Criticality experiment could help nation's nuclear power industry save billions of dollars

MATT BURGER (1381) and Allison Barber (1384) place fuel rods in the Seven Percent Critical Experiment (7uPCX) test reactor — a reactor stripped down to its simplest form. The fuel rod Matt is holding is actually a dummy rod used for practice. (Photo by Randy Montoya)

By Bill Murphy

An experiment now being conducted at the Sandia Pulsed Reactor Facility Critical Experiments (SPRF/CX) could lead to more efficient operation of the nation's nuclear power reactors, potentially saving the industry — and maybe even ratepayers — billions of dollars.

The Seven Percent Critical Experiment (7uPCX) is led by Gary Harms (1384). It is generating data to serve as real-world benchmarks to validate the computer codes used to design fuel element configurations in commercial nuclear reactors.

RICK GOMEZ AND AUTUMN HIGGINS practice fuel rod handling protocols for the 7uPCX experiment using dummy fuel rods. (Photo by Randy Montoya)

Today, Gary explains, virtually every commercial reactor in the country is licensed by the Nuclear Regulatory Commission to use nuclear fuel rods that contain up to 5 percent U-235, a fissile isotope of uranium. Fuel rods, about a centimeter in diameter, are bundled together to form the fuel core assemblies in a nuclear reactor.

Because the reaction process by definition consumes the fissile U-235 in the rods, commercial power plant operators periodically need to shut down their reactors to refuel. Reactors are only profitable when they're online and generating power; shutdown reactors cost time and money.

Commercial reactors around the country, Gary says, "are right up against that

(Continued on page 6)

Remembering 9/11

Public Relations and Communications Center 3600 Director George Rhynedance was in the US Army eight years ago, stationed at the Pentagon, when it was struck by a hijacked aircraft flown by terrorist operatives of Al-Qaida. In a first-person account beginning on **page 4**, George recalls the horrors and heroism of that day.

Sandia LabNews

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Sandia National Laboratories

Sandia to mark 60th anniversary with events in Washington, D.C.

By Rachel Kolb

It's been a milestone year for Sandia as the Labs celebrates its 60th anniversary, but the best is yet to come. The yearlong celebration will culminate on Sept. 16, in the form of a national event in Washington, D.C., showcasing Sandia's robust history of "exceptional service in the national interest."

"The goal for the event is both a celebration of 60 years of national service and a declaration that Sandia

(Continued on page 6)

Inside . . .

Meet Sandia's Surface Metal Micromachining team

ADAM ROWEN, team lead for Sandia's Surface Metal Micromachining group. (Photo by Randy Montoya)

By Rachel Kolb

The members of Sandia's Surface Metal Micromachining team, part of Photonic Microsystem Technologies Dept. 1725, understand the importance of innovative small devices. The group, which works in three unique adjoining labs in the Microsystems and Engineering Sciences Applications East Lab (MESA EL) facility, provides a set of essential capabilities to its organization and to Sandia.

"Our expertise is the fabrication of thick, high-aspect-ratio metal structures that are too small for traditional machining," says team lead Adam Rowen (1725). "Fabrication of this nature requires using all of our core capabilities: creating precise photoresist molds on top of metalized surfaces or lithography, submersion of the empty mold into chemical baths for metal filling or electroplating, and final polish or planarization."

Although the technology in which the team specializes, LIGA (lithography, electroplating, and molding), was once nearly abandoned by Sandia, Adam and his coworkers have expanded it into a successful technique leveraged across the Labs, other national laboratories, and in industry.

"Surface micromachining and electroplating at the micro scale fill a gap between micromachining using

(Continued on page 6)

That's that

If you were more than five or six years old on 9/11 — and that means everyone now employed at Sandia — you remember pretty vividly the events of that horrible day. Most of us experienced the terror attacks only through the news media - television, radio, newspapers, and (to a lesser extent back then) the Internet. For most of us, that was plenty close enough.

A number of Sandians, though, happened to be stationed in or reporting to customers in Washington at the time of the attacks. Those individuals experienced the events much more viscerally than the rest of us.

Perhaps no one here at Sandia was closer to the dangers of that day than George Rhynedance, director of Public Relations and Communications Center 3600. In 2001, George was still in the military, serving in the Pentagon at the time as a Lt. Col. in the Defense Department's public affairs group. On the morning of 9/11, he was close enough to the explosion from the suicide attack that he felt the floor heave and buckle beneath his feet.

I asked George if he'd be willing to relive that day for *Lab News* readers, sharing with us an account of what he felt, what he saw, what he thought, and what he did.

George agreed; his riveting and vivid account begins on page 4. It's well worth your time to read it.

* * *

Has your life changed since 9/11? I was talking to me wife Rebecca about that very subject the other day. (When this time of year comes around who among us doesn't reflect on the events of that day and what they mean?) Anyway, she told me about something she does that I hadn't really been aware of. Every morning for the past eight years, she turns on the TV in the kitchen and gets an immediate sense of relief by noting that there's a commercial on, or a bunch of people on one of the talk shows chatting about some innocuous subject. Those mundane activities reassure her that life goes on, that there has not been some sort of ghastly replay of the 9/11 attacks.

Rebecca's response reminds me of what I did as a kid growing up in the 1950s and 1960s. In those days, the air raid siren on the courthouse would go off from time to time for a test. Or was it a test? With thoughts of nuclear holocaust never that far from our minds, the very sound of those sirens made us feel like we'd had the wind knocked out of us. The first thing I'd do - once I collected myself - was turn on the little AM radio that was always nearby. If I heard Bobby Vinton crooning about his latest heartbreak or Bucky Beaver shilling for Ipana toothpaste, I could breathe again.

* * *

For the generation born after, say, 1990, 9/11 is a fundamental, primal defining event, just as Dec. 7, 1941, was for an earlier generation. Case in point: My mother-in-law was 11 years old when a carrier group from the Japanese Imperial Navy attacked the American fleet in Hawaii, marking our entry into World War II. A year or so back, when she was shopping at her local market in Lexington, Va., she went to write a check and noted aloud that it was Pearl Harbor Day. The young cashier said something like "I beg your pardon?" "You know, December 7, Pearl Harbor Day," my mother-in-law replied. "Is that important?" the cashier asked.

How long will it be, my wife wondered, before there's a cashier in Albuquerque or Lexington or Peoria who, when you refer to 9/11, won't know what you're talking about? Probably sooner than we think.

* * *

Well, it looks like this entire column was taken up by ruminations about 9/11. I had a bunch of other stuff I wanted to talk about — the State Fair and prize pumpkins, the movie *Peggy Sue Got Married* (yes, there is a Sandia connection; check out the current Lab News Interactive poll question that asks whether you ever wish you could hit the reset button on your career), and other things — but on this eighth anniversary of the attacks that killed almost 3,000 people, it's appropriate that our focus is on remembering that day and how it changed our lives and our nation. For we are all of the generation who *will* remember.

See you next time.

— Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

Sandia News Briefs

"Strong Intrinsic Mixing in Vortex Magnetic Fields," a paper written by **Jim Martin (1112), Lauren Shea-Rohwer (1715), and Kyle Solis (1112)** and published in *Physical Review E*, has been gaining significant international recognition. The paper provides experimental demonstration of the use of rotating vortex magnetic fields to drive mixing in fluids through the use of microparticle chains in the fluid. It has been highlighted in *Physical Review Focus* and is being considered for the September issue of the *Materials Research Society Bulletin's* review section.

* * *

A group of Sandians participated in a quantum science and engineering workshop hosted by Texas A&M University and Princeton University in Jackson Hole, Wyo., Aug. 3-9. This workshop is an exclusive, invitation-only forum useful for exchanging ideas at the cutting edge of quantum optics and light-matter interactions. The nine Sandians, who represented a range of departments in **Centers 1000 and 6000**, presented on topics from solar energy to quantum lasers and were exposed to presentations from experts in various fields relating to energy applications.

* * *

Rehka Rao and David Noble (both 1514), along with Tom Baer from Proctor and Gamble, developed and gave a mini-symposium, "Computational Fluid Mechanics for Free and Moving Boundary Problems," at the recent US National Congress on Computational Mechanics in Columbus, Ohio, July 16-19. The mini-symposium was a great success, with 24 papers and three keynote talks presented during five sessions. Rehka and David plan to follow up by serving as guest editors for a special issue of the *International Journal for Numerical Methods in Fluids*.

