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Ricardo Martí-Arbona

Multi-faceted leader receives Lab's Operations Excellence Medal

Ricardo Martí-Arbona is the winner of the Lab's prestigious Operations Excellence Medal. Throughout his 15-year career at Los Alamos, Martí-Arbona, a research and development manager in MPA Division, has lent his operational acumen to numerous Laboratory groups, divisions, and directorates—all in the name of safety, security, efficiency, and mission delivery.



When asked about his career, Martí-Arbona emphasized the importance of bringing together people from different disciplines to embrace operational excellence. "If we can all embrace the mission and work together toward a common goal, then we can be successful. I don't try to do operations in a bubble; I work with subject matter experts, workers, everybody who's affected to make sure everyone understands how their work influences our milestones and what kind of impact they have on program and mission execution. Everyone contributes and that helps us reach our goal of simultaneous excellence," he said.

Skilled coordinator

Martí-Arbona serves as deputy group leader for the Center for Integrated Nanotechnologies (MPA-CINT) and the safety and process coordinator for MPA Division, where one of his most recent contributions was coordinating the LANL rotor project. As the subcontractor technical representative (STR) for the project, Martí-Arbona successfully orchestrated the complex, industrial-scale operation that spanned 22 divisions from all 4 Lab directorates. In his letter of support for Martí-Arbona's nomination, MPA Division Leader Andrew Dattelbaum wrote, "Had Ricardo not been the STR for this project, I doubt that we would have been able to execute the move of the rotor in the expeditious time frame that we ultimately achieved."

Dedicated to the environment

Supporting the Lab's initiative to reach net-zero carbon output and changing how the Lab operates to accomplish this goal are also part of what drives this mid-career leader. "Participating in these efforts to create tools that will help us achieve the operational excellence we strive for as a Lab is extremely important to me," Martí-Arbona said when asked about the My Green Lab and My Green LANL initiatives that support the Lab's net-zero emissions program.

Emergency response expert

Volunteering as an auxiliary member of the Laboratory's HAZMAT team is also part of Martí-Arbona's expertise, where he supports response efforts and exercises as a chemistry and biology subject matter expert and HAZMAT responder. He is also an ardent safety and security advocate, and he eagerly steps up to support various Worker Environmental, Safety, and Security Team groups whenever the opportunity arises.

Passionate mentor

Martí-Arbona is also making a positive and lasting impact on the next generation of the Lab's workforce by leading the Joint Science and Technology Institute (JSTI) West. This two-week, fully funded program brings high school students from across the nation to have real, hands-on research experiences. He was instrumental in creating the West arm of JSTI and bringing the opportunity to Northern New Mexico. Since 2019, he has coordinated more than 120 Laboratory volunteers and researchers from Sandia National Laboratories and the Department of Defense to work with these high school students.



“ I encourage you to continue to explore scientific veins that excite you, to speak to the potential applications of those discoveries in the far future, while looking for opportunities to apply those discoveries toward solving national challenges today. Reach out to me (or Andrew) at any time to discuss potential research ideas and opportunities.

From Jen's desk . . .

In this edition of *MPA Materials Matter* we celebrate awards and recognitions received by our MPA colleagues within 2023. CONGRATULATIONS to our colleagues highlighted in this issue and the many others in MPA that excel at enabling the technical vitality, mission successes, and workforce development of the Laboratory. Beyond the honors noted within this issue and the recent edition of *Physical Sciences Vistas*, I want to mention the many additional ways our colleagues have not only pushed the frontiers of fundamental and applied science and engineering, but received internal and external recognition for that work, including:

