The quest for efficiency in thermoelectric nanowires

By Sue Major Holmes

It’s all about efficiency in the small world of thermoelectric nanowires. Sandia researchers say better materials and manufacturing techniques for the nanowires could let carmakers harvest power from the wasted heat of exhaust systems or lead to more efficient devices to cool computer chips.

Researchers at Sandia’s campuses in New Mexico and California published a paper, “Using Galvanostatic Electroforming of Bi1-xSbx Nanowires to Control Composition, Crystallinity and Orientation,” in the Jan. 28 edition of the Materials Research Society’s MRS Bulletin. The authors are W. Graham Yelton, Steven J. Limmer, Douglas L. Medlin, Michael P. Segal, Michelle Hekmaty, Jessica L. Lensch-Falk, Kristopher Erickson, and Jamin Pillars.

The work was the first time researchers managed to control crystal orientation, crystal size and alloy uniformity by a single process. All three factors contribute to better thermoelectric performance, Graham says.

“The three together mean a huge gain, and it’s hard to do,” he says. “It’s turning the knobs of the process to get these things to behave.”

Better nanowire geometries can reduce heat conductivity and improve what’s called the thermoelectric fig-

(Continued on page 4)

Graham Yelton and Sandia colleagues have developed a single electroforming technique that tailors key factors to better thermoelectric performance: crystal orientation, crystal size and alloy uniformity. The work is outlined a paper, “Using Galvanostatic Electroforming of Bi1-xSbx Nanowires to Control Composition, Crystallinity and Orientation,” in the Jan. 28 edition of the Materials Research Society’s MRS Bulletin.

(Continued on page 4)

Sandia Labs names new vice president of Human Resources and Communications

By Valerie Larkin

A human resources executive with more than 17 years of experience in a wide variety of human resources and communications disciplines is the new vice president of Human Resources and Communications at Sandia.

Melonie Parker will be responsible for shaping Sandia’s strategies for staffing, recruiting, communications, health and wellness initiatives, and outreach to the community.

“Melonie’s experience across the spectrum of human resources and communications functions, coupled with her strategic leadership approach, will ensure Sandia continues to have the solid foundation it needs to be successful in fulfilling its vital national security mission,” said Kim Sawyer, Sandia’s deputy laboratories director and executive vice president for Mission Support.

Melonie comes to Sandia from Lockheed Martin Corp., where she served most recently as director of human resources for the Mission Systems and Training Undersea Systems department. She has experience in staffing, compensation, benefits, employee relations, Equal Employment Opportunity, Affirmative Action, diversity programs, and outreach initiatives.

She held a number of management positions since joining Lockheed Martin in 1994. Melonie has a bachelor’s in mass communications from Hampton University in Virginia and a master’s in human resources development from Villanova University in Pennsylvania. She graduated from Lockheed Martin’s Executive Assessment and Development Program in 2012 and is a certified senior professional in human resources.

“I am honored to join an organization that does such outstanding national security work. Sandia has a great reputation, and I look forward to being part of this team,” Melonie says.

Sandia LabNews

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DOE launches pilot entrepreneur boot camp Lab-Corps helps transition lab technologies to the market. See page 3.

NNSA, Livermore, Sandia launch education initiative with 13 historically black colleges and universities. See page 7.

Jon Madison named winner of a Black Engineer of the Year Award (BEYA) for Most Promising Scientist. Read about Jon on page 8.

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Interior Department Announces Transmission Line

SunZia Southwest Transmission Project to tap renewable energy sources in Southwest


The $2 billion SunZia project is planned to help development of wind and solar energy from New Mexico and Arizona, and provide renewable power to the growing desert Southwest region.

See more event photos by Randy Montoya on page 5.
That's that

Consider these items from a couple of editions of the Sandia Daily News: The Radiation Effects and High Energy Density Sciences Laboratory team was recently honored with an Information Tuesday, Jan. 27... The Bioscience Research Foundation Investment Area (BIF) will hold an information session on the campus on Feb. 7. The ALEGRA (A Large Hydrodynamics Research and Engineering Applications) code is the US Department of Energy’s eight mission laboratory's Directed Research and Development (DR&D) program. ALEGRA code developed by Sandia, collaborators wins outstanding achievement award by Sue Major Holmes

The National Training and Simulation Association (NTSA) has honored the Sandia team for outstanding efforts for outstanding achievement. The team was honored with one of six awards presented during the annual Interservice/Industry Training, Simulation, and Education Conference in December. The project was chosen from amongst 48 nominations.