* * *

A state-of-the-art cryo-ultramicrotome system has been installed in the Materials Science and Engineering Center in Bldg. 897. The system can be used to slice soft, polymeric, or biological samples to thicknesses of less than 100 nm. The samples can then be analyzed by transmission electron microscopy (TEM). **Materials Characterization Dept. 1822** has used the system's capabilities to prepare rubber samples containing various nanoscale objects such as zinc oxide rods, clay particles, and carbon fibers for TEM analysis.

* * *

The Alternate Emergency Operations Center (EOC) Dept. 4136 on July 30 hosted a drill simulating an evacuation emergency. Participating agencies included Sandia Site Office (SSO) personnel, Kirtland Air Force Base personnel, Sandia's Security Police Officer team, and Emergency Response Organization personnel. The scenario involved a vehicle-borne improvised explosive device inflicting mass casualties and the necessity to secure a perimeter. Although incidents like this are unlikely to occur, they present many challenges to initial decision makers and responders, making Sandia's support crucial to a successful outcome.

Feedback

Pedestrian turnstile/gate funded at Eubank Contractor Gate

Q: *Did the pedestrian gate/turnstile at the Eubank Contractor Gate get funded by Sandia this year? The last Feedback response said the issue was funding, as KAFB said they would modify the MOU as needed.*

A: Some good news! The pedestrian gate/turnstile at the Eubank Contractor Gate was funded by the Integrated and Enabling Services (IES) this year. The new gate is currently under construction and it is anticipated construction will be complete by Oct. 1, 2009. Once construction is complete Sandia and the Sandia Site Office (SSO) will negotiate the required gate operations process with our partners at KAFB.

— Jeff Quintenz (4800)

Take Note

Retiring and not seen in the *Lab News* pictures: Lauren Hancock (2995), 26 years; Marca De La Porte (3554), 34 years; and Thomas M. Heine (5915), 35 years.

Retiree deaths

Clara M. Ostrander (age 75) . . . . . June 19
Robert J. Chavez (83) . . . . . July 23
Eugene L. Emerson (83) . . . . . Aug. 1
Paul A. Fjelseth (74) . . . . . Aug. 1
Robert C. Miller (80) . . . . . Aug. 11
David H. Davis (79) . . . . . Aug. 12
Arlin Cooper (73) . . . . . Aug. 17
Aldis S. Hayes (97) . . . . . Aug. 22

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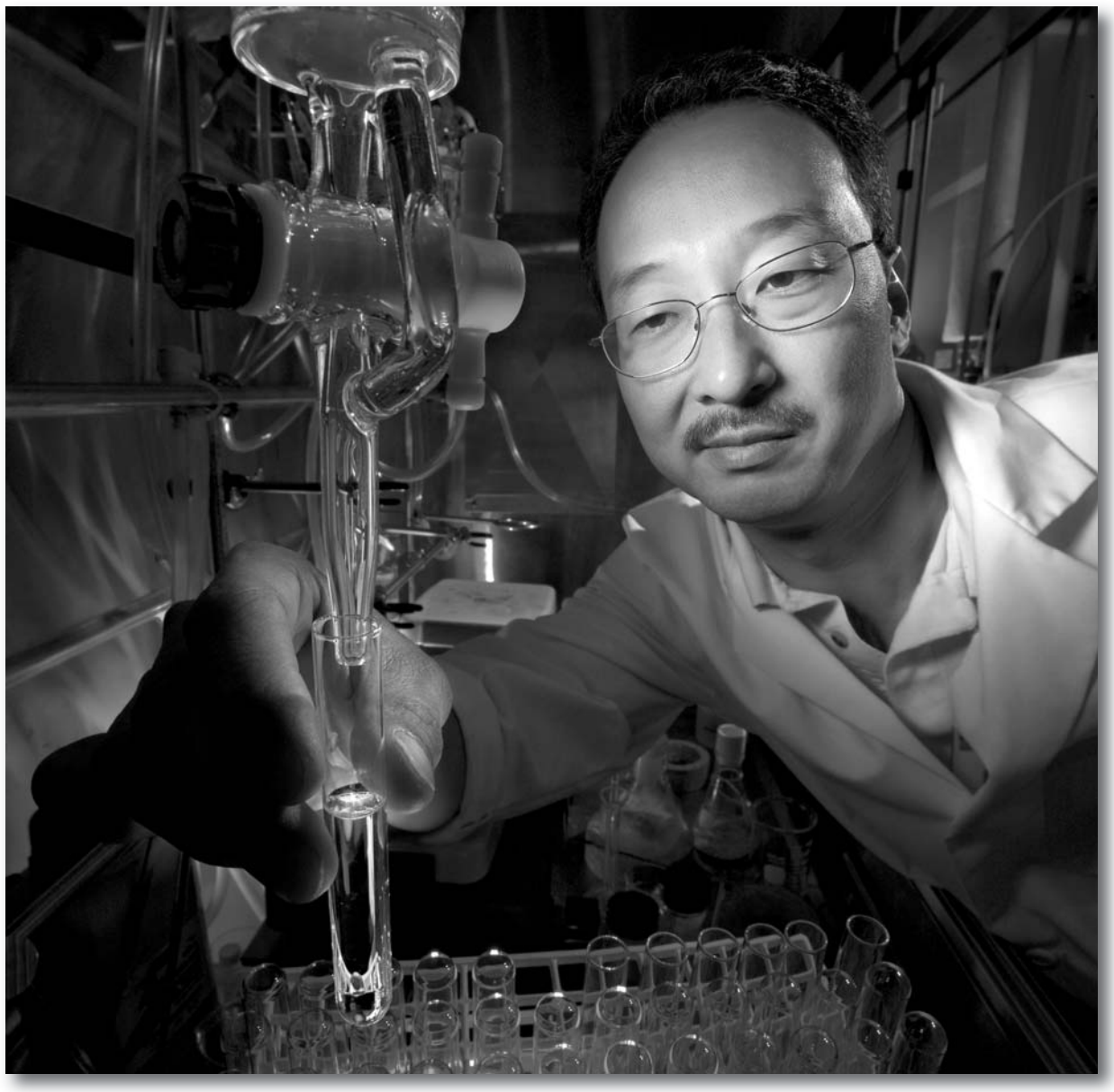
Sandia researchers discover method to direct cell-like microdomain formation

By Patti Koning



DARRYL SASAKI collects fractions from flash column chromatography to isolate a synthesized lipid in research characterizing a method of forming cell-like microdomains. (Photo by Randy Wong)

Science rarely follows a perfectly charted course. A map of the evolution of scientific discoveries would look like the tributaries of the Amazon River, with one idea leading to another, sometimes extending in a single direction, dead ending, or looping back to the source.

So it went for Darryl Sasaki (8651) and Carl Hayden (8353), when a chemical mixture that didn't organize quite right enabled them to stumble upon a synthetic analog of an important cellular process. They had been studying protein dynamics, specifically ways to bind proteins to a molecular surface, and discovered a method of creating reversible microdomains that draw proteins onto the surface of the cell like a powerful vacuum. The work recently appeared in the *Journal of the American Chemical Society*.

The original project headed by Michael Kent (8622) sought to understand how specific protein receptors organize on a cellular surface in response to pathogen presence, which activates our innate immune system. That project, funded by Sandia's Laboratory Directed Research and Development program, was part of a Sandia strategy in the area of biodefense and emerging infectious disease to elucidate the molecular bases of host-pathogen response in the innate immune system. Previous experiments with other cell membrane models had demonstrated the ability to bind proteins to specific molecules in the membrane while maintaining mobility and dispersion across the surface.

In this case, when the researchers added copper to make the surface adhesive for proteins tagged with a histidine (His) tail, the copper binding molecules formed stable microdomains. In genetic research, a His-tag is frequently used as a way to purify recombinant proteins. The discovery came about because the copper binding molecules changed their electrostatic nature in an unexpected way.

Darryl says they noticed that "instead of becoming positively charged as we had seen with similar systems in the past, the copper binding molecules became charge neutral, allowing the molecules to phase separate from the rest of the membrane."

Initially the researchers didn't understand the nature of the dark domains on the surface. First, they thought they had generated holes in bilayer, but through Carl's experiments to characterize the results, soon it became apparent that the dark domains were formed by the aggregated molecules. Using fluorescent-labeled His-tag proteins they demonstrated that the dark patches were protein-targeted, copper-rich domains.

