New research: Metal-organic frameworks mop up radioactive gases from spent nuclear fuel

By Nancy Salem

Research by a team of Sandia chemists could impact worldwide efforts to produce clean, safe nuclear energy and reduce radioactive waste. The Sandians used metal-organic frameworks (MOFs) to capture and remove volatile radioactive gas from spent nuclear fuel. “This is one of the first attempts to use a MOF [pronounced “MOF,” not as initials] for iodine capture,” says team lead Tina Nenoff (1114) of Sandia’s Surface and Interface Sciences Department. The discovery could be applied to nuclear fuel reprocessing as well as to cleanup from nuclear reactor accidents. A characteristic of nuclear energy is that used fuel can be reprocessed to recover fissile materials and provide fresh fuel for nuclear power plants. Countries such as France, Russia, and India are reprocessing spent fuel. The process also reduces the volume of high-level wastes, a key concern of the Sandia researchers. “The goal is to find a methodology, to line things up so less waste is interred,” Tina says. Part of the challenge of reprocessing is to separate...
That's that

“When the moon is in the seventh house and Jupiter aligns with Mars . . .”

Remember that? If you do, there are probably some very embarrassing photos of you in part 2. We’re talking about the idea lying around in chemicals on paper rather than in bite and bytes. Come to think of it, that’s one of the downsides of this medium. The rest, well, that’s the same stuff that will sellissess a bellbottoms, hoaraches, Nehru jackets, and disco. Today, your past clings to you like a bad suit, almost literally. That ridiculous leisure suit you wore to your sister’s wedding? You might actually be able to get away with it today, but you’ve become a serious impediment to your future job prospects. In Julius Caesar, Shakespeare (or whomever) claims, “What we see that we are: that is the respect in which we are oft interred with their bones.” Maybe that was true in the 17th century; today, nothing is interred with your bone: good and bad. It’s all out there.

By the way, I’m getting around to the point of that first sentence: It’s from the hit musical Hair, which was a cultural phenomenon 40-something years ago. The words are from the song “The Age of Aquarius,” an astrologically significant song of peace and love. I don’t know about that but I do know that every few years, Mars is in conjunction with Earth in just such a way that it’s the perfect time to launch spacecraft to the Red Planet.

We’re in one of those rare periods right now and the US has successfully launched an incredible, astonishing payload on an eight-month voyage to Barsoom (that’s another word for Mars). The Mars Science Laboratory, with its incredible Curiosity rover—the “Monster Truck of Mars” as it’s been called—is NASA’s boldest Mars mission yet.

Its goals include characterization of the climate and geology, and—very importantly—the Philosopher’s Stone of planetary exploration—a determination of whether life ever arose on the planet. That’s what we really want to know. Is anybody there?

As it happens, there’s a significant New Mexico connection to the mission: A Sandia team was responsible for range safety issues during the launch sequence. (A Russian spacecraft, taking advantage of that same pretty good track record, but success is no certainty. Earlier this month we got a hint that our mission may have seen its last.) NASA involves the geology portion of the mission with Sandia, by the way, was singled out for praise by then-NASA Administrator Dan Goldin back in 1997 for its role in the development of the Mars Pathfinder airbag landing system.

If you want to see some brilliant, stunning, inspired engineering, I’d strongly recommend the video. The video depicts the spacecraft cover landing on Mars, then rolling off into the Marsorian hinterlands collecting and analyzing soil samples. (Here’s one link: http://www-a.jpl.nasa.gov/video/index.cfm?id=979) The audacity of this mission will blow your mind.

As we adapt as we become over the years at spacefaring, we laymen mostly assume these missions will succeed. Thus far, we have as a pretty good track record but success is no certainty. Earlier this month we got a stark reminder of that: A Russian spacecraft, taking advantage of that same pretty good track record, but success is no certainty. Earlier this month we got a stark reminder of that. A Russian spacecraft, taking advantage of that same pretty good track record, but success is no certainty. Earlier this month we got a stark reminder of that. A Russian spacecraft, taking advantage of that same pretty good track record, but success is no certainty. Earlier this month we got a stark reminder of that.

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Do you say toe-may-toe or toe-mah-toe?

