciplinary approach

The office will apply a multidisciplinary approach to its investigations, drawing on the expertise of political science, economics, and other disciplines.

(Continued on page 4)

Romig, Jakowatz, Asay elected to National Academy of Engineering

By John German

“Pretty exciting, isn’t it?”

That was how Sandia VP Al Romig put it about news last Friday that three Sandians, Jack Jakowatz, Jim Asay, and Al himself, had been elected to membership in the National Academy of Engineering.

Election to the NAE is among the highest professional distinctions that can be accorded an engineer.

“I am personally pleased but also absolutely delighted at the honor that having three Sandians elected brings to the work of the Labs,” says Al.

“It’s great news,” said George Samara (1120), one of Sandia’s earlier elected NAE members, in spreading word around the Labs of the honors.

“Heartiest congratulations to Al, Jack, and Jim.”

Academy membership honors those who have made “important contributions to engineering theory and practice, including significant contributions to the literature of engineering theory and practice,” and those who have demonstrated accomplishment in “the pioneering of new fields of engineering, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education.”

NAE President Wm. A. Wulf announced the awards in Washington on Feb. 14.

The three Sandians were among 77 new members and nine foreign associates elected, bringing the total NAE US membership to 2,138 and the number of foreign associates to 165.

This is the first time three Sandians have been elected NAE members, in spreading news last Friday that three Sandians, Jack Jakowatz, Jim Asay, and Al himself, had been elected to membership in the National Academy of Engineering.

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Speaker probes the darkness inside the minds of ‘lone wolf’ terrorists

Labs, Bureau of Reclamation plot strategy for desalination R&D

Sandia, KAFB team up to safely destroy surplus explosives

Sandia board establishes new Audit and Ethics Committee

(Continued on page 5)
Sandia ‘heroes’ donated 1,602 units of blood in 2002

Sandia employees are being called heroes for donating 1,602 units of blood in 2002.

The thanks comes from Gretchen Cody of United Blood Services in a letter to Sandia President Paul Robinson. The organization’s motto is Give blood. Be a hero.

“Heroes working at Sandia...donated 1,602 units of blood in 2002 for hospital patients’ use,” says the letter. “Thanks to you and your organization for creating a convenient avenue for your personnel to participate in this life-saving program. Please let those who donated know their donations are greatly appreciated and desperately needed.”

Feedback
Oracle rumors baseless
Q: I keep hearing that the old Sandia accounting software was maintained by two or three people — the Oracle software takes hundreds. Is this true?
A: No, it is not true. The staff that implemented Oracle also had responsibility for maintaining and supporting the old accounting/property/inventory/purchasing/accounts payable/ case/genera ledger systems. So, the number you heard about (the two or three) were the only dedicated staff to the old system, while the others were dual-tasked and were responsible for implementing and supporting the new system as well as maintaining the old. The hundreds number you hear about are the persons who are involved in a day-to-day basis with financial, procurement, manufacturing, and reporting modules that use Oracle Enterprise Resource Planning software to accomplish their jobs. The staff supporting Oracle is less than the what the old in-house-developed systems had. — Ralph Runnoe

For the record
The Feedback reply in the Feb. 7 issue (page 3) indicated Sandia employees’ 401(k) matching funds are paid by Lockheed Martin Corporation. They are paid by Sandia, about $20 million a year.

Scary as it might be, there could be some good in all this. For example, your 401(k) might be held some Home Depot or Lowe’s or Albertson’s stock. Or maybe Garrison Keillor will be inspired to ask the Duct Tape Council to add another half-hour to Prairie Home Companion.

When we think of “snail mail,” we usually have the US Postal Service in mind, but Rod Geer (12640) found out a couple of weeks ago that Sandia has it too. Rod’s invitation to an awards breakfast for Division 12000 Employee Recognition Awards nominees showed up in his mailbox. The thing was, however, that it was for a February 2002 breakfast.

Getting a piece of mail late’s not such a big deal, but missing a free breakfast...now, you wouldn’t want that to happen very often.

Here’s a corollary to the opinion that we should work at keeping our identity as a national laboratory and not fuzz-up that identity by referring to ourselves as a company or corporation. The point being that as one of only a handful of national labs, we enjoy a unique identity definitively separate from the hundreds of thousands of companies and corporations.