When they removed the copper, the proteins quickly dispersed. That's when Carl and Darryl realized they were onto something. In a broad sense, their system mimics the formation and function of membrane microdomains in cells, which are also called lipid rafts.

A controversial concept

"Like lipid rafts, our microdomains are directed to form through a chemical signal and disappear upon removal of the signal, and they perform as sites with enhanced recognition properties for specific agents, such as signaling molecules, proteins, and viral particles," says Darryl. "Lipid rafts are still a somewhat controversial concept because they have not been observed in live cells, but can be formed in model systems. Their existence could help explain many biological functions, including those related to the response of a host cell to an invading pathogen."

The work draws upon both researchers' areas of expertise: Darryl, an organic synthetic chemist, created the molecules and lipid membranes that Carl, a laser spectroscopist, visualized. "This is an example of how Sandia brings together scientists with different expertise and skills to tackle complex problems," says Darryl. "If we were at a university, Carl would be sitting in a different building and we might not ever cross paths."

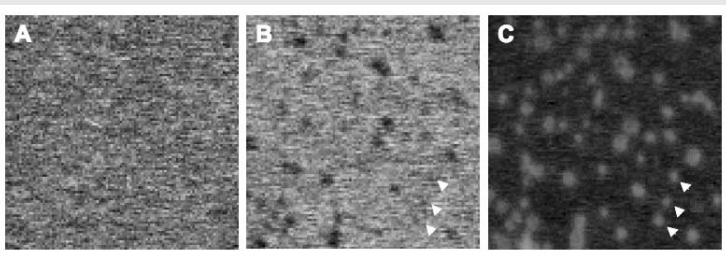
Sandia CaliforniaNews

The original project examined protein organization, not the details of membrane structure. But with the ability to toggle protein affinity and nanoarchitecture, the work now impacts Basic Energy Science (BES) research on switchable materials. For Carl's BES work studying single molecule conformations and function, the ability to switch on or off the binding of molecules to membranes provides new ways to look at how interactions with membranes control functions of biological molecules.

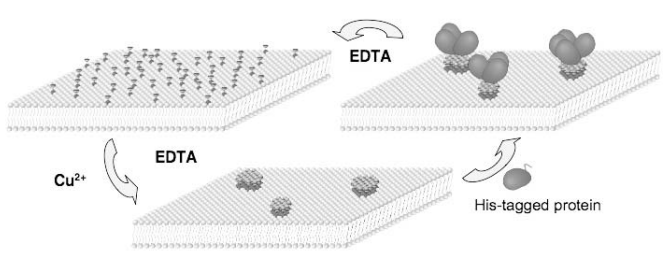
"For BES programs we are trying to develop suitable materials to build unique structures at the nanoscale that can be disassembled easily and quickly," says Darryl. "The potential for switchable nanoscale materials is huge. Applications might include sensing, light capture, and even nanowires to put function into composite structures."

Carl and Darryl, in collaboration with Jeanne Stachowiak (8125), are also looking at binding of proteins to the same membrane structures in vesicles. "At certain lipid compositions, the proteins cause the membrane to pucker and generate shapes that look like eukaryotic events occurring. Eventually the structures shrink down to a tube that can grow pretty long. It's an amazing way to generate even higher order structures," says Darryl.

Down the road, switchable materials could be used to create nanostructures for picoliter fluidics, addressable nanoparticle coatings, and targeted drug delivery. Switchable materials may even someday be used to create bio-based electronics that assemble and reassemble themselves in response to specific stimuli, leading to materials for numerous applications, including bionic devices.



Confocal microscopy images of membranes (A) before; (B) after adding copper; and (C) following incubation with His-tagged proteins. The arrows identify low contrast domains that became distinct with protein affinity.



A schematic showing the formation of reversible microdomains driven by copper recognition followed by selective adsorption of a His-tagged protein.

Just then, the building collapsed...

By George Rhynedance, Director of Public Relations and Communications Center 3600

I was an Army lieutenant colonel stationed at the Pentagon on Sept. 11, 2001. It was a trying and difficult day for everyone involved and it was punctuated by heroism and drama, most of which would only become apparent in the days and weeks following the event. These reflections of the day are my best recollection of how it happened for me and my family. One hundred eighty four people died in the Pentagon and thousands of others were killed in the World Trade Center and the Shanksville, Pa., crash. Tens of thousands of lives were affected across the country. I know everyone has a story from that day. This is mine, and I appreciated the opportunity to tell it on this eighth anniversary of 9/11.

All photos from US government sources

Sept. 11, 2001, started out as a beautiful autumn day in northern Virginia. It was still mostly dark when my wife returned home from her morning run and started to get ready for her day as a high school math teacher. As the sun began to rise in a clear eastern sky, I kissed her goodbye and headed for my assignment as a media desk officer in the Pentagon's public relations office . . . all the makings of a typical day.

GEORGE RHYNEDANCE

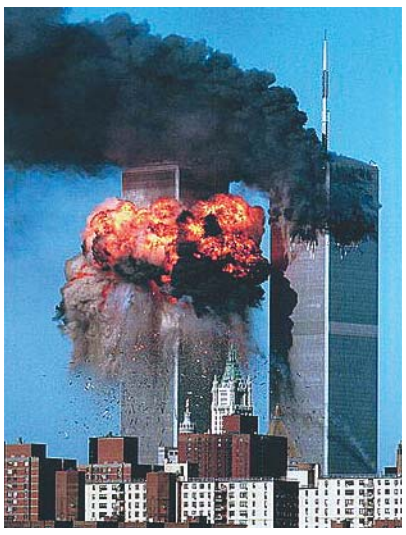
THE PENTAGON is made up of five concentric rings, A through E, with E the farthest outside and A closest to the center. The 9/11 attack, which occurred in the area on the left side of this photo, penetrated four of the five rings of the massive building.

I made the 22-mile trip in pretty good time. The sun had just cleared the horizon as I pulled in to the Pentagon's north parking area. I noticed what a nice day it was going to be with the temperature crisp, the sky bright blue, and the fall colors in the Tidal Basin just beginning to show. I made a mental note to get out for a run later in the day. It was going to be too good to miss.

My fellow desk officers in the media office worked in a typically efficient, caffeine-fueled cubicle farm on the E Ring of the Pentagon. A place referred to as the Press Corridor. We were an affable group, all 20 or so of us in waist-high cubicles that included a small bookshelf for reference documents, a computer, the requisite phone for taking calls from the media, and a small TV to monitor the news. All the hardware necessary for daily interaction with the media. When sitting in front of your computer, you could almost disappear from sight.

The WTC attacks

The work day started typically enough with the boss' brief media update and some strategizing about how to handle the morning's breaking defense stories. As a routine part of our jobs, most of us watched one of the variety news shows on our cubicle televisions. It was on one of those programs that we learned of the first World Trade Center hit.



"NONE OF US could believe what we were watching as the plane turned sharply left and plowed into the second tower in a ball of flames. . . ."

Early reports started coming in — through the anchors and the TV crawlers — of an apparent aircraft crash into one of the towers. The TV pictures were a bit grainy as the media scrambled to get cameras in the right places to capture the action. A handful of my colleagues had gathered around one television to watch the reporting. It was, to say the least, pretty incredible.

My phone rang. It was a colleague on the other side of the building with a meeting requirement. I was being asked to come to a gathering to prepare for what was known as a "principal's meeting." This was an action-officer level advance meeting designed to go over the contents of a later meeting that would be attended by a deputy assistant, or an assistant secretary of Defense. (Yes, in the Pentagon we often held meetings to prepare for meetings.)

It was our job to prepare the principal participant for the meeting. In my case, it would be the assistant secretary for public affairs. We would meet to discuss what we were watching on the television. The phrase "potential terrorist event" was used, and that, of course, got our attention.

It was about this time that the television coverage showed a plane apparently taking off from what I assumed was a New Jersey airport. The aircraft was climbing and turning left. As a long-time Army helicopter pilot familiar with controlled airspace rules, I remember being surprised that the airspace in the vicinity of the Trade Center wasn't closed after a mishap like the one we were watching. I also thought it was pretty good that they were able to keep air traffic flowing even as this was going on. As I watched though, that thought was quickly overcome by events. None of us could believe what we were watching as the plane turned sharply left and plowed into the second tower in a ball of flames.

My phone rang again. I had to hustle because my meeting had just been moved up. The time was now about 9:15 a.m. My wife and kids were just starting second period in the local high school but were watching their classroom TVs as the news in New York unfolded.