And do you say twenty-two or twenty-twelve for the year we’re about to begin? So far, you’ve also used the “thousand” construction, as in two thousand-one (which we say how Arthur C. Clark and Stanley Kubrick pronounced the title of their novel). I’ve heard people refer to twenty-oh-nine, twenty-ten and so on, but it hasn’t sounded right to me. So far, I think, though, I’m getting okay with the construction. And inevitably, I think usage will universally be of the “twenty” style before long. The later we get into the century, the more awkward the “two-thousand” formulation sounds. And speaking of centuries, I’m finally beginning to internalize that when we speak of “the last century” we’re talking about the 1900s, not the 1,900s. Being accused of being a “man of the last century” in 2011 isn’t quite as bad as being accused in 1999. But I’m afraid of being a 21st century Renaissance man! That’s another thing altogether, and one I’d be OK with.

See you next time . . .

— Bill Murphy (505-845-0647, wtmurph@sandia.gov)

Sandia’s Heart of Diversity Award seeks nominees

Sandia wants to recognize employees who do awarded the Joseph A. Burnet Award, award for their outstanding work on behalf of someone else in the workplace.

The Lab’s Diversity & Inclusion Organization (DIO) is seeking nominations for outstanding individuals or teams who stood up for change to improve diversity and inclusion in the workplace.

Senior manager Esther Hernandez and diversity team lead Marie Brown (both [0040] and each division Cooperation Program, her responsibilities have included initiating new programs in arms control and nonproliferation and developing strategies for nuclear security that intersect multiple laboratory missions.

In 2009-2010, Sandia served as a visiting scholar at the Center for International Security and Cooperation at Stanford, where she initiated new research in applying the concepts of systems resilience to nuclear nonproliferation.

She is internationally recognized for her work to enable international technical collaboration to enhance security. In 1994 she led the establishment of Sandia’s Cooperative Monitoring Center, which promotes dialogue and understanding on security issues.

Arian earned bachelor’s degrees in physics, mathematics, and philosophy from the University of New Mexico in 1983. She received her Master of Science degree from the University of California at San Diego.

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Family Science Night a big hit at Bay Area Science Festival

By Patti Koning

E ach year, Family Science Night (FSN) brings the excitement of scientific discovery to thousands of children and their families at weekly events at schools in the Livermore area. At the Bay Area Science Festival, held Oct. 29 – Nov. 6, FSN reached many more families.

Led by the University of California, San Francisco (UCSF), the first-ever Bay Area Science Festival was designed to showcase the region’s catalytic role in scientific progress and provide innovative opportunities to build community around science, technology, and engineering. The weeklong event, which included star parties at Bay Area observatories, guided hikes on regional trails, and “wonder dialogues” with scientific leaders, was deemed a smashing success by coordinators and participants alike.

The festival kicked off Oct. 29 at Cal State East Bay’s Discovery Day. Jennifer Halstrom, Mike Janes, and Patti Koning (all 8529) represented Sandia along with retiree volunteers Joel Lipkin and Leo Mara and FSN coordinators Leslie Swift and Karen Abela. A steady stream of parents and children came through the Sandia room, where they worked on signature FSN activities like the hot pipe, straw flute, optical illusion, spinning balloon, and wonderwhirler. The infrared camera proved to be a huge hit — who wouldn’t want a heat map picture of themselves to bring home?

“I think Sandia brought something unique to the Bay Area Science Festival,” says Mike. “Family Science Night is all about hands-on activities that teach basic scientific concepts in a fun and engaging way while bringing together parents and their children.” In some cases, the parents were more involved in the activities than their children.

Sandia also participated in the closing day of the festival, another Discovery Day held at AT&T Park in San Francisco. More than 21,000 people of all ages came to the park and visited activities and booths run by more than 170 exhibitors representing a “who’s who” of the Bay Area scientific community — NASA, Stanford University, the US Geological Survey, the Search for Extraterrestrial Intelligence, Chabot Space Center, the Exploratorium, Lawrence Livermore National Laboratory, and, of course, Sandia.

Dan Segalman named to Air Force Scientific Advisory Board

Dan Segalman (8259) has been selected to serve on the Air Force Scientific Advisory Board (SAB) for a four-year term that began in October. The SAB, organized under the Federal Advisory Committee Act, provides a link between the Air Force and the nation’s scientific community.

The SAB promotes the exchange of the latest scientific and technical information that may enhance the accomplishment of the Air Force mission.