The citation commended the team for maturing ALEGRA into an invaluable, highly advanced hydrodynamics code featuring state-of-the-art technologies. ALEGRA provides improved armor modeling requiring the ability to model solid dynamics and magnetohydrodynamics. The effort began years ago when the code was being developed by various Sandia national laboratories and improved as model parameters are added to the code. The result is a validated, accepted tool that is used globally to simulate armor impacts.

Lab News Reader Service The Sandia Lab News is distributed in-house to all Sandia employees, on-site contractors, and mailed to all Sandia retirees. It is mailed to individuals in industry, government, academia, nonprofit organizations, media, and private life who request it. To notify of changes in address, contact Benefits Department, Ext. 3132, Customer Service, at 505-844-4237, or Mail Stop 0121, Sandia National Laboratories, Albuquerque, NM 87185-0121.

Others To receive the Lab News or to change the address (except retiree addresses) contact Michelle Fleming, Media Relations and Communications Department, Ext. 3651, 505-844-4902, email michelle.fleming@sandia.gov, or call 805-655-6000, Sandia National Laboratories, Albuquerque, NM 87185-0165.
DOE launches pilot entrepreneur boot camp

By Holly Larsen

I

nterest in entrepreneurship is alive and kicking in the Livermore Valley, if attendance at a recent meeting on the topic is any indication. In a Livermore Valley Open Campus room set up for 60, it was standing-room only as staff from Sandia and Lawrence Livermore national labs gathered on Jan. 21, to learn about Lab-Corps, a new DOE-funded “boot camp” on transforming lab technologies to the market.

The two national labs, the UC Davis Graduate School of Management, and the Livermore-based i-GATE Innovation Hub garnered a highly competitive i-CORPS grant awarded by the National Science Foundation's I-Corps program. Each of the panelsists encountered different ups and downs. For example, former Sandian Don Arnold, who helped found a company that was purchased by leading mass spectrometry supplier AB SCIEX, obtained funding for his venture after only one pitch. Greg Sommer, also a former Sandian, gave at least 150 pitches before finding investors for his point-of-care medical testing company, Sandstone Diagnostics.

Nonetheless, the three stressed several common themes:

“I really began to understand the importance of personal relationships,” said Greg. “All of a sudden, life became a contact sport. I realized that people were not judging my idea — they were judging me and my team. Did we have the dedication to pull this off?”

Don agreed and added, “It’s really important to be adaptable. After listening to potential customers, you’ll probably find that you need to create a very different product than what you’d originally envisioned.”

The third panelist, Lloyd Hackett, a former LLNL scientist who helped start the Metal Improvement Co., which was originally funded and then bought by advanced technology supplier Curtiss-Wright, offered this advice: “Do your homework, but don’t be afraid of the unknown. You won’t have all the answers when you start out — but you have to move forward anyway.”

Entrepreneurial insights shared

Two others also spoke. Professor Andrew Hargadon, founder of the UC Davis Child Family Institute for Innovation and Entrepreneurship and author of “How Breakthroughs Happen: The Surprising Truth About How Companies Innovate,” stated that innovation isn’t about an idea, but rather about the network needed to bring an idea to reality.

“Throughout the national labs, we see an incredible potential and of the resources and teams needed to transition the product to the market, whether through industry partnerships, licensing agreements, startups, or other business opportunities. The teams will gain a keen sense of their product’s commercial potential and of the resources and teams needed to

Tech transition boot camp

Lab-Corps will provide extensive training and resources to two teams selected competitively in late March 2015 from the Livermore Valley Site pilot program, along with two teams each from four other national labs. The objective of the pilot is to determine if training can enhance researchers’ understanding of methods that would allow a wider audience to benefit from government investments in the national labs. If successful, the pilot could be expanded and funded for several years to meet the DOE goal of encouraging lab-wide entrepreneurial skills and bring a greater number of lab technologies to market.

Teams selected for Lab-Corps, will consist of a principal investigator, an entrepreneurial lead, and an industry adviser, and receive $75,000 to attend entrepreneur training and collect direct customer feedback on a potentially marketable technology in an area of interest to EERE.