I moved out from my side of the building and headed across the Pentagon for the meeting. I had an armload of files and some information I had been able to pull off the Internet about what was going on in New York.

When I arrived, I joined about a dozen colleagues from other offices around the Pentagon — we all knew one another. The meeting was held on the B Ring. The Pentagon is made up of five concentric rings, A through E, with E the farthest outside and A closest to the center. We were in a smallish, secure conference room (think vault-type room here). There were safes and fax machines on tables around the perimeter of the room, making it seem even smaller. I settled in the back row, sitting on a table next to a fax machine. It was about 9:30 a.m. The meeting started.

It wasn't more than a few minutes later, as we were going through agenda items and taking reports in preparation for the principal's meeting that it happened. Without warning, there was a muffled rumble and the building heaved. It felt like a wave rolled under the floor. There was enough energy transferred through the conference room to blink the lights, tip the tables, cause some of the safes to rock, and for dust to fall from the ceiling tiles.

"THERE WAS SO MUCH SMOKE, so high in the air, it was hard to imagine what had just happened . . ."

'You ok? Yeah, are you?'

With the exception of a couple of expletives, it was very quiet. Training and prior service experience seemed to kick in quickly for us all. While we didn't say much, it was clear something big — and probably pretty bad — had just happened. As one, the group began to evacuate. After a quick accountability and condition check — "You ok? Yeah, are you?" — we moved in different directions: some back to their offices and some toward the sound of the hit. It was very quiet in the halls initially. We didn't know it yet, but we were on the side of the building that had just taken a direct hit by a suicidal pilot in a big airplane (we would later learn that the plane hit our side of the Pentagon on the E Ring and plowed through D and C, finally coming to rest in the space between the C and the B rings — not too far from where we were meeting.

"WHEN I ARRIVED, most had evacuated and the rest were in the process of leaving. Everyone seemed safe. . . ."

This is where the day really began.

It was clear something was burning when we got around the corner in the hallway. Heading for the smoke, we stopped in offices along the way, making sure people were getting out — and they were, very efficiently. I opened a couple of office doors to find everyone evacuated, then fell in with a soldier helping a person into the center of the building, away from the smoke in the hall. Very few seemed to be coming from the area where the smoke was spreading. And that was not a good sign.

We made it into the center courtyard without too much trouble, just following the flow of those evacuating. Glancing over my shoulder, I saw for the first time the thick, black and orange cloud of smoke and fire billowing from the roof of the building. There was so much smoke, so high in the air, it was hard to imagine what had just happened (this was just minutes after that first impact and we still didn't know it was a plane that had hit).

(Continued on next page)

9/11 remembered

(Continued from preceding page)

"I NOTICED several teams pushing gurneys across the grassy area in front of the fire . . ."

I made my way across the courtyard to my original side of the building, concerned about my office mates and their status at the media office. When I arrived, most had evacuated and the rest were in the process of leaving. Everyone seemed safe. I evacuated too.

Once outside, I made my way around the building to the point of impact. I was struck by how quickly the first responders were on the scene. It couldn't have been a half hour after the strike and the fire department was fully deployed and pouring water into the fire area, while the Pentagon police and the D.C. Park Police were working to cordon off the area and to control access into and around it.

Inside the cordon

I noticed several teams pushing gurneys across the grassy area in front of the fire toward waiting ambulances. At one point, very early, Secretary of Defense Donald Rumsfeld was even seen escorting one of the stretchers. I was inside the cordon, so I joined a group of soldiers positioned to evacuate wounded as they were recovered. It quickly became apparent that there were far more of us than were needed to carry litters, so I began to search out my public affairs colleagues to try and assist with media.

As I moved around I was struck by the scene. The most powerful defense ministry in the world was on fire, dozens of rescue and fire units were on the scene, ambulances lined up in rows to take survivors to local medical centers (as it turned out, only a few would be needed), the smoke, the helicopters flying overhead and people — lots of people — just watching or lending a hand when they could. And then there was a ripping sound in the sky as the first of two F-16s arrived on the scene and established an air cap over the building. Suddenly things seemed a little less out of control. For some reason, the presence of the air cap was very reassuring to me personally.

"I WAS STRUCK by how quickly the first responders were on the scene. . . "

American Airlines Flight 77

Shortly after 8 a.m. on Sept. 11, 2001, five members of Al-Qaida hijacked American Airlines Flight 77, a Boeing 757-200, shortly after it took off from Dulles International Airport just outside Washington, D.C.

The hijackers herded the 64 passengers toward the rear of the aircraft using knives and paper cutters, then flew a circuitous route that took them away then back toward Washington. At about 9:45 a.m. they flew the aircraft and passengers into the side of the Pentagon. The impact destroyed or damaged four of the five rings in that section of the building.

All aboard Flight 77 were killed, along with 125 people in the Pentagon.

Trying to get word out

Back at the local high school, a northern Virginia school with many military kids in attendance, the administrative staff kept a close eye on the events of the day. Once the Pentagon was hit and the news reporting began focusing on the local angle, they asked each teacher to turn off the televisions in the classrooms. They also paid close attention to the few members of the staff with family members or spouses who worked at the Pentagon. Mrs. Rhynedance was one of them. Since she had experienced a number of emergencies during our 20-plus years in the Army, she was generally confident in my ability to get word to her that I was either not involved or OK. One time, I was able to get a call off from a combat zone via satellite link to assure her our unit was not involved in a widely publicized helicopter crash, and another time I was able to get word to her via a series of phone calls, that covered the country, through a number of friends because phone lines were tied up — which they typically are in an emergency.

Today was no different. Within hours of the event, I tried desperately to get a call to her or to our answering machine to let her and our children know I was alright. On this day, all cell phone coverage was interrupted and phone lines were completely jammed (it was interesting to see people who had evacuated with their cell phones sharing with perfect strangers in an effort to get word to loved ones — without success). It would ultimately be nearly 22 hours from the time I kissed my wife goodbye to the time I rolled back into the house the next morning after not getting a call off all day and night.

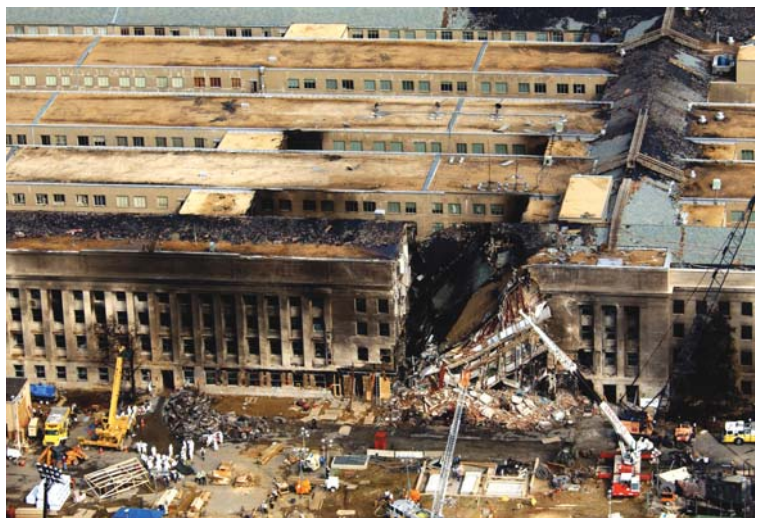
Media converges on the scene

As I made my way around the fire area, I ran into a couple of my media relations colleagues. Microwave-equipped media trucks were starting to pop up all over the place. Clearly we needed some order to where they were located. This would allow us to provide information efficiently as the situation developed. We went about consolidating the trucks at a small gas station about 200 yards away on an overlook that provided an uninterrupted view of the strike zone. We had to get the few trucks that had parked in the cloverleaf of a close-by interchange out of that area. Medevac choppers were circling and might not be able to land close if the trucks were in the way. We each went to a different truck and got them moving.

As I walked toward the truck, I noticed small bits of aircraft sheet metal in the grass. I recognized it for the lime green paint that was visible on the underside. I knew from my aviation experience that sheet metal on aircraft is painted with a greenish, noncorrosive paint. It is distinct in color and this is what I was seeing on the ground. I stopped for a moment and noted the scene in front of me . . . it's funny how you remember these brief snapshots in time.