Laboratory Fellows (R. Borup and F. Ronning); Laboratory Fellows Research Prize (Y.S. Kim); American Society of Mechanical Engineers Fellow (M. Pettes); Battelle National Laboratory Inventor of the Year (Y.S. Kim); IAGE Outstanding Researcher Award (P. Zelenay); Nanomaterials Young Investigator Award (A. Chen); R&D 100 Awards (three of LANL's 10 awarded to MPA); Postdoctoral and Student Distinguished Mentor Awards (M. Boshier, M. Martin, Y.S. Kim, J. Hollingsworth); Postdoctoral Distinguished Performance Awards (P. Sharan); Distinguished Student Performance Award (P. Martin); Scientific Discovery Award, DOE National Laboratory Postdoc SLAM (T. Kucinski); On the Hill Science Days (V. Zapf and M. Jaime); MSI Program and Pipeline Development (T. Rockward); Clarivates Annual Highly Cited Researcher (P. Zelenay); NASA Group Achievement Award (R. Newell); contributions to National Academies of Science/Engineering reports (R. Gray and the magnet lab); readying the maglab for the rotor return (maglab et. al.); readying CINT renewal (CINT et. al.); conceptualizing and/or spinning off MPA technology (H. Thakkar, L. Chavez); countless briefings to DOE, GS, and Weapons sponsors, as well as US Senators and White House staff; countless milestones and deliverables met, and so much more. Finally, in 2023 we mentored 87 postdoctoral colleagues and together we have 350 publications within peer-reviewed journals!

Well done to those (listed above and others) honored during this past year and to ALL MPA for your continued successes!

What does this eyechart list of MPA accomplishments say to me? My mentors at Los Alamos joined the Lab when it was called Los Alamos Scientific Laboratory. With that name and through our heritage at LANL, we in MPA continue to push important boundaries of scientific discovery in quantum, high magnetic field measurements, nanomaterials, fuel cells, and advanced instrumentation—all successes for the missions of the Laboratory. YOU are an important part of the ingenuity and success of the Laboratory. I also observe those use-inspired and fundamental scientific discoveries translating to more applied programs. Thus, we enable LANL to not only meet the needs of "today's missions, but those of tomorrow." I encourage you to continue to explore scientific veins that excite you, to speak to the potential applications of those discoveries in the far future, while looking for opportunities to apply those discoveries toward solving national challenges today. Reach out to me (or Andrew) at any time to discuss potential research ideas and opportunities.

Finally, one of the best ways for people to understand the importance and impact of our work is to explain what we do—at the *Scientific American* level—to our peers, our leaders, and the broad public. But that motivation doesn't stop there, I encourage you to take the time to express the excitement and benefits of your work to FIN, IH, admins, and the FOD, so that they appreciate the impact of your work and their contributions to MPA's successes. It's my pleasure to work with you all. Thank YOU for what you contribute to LANL's missions.

MPA Deputy Division Leader Jen Martinez ■



From Laurel's desk . . .



In my opinion, one quality that is critical for a successful leader to embody is the willingness to challenge the status quo to effect change for the benefit of the people they represent.

For the first time in nearly 20 years, the National High Magnetic Field Laboratory—a three-site user facility which includes the Pulsed Field Facility in MPA-MAGLAB—began the search for a new director in spring of last year. Naturally, this effort resulted in frequent discussions surrounding what qualities an ideal candidate for such a position would possess. Everyone largely agreed that a strong leader was needed; however, what that meant to people varied widely. In my opinion, one quality that is critical for a successful leader to embody is the willingness to challenge the status quo to effect change for the benefit of the people they represent. In my role as deputy group leader of MPA-MAGLAB I am mindful of incorporating this leadership quality into my work. One example of this is well captured through my nearly two-year effort to implement the Lab's policy changes on the use of fixed oxygen alarms in the group's lab spaces.

Here in MPA-MAGLAB for years we have successfully maintained our own programmatically driven oxygen alarm response procedure for the nearly 20 oxygen monitors contained in the high-bay buildings that house our pulsed magnets. This procedure includes the use of a centralized system that provides the status of all monitors in real time, sends email alerts when an alarm occurs, and automatically shuts off the flow of nitrogen from the 15,000-gallon tank outside that feeds into our building. This effort was born in part out of the realization that we needed a robust and reliable way to ensure the safety of those in our spaces when our pulsed magnets expectedly but unpredictably fail, causing short-lived, localized, oxygen-deficient environments. Early in the roll-out of the new oxygen alarm policy we had walkdowns with the policy owners to determine where the newly required horns and strobes would be located. It was quickly apparent that the easiest path forward was to mimic the one-size-fits-all plan that worked for other labs; however, this plan would significantly increase the complexity of our alarm response and hamper our ability to get work done. At this juncture I could either go along with the “status quo” or challenge myself and all parties involved to produce a plan that would satisfy the intent of the policy while allowing us to continue to manage our oxygen alarms safely.