At the end of 5–7 weeks of intensive training, market research, and networking over the summer, the teams will gain the information and know-how needed to complete and present the business canvas. Experience from the National Science Foundation’s I-Corps program — the model for Lab-Corps — indicated that teams will need to talk to about 100 potential customers to complete their business canvas.

In essence, the teams will apply the scientific process to refine and validate their hypotheses — summarized as value propositions — about their product. The teams will gain a keen sense of their product’s commercial potential and of the resources and teams needed to

Next Steps

Carrie Burchard of Sandia and Christine Hartmann of LLNL outlined steps for staff wishing to join the competition — or simply learn more about entrepreneurship.

Lab employees are invited to attend two free training programs: a series of weekly entrepreneur information sessions at the i-GATE Innovation Hub in downtown Livermore on Wednesdays at 4 p.m. and UC Davis entrepreneur training sessions held Thursday evenings. To get started, members of the workforce can go to http://tiny.sandia.gov/Entrepreneurs and submit a request. Lab staff members who want to compete to be selected as a Lab-Corps team should contact Craig Smith (casmith@sandia.gov) to learn more.
nanowires

(Continued from page 1)

use of merit, a measure of a material’s electrical and thermal conductivity. The higher the electrical conductivity and the lower the thermal conductivity, the higher the figure of merit and, therefore, the more efficient the material. However, the quality of thermoelectric nanowires in the past proved inadequate.

Thermoelectric nanowire use in its infancy

Despite their inefficiency, some thermoelectric materials are already in use. Graham compares their stage of development to the early days of solar photovoltaic cells: Everyone saw the potential, but they were so inefficient they were used only when nothing else worked.

Improved efficiency in nanowires would increase the use of thermoelectric materials. Graham says they’re already used in some sensors, and vehicle manufacturers are looking into their potential to harvest heat from exhaust systems to power vehicle sensor systems. Decreasing the power needed to run a vehicle’s operating system could reduce battery and alternator weight and perhaps eliminate some power-generating equipment, trimming vehicle size and weight.

Sandia’s paper describes how the team created thermoelectric nanowire arrays with uniform composition along the length of the nanowire and across the spread of the nanowire array, which potentially can include hundreds of millions of nanowires. In addition, they created nanowire crystals of uniform size and orientation, or direction. Uniform composition improves efficiency, while orientation is important so electrons, the carriers of energy, flow better.

The team used a cost-effective method called room-temperature electroforming, which is widespread in commercial electroplating. Electroforming deposits the material at a constant rate, which in turn allows nanowires to grow at a steady rate. The method produced wires 70-75 nanometers in diameter and many microns long.

Graham used pulses of controlled current to deposit the thermoelectric material to control composition throughout the wire and the array. “There are little nuances in the technique that I do to allow the orientation, the crystal growth, and the composition to be maintained within a fairly tight range,” he says.

Technique allows control over important facets of nanowire formation

The method produced a fairly large, slightly twisted crystalline wire structure that was almost a single crystal and had the desired orientation. “Without that you couldn’t get good efficiencies,” Graham says.

The chemistry of the material also is important because antimony salts play a major role in crystalline quality and orientation. Bismuth-antimony (Bi-Sb) alloys have some of the highest thermoelectric performance — acting both as a conductor of electricity and an insulator against heat — among many materials for near-room temperature applications. But existing Bi-Sb materials don’t produce effective solid-state cooling when power is constantly delivered to the device being cooled, such as a computer.

Sandia’s team wanted a compound that behaved like a metal but would not conduct heat. Alloying antimony with bismuth fit the bill, Graham says. In-Bi nanowire arrays electroformed with an antimony-iodide-based chemistry lacked the needed qualities, but arrays electroformed from an antimony-chloride-based chemistry produced crystallography and orientation for maximum thermoelectric performance.

“The chemistry allowed us to go from poly-nano-crystalline structure to near single crystals of 2-5 micrometers,” giving better control over uniformity, Graham says.

The next step is more challenging: making an electrical contact and studying the resulting thermoelectric behavior.

“Thermoelectric materials readily form oxides or intermetallics, leading to poor contact connections or higher electrical contact resistance. That reduces the gains achieved in the materials development,” Graham says.

While the Sandia team has been able to get good contact at the bottom of an array, making a connection at the top has proved difficult, he says.