The smell was overwhelming. It was pure jet fuel, very distinctive and very smoky. Under the overpass was a triage area for casualties. It was filling with medical staff and was being supplied by golf carts running the length from the strike area to the medical clinic right on the highway that was now abandoned. I noticed a number of light poles down on the highway the plane flew over on its course to the Pentagon. Even more poignant were the couple of abandoned cars remaining on the road with windows actually blown out, apparently from the overpressure of the plane flying so low and so fast.

More first responders were on the scene and working the fire. Security and law enforcement were doing their level best to control the area closest to the building and to get people away — there were rumors of another airplane inbound and there was a big effort to get the large crowd of workers and onlookers to disperse. Helicopters were flying overhead, and the F-16s were in a chase pattern above and around the building. I also noticed a handful of military men and women hustling grocery carts full of ice from the gas station toward the building, over curbs and grass and highway Jersey walls. They were delivering the ice to the first responders. Right behind them came another group of carts with drinks and snacks. Amazing. This brigade of volunteers would ultimately clean out the small convenience store at the gas station, providing drinks, snacks, and ice to the first responders. And they literally carried it down one bag at a time.



"THE TOP FLOOR just gave way and pancaked the floors beneath. A large cloud of dust and smoke spread over the scene . . ."

Just then, the building collapsed.

I'm not sure why I was looking at the fire right then, but the top floor just gave way and pancaked the floors beneath. A large cloud of dust and smoke spread over the scene and the steady water hose lines seemed to waver. Thirty seconds later, the lines were again focused and fighting back a large fire. I noticed the color of the smoke had changed. It was now almost grey, undoubtedly a combination of the jet fuel burn and the water.

The day would continue like this. You remember it as a series of small moments frozen in your mind while you either worked on a specific mission or paused to help others. By noon, the media operation was consolidated at the gas station and the assistant secretary had made an announcement to the world that the Pentagon, though wounded, was open and would not be deterred by terrorists from the business of national security. Later that evening Secretary Rumsfeld would host a handful of journalists inside the Pentagon briefing studio — while the building was still burning. It would be hours after the fact that we learned that both World Trade Center towers had collapsed.

Sept. 12 . . . a beautiful autumn day

The day would end for me hours after midnight as we broke into groups to begin covering continuous operations. I had a few hours to catch some sleep and get cleaned up before I had to be back on the job. I considered doing it from my desk but needed to get home and make sure my family knew I was safe. Since the roads were empty at that hour, I made the trip home in decent time. When I pulled up to my driveway and stepped out of the car, I noticed the cool, crisp air of Sept. 12. The sky was clear and the stars were bright. The eastern sky had a hint of lightening. It had all the makings of another beautiful autumn day in northern Virginia. My wife was just coming out the door to take her morning run. I remembered my mental note to get out for a run yesterday.

I kissed her hello.

"THE ASSISTANT SECRETARY had made an announcement to the world that the Pentagon, though wounded, was open and would not be deterred by terrorists from the business of national security. . ."

Criticality study

(Continued from page 1)

GARY HARMS (1384, in center foreground) explains details of the 7 Percent Critical Experiment (7uPCX) to a visiting delegation including, from left: James Felty, SAIC, Nuclear Criticality Safety Program (NCSP) deputy manager; Jerry McKamy, director, Facilities Operations Division, NA-172.1 and NNSA NCSP manager; Philip Pizzariello, NNSA NA-172.1; Jody Pugh, NNSA SSO; and James Lee, director of Radiation Sciences Center 1300. The 7uPCX experiment is funded jointly by the DOE/NNSA Nuclear Criticality Safety Program and DOE's Office of Nuclear Energy. (Photo by Randy Montoya)

5 percent limit."

It's clearly in an operator's interest to keep reactors online more and shut down less. The good news is, there's a simple way to achieve that goal: Use a fuel rod that contains more than 5 percent U-235.

As a matter of physics, if fuel rods could contain a higher percentage of fissile material — U-235 — reactors could operate for longer periods between refueling. (Naval reactors use fuel elements with much higher percentages of fissile material; they also go much longer than commercial reactors between refuelings.)

Here's the dilemma: The NRC licenses held by commercial reactor operators currently stipulate that 5 percent fuel limit. Reactor operators would like to show the NRC that they have reliable models demonstrating that their systems can operate safely using fuel rods with higher percentages of U-235. But how accurate are the models?

That's where the 7uPCX experiment comes in. In Sandia's SPR facility, Gary and his team have constructed a small critical assembly — it's like a baby reactor stripped down to its simplest form — to study the physics of using fuel rods enriched to 7 percent U-235.

Reactor engineers, under Gary's guidance, meticulously and incrementally add fuel rods to the assembly and monitor the level of fission activity that's occurring. Ultimately, the number of fuel rods in the core of the assembly is gradually increased until a self-sustaining nuclear chain reaction is achieved.

The data generated in this real-world experiment can be compared to the data generated by computer models. If the models and the real-world data are a close match, that can be taken as one indicator that the models are reliable.

Because of the potential implications of the experiment to the commercial nuclear power industry, Nuclear Facilities and Applied Technologies Dept. 1380 Senior Manager Paul Raglin calls the 7uPCX assembly Sandia's "billion-dollar reactor."

Benchmark data generated by 7uPCX will also be used to validate methods used in the criticality safety analyses for shipping and storage configurations for fuel in the 7 percent enrichment range.

The 7uPCX experiment is funded jointly by the DOE/NNSA Nuclear Criticality Safety Program and DOE's Office of Nuclear Energy (DOE/NE). It is being done in collaboration with Areva Federal Services LLC (a nuclear fuel provider for commercial reactors), Oak Ridge National Laboratory, and the University of Florida. The 7uPCX is a follow-on to criticality experiments done at SPRF/CX in 2002; those earlier experiments were funded by DOE/NE.

Sandia members of the 7uPCX experiment team include: Gary Harms, John Ford, Sid Domingues, Matt Burger, Autumn Higgins, Rick Gomez, and student intern Allison Barber.

SPRF/CX: the future

NNSA's Nuclear Criticality Safety Program provided substantial funding for the restart earlier this year of the SPRF/CX and has committed baseline funding to maintain a capability to perform critical experiments with low-enriched fuel lattices for the next several years. The NCSP support also ensures that the facility will be ready to perform criticality experiments for other customers without having to go through a costly start-up process for a new nuclear experiment facility.

Over the next several years, the experiments in the SPRF/CX will be used in the training program for Sandia nuclear criticality safety engineers. A collaboration has begun with the Los Alamos Critical Experiment Facility (CEF) to maintain the proficiency of the CEF operators at the SPRF/CX while the CEF is being restarted. For fiscal years 2010 and beyond, the CEF operator training task will transition to more general NCSP hands-on criticality safety training with a training class available to qualify nuclear criticality safety engineers both inside and outside the DOE complex.

Micromachining

(Continued from page 1)

conventional semiconductor processes and mesoscale machining using conventional machining processes," says Gil Herrera, director of Sandia's Microsystems Science, Technology, and Components Center 1700.

"Adam and his team have developed a suite of tools and processes that enable the fabrication of novel devices to meet a range of national security needs."

The process begins in the first of the metal micromachining labs, a lithography lab equipped with its own Class 100 clean room. Here, precise tiny molds, which will later be filled with metal, are created using a variety of advanced techniques, including UV exposure, similar to the procedure of exposing film negatives to make a photographic print.

After the team's technicians create a mold, they take it next door to the electroplating lab to be filled with metal. This lab includes several fume hoods, housing more than nine different plating chemistries, and hosts a facility for benchtop plating, where metal-plating experiments can be performed in a controlled environment.

Technicians place the mold in an electroplating bath that contains a metal dissolved in uniform solution. The bath, designed for high-aspect-ratio electrofilling of molds, functions by propelling jets of solution to create a solid, uniform accumulation of metal in the mold.

ADAM ROWEN (foreground) and Christian Arrington (both 1725) in the Surface Metal Micromachining electroplating lab. (Photo by Randy Montoya)

After the mold is filled with metal, there is one more step: it usually must be polished in the team's planarization lab. "Typically the devices fabricated in our first two labs need to be lapped down to planarize the plated metal and the top of the resist mold," says Adam. "This is often for mechanical or optical reasons."

The planarization lab has a line of polishing wheels ranging from hard to soft for bulk removal to fine polish. The metal is placed on a wheel, where it is buffed and polished. After this, the process is finished, and the newly created metal device is ready for its next application.