The corollary is that as an extension of that uniqueness, perhaps we should consider giving buildings and special places names, rather than numbers. We already have the Steve Schiff Auditorium, and in the International Programs Building there are rooms named for Robert Oppenheimer and Andrei Sakharov. Much warmer than T70 or Bldg. 823 or Rm. KK.

Any thoughts or suggestions? * * *

And in the spirit of “saving the best for last,” you’ll surely want to watch for this year’s issue of Labs Accomplishments, which will be delivered next week. Bill Murphy, who has edited this annual compilation of the gems of Sandia’s work for the past several years, has outdone even his own usual sterling work this time, producing a full-color publication any organization would be proud to claim. Don’t miss it.

— Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)

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— Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)
Kathleen Puckett peers inside lone terrorists’ minds

By Nancy Garcia

Although she never interviewed them, retired FBI special agent and psychologist Kathleen Puckett has spent hours reviewing the files of 10 “lone wolf” domestic terrorists for forensic analysis. She explained that groups appeal to a need for connection. “The tie that binds is paranoia, distrust and suspicion are the social connection (including identity and stature), and cognitive connection through conspiracy theories that seem to hang together. Lone terrorists, however, become socially isolated because of their failure to adjust. They are either rejected by the group or reject it. They cling to the group’s ideology with an intensity fueled by anger and isolation. The ideology, she said, “would never reject them, abandon them, or let them down.”

Convinced of the rationale for the group’s existence, they dedicate themselves totally to that cause and pursue activities that fulfill their need to matter. Group members, on the other hand, tend to engage in more talk than action. “It’s mostly talk,” Puckett said: “I hate them too — let’s hate them together.”

Timothy McVeigh, convicted of the 1995 bombing of the Murrah Federal Building in Oklahoma City, typified the failed social adjustment and attachment to a cause. Executed in 2001, he remained “a true believer to the real end,” Puckett said.

Like many lone terrorists, he accepted what he called “collateral damage” (the death of 19 children among the 168 fatalities) but did not intend to die himself. “Most terrorists want to live to fight another day,” she said, “They really would rather have been part of the great march to glory with the group.”

Puckett read the thousands of pages of writings of Theodore Kaczynski, who operated for 17 years, mailing letter bombs from his cabin in the Montana wilderness. “He was very, very needy,” Puckett said. “He was totally convinced his life would be complete if he could just get a woman to join him in the woods.” The only times his misery did not appear in his writings coincided with the times he was building a bomb, she said.

He was the brightest among the 10 individuals she studied, but all had average or better intelligence, she said. Ranging from 21 to 40 years old, the men were in what she called the prime age for violent behavior. A few had suspected or confirmed mental illness, too.

Joseph Paul Franklin, who allegedly tried to spark a race war by killing more than 20 people from 1977-1980 as a sniper, was “probably the most psychopathic of this group,” Puckett said.

John Salvi III, who killed two Planned Parenthood receptionists and wounded others, “was most clearly mentally ill.” He committed suicide in prison in 1986.

Kaczynski opted to plead guilty rather than accept a life sentence. With a mental-health defense he felt he was being forced upon him. Another lone terrorist, anti-abortionist Paul Hill, gravitated to a more extreme stance after enduring national media attention on the Phil Donahue show. He shot two and wounded one outside a clinic. Committed to death row, he remains an unrepentant defender of the unborn.

One person she studied remains at large, Eric Robert Rudolph, who allegedly carried out the Centennial Olympic Park bombing in Atlanta and bombings at a gay nightclub and an abortion clinic in 1997 as well as a fatal bombing in Birmingham in 1998.

In all cases, Puckett found, a political cause was never the ultimate cause of the terrorist acts. She found the individuals already possessed psychological precursors that predisposed them to act from the pain of social isolation. “All these people wanted to matter,” she said. “Since they could not matter as a part of a group, they sought to matter by causing a destructive impact on society.

Tech transfer consortium honors EUVL project

By Nancy Garcia

The Federal Laboratory Consortium for Technology Transfer has granted the Extreme Ultraviolet Lithography (EUVL) project an Excellency in Technology Transfer award for its next-generation technology to produce faster and more powerful microchips. The EUVL team is made up of scientists and researchers from Sandia, Lawrence Livermore, and Lawrence Berkeley national laboratories working as the Virtual National Laboratory. The team has successfully transferred the EUVL technology under a multiyear CRADA (cooperative research and development agreement) to the Extreme Ultraviolet Limited Liability Co. (EUVL LLC), a consortium headed by Intel Corporation that includes chipmakers Advanced Micro Devices, IBM, Infineon, Micron Technologies, and Motorola.