“To make a contact and measure array performance is not trivial,” Graham says.

He and his colleagues are seeking further funding to solve the problem of successfully making contacts, and then to characterize the thermal electric properties of arrays. “If successful at the Labs, we would try to find an industry collaborator to mature the idea,” he says.

*Photos by Randy Montoya*
Mileposts

New Mexico photos by Michelle Fleming

Recent Retirees

When winter weather strikes, do you know where to go for information about Sandia work delays or closures? Should overnight weather conditions make the Labs' parking lots unsafe until they are cleared, Sandia's Emergency Operations Center (EOC) will distribute a workforce message about the delay, including a specific time to report to work, and other relevant details including how to charge time for the delay.

Under typical snowy conditions, messages will be sent no later than 5 a.m. the day of the delay, and will include a stipulated start time dependent on the severity of the storm.

Messages will be delivered in a variety of ways, beginning with Sandia email, allowing employees to monitor the information sources most convenient to them. These sources include:

- **Sandia email**
- **Sandia Bulletin Board** (Dial 845-6789 and follow the menu choices; 925-294-3333 for California-specific events.)
- **Radio Sandia**, 1640 AM
- **Alert banners** on Sandia's external homepage, www.sandia.gov, and internal Sandia Techweb
- **News coverage** through local television and radio stations
- **Sandia Facebook**, facebook.com/SandiaLabs, and **Sandia Twitter**, twitter.com/SandiaLabs

During inclement weather, employees should follow arrangements made with their manager for weather delays, including any telecommuting work. Information regarding road conditions can be found at www.nmroads.com/ in New Mexico, or http://511.org in California.

Inclement weather information
President and Laboratories Director Paul Hoenert took part in a roundtable discussion on educating future cybersecurity experts with Vice President Joe Biden and Secretary Moniz. White House Science Advisor John Holdren is second from left. Sandia's Homeland Security Group leads the cybersecurity consortium (blue shirt).}

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### MISCELLANEOUS

ALL-IN-ONE PRINTER/SCANNER/COPIER/IFAX, Lexmark Pro705, like new, sells for new at Sam's, $75. Babk, 228-3225.


HD TV, Samsung 40”, w/Sony DVD player, $200. Hennessey, 505-269-6243.

REFRIGERATOR, Kenmore, bottom freezer, French doors, water/ice in door, 23-cu. ft, 3.5/4W x 34.1/4D x 69.7/4H, excellent condition, $1,100.

Drum, 350-6341.

FURNITURE, loveseat & chair, swivel chair, dr, cherry burl, set, coffee & end tables, Feke, 573-0395.

DINING ROOM TABLE, oak, 6’11” x 38”, 6 chairs, hidden drawer/cabinets, can email photos, $800. Stanke, 296-2893.

KID’S BD, SET, Ashley Doll House loft, 2 twin beds; low dresser & mirror, desk, $600. Hall, 869-8829.

GOLF CLUBS, Ping G10, graphite shaft, irons 4-W, $175; Ping ISI-K, 867-8829.

ADAMS, 821-0899.

SPEAKERS, 4, Nova 8B 7KHZ, 80 MA, w/hard case, $100. Flores, 407-4808.

40 MA, w/dies for 410, 12 & 20 shaft, irons 4-W, $175; Ping ISI-K, 867-8829.

Langwell, 299-1024.

clothes & purses, household, $15 ea. Fenimore, 298-8052.

Langwell, 299-1024.

MOTORCYCLE, Saddleman gel seat, KTM tank bag, 19K miles, $1,500 OBO. Martinez, 285-6180.

MUFFLERS, MUFFLER, SPORT MUFFLER, $350.

Plumb, 681-1846.

Sling & cleaning rod, $350.

Langwell, 299-1024.

BOOKS, for school in Zimbabwe, $25 million DOE grant in FY15.

GARCIA, 280-5815, ask for Frank.

NEWLY PAINTED, extras, $5,000. Garcia, 505-980-0991.

1. Limit 18 words, including last word.
2. Include organization and full name of sender.
3. Include organization name.
4. Include organization name.
5. One ad per issue.
6. We will not run the same ad more than twice.
7. No “for sale” ads for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce, married, single, domestic partner, student-aged children of employees.
10. Housing listed for sale is available with or equal to row home, city, color, or national origin.
11. Contact only advertised, student-aged children of employees.
12. We reserve the right to publish any ad that we consider offensive or in bad taste.