Through this series of laboratory techniques, the metal micromachining team's broad-reaching capabilities have provided solutions to difficult problems for both Sandia and industry, says Adam. Among the solutions that the team has provided is a retinal implant, in collaboration with Lawrence Livermore National Laboratory, which just won an R&D 100 award.

"The intent of this [retinal implant] project is to develop a bio-electronic implant, capable of providing a solution for retinal degenerative diseases," says Adam. "My team's part of this project was to fabricate the interface between the retina and the electronics."

This involved the precise task of electrofilling solid metal plugs into each and every hole across large arrays of through hole vias drilled out of various substrates.

Another of the team's successes took place in the Terahertz Waveguide Grand Challenge, which called on engineers to exploit the terahertz region of the electromagnetic spectrum, between the microwave and infrared regions, for various disruptive and imaging applications. One of the outstanding issues surrounding terahertz radiation is the ability to move it from one place to another.

Adam and his team solved this problem by fabricating solid metal waveguides. Going beyond the normal approach of making a structure with a single mold, the team developed methods to stack multiple layers of photolithography and electroplating to create 70-micrometer-tall, hollow, rectangular, gold waveguides. They were subsequently able to fabricate the waveguides directly onto nonplanar semiconductor chips to couple them with terahertz lasers to make some of the first terahertz integrated circuits.

The team is proud of its capabilities and its successes. "My team's niche is a consolidated, in-house capability for creating unique devices based on diverse and exotic materials, with advanced and nontraditional processing without the inherent limitations found in other areas," says Adam. "There is no limit to a team's success when composed of the right people with clear vision, goals, and roles and responsibilities."

60th anniversary

(Continued from page 1)

has a broad mission and commitment to continued national security," says Erik Webb (12151), manager of Institutional Relationships and part of a core team of Sandians involved in organizing the event.

The team has planned several major components for the national celebration. Its centerpiece will be an information colloquium and luncheon hosted by Sandia President and Labs Director Tom Hunter for approximately 100 invited guests, including members of Congress, representatives of DOE and NNSA, key leaders in executive branch agencies that use Sandia's skill base, and representatives from industry and academia. Members of Sandia management and staff will also attend.

The day of the luncheon, a tech expo will take place in the new Capitol Visitor Center, where Sandia scientists and engineers will present displays of various Sandia technologies.

"There will be posters, video, and hands-on demonstrations of technology related to Sandia's major mission areas displayed under the headings Supporting the War Fighter, Securing America's Energy Future, Assuring Nuclear Security, and Securing the Homeland, trying to tie together Sandia's 'value proposition,' or reason we bring value to the nation," says Erik.

A wall-sized poster commemorating Sandia's 60-year history is currently on display in the lobby of the DOE Forrestal Building as part of Sandia's overall celebration.

Invited speakers for the event include Energy Secretary Steven Chu; New Mexico Sens. Jeff Bingaman and Tom Udall; North Dakota Sen. Byron Dorgan; Reps. Martin Heinrich of New Mexico and Jerry McNerney of California; Gen. James Cartwright; Sandia President and Labs Director Tom Hunter; and representatives from NNSA.

In addition to a celebration of Sandia's legacy, communicating with Congress is a goal of the event. Showcasing Sandia's success on a national stage, organizers hope, will increase awareness and visibility for the Labs and its work. It will also provide an opportunity for Sandia to establish important relationships with members of Congress, federal agencies, and their staffs.

"The theme [of the celebration] is Sandia's role in support of broad national security issues," says Erik. "This event will help us celebrate Sandia's weapons heritage, and at the same time highlight Sandia's future as we seek to solve a broad spectrum of national security problems."

Sandia Classified Ads

MISCELLANEOUS

HOME GYM, Bowflex Blaze, 210-lbs., 50 various exercises, excellent condition, like new, $650 OBO. Mortimer, 453-2492.

USED BRICK, ~300 misc. bricks, w/half & 3/4 bricks, great garden path, free. Hunter, 294-2877.

RAIN BARREL, super-sized, 300-gal., 81"H x 36"D, plastic approved potable, spigot bottom, fits under eaves, $295 negotiable. Paules, 345-4006, ask for Sandy.

FREE WEIGHTS, bar, dumb bells, & 130-lbs. of weights, $100. Chavez, 275-0647.

DOG RUN, 12'L x 6'H x 5'W, w/wire top/bottom, $125. Smith, 401-7872.

LAMPS, 35-in., 2, lovely neutral tone ceramic, w/spotless white lined fabric shades, email for photos, $70/both. Pitts, 293-5482, ritapitts@comcast.net.

TV/VCR/DVD COMBO, Panasonic, 20-in., $200. Valdez, 934-3331.

XBOX, original Halo edition, w/Halo & 4 additional games, HD component cables, great deal, $120 OBO. Stasiunas, 275-3933.

'00 SUNDOWNER GOOSENECK TRAILER, 3-horse, many amenities, call for more info & photos, $12,900. Garcia, 688-5673.

SKYCADDIE, model #3, GPS golf course layout device, $140. Spray, 821-5877.

PLAY STRUCTURE, redwood, weathered but structurally sound, swings, slide, climbing wall, tree house, photos available, $400 OBO. Alvin, 797-4834.

SOFA, Southwestern striped pattern, neutral colors, oak frame, removable cushions, very good condition, $100. Hussong, 332-3523.

PENTAX SPOTMATIC & LENSES, 35 mm, 200/135/50/28/28 & variety of misc. stuff, $300. Thalhammer, 298-8521.

REFRIGERATOR, white, 20.8-cu. ft., Whirlpool, top freezer w/ice maker, glass shelves, excellent working condition, $225. Allman, 299-2438.

SHREDDER/CHIPPER, $100; women's mountain bike, $40; Carrera Traffic Light Duel slot car set, $45; goat/sheep stanchion, $60; utility garden wagon, $30. Phelan, 869-6094.

MULTIFAMILY YARD SALE, Sept. 12, 8 a.m.-2 p.m., 624 Rosebud Drive NW, signs from Coors & Los Volcanes, tons of new stuff. Maestas, 304-6635.

ROTOTILLER, 5-hp engine had stroke, make offer; TI 84 Plus calculator, manual & cover, used 1 yr., mint condition, $75. Prior, 239-9586.

STAMP COLLECTION, 26K Universals in 41 albums, 5 shipping foot lockers w/FDC, B of B, specialties, $3,400 min. Eglinton, 505-256-1921.

RAINBOW PLAY SET, 3 swings, bar, slide, covered play area, sandbox w/cover, $995 OBO; sleigh bed, Thomasville Elysse, queen, wood burl ash frame, $995 OBO. Hassan, 822-9544.

MONITOR, Dell, color, 15-in., $45. Paul, 505-296-6500 or 505-480-0046, ask for Ken.

LAPTOP CASES, 2, excellent condition, shoulder strap ($35), roller case ($70) OBO. Zamora, 505-899-6330.

ROOM DIVIDER, tri-fold, Mission-style, beautiful, real wood (furniture) w/wrought iron inserts, photos by request, $75. Cocain, 281-2282.

COMPUTER DESK, w/hutch, cherry, great condition, must sell, $250; beautiful banana tree, must go. Pope, 450-9739.

HOME GYM, Bowflex Revolution, w/all attachments, $1,400. Schmidt, 280-2772, ask for Nydia.

PITCHING MACHINE, Iron Mike MP6, w/~130 dimpled baseballs, very good condition, $1,500. Jaramillo, 232-3442.

TELESCOPE, electronic digital Telestar, $75; Black & Decker leaf blower, $20; Raiders Jacket. Pino, 286-6153.

FIVE-DISC CHANGER, Sony DVP-NC655P, $75; PhotoFrame screen, $25; dresser, $125; cherry end/coffee table set, $225. Schoder, 440-7816.

COCKATIEL, male, 15 mos. old, hand-fed, very tame, 15-word-vocabulary, beautiful markings, w/cage, toys, portable play gym, accessories, $350 OBO. Yates, 505-550-0371.

POLE LAMP, $30; skateboards, $30; roller blades, size 9-1/2 women's, $35. Pullen, 858-1500.

MEN'S JEANS, 16 pr., Levi 550 & vintage 501s, all sized 31x34, blues, whites, gray, various conditions, $50. Stanopiewicz, 286-2889.