As a board member, some of Dan’s duties will include regular reviews of the Air Force Research Laboratories, including the Air Force Office of Scientific Research, where he did a two-year Intergovernmental Personnel Assignment in 2000-2001. The SAB also conducts numerous studies for the secretary of the Air Force and the chief of staff of the Air Force.

“I’m pleased to be appointed to the board because I feel it’s important for Sandia to be connected to other government agencies,” Dan says. “It’s also an opportunity for me to fulfill our mission of providing excellent technical information and crowd favorite glue goo.

“It was pretty exciting to be a part of this event from the beginning,” says Mike. “We didn’t know what to expect — but I’m not sure we could have envisioned the level of enthusiasm and sheer numbers of people we saw. Hopefully the Bay Area Science Festival will become an annual event and an ongoing tradition for Sandia.”

Located near home plate, the Sandia FSN booth stayed busy all day with the wonderwhirler, optical illusion, and crowd favorite glue goo.

Sandia California News

RETIREE VOLUNTEER Leo Mara shares a moment of science fun with kids at the Bay Area Science Festival.

REP. ZOE LOFGREN, D-CALIF., who represents the 16th congressional district (including much of San Jose and Silicon Valley), visited Sandia/California on Nov. 9. She received an overview of Sandia from Div. 8000 VP Rick Stulen, an update on the Livermore Valley Open Campus from Andy McIlroy (8310), and a tour of the HCCI Engine Laboratory at the Combustion Research Facility with John Dec and Bob Carling (both 8300). (HCCI stands for homogenous-charge compression ignition.) Len Napoli-tone (8100) provided an overview of Sandia’s cybersecurity work.

Lofgren serves on the House Judiciary Committee and the House Science, Space and Technology Committee. Among other issues discussed during her visit, she solicited a formal technical assessment from Len on two pieces of Internet legislation under consider-ation by Congress.

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and isotopes. The Sandia researchers investigated the structural properties on how they work and found that the iodine can be trapped by other members of the Off-Gas Sigma Team — Pacific Northwest, Argonne, and Idaho national laboratories. The Sandia team also fabricated MOFs, made of commercially available products, into durable pellets. The as-made MOF is a white powder with a tendency to blow around. The pellets provide a stable form to use without loss of surface area, Tina says. Sandia has filed for a patent on the pellet technology, which could have commercial applications. “We figured out a binderless process to make industrially relevant pellets,” Tina says. The project began six years ago and the Sigma Team was formalized in 2009. It is funded by the DOE Office of Nuclear Energy. Tina has been involved from the beginning, tapping a background in nuclear weapons cleanup. She has been at Sandia 18 years and previously worked on removal of radiological ions from liquid tanks. Seeking capture and removal solutions. “Over the years, through my career, I’ve gone back to working on materials associated with separations and waste forms for radioactive ions. The Sigma Team is seeking capture and removal solutions for all the volatile gases involved in reprocessing. Sandia’s iodine and MOFs research was featured in two recent articles in the Journal of the American Chemical Society, authored by Tina and team members Dorina Sava (1114), Mark Rodriguez (1282), Jeffery Greathouse (6915), Paul Crozier (1426), Terry Gartno (1816), David Rademacher (1111), Ben Cipiti (6223), Haiqing Liu (1114), Greg Halder, Peter Chupas, and Chapman. Chupas, Halder, and Chapman are from Argonne. “The most important thing we did was introduce a new class of materials to nuclear waste remediation,” says Dorota, postdoctoral appointee on the project. She joined the team 16 months ago from the University of South Florida, where she did graduate work on such materials. Tina says a third paper was published this year in Industrial & Engineering Chemistry Research that shows the incorporation of MOFs with iodine in a one-step process, low-temperature glass waste form. “We have a volatile-off-gas capture using a MOF and we have a durable waste form,” Tina says. She and her colleagues are continuing their research into new and optimized MOFs for enhanced volatile gas separation and capture. “We’re looking at a broad range of materials and learning from them to make new materials,” Tina says.

DORINA SAVA (1114) is the postdoctoral appointee in a group of Sandia chemists who are part of a multibeam team seeking capture and removal solutions for volatile gases involved in nuclear fuel reprocessing. The Sandians zeroed in on removal of radioiodine.