Current lithography technology — which uses light focused by lenses, to imprint features etched on a silicon chip — has advanced during the past 25 years to essentially double the number of features that can be packed onto each chip every two years. However, by 2007, the steady reduction in feature sizes possible with visible and ultraviolet-light lithography is expected to reach a physical limit, halting advances in the speed and power of microprocessors.

EUVL has been targeted by industry as the next-generation lithography approach to be introduced in 2007 for high-volume manufacturing. It uses extreme ultraviolet light with a wavelength 10 times shorter than the current wavelengths. Since the shorter wavelength is absorbed by lenses, the EUVL system must use a reflective optical system (coated mirrors) instead of transmitting lenses for the operating wavelength of 134 angstroms. Industry watchers say EUV lithography could be used for the next decade, contrasting current lithographic techniques that are typically outdated within a few years.

The first full-scale prototype EUVL machine, located at Sandia’s California site, was completed in 2001. The technology demonstrated by the prototype machine will make possible microprocessors that are 10 times faster with 10 times as many active transistors and memory chips that can store 40 times more information.

“This recognition marks another mile- stone in the evolution of EUVL technology,” says Don Sweeney, Livermore’s EUVL program manager and director of the EUV Virtual National Laboratory. “It truly is an honor to be recognized for the successful transfer of fundamental science developed at the national laboratory level to the private sector.”

The FLC award is given only to organizations that have successfully transferred a technology to a commercial company. A panel of technology transfer experts from industry, state and local government, academia, and the federal laboratory system evaluated the nominations.

The Federal Laboratory Consortium for Technology Transfer is a nationwide network of more than 700 federal laboratories that provides a forum to develop strategies and opportunities for linking laboratory technologies with the commercial marketplace. The FLC was organized in 1974 and is normally chartered by the Federal Technology Transfer Act of 1986 to promote and strengthen technology transfer nationwide.
CO₂ sequestration (Continued from page 1)

The total capacity of US geologic repositories is estimated to be between 300 and 3,200 gigatons of carbon dioxide.

It’s a health hazard to those who breathe it, and if global climate change is real, emissions of man-made CO₂ are probably a leading cause.

The southern New Mexico collaboration is one of several regional partnerships that make up DOE’s Carbon Sequestration Program, funded by the Office of Fossil Energy.

The larger program is exploring all the ways carbon dioxide could be captured at the smokestack and disposed of in a safe place.

It supports the President’s Global Climate Change Initiative (GCCGI), which seeks to slow the increase of CO₂ concentrations in the atmosphere and to ensure that a suite of commercially ready sequestration technologies are available by 2022.

DOE-funded teams, for instance, are exploring the possibility of injecting CO₂ into aquifers or the deep ocean, where the gas would be harmlessly dissolved in water.

Others are studying how to speed or improve the natural carbon absorption processes of forests and the ocean’s surface.

The total capacity of US geologic repositories — depleted oil and natural gas reservoirs, aquifers, and unmineable coal beds — is estimated to be between 300 and 3,200 gigatons of carbon dioxide.

The DOE program proposes a combination of various carbon sequestration efforts to significantly lower net carbon dioxide emissions

“CO₂ sequestration is now a research professor and associate director at the Institute for Shock Physics at Washington State University, Pullman. Last fall he was honored with the American Physical Society’s Shuttleworth Science Award (Lab News, Oct. 10, 2002).

“I was extremely proud to hear that the National Academy of Engineering had elected three more Sandians to membership,” says Sandia President and Labs Director C. Paul Robinson, who himself was elected to NAE in 1998.

“Each is exceptionally worthy of membership, and it’s even more remarkable that the specialties of these three are so diverse: Al Romig, who is a premier materials scientist, Jim Asay, who is a world-recognized expert in equation-of-state technology, and Jack Jakowatz, who has pioneered real-time SAR with many important applications.