### TRANSPORTATION

- **515 FAO 500**, w/sport pkg., ran/wrong year in 1/23 Lab News, ~1,000 miles, brand new, perfect condition, premium sound system, $4,600. Miller, 505-687-6677.

- **140 FDX**, LEASE TAKEOVER, lease ends May 2016, contract mileage 21,075, current mileage 6.6K, $149/mo. McGrath, 505-980-0991.

- **98 BUCK LEBARE, 6-cri, re-burned engine, new tires, $2,500 OBO. Devender, 505-332-8824, ask for Randy or Nolan.

- **60 CAMERON S 2000, extended cab, $3,000. Retunski, 505-648-2806.

- **11 KTM ADVENTURE 990 DAKAR**, 1621 actual miles, hardly ridden, $4,800. Salazar, 319-7250.

- **60 CHEVY TRUCK, 4WD, club cab, 5.2L, manual, lifted, off-road tires, 117K miles, runs, great, $3,500. Flynn, 815-762-4075.

- **MUZZLELOADER, Knight MK94, .50 caliber,”006 SUBARU TRIBECA LIMITED, 7 passenger, navigation, new tires & wheels, $2,200; 16,000-lb. Reese 5th wheel hitch, $375; ask for photos. Drebing, 350-6341.

- **09 CHEVY cruze LT, 4 dr, new, needs new ink cartridges, $15,000. Magid, 505-450-1514, text homepage, click on News Center, ask for Photos. Drebing, 350-6341.

- **06 MAZDA MIATA, 30K miles, excellent condition, $10,000. Melkey, 319-538-6155.

- **01 TOYOTA SIENNA XLE VAN, white, beige interior, smoke free, cap- tain’s chairs, 1 owner, 166K miles, $8,400, Hebert, 505-383-3100.

- **06 JEEP WRANGLER UNLIMITED, 4x4, lifted, AT, 4L, AC, hardtop, soft-top, rebuilt, 966 miles, $16,500 Bonahom, 505-299-2926.


- **06 SUBARU TRIBECA LIMITED, 7 passenger, navigation, new tires & wheels, $2,200; 16,000-lb. Reese 5th wheel hitch, $375; ask for Photos. Drebing, 350-6341.

- **99 BUCK LEBARE, 6-cri, re-burned engine, new tires, $2,500 OBO. Devender, 505-332-8824, ask for Randy or Nolan.

- **06 GMC SIERRA 1500, extended cab, 2000, work truck, white/grey, locking bed toolbox, receiver hitch, chains, $6,900 OBO. Suss-Jettla, 275-8737.

- **06 GMC ENVOY, 6-cyl,109K miles, runs, great, well maintained, $4,800. Salazar, 319-7250.


- **AG-TAC COMBINE & accessories, $120,000. Thomas, 545-1914.

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### REAL ESTATE

- **3.12 ACRES, Tijeras, ~116 Rincón Loop, very quiet, excellent access to I-40, $45,000. Swinland, 401-0031.

- **3-BDR. HOME, 3 baths, 2,480-sq. ft., separate in-law quarters, swimming pool, ~274,900, $429,900 w/realtor. Ramos, 972-951-0290.

- **3-BDR. HOME, 2 1/2 baths, 1,470-sq. ft., all appliances, star elevator, MLS:681670, ~14,000, Wright, 512-337-0773.

### WANTED

ROOMMATE, UNM/Ridgecrest, 2- bed home, 1 bath, garage, like new at UNM, ~375/mo. Kelly, 263-0810.

GOOD HOME, birds, female canine, 2 society felines, w/ large cage, happy, healthy birds. Schauer, 103-2053.

BICYCLE, for short commutes, I’m 5’4” Biedermann, 54-7468, BOOKS, for school in Zimbabwe, preschool-7th grade. Hoffa, 505-274-8306.

ROOMMATES, 2 available rooms, home 15 mins. from KAFB, students preferred, $130 mo/split utilities. Wood, 505-270-8490.