(Continued from page 1)
Nanowires

(Continued from page 1)

So you’d want to measure the possible changes in voltage of one wire as caused by another, to determine how significant the current boost or drag, so you can allow for it in designing your device. But you have a problem. The best test method available involves putting a piece of material called a gate, between two nanowires on a single chip. The gate flooded with electrons, as acts as a barrier: It maintains that integrity, in effect, of the wires on either side, by repelling any electrons attempting to escape across it. But the smallest wire separation allowed by the gate is 80 nanometers. A much smaller gap is necessary for verbatimit with expected future devices.

Simple but brilliant test design

Now consider instead this simple but brilliant test nanowires, says Mike. “They’ve been doing it and co-workers at McGill University envisioned was to put the nanowires one above the other, rather than side by side, by separating them with a few atomic layers of very purely grown crystal. The result? Nanowires separate vertically by only 15 nanometers. And because each wire sits on its own independent platform, each can be independently fed and controlled by electrical inputs varied by the researchers.

“In the long run, our test device will allow us to probe how 1-D conductors are different from 2-D and 3-D conductors.” — Researcher Mike Lilly

The researchers found, as reported online at DOI: 10.1088/NNANO.2011.182, and in the upcoming December 2011 Nature Nanotechnology, highly significant effects. Positive voltage boosts could be as high as 25 percent on the second wire.

This work required the crystal-growing expertise of John Renfrew (1132), the fabrication and measurement skills of McGill doctoral student Dominique Laroche, and elements of previous work by Jerry Simmons (1120).

“There are all sorts of people working on nanowires,” says Mike. “They’ve been doing it for 20 years. At first, you study such wires individually or all together, but eventually you want a systematic way of studying the integration of nanowires into nanoelectric circuits. That’s what’s happening now. It’s important to know how one-dimensional (1-D) wires interact with each other and with regular wires. A 1-D wire is not the common thick-waisted house- hold (3-D) wire, which allows current to move across, vertically, and forward, nor is it your smaller flattened micron-sized wires (2-D) in typical electronic devices, that allows electrons to move forward and across but not up and down. In 1-D wires, the electrons can only move in one direction: forward, like prisoners coming to lunch, one behind the other.

Though the gallium-arsenide structures used by Mike are fragile, nanowires in general have very practi- cal characteristics — they may crack less than their big- ger cousins, they’re cheaper to produce, and offer better electronic control. But it’s as a problem in basic science that their characteristics fascinated Mike.

The Coulomb drag effect

“In the long run, our test device will allow us to probe how 1-D conductors are different from 2-D and 3-D conductors,” says Mike. “They are expected to be very different, but there are relatively few experimental techniques that have been used to study the 1-D ground state.”

One reason for the difference is the Coulomb force, responsible for what is termed the Coulomb drag effect regardless whether the force hastens or retards currents. Operating between wires, the force is inversely propor- tional to the square of the distance; that is, in ordinary microelectronics, the force is practically unnoticeable, but because the Coulomb force is large enough that electrons in one wire can “feel” the indi- vidual electrons moving in another placed nearby.

The drag means that the first wire needs more energy because the Coulomb force treats, in effect, increased resistance. “The amount is very small,” says Mike, “and we can measure it. What we can measure is the voltage of the other wire.

There are no straightfor- ward answers as to why the Coulomb force creates a negative or positive drag, but it does.

“That’s known, Mike says, is that “enough electrons get knocked along that they provide positive source at one wire end, negative at the other. A voltage then builds up in the opposite direction to keep electrons in phase.”

The so-called Fermi sea — a 3-D concept used to predict the average energy of electrons in metal — should totally break down in 1-D along the lines that should form a Luttinger liquid, says Mike. A Luttinger liquid is a theoretical model describing the interac- tion of electrons moving in a 1-D conductor. To better under- stand the Luttinger liquid is Mike’s underlying reason for the experiment.

Having an interest on many levels proved useful because making the test device “took us a very long time,” says Mike. “It’s not like building the same generator after generator. Yet the research and design were going in trying to understand the fundamental ideas behind what is going on when you’re working with very small systems.”

Device fabrication was conducted under a user project at the Center for Integrated Nanotechnologies, a DOE Office of Science national user facilities jointly run by Sandia and Los Alamos national laborato- ries. The device design and measurement were completed under the DOE Office of Science BES/Division of Materials Science and Engineering research program.