“I’m especially proud that the Academy has seen fit to induce these individuals, particularly since some of their greatest accomplishments have been performed in the classified realm. It should be encouraging to all Sandia engineers that such outstanding work can be awarded an Academy membership.” — Ken Frazer

Page 4
Sandia, Bureau of Reclamation release research strategy for cost-effective water desalination

By John German

Sandia and the US Bureau of Reclamation (USBR) last week announced the release of a Technology Roadmap to guide future investments necessary to reduce the cost of water desalination.

The report, compiled by a panel of experts, also outlines needed advanced water treatment technologies.

Desalination technologies could provide new processes to remove salts and other contaminants from impaired waters cost-effectively and efficiently.

“The development of an adequate and viable water supply for the 21st century requires the coordinated efforts of many organizations in both the public and private sectors,” says Tom Hinkebein (6113), the roadmap program manager who, along with Marie Garcia (1010), represented Sandia on the panel.

“The Technology Roadmap provides the framework for those interactions,” he says.

The research roadmap defines a research and development path for desalination technologies, beginning today and continuing through the year 2020. If implemented, the strategy would support finding solutions to the nation’s water supply-related needs by advancing water desalination technologies, he says.

“Cost reduction is the single most important factor necessary to increase the implementation of desalination, which will in turn reduce pressure on our limited fresh water supplies,” says John Keys, Commissioner of the Bureau of Reclamation. “As we enter the fourth year of a drought in many western states, it is imperative that we develop new technologies to increase our domestic water supply.”

The report is expected to be used to guide decision making by Congress, federal agencies, utilities, and research institutions and individuals funding or conducting desalination research.

The Bureau of Reclamation is asking the National Academy of Sciences’ National Research Council (NRC) to review the report to address whether the roadmap presents an appropriate and effective course to help address future freshwater needs in the United States.

The NRC also is asked to identify general priorities for research investments. A final report of the roadmap committee will be issued that incorporates the comments from the NRC and other national desalination experts.

Development of the roadmap began with a discussion among members of an expert panel of major national-level water supply needs over the next several decades and included several case studies drawn from across the nation, says Tom.

Sandia and the Bureau of Reclamation convened the panel, which included representatives of the private sector, municipal water agencies, academic and other research institutions, and the federal government.

The report is available at www.usbr.gov/water/desal.html.

Policy center

(Continued from page 1)

social sciences together with expertise and relationships from technical disciplines and programs. Collaborations within and between Sandia and UNM will be of special attention, but the office will actively seek to facilitate collaborations among multiple institutions and across disciplines.

“Technology can be a causative or curative agent of insecurity, but often can only be fully understood in a broader framework including economic, social, or political factors,” says Roger Hagengruber (10), the office’s first director.

“This office will seek to forge broad alliances among the many experts in diverse fields at UNM, Sandia, and other organizations around the world committed to supporting thoughtful and effective national and international policy,” he says. “The relationship between the University and one of the nation’s national labs will be a unique advantage.”

Roger most recently served as the Labs’ senior vice president for nonproliferation and arms control. His Sandia career included assignments to negotiating teams in Geneva and service on national panels dealing with national and international security issues.

He also is a political science professor at UNM and is director of UNM’s Institute for Public Policy (IPP), which operates a survey research center to collect and analyze public attitudes about a variety of public policy issues including technology and national security.

The office will be located at UNM under Vice Provost for Research Terry Yates. A board of directors including a senior executive each from UNM and Sandia and one member of the community will oversee its activities.

Lockheed Martin is providing startup funding — $250,000 a year for five years. The long-term goal is to create a base of support from corporations, policy foundations, government agencies, and other institutions that would make the office self-sufficient, says Roger.

First steps

The primary function of the office, he says, will be to provide an environment where researchers from diverse disciplines and organizations can engage in research, projects, and education in support of the public service missions of UNM and Sandia.

In doing so, it will initiate research, develop curricula, organize conferences and seminars, host visiting scholars, engage students and interns, and convene multidisciplinary teams and task forces.

Among the office’s first efforts, says Roger, will be to conduct an in-depth analysis of more than a decade of public opinion data on national security issues that has been collected for Sandia by the IPP.