### NSNA, Livemore, Sandia launch education initiative with 13 historically black colleges and universities

Department of Energy will provide a $25 million grant over the next five years to support cybersecurity education

President and Laboratories Director Paul Hoenert took part in a roundtable discussion on educating future cybersecurity experts with Vice President Joe Biden and Secretary Moniz. White House Science Advisor John Holdren is second from left. Sandia’s Homeland Security Group leads the cybersecurity consortium (blue shirt).

The cybersecurity consortium will strengthen institutions at the historically black colleges and universities (HBCUs) who are part of the consortium, with Sandia and Lawrence Livermore national labs and the Charlotte Mason Institute in Virginia. President and Laboratories Director Paul Hoenert took part in a roundtable discussion on educating future cybersecurity experts with Vice President Joe Biden and Secretary Moniz. White House Science Advisor John Holdren is second from left. Sandia’s Homeland Security Group leads the cybersecurity consortium (blue shirt).
Growing up in Kansas, Jon Madison had a strong sense of who he was and where he was going. “I wasn’t an average kid,” he says. “Whatever my peers were doing, chances are I wasn’t doing it. After school and weekends I helped with my family’s business. My peers were doing something else.”

He worked in the family business and decided it wasn’t for him. He wanted a career in science. But math didn’t come easy, so his sister tutored him every day throughout his first few years of high school. “She got me on the path to learning and understanding math,” he says. “She told me to do your best, and that stuck with me.”

Jon went to Clark Atlanta University, a historically black university, where he earned a bachelor’s degree in mechanical engineering science. He then headed to the University of Michigan to complete his master’s and PhD in mechanical engineering science. He then headed to the University of Michigan to complete his master’s and PhD in materials science and engineering.

He was in the Louis Stokes Alliance for Minority Participation (AMP) initiative, a STEM scholarship program of the National Science Foundation. “They said from day one that I would go to grad school,” he says. “The expectations were high.”

He did summer internships at the Naval Research Laboratory in Washington, D.C., Washington State University, and the Massachusetts Institute of Technology. “I was looking for mechanical engineering internships but ended up in materials research programs,” he says. “I got a lot of exposure and opportunity to see materials science in different ways. That’s when it clicked for me that I would like to pursue materials science as a career.”

Jon began looking at the job market as he finished his dissertation, focusing on industry rather than academia. A conversation with his mentor, George Spanos, technical director of the Minerals, Metals & Materials Society (TMS), changed all that. Jon recalls Spanos asking him what was most important to him. What were the things really, really wanted to do in his career? “He boilled it down to three things. I wanted to mentor students, do fundamental research, and be involved in professional societies,” Jon says. “George responded by saying it sounded like I was looking for a national lab. That had never even entered my mind.”

That was the summer of 2009, and in 2010 Jon joined Sandia. “I talked to many of the labs, but Sandia was always the frontrunner,” he says. 

An advocate for diversity

Jon’s work centers on destructive and non-destructive techniques to understand microstructure in three dimensions, and using that information in experiments and simulations. He’s also helping to develop a materials database that can be used across the labs. “I get a tremendous sense of satisfaction from accomplishing things,” he says. “I like to see something come together in a complete way.”

Duane Dimeo, director of Pulsed Power Sciences Center 1609, nominated Jon for the BEYA award, saying his research skills “are differentiated from many peers by a mastery of both experimental and modeling expertise with a focus on quantification of defects in materials microstructures.”

“Jon is a tireless advocate for ensuring diversity within his professional field and at work,” Dimeo says. “He serves as a role model for aspiring young African American students.”

Jon is an Executive Fellowship mentor and works with interns from around the country. “I take mentoring really seriously,” he says. “It is our responsibility as scientists to mentor the next generation. It’s close to my heart because I was groomed by mentors.”

He and his wife volunteer with Big Brothers Big Sisters of Central New Mexico. And Jon is a life member of the National Society of Black Engineers and the NAACP. He is also area director of the service fraternity Alpha Phi Alpha, which had Dr. Martin Luther King Jr. as a member.

In his spare time, Jon plays video games, reads, and watches movies. He also takes on the occasional painting job around the house, a nod to the family business. “It tends to be on my to-do list,” he smiles.

“Jon’s message to young people is the same one he received as a kid from his parents. “It doesn’t matter what you choose to do, just strive to do your best,” he says. “The better you perform now, the more doors will open for you later. You don’t want to close those doors before you have a chance to look through them. You never know what opportunities are around the corner.”