Carbon storage to rival oil and gas industry in size, Schlumberger VP predicts

By Neil Singer

Some may still be debating — if not global warming itself — then who or what’s causing it, and whether its consequences be good or bad. But industrial giant Schlumberger (Schlum-ber-jer)’s simple plans on making money on one aspect of it: capturing excess carbon in the atmosphere and storing it.

John Tombari, president of Schlumberger Carbon Services, told an audience of 41 at Sandia’s CNSAC auditorium (and 20 more from the University of Texas – Austin who attended via teleconferencing) that he foresaw the rise of a carbon storage industry that would rival the size of the oil and gas industry.

The talk on the company’s proposed carbon capture techniques and possi- ble storage locations was presented as part of Sandia’s Climate Security Pro- gram. The talks, hosted by program director Rob Ledend (1499), was the fourth in a series of lectures to explore possible dangers and opportunities of a change in climate.

Facilities would accept carbon by injection

“Storage facilities of 100 square miles — circles with a radius of 5 miles,” Tombari later said dismissively, “not very big” — would one day dot the United States. Most numerous near industrial centers, power plants, and associated gas facilities, they would accept carbon by injection for 30 years and then be closed and handed over to an undetermined entity for long-term stewardship.

The research program.

“The CO2 [carbon dioxide, the major form of atmospheric carbon] can be used as a therapy for cancer patients,” says Tombari. “It will stay in the earth, but that handles only 10 to 30 percent of the problem,” Tombari said.”

“For the rest, we need saline forma- tions where oil and gas didn’t trap themselves, filled with salt water too high in concentration to be used as a water source.” There are many of these, he said.

However, a considerable number of possible locations might not make the cut. “We’re looking for rock in the earth with capacity, injectivity, and stability,” he said.

Big grains are desirable for good storage. Their porosity and permeability are factors that can be measured. The ideal site, he said, would be at depths greater than 1,000 feet for containment and to keep the gas in its compressed phase. A confirming layer of small grains above it is ideal.

Lack of awareness an obstacle

“A 41 percent reduction [of airborne excess carbon] by 2030 from 2005 levels is technically feasible using a full range of portfolios,” he said. These would include increased efficiencies in current power generation, as well as increased use of a panoply of non-carbon-emitting energy production sources such as wind, photo- voltaics, and nuclear.

Getting carbon capture programs started is a problem because the general lack of awareness makes it difficult to involve the public in accepting carbon storage sites in, to speak, their backyards. “Every site has different risks,” Tombari said.

“It’s not like building the same generator after generator.”

“Technically, he said, the process would be very expensive to move forward “without a price on carbon, without incentive funding, without a sense of urgency to defuse NIMBY [not in my backyard], and a national and international regulatory framework.”

Things would pick up, he said, once there was an agreement on the value to monetize carbon.

“The US has 27 percent of the world’s coal reserves, so it’s to US interests to actively pursue and improve methods of carbon capture,” he said.

In the question period, Rob asked, “If carbon will be monetized, as you believe, can you make a prediction as to when that will happen, and what we will see proceed from there?”

“You sound like my boss,” said Tombari.

He estimated a beginning between 5 and 10 years. “You’d better start in 2018 if you want to put carbon in the ground by 2025,” he said.
Sandia sponsors N.M. Hydrogen Fuels Challenge

By Iris Aboytes

Sandia was one of the sponsors of Albuquerque Public Schools’ sixth annual New Mexico Hydrogen Fuels challenge, held recently at Highland High School. Fifty middle schools teams — 300 students from 29 middle schools from around the state including Carlsbad, Espanola, Las Cruces, and Gallup — participated.

In addition to racing their built-from-scratch hydrogen-powered cars, the students were required to write a short essay on alternative fuel. That was followed by an oral presentation.

The project-based learning event restricts students to using a provided hydrogen fuel cell and electric motor.

First place went to Madison Middle School from Albuquerque. Ernie Pyle, also from Albuquerque, took second place.

Third place went to P.R. Leyba Middle School from Carlsbad.

“This was one of the most diverse group of students,” says project leader Cheryl Garcia (3652). “It is awesome watching them as they try their best. Each one was a winner in my book.”
Retiree BJ Jones publishes cookbook

By Iris Aboytes

She did it. Retiree BJ Jones’ cookbook, Food, Fun, Family and Friends, has just been published and is available on Lulu.com. To hear BJ tell it, she started writing her first book back in Christmas 1985. “I received my first journal and began recording our parties,” says BJ.