The office will also develop curricula for short courses intended for students, business leaders, and government officials on such topics as homeland security, weapons of mass destruction, and terrorism, create a master’s degree program in international policy and technology; organize a conference on technology and security topics of specific interest to New Mexico and the Southwest such as water and border issues; and initiate a distinguished speakers series to share the perspectives of national and international luminaries in related fields.
Feedback
Q: I noticed in the Sandia Journal an article about the troubles at LANL. The article attributed being a part of the lab, instead of being independent. What is the situation at Sandia?
A: Independence is a necessary condition for an objective assessment system and a key aspect of a robust assurance system (i.e., a system to inform all stakeholders of the enterprise that expectations, whether expressed as rules or performance objectives, are being met or are likely to be met).

In general there are two components of independent assurance: those provided for from within the organizational structure of the enterprise and those either imposed by oversight authorities or requested by management that are performed by parties external to the enterprise. Both components are necessary for a robust assurance system. Comparing and integrating these two independent sources of assessment information allow for a higher level of assurance and better fulfillment of oversight responsibilities.

At Sandia, the independent internal assurance function for business matters (financial controls, resource controls, quality, ES&H etc.) is largely the responsibility of Audit and Ethics Center. This center reports to the President and EVP of Sandia and, in total, assures that the Audit and Ethics Center is as free, as feasible, of influence that could limit its independence: those provided for from within the organizational structure of the enterprise and those imposed by oversight authorities or requested by management that are performed by parties external to the enterprise.

1100 Independence and Objectivity
The internal audit activity should be independent, and internal auditors should be objective in performing their work.

1110 Organizational Independence
The chief audit executive should report to a level within the organization that allows the internal audit activity to fulfill its responsibilities.

1110.A1 The internal audit activity should be free from interference in determining the scope of internal auditing, performing work, and communicating results.

1120 Individual Objectivity
Internal auditors should have an impartial, unbiased attitude and avoid conflict of interests.

With respect to organizational independence, the Director of 12800 reports directly to the Executive Vice President (EVP) and President. The Director is a member of key executive oversight councils such as the Risk Oversight Management Council (ROMC) chaired by Executive VP Joan Woodard with eight LLT members on the Council, and also interacts and provides reports to the LLT audit organization, which reports to the Lockheed Martin Corp. Audit and Ethics Committee of the Board. The Director also reports to the Sandia Board of Directors (the Board was recently restructured to have a Governance committee and an Audit and Ethics subcommittee). Private time with the Board of Directors at these meetings without any Sandia management is routinely provided for the Audit Director. Further, there is frequent dialogue with the DOE/IG and GAO, providing opportunities for checks on assessment scope and process. To maintain their reliance on the Sandia internal assessment process, DOE/IG annually audits the Internal Audit department.

The internal audit function is formally chartered by the President and EVP of Sandia and the VP of Lockheed Martin internal audit.

That charter addresses the audit responsibilities and requirements for unimpeded access to personnel and documentation. Details of the Audit Center’s responsibilities and authorities are incorporated in our business rules in CPR001.3.5 Audits, Assessments, and Appraisals. The Audit Center also participates in a peer review process on a triennial basis that provides external review and comparison of assessment processes.

Individual objectivity and competence is addressed by several Center practices. These include selecting individuals having appropriate education and background, attaining relevant professional certifications, and assigning personnel to minimize potential conflicts of interest or past history bias potential. Internal audit processes follow general requirements of the Lockheed Martin Corporate Internal Audit Statement (CAPS 013) designed to comply with all IIA standards and guidance for the Professional Practice of Internal Auditing, including a Code of Ethics. In addition, Internal Audit’s reports are reviewed by the Lockheed Martin internal audit organization, and associated corrective actions are tracked by Lockheed Martin management.

These features represent industry best practices and, in total, assure that the Audit and Ethics Center is as free, as feasible, of influence that could limit its scope or its objectivity. — Jennifer Crooks, 12800

Sandia establishes new Audit and Ethics Committee
Sandia has consistently tried to make sure that its audit system is independent and objective. (See adjacent Feedback.) Most recently that commitment has gone one step further.

A new Audit and Ethics Committee—a subcommittee of the Sandia Corp. Board of Director’s Governance Committee—has been established that consists only of “outside” board members who are not from Sandia or Lockheed Martin.

“The idea of total independence for our audit teams has been high on our radar screens for a long time,” says Executive VP Joan Woodard, who also heads up Sandia’s Risk Management Oversight Council. “This idea of a subcommittee of the board that consists of no Sandians or Lockheed Martin affiliated people leads us further in that direction. The idea started months ago and has evolved with the design of an active role for the board in providing assurance to NNSA of the quality of the laboratories operations.”