How to submit classified ads

DEADLINE: Friday noon before week of publication unless changed by holiday. Submit by one of these methods:

- **EMAIL: Michelle Fleming (classads@sandia.gov)**
- **FAX: 844-0645**
- **MAIL: MS 0165 (Dept. 3651)**
- **DELIVER: Bldg. 811 Lobby**
- **INTERNAL WEB: On internal web homepage, click on News Center, then on *Lab News* link, and then on the very top of *Lab News* homepage "Submit a Classified Ad." If you have questions, call Michelle at 844-4902. Because of space constraints, ads will be printed on a first-come basis.**

Ad rules

1. Limit 18 words, including last name and home phone (If you include a web or e-mail address, it will count as two or three words, depending on length of the address.)
2. Include organization and full name with the ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. We will not run the same ad more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce, retired Sandians, and DOE employees.
10. Housing listed for sale is available without regard to race, creed, color, or national origin.
11. Work Wanted ads limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in bad taste.

CELLO, Robertson's, 3/4 size; violin, Zeta Strados; both w/cases, excellent condition, make offer. Vigil, 505-220-6938.

MOBILITY SCOOTER, Pride, excellent condition, needs batteries, $150. Stubblefield, 298-2991.

STROLLER, Eddie Bauer, $40; Cosco juvenile portable playpen, $20; Little Tykes Playhouse, $45. Bogdan, 332-3179.

INKJET PRINTER, HP PhotoSmart 7550, excellent photo print quality, $75; Actiontec GT701-wg wireless DSL modem, $30. Hall, 280-4344.

RECLINER, new condition; '01 Travel Trailer, 22-ft., HiLo, $9,500; women's 15-spd. bike, w/helmet, like new, $65. Salazar, 363-1304.

TRANSPORTATION

'57 CHEVY, steel back end, 50's dinner-style sofa, metalwork done, primer, new colorful upholstery, $2,900. Marchi, 291-9181.

'02 JEEP WRANGLER SPORT, 4WD, ~76K miles, good condition, $11,500. Baca, 771-8656.

'65 MERCEDES, 220 SB, 4-dr., fin tail, green, 6-cyl. gas, Sonic cruiser, classic car w/trophies, $5,999. Sotelo, 298-0358.

'02 MERCURY COUGAR, V6, green, sporty, new tires, 29-mpg, 60K miles, runs great, $4,000 OBO. Cruz-Campa, 294-5091.

'84 BUICK REGAL, project car, primered, runs great, $2,500. Medina, 293-0703.

DODGE LANCERS, 2, '61 & '62, both 2-dr., rollers, mostly complete, not running, free. Buteau, 771-2334.

'05 INFINITI G35 COUPE, loaded, rare 6-spd., 19-in. wheels, leather, sunroof, 38K miles, beautiful condition, $21,500 OBO. Schaub, 821-7242.

'06 HONDA ACCORD EX, V6, AT, white, 63K miles, excellent condition, $16,200 OBO. Archuleta, 450-3729.

'98 JEEP GRAND CHEROKEE, 4x4, 6-cyl., AT, PW, PL, PM, AC, tow pkg., charcoal color, $3,000 OBO. Fernandez, 247-0121.

'72 VW BEETLE, 2K on rebuilt engine, new longblock, generator, clutch, clean interior, AM/FM/CD, $5,000. Williams, 505-288-0837.

'03 FORD EXPEDITION, 4x4, Sport Utility XLT, 4.6L, AT, PL, PW, AC, 82K miles, running boards, $9,500. Lucero, 554-4475.

RECREATIONAL

'03 KAWASAKI BAYOU 300, 4x4, full time 5-spd., low & high range, $4,500 OBO. Sanchez, 275-7416 or 280-5725, ask for Johnny.

MOUNTAIN BIKE, Trek 930, single track, white, 16-in. frame, Rock Shox fork, $100. Lukens, 286-6482.

BICYCLE, Day6 Dream 21, 26-in., 21-spd., w/SS seat, like new, more info at http://day6bicycles.com, $549 OBO. Mooney, 294-5161.

'07 YAMAHA RHINO 660, fully customized/upgraded, call for photos & upgrades list, $18,000 invested, asking $12,600 OBO. Jaramillo, 505-203-8408.

REAL ESTATE

3-BDR. HOME, 2 baths, Indian School & Wyoming, $185,000. Stafford, 453-6898, ask for Danny.

2-BDR. CONDO, 1-1/2 baths, Sandia Heights, great mountain views, MLS#656152, $200,000. DiBello, 797-2000.

3-BDR. LOG HOME, 3 baths, 2,214-sq. ft., 2-story, granite kitchen counters, fireplaces, Jacuzzi, garage, Pecos River, panoramic views, $429,000. Garcia, 280-5815.

2.5 ACRES, Edgewood, Los Cerritos subdivision, underground utilities & water, on cul-de-sac, $82,500. Gallegos, 865-1647.

4-BDR. HOME, 3-baths, 2-car garage, 3,350-sq. ft., 3/4 acre lot, Pueblo/custom-style, Bernalillo/Algodones, $499,000. Montoya, 505-917-8791.

WANTED

EQUALIZER TRAILER HITCH, w/stabilizer bars & attachments. Edmund, 881-7974.

ROTOTILLER, rear-tine, walk-behind, 4-8-hp. Olson, 294-4891.

MOVING BOXES, all sizes. Montoya, 833-0815, peanut0626@q.com.

SMALL DOG, Maltese, Lhasa Apso, Shitzsu or other small breed for family pet, loving home. Segura, 505-573-4608.

ROOMMATE, Paradise Hills, all amenities, pets OK, available 9/1, $350/mo., +1/2 utilities. Atchison, 235-5651.

LOOKING TO CO-OP, 24 tons of hardwood pellets for pellet stove. Mickelsen, 717-1449.

ROOMMATE, new 5-bdr. home, 5 mins. from base, quiet, clean person, no smoking/pets, $400 + utilities. Long, 206-229-7017.

KEYBOARDIST, experienced, versatile, for working variety dance band, classic rock, Motown, disco, country etc., www.undiskovered.com. Gunther, 440-9341.

AEROBIC-STYLE EXERCISE MACHINE, for disabled person, upper body & arm exercises, inexpensive please. Williams, 271-8104, ask for Paul.

The early bird gets the . . . whatever

LAB NEWS PHOTOGRAPHER Randy Montoya caught this bit of domesticity roadrunner-style right outside our back door in Bldg. 811. A couple of us saw a roadrunner dash across the pavement between our building and Bldg. 800's front lawn. We were remarking on it when Randy characteristically grabbed his camera and dashed out the door right after it. Just as he was setting up the shot, a juvenile roadrunner appeared out of the bushes and received this afternoon treat from mama bird. We hadn't noticed the roadrunner carrying anything; it was only Randy's zoom lens that revealed that vital element of the family drama.

Trinity Site

Tour set for Oct. 3

The National Museum of Nuclear Science & History's twice-yearly tour of the Trinity Site National Historic Landmark is scheduled for Saturday, Oct. 3. The tour will include docent talks, walking Ground Zero, viewing of Jumbo and visiting the McDonald ranch house, as well as a Friday night lecture by University of New Mexico history professor Ferenc Szasz. Tour buses will leave the museum (Eubank and Southern) at 6 a.m. and return at approximately 4:30 p.m. Participants will be treated to lunch New Mexico Tech in Socorro. Cost of the tour is $60 per person. Seats are limited, so make your reservations early by calling 245-2137 or going to the museum website at http://www.nuclearmuseum.org.

Melissa Sisneros worked at making dreams come true

Being positive role model for her daughter was prime motivation

By Iris Aboytes

Melissa Sisneros (6344) says she is a member of technical staff today because of her 16-year-old daughter Samantha. She wanted to create an amazing life and be a positive role model for her.

Melissa is the project leader of both the Simulation Terrain Team and the Technical Operations Team.

The Simulation Terrain Team (STT) creates and modifies existing 3-D terrains, both real and notional. "We combine data from multiple sources," says Melissa, "using varied Geographic Information Systems and 3-D modeling tools into terrain models for customers in Centers 6300, 6400, 400, and 12000. These terrains consist of elevation, imagery, and 3-D models with textures."

The Technical Operations Team (TOT) provides a business approach to internal capability development and sustainment for Interactive Systems Simulation & Analysis (ISS) Dept. 6344. "Capabilities represented by the TOT are essential for our customers." says Melissa.

The TOT serves ISS projects and matrixes support to other organizations across the laboratory.