I'm happy to report that after nearly two years of discussions with facilities, the policy owners, and engineering—plus more walkdowns than I can count—we are in the final stages of signing off on a procedure that I believe is not only defensible and logical but also useful in keeping those working in our spaces safe with minimal impact to our ability to get work done. This was by no means an easy path to take, but for me it was an easy decision to challenge a solution that did not work for my organization and put forth my efforts to figure out a path forward that would. In this new year I plan to continue incorporating this mindset in the work I have ahead of me, and I challenge you all to do the same.

MPA-MAGLAB Deputy Group Leader Laurel Winter ■

Rod Borup named Laboratory Fellow

In recognition of his outstanding career achievements, Rod Borup has been named a Los Alamos National Laboratory Fellow.

Borup (Materials Synthesis and Integrated Devices, MPA-11) is internationally recognized for his scientific excellence and exceptional leadership in the area of fuel cell technologies and is the face of Los Alamos's flagship fuel cell program. He has made significant advances in fuel cell technology for clean energy applications and has an outstanding record of professional service and internal service to the Laboratory. Additionally, he is now engaged in a new application of fuel cell technology that will support the modernization and management of the future stockpile.

Laboratory Fellows are appointed by the Director in recognition of sustained outstanding contributions and exceptional promise for continued professional achievement and continue to serve as advisors and mentors at all levels of the Laboratory.

Technical contact: Rod Borup ■



Kim's projects include an Advanced Research Projects Agency-Energy funded-proposal to develop fuel cells that function above 100°C, and up to 230°C, without using water. That project resulted in fuel cells made of an ion-pair coordinator polymer membrane designed to provide a higher rate of proton conductivity across a wide range of temperatures. His work was commercialized with support from the DOE's Energy Efficiency and Renewable Energy Hydrogen and Fuel Cell Technologies Office "LInnovator" program, which helped Advent Technologies verify the manufacturability of the technology. Advent has opened a factory in Massachusetts to manufacture the fuel cell's membrane electrode assemblies.

Kim, who earned a PhD in polymer engineering from the Korea Advanced Institute of Science and Technology, joined Los Alamos in 2003 after a postdoctoral fellowship at Virginia Tech.

Technical contact: Yu Seung Kim ■

R&D 100 Awards highlight Laboratory technology

Novel technologies that measure material signatures at the nanoscale, analyze the spectral fingerprint of toxic gases, and create high-performance optoelectronics from earth-abundant materials have been recognized with R&D 100 Awards.

Spanning industry, academia, and government-sponsored research organizations, the awards honor the latest and best innovations and identify the top technology products of the past year.

Making these technologies possible were members of MPA Division in collaboration with their Lab and external colleagues.

HXI: Hyperspectral x-ray imaging detector is a new capability in energy resolution and efficiency for material analysis in scanning electron microscopes allowing researchers to measure material signatures at the nanoscale. Such analytical capabilities are especially important for samples that vary in composition on very small length scales and where macroscopic material properties depend on microscopic features. Nanoscale mapping could benefit the semiconductor fabrication industry, forensics, materials science, environmental science, biological science, and geological science fields. MPA team members were Michael Rabin (Quantum, MPA-Q), Eric Bowes (Center for Integrated Nanotechnologies, MPA-CINT), and Gregory Wagner (Materials Synthesis and Integrated Devices, MPA-11).



Yu Seung Kim, right, and Lou Von Thaer (far right), president and CEO of Battelle.