For example, it will allow Jennifer Crooks, Director of Audit and Ethics Center 12800, to go before the Audit and Ethics Committee and discuss matters of concern freely and not feeling intimidated by having Sandia upper management—her bosses—in attendance.

The new Audit and Ethics Committee is still evolving. It currently has two members—Bill Howard, chair, and Donna Bethell. A third will be added soon.

The subcommittee will oversee the efficacy of the Sandia Internal Audit and Ethics function through review of the annual audit plan and quarterly review of issues and trends. Independent and objective auditing by the 40 people in Jennifer’s division is achieved in several ways. For example Jennifer reports directly to Joan and Sandia President Paul Robinson. As a result auditors are not pressured by management being audited. “We vow to remain vigilant in making sure Sandia audits of its operations are independent, fair, and unflawed,” Joan says. — Chris Burroughs

Recent Patents
William Swaett (1743), Stephen Gentry (5712), Clinton Boye (5710), Carter Grotheck (5712), Brian Stallard (5712), and Michael Desouco: Information-Efficient Spectral Imaging Sensors
Tina Neroff (6233) and May Nymnar (6118): New Sili- cotanate Molecular Sieve and Condensed Phases
Sherry Morisette, Joseph Cesano II (1843), and Duane Dieringer (1801): Solid Freeform Fabrication using Chemically Reactive Suspensions.
Donald King (6424), Laura Bednorz, and Bernard Wemsman: Microminiature Thermionic converters.
Frank Peter (2614), Richard Givler (9114), Kevin Zavadil (1832), Paul Galambos (1769), Randy Shul (1765), and Christi Willison Gohet: Surface Micromachined Structure Fabrication Methods for a Fluid Injection Device.

Job Shadow Day brings 40 students to Sandia
ROCKET NOZZLES — Sandia’s Todd Criel (15426) discusses how engine nozzles guide a rocket in flight with Daniel Nava and Nalton Antonio (right), both freshmen at Del Norte High School. The two were among about 40 students who took part in Groundhog Job Shadow Day at Sandia, an opportunity for one-on-one group interactions between area high school students and Sandia employees, organized by the Labs’ Corporate Outreach group (12450). Seven area high schools participated in the program. Marisa Tapia, an Albuquerque High School (AHS) junior recounted a number of interesting experiences during her day at the Labs. “We found out what is involved in being an engineer,” she said. “It takes determination,” added classmate Sheana Perry. “And, you can tell that the people here enjoy their jobs.” Gary Chavez, an AHS senior, said he enjoyed his day at Sandia and will major in “something in science, possibly chemistry,” at UNM next year. (Photo by Randy Montoya)
Don’t tug on cape of karaoke performers; just applaud

Coronado Club after-work group attracts singers from across Labs

By Neal Singer

Several visitors to the usually peaceful Coronado Club bar experienced a peculiar double vision — eyes not quite coordinating — on a recent Thursday evening as they looked across the bar’s color TVs into a new space opened in what, during the day, is cafeteria land.

The bar’s large TV screens featured the usual beautiful people in perfect clothes in the color-matched settings that customarily entertain us while we sit still. But slightly beyond them, were, well, Sandians, us, in all our glory — T-shirted or in ties, in jeans or in dresses, perhaps short or long a pound or two, holding wireless microphones close to lips and singing. Some performers hit surprisingly clear, pure notes as they stood either anonymously in the new room’s doorway or belting it out on stage.

The visitors — members of a Sandia group called the World Improvement Society, which holds the simple credo that the world improves with a few after-work beers and a little conversation — decided this was worth a closer look and changed tables to sit in the adjoining room.

Over an impromptu wood-floored stage, on a large raised monitor, appeared emotional words that seemed somehow shockingly out of place at Sandia:

I can’t get enough of your love, babe.
I can’t get enough.
Can’t get enough.
Got a dream they wanna come, they wanna share.
They’re coming to America.
Got a dream they’re here to stay.
They’re coming to America.

One WIS member noted he had never really understood the words of these songs before seeing them written out in front of him as the music played.

You let the wrong words slip when kissing persuasive lips/the odds are you won’t live to see tomorrow/secret-agent man.