The cookbook is based on BJ’s own tested recipes in entertaining. As a child, BJ says, some of her favorite programs were Julia Child and The Gallipool Gourmet. As the oldest of three daughters, her working mother, Joanne, was happy to let her experiment in the kitchen, and expectant she did.

The Danish side of her family celebrated many family events with wonderful Danish food, so BJ appreciates meals from a very early age. One of her grandmothers was head of a rural school district cafeteria program. When I was 14, I helped my grandmother cook for the YMCA camps,” says BJ.

“In high school, I catered family dinner parties and was written up in our local newspaper, The Fresno Bee (Fresno, Calif.).”

In 1983 BJ married Orlando Lucero and moved to his native New Mexico. BJ began her career in Human Resources management at Sandia in 1984, but continued to cook, entertain and collect recipes. “I decided to type our favorite recipes and have them bound as the best homemade cookbooks to give out as Christmas presents to family in friends,” says BJ.

“Thus began our annual tradition. I constantly try new recipes and my family rates them. Those that receive excellent ratings are part of our annual private cookbook. When you cook and entertain a lot, there are bound to be some unwelcome surprises. In fact, the first party I put in the book was Christmas 1985 when my family from California came to visit us in our new home in Albuquerque. New home, new appliances — what could go wrong? Well, the refrigerator door stuck and would not open. I had to get the stuffing and what could go wrong? Well, the refrigerator door got stuck and would not open. I had to get the stuffing and

When BJ retired from Sandia, she channeled her creative energies into making her wish to publish a cookbook a reality. She hopes the book inspires others to take up the heart-centered practice of entertaining at home.

“Orlando and I are privileged to be involved in various volunteer opportunities in our community,” says BJ. “I believe it is important that we take the time to nurture not only our bodies but also our souls. Having people join us for the fellowship of a meal is the best example of real social networking. Sometimes we donate a dinner at our home as a fundraiser for an organization. It allows me to have fun planning and creating a party while raising money for a great cause.”

To find out more about BJ’s book, go to lulu.com/sportlight/bjjones. It is currently available in Albuquerque exclusively at ScoJo’s Gift and Cards, Paseo del Norte at Wyoming.

“I think my cookbook is for someone who would appreciate having the pre-planning for entertaining done. That will enable them to concentrate on the fun of the event,” says BJ. “I know people are busy. We are all multitasking and juggling these days, but it doesn’t have to be so much to friends, family, and acquaintances when you take time and invite them to your home for a meal.”

“I hope you enjoy it as much as I enjoyed creating it.”

Participating in sports teaches the value of teamwork

Sandian Nikki Lobato learned her lessons well as member of Lady Lobos basketball squad

By Iris Aboytes

“That’s my mama,” says 4-year-old Ryan Lobato, pointing to the radio. His mom is Sandian Nikki Lobato. Nikki does the color commentary for the University of New Mexico (UNM) Lady Lobo basketball games on 610 KNML, the Sports Animal.

From 1997 to 2001 Nikki, then Nikki Heckroth, was the point guard for the Lady Lobos. She was the team captain for two years and was Academic All-Mountain West Conference the final three seasons. She had a school-record 200 assists in the 2000/2001 school season. Nikki earned an accounting degree from UNM and came to Sandia in 2004. She began her career in the area of Safeguards and Security, where Sandia supported her in earning a master’s degree in accounting. Nikki is now in Org. 10666, where she provides business partnering with Center 6600, Critical Asset Protection & Security. She is the business financial lead in two program areas that include the Nuclear Counterterror-ism Incident Response (NCTR) Program in the Nuclear Weapons (NW) SMU and the Critical Asset Protection Program in the International Homeland and Nuclear Security (HNS) SMU.

In 2007, Nikki was approached about being the color commentator with Joe Behrend, the sportscaster. The adrena- lin still pumping from her 2-year-old daughter Payton — to be in Las Vegas.

“Growing up in the sports arena is a very healthy environment,” says Nikki. “It teaches us winning and losing, such an amazing basketball environment. I was excited to be in that venue again.”

So next time you attend a Lobo game or listen to the radio, remember you’re hearing someone from our community. Nikki is an accountant who just happened to be a top Lady Lobo.