Growing up on a farm in a valley out in the middle of nowhere near Santa Rosa, N.M., a higher education was not in Melissa's future. "Nowhere" was home to only seven families. Her dad Silvano was a rancher/welder/ well-driller. Her mother Seferina was a homemaker and also cleaned rooms for a local motel. She cooked, cleaned house, and washed clothes to help her family.

Melissa has two sisters and two brothers and they all had plenty of chores. Keeping the floor clean was hard. There was no actual floor, just dirt. "Clean" to her mom meant the broom's path had to all be in one direction with no holes. Water came from a cistern, and Melissa studied by the light of a lantern.

Melissa says she is pretty proud of her family.

"I have a brother who is a doctor, another brother runs the family farm; one of my sisters owns a jewelry business and my other sister is a social worker."

Melissa and her parents just got back from a 7-day cruise to the Bahamas, Virgin Islands, Puerto Rico, and the Turks and Caicos. Silvano had always wanted to go to Puerto Rico.

"She paid for everything," says Seferina. "Melissa is very beautiful and a very good daughter. She always has been."

Melissa came to work at Sandia as an office administrative assistant in 1990. She became a director's secretary, was a management assistant, and a technologist. Approximately seven years after coming to Sandia she went to work in retiree Jim Rice's organization.

"I decided I wanted to go to school," says Melissa. "I was very lucky. Jim was very supportive and I began attending school full time as well as working full time."

As a single mother of a five-year old and with no relatives living close, Melissa left Samantha off at day care starting at 6 a.m. After work, Melissa would pick her up, take her to McDonald's or Burger King (Sami's choice) and then to a night day care. They would be home after 10 p.m. each evening.

After she received her undergraduate degree, Jim encouraged her to get her master's. So she skipped a week and started right back to school. In a four-year period Melissa earned both her bachelor's and master's degrees in computer information systems.

"It was hard leaving Samantha for so many hours during the day," she says, "but I was doing this for us to have a better life."

THE LIGHT OF HER LIFE — Melissa Sisneros and her daughter Samantha enjoy a special moment together during a recent cruise. Melissa says serving as a role model for her daughter has been a prime motivator in her career.
(Photo courtesy of Melissa Sisneros)

WITH SANDIA ON HER SIDE — Melissa Sisneros (6344) started at Sandia as a office administrative assistant in 1990; she now holds a master's degree in computer information and is the project lead for both the Simulation Terrain Team and the Technical Operations Team. (Photo by Randy Montoya)

Melissa has been involved with the MANOS program for several years, serving as coordinator one year. She also does volunteer work at the National Hispanic Cultural Center and is a Spanish translator for Healing the Children, Southwest Chapter.

Melissa is very excited — she has just been approved as a volunteer at the NICU (Newborn Intensive Care Unit) at Presbyterian Hospital. She loves babies and in her extra time will be rocking the special bundles that need a little more rocking. As well as volunteering, Melissa has been a mentor for many years.

Her daughter Samantha has followed in her footsteps. She volunteered at Carestone, an Alzheimer's facility, this summer.

"She has compassion for and loves the patients," says Melissa. "She was the Activities coordinator's assistant. I'm very proud of my daughter!"

"Hobbies?" says Melissa. "My life consists of helping my daughter make the best of her last couple of years in high school, and ensuring she goes onto college, going to work, the gym, and going to church." She loves to dance when time permits. Mostly, she hangs out with Samantha.

"I have been very fortunate to have had good mentors," says Melissa. "I love my job. My management team, Mike Skroch and Gerry Sleefe, strive to create cohesiveness in the organization. I have the utmost respect for them."

If Melissa wanted to reinvent herself, she would become a pediatric nurse. For now, her second career is on hold.

"Anything is possible when you have the determination to reach your goals and dreams," says Melissa. "I was blessed to have a positive support group and Sandia National Laboratories on my side."

THE SISNEROS FAMILY HOME near Santa Rosa, N.M., where Melissa Sisneros grew up, was a modest one, but her mother and father's encouragement of hard work paid off. Melissa and her siblings have all established successful careers. (Photo courtesy of Melissa Sisneros)

Melissa Sisneros worked at making dreams come true

Being positive role model for her daughter was prime motivation

By Iris Aboytes

Melissa Sisneros (6344) says she is a member of technical staff today because of her 16-year-old daughter Samantha. She wanted to create an amazing life and be a positive role model for her.

Melissa is the project leader of both the Simulation Terrain Team and the Technical Operations Team.

The Simulation Terrain Team (STT) creates and modifies existing 3-D terrains, both real and notional. "We combine data from multiple sources," says Melissa, "using varied Geographic Information Systems and 3-D modeling tools into terrain models for customers in Centers 6300, 6400, 400, and 12000. These terrains consist of elevation, imagery, and 3-D models with textures."

The Technical Operations Team (TOT) provides a business approach to internal capability development and sustainment for Interactive Systems Simulation & Analysis (ISS) Dept. 6344. "Capabilities represented by the TOT are essential for our customers." says Melissa.

The TOT serves ISS projects and matrixes support to other organizations across the laboratory.

Growing up on a farm in a valley out in the middle of nowhere near Santa Rosa, N.M., a higher education was not in Melissa's future. "Nowhere" was home to only seven families. Her dad Silvano was a rancher/welder/ well-driller. Her mother Seferina was a homemaker and also cleaned rooms for a local motel. She cooked, cleaned house, and washed clothes to help her family.

Melissa has two sisters and two brothers and they all had plenty of chores. Keeping the floor clean was hard. There was no actual floor, just dirt. "Clean" to her mom meant the broom's path had to all be in one direction with no holes. Water came from a cistern, and Melissa studied by the light of a lantern.

Melissa says she is pretty proud of her family.

"I have a brother who is a doctor, another brother runs the family farm; one of my sisters owns a jewelry business and my other sister is a social worker."

Melissa and her parents just got back from a 7-day cruise to the Bahamas, Virgin Islands, Puerto Rico, and the Turks and Caicos. Silvano had always wanted to go to Puerto Rico.

"She paid for everything," says Seferina. "Melissa is very beautiful and a very good daughter. She always has been."

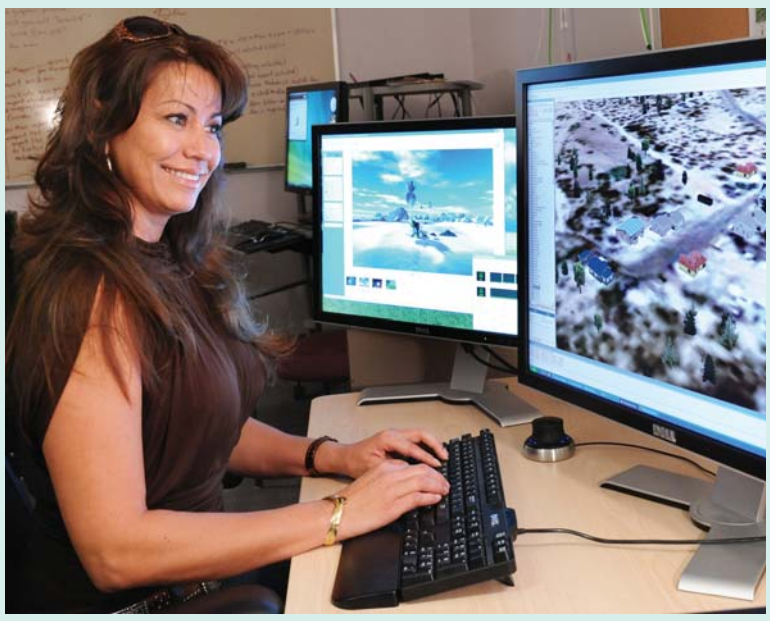
Melissa came to work at Sandia as an office administrative assistant in 1990. She became a director's secretary, was a management assistant, and a technologist. Approximately seven years after coming to Sandia she went to work in retiree Jim Rice's organization.

"I decided I wanted to go to school," says Melissa. "I was very lucky. Jim was very supportive and I began attending school full time as well as working full time."

As a single mother of a five-year old and with no relatives living close, Melissa left Samantha off at day care starting at 6 a.m. After work, Melissa would pick her up, take her to McDonald's or Burger King (Sami's choice) and then to a night day care. They would be home after 10 p.m. each evening.

After she received her undergraduate degree, Jim encouraged her to get her master's. So she skipped a week and started right back to school. In a four-year period Melissa earned both her bachelor's and master's degrees in computer information systems.

"It was hard leaving Samantha for so many hours during the day," she says, "but I was doing this for us to have a better life."



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