The words on screen were highlighted as their turn came to be sung. Some singers found security in staring at the words, blanking out the audience, while others detached from the screen enough to move around the stage and even, occasionally, among the customers.

Meanwhile, those at tables, when not drinking, talking, or applauding, were doing what Sandians do best — looking through books. But these white looseleaf-bound volumes contained no DOE regulations. On each of 111 pages were the names of approximately 100 songs, arranged by artist; a second set of pages arranged the same 11,000 songs by title. The bold custom form of several selection forms the audience did double duty as performers, and the performers, as audience.

WIS requested an explanation. We learned that this was a karaoke bar set up every Thursday night at the Coronado Club by the husband-and-wife entrepreneurial team of Tony and Mary Romero, aided by their daughter Joanne. The couple claims that their computerized equipment — which houses their extensive song repertory, gives vibrato and depth to thin voices, and moderates overly soft or loud ones — is the best in Albuquerque. (The WIS did not check this assertion but rated the electronic manipulation skillful.) There is no charge to sing (costs are paid by the Club, perhaps one reason why the singing was nonstop as Sandians from many work groups participated.

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The question in our minds was why apparently conservative people pick up a mike and sing to others in a bar.

David Tenorio (12345), a member of the self-styled Red Rover group who sings in Willie Nelson-like mellow style, says the number of men and women who come to sing is always surprising. According to club bartender Mendy Romero, aided by their daughter Joanne. The customer entrepreneurial team of Tony and Mary Romero, aided by their daughter Joanne. The couple claims that their computerized equipment — which houses their extensive song repertory, gives vibrato and depth to thin voices, and moderates overly soft or loud ones — is the best in Albuquerque. (The WIS did not check this assertion but rated the electronic manipulation skillful.) There is no charge to sing (costs are paid by the Club, perhaps one reason why the singing was nonstop as Sandians from many work groups participated.

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One highly visible performer is David Dobias, who sings in Willie Nelson-like mellow tones and wears a dark-colored cowboy hat with dangling feathers, jeans, cowboy boots, and western-style shirt. “My sister made the hatband and feather for me for a company retirement party,” says David. “I have sent in tunes he wrote to record companies, but their replies haven’t paid any bills. “Now singing is just a stress reliever and a fun thing.”

Barb Reser (2910), Military Liaison and Knowledge Management, whose husband and co-attendee is medical clinic administrator Terry Reser (3333), says the number of men and women who perform are roughly equal. Barb, one of the more lively performers, is one of the few who doesn’t lock in to the teleprompter screen for words and comfort but dances across the stage rhythmically as she sings. “I have a good time,” she says.

Her husband describes his experience differently. “For a long time, I just listened. Then I heard two guys sing and I thought I couldn’t do worse than that. So I succumbed and sang. Somebody must do a vegetable check at the door because nobody’s thrown rotten tomatoes at me yet.” He used to come, Terry says, for the compelling reason that he carpool with Barb, but now he comes for the camaraderie of the group.

Andy Bogdich, coordinator of the Weapon Intern Program (0632), says that 30 to 40 interns sometimes visit karaoke after early evening classes for camaraderie in a nonwork environment.

The karaokeists are always looking for new volunteers to emerge from silence into limited stardom, or just to have a good time.

LADY SINGS IN BLUE — Barb Reser leaves work behind and sings. LADY SINGS IN BLUE — Barb Reser leaves work behind and gets into her song.

Photos by Randy Montoya

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Other Red Rovers are Morgan Davis and Mike Watson, who sings in Willie Nelson-like mellow style, says the number of men and women who come to sing is always surprising. According to club bartender Mendy Romero, aided by their daughter Joanne. The customer entrepreneurial team of Tony and Mary Romero, aided by their daughter Joanne. The couple claims that their computerized equipment — which houses their extensive song repertory, gives vibrato and depth to thin voices, and moderates overly soft or loud ones — is the best in Albuquerque. (The WIS did not check this assertion but rated the electronic manipulation skillful.) There is no charge to sing (costs are paid by the Club, perhaps one reason why the singing was nonstop as Sandians from many work groups participated.

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Mileposts

Photos by Michelle Fleming

Steve Burchett
35 9126

John Long
35 9322

Douglas Schuler
35 2952

George Kaye
30 5902

John Thayer
30 10861

Charles Christensen
25 2913

Mary James
45 10501

Ward Bower
40 6218

Conrad Stayner
40 2913

Frank Bacon
35 2502

George Cordova
25 14404

Benjamin Dominguez
25 9334

Debbie Johnson
25 12620

Stanley Kawka
25 2345

Gregory Kolb
25 6218

Tamara Orth
25 2911

William Pregent
25 5852

Leigh Saunders
25 10263

Craig Lee Walker
25 14401

William Wolf
25 3115

Carol Amedeo
20 15000

Mark Baumann
20 5848

Michael Benavidez
20 3114

Thomas Brewer
20 12326

Viola Campos
20 11500

Charles Duus
20 15201

Raymond Gabaldon
20 15309

Paul Gibson
20 5735

Charmaine Grabowski
20 10852

Joseph Gustwiller
20 15417

Ann Marie Gutierrez
20 3520

Michael Irwin
20 6134

Mark Jenkins
20 1769

Sandra Mays
20 10267

Tim Moss
20 6218

Michael Pedroncelli
20 2338

Gary Polansky
20 6406

Kenneth Reaves
20 2993

Larry Rinehart
20 15333

Michael Swanson
20 5713
MAGAZINES, GOLF SHOES, women
MOVING SALE, Feb. 22, 8 a.m., 7205
RUBBER STAMPS, 21 different sets,
NATIONAL GEOGRAPHIC
COMPUTER DESK, wood, D20
REFRIGERATOR, $100; queen
EXERCISE CYCLE, Airgometer, full-body
EDGE-SANDER, Delta, w/5-ft. tilting
WOOD-BURNING INSERT, w/blower,
VACUUM, 2000 Rainbow Air Purifier,
SCREEN DOOR, wooden, 3
ENTERTAINMENT CENTER, solid oak,
POOL HEATER, 181,000-Btu, $600;
desk/dresser, 4 drawers, w/mirror/
shelf below, excellent condition,
BEDROOM SET, rustic, queen head-
SPEAKERS, KLH, new in box, 3-way,
98 LANDROVER DISCOVERY II, 1 owner,
92 SATURN SC2, leather, PW, PL, sun-
92 FORD RANGER, extended cab, V6,
98 TOYOTA TACOMA SR5/TRD, V6,
WANTED
Drywall, 3/8-
s, $2/issue; scrapbooks,
99 LANDROVER DISCOVERY II, 1 owner,
95 CHEVY DESIGNER CONVERSION
93 PONTIAC TRANSPORT MINIVAN,
93 PONTIAC TAHOE 150/155, V6,
93 PONTIAC GRAND PRIX, V6,
93 CHEVROLET Alero, V6,
93 FORD LTD, V6, PW, PL, sun-
93 FORD TEMPORARY TRUCK, V6,
93 CHEVROLET OUTLOOK, V6,
93 FORD ECONOLINE, V6,
92 JEEP GRAND CHEROKEE, V6,
92 BUICK LESABRE, V6,
92 FORD ESCORT, V6,
92 HONDA CIVIC, V6,
92 HONDA ACCORD LX, 4-dr., V6,
89 HONDA CIVIC, V6,
89 FORD ESCORT, V6,
89 HONDA ACCORD, V6,
88 HONDA CIVIC, V6,
88 CHEVROLET CAMARO, V6,
88 HONDA CIVIC, V6,
86 VOLKSWAGEN CABRIOLET, V6,
86 FORD ESCORT, V6,
86 CHEVROLET MONTE CARLO, V6,
86 PONTIAC GRAND PRIX, V6,
86 BUICK LE Sabre, V6,
86 HONDA CIVIC, V6,
86 CHEVROLET CAMARO, V6,
85 FORD ESCORT, V6,
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SANDIA is developing new integrated microsystems and collections of microscopic smart devices that can sense, analyze, communicate, and react to their environment. Already used in automobile airbags, ink-jet printers, computers, and compact disk players, improved microsystems in weapons will provide:

- Robust guidance and instrumentation
- Self-diagnosis and communication of problems
- Improved safety and control

Thirty individual microchips with acoustic wave sensors make up this quarter of a wafer, which fits nicely on an orange slice.

Precision microcomponents, seen next to a ladybug, are fabricated by using tiny molds to mass-produce three-dimensional structures in a variety of materials, including metals, polymers, and ceramics.