Yu Seung Kim named Inventor of the Year by Battelle

Yu Seung Kim (Materials Synthesis and Integrated Devices, MPA-11) has been honored as Battelle's Inventor of the Year for Los Alamos. The annual award is given by Battelle to recognize inventors from Battelle and the nine national laboratories it manages.

Kim was recognized for innovative research "to design fuel cells with an ion-pair coordinated polymer membrane, which increases the temperature range a fuel cell can reliably function in and increases the power of the vehicles."

continued on next page ►

Distinguished Performance Awards

MPA staff recognized for notable contributions to Lab's mission

For their dedication, effort, and outstanding sustained performance in support of transformational science in a safe, secure workplace, members of MPA were recognized with 2022 Laboratory Distinguished Performance Awards.

Individual Award

Saryu Fensin

Center for Integrated Nanotechnologies, MPA-CINT

Saryu Fensin played a critical role in several projects related to the Lab's plutonium research and development. Fensin showed exceptional technical and project leadership in executing experimental work and leading large teams to enable Laboratory success. Her dedication led to the completion of three NNSA Level 2 milestones in the same year, with one milestone contributing directly to a fiscal year 2023 pegpost/Level 1 milestone. Fensin's work involved collaboration across multiple Lab divisions and with stakeholders at Sandia and Lawrence Livermore national laboratories. She not only coordinated team activities in each of the projects, but also helped determine the projects' technical directions and the execution of complex concepts through creative and novel experiments.



preparedness. The final document has been praised throughout the Laboratory, the NNSA, and DOE for its scope and thoroughness, and it will serve as the benchmark for future climate assessments conducted by the Lab.

Epic Shadow 23-01 Team

Alexa Hanson, Brian Scott

Materials Synthesis and Integrated Devices, MPA-11

To test the operational readiness of nuclear forensic examinations at DOE and NNSA sites, the Office of Nuclear Forensics developed a series of exercises to assess each site's capabilities under varying circumstances. The most recent exercise was Epic Shadow 23-01. The significant improvement on previous approaches reaffirmed Los Alamos's position as a leader in nuclear forensics and the strategies will be incorporated into future exercises and operational work.

Pegpost Team

Carl Cady, Saryu Fensin, Daniel Martinez

Center for Integrated Nanotechnologies, MPA-CINT

Between 2019 and 2022, in pursuit of the Assess Lifetimes and Mitigate Aging pegpost, the Pegpost Team contributed to the advancement of both electron beam additive manufacturing and electroforming technologies, establishing these techniques as viable manufacturing alternatives for future systems. These efforts resulted in potential new manufacturing solutions for difficult-to-process materials, yielding novel perspectives on manufacturing development, physics qualification, and component lifetime. ■

Large Team Awards

Climate Change Vulnerability Assessment and Resilience Plan Team

Andrew Dattelbaum

Materials Physics and Applications Division, MPA-DO

In addition to outlining possible threats that climate change poses to the Lab, the team's assessment highlights creative strategies to build up the Lab's resistance and complete a plan for long-term

R&D 100 Awards cont.

NACHOS: Nano-satellite atmospheric chemistry hyperspectral observation system delivers trace gas detection capabilities in a small, lightweight package for space. It analyzes the spectral fingerprint of each toxic gas, processes raw data, and supports attribution of harmful gas emission sources on Earth. NACHOS supports space-based, airborne, and ground-based mission deployment, including trace gas detection from CubeSats, deep-space planetary missions, remote monitoring ground stations, and airborne monitoring from drones. Two NACHOS CubeSats have flown in space. Nicholas Dallmann (MPA-Q) was a member of the team.

SPeC: Solution processed crystalline thin films combines molecular engineering of earth-abundant materials with a thin film coating method that can be adapted to mass production and scaled for size. Processing costs less and uses much less energy compared with current approaches. The near-single crystal layer films create many fewer crystal-grain boundaries and defects than other semiconductor fabrication methods. Benefits include more efficient solar cells, brighter and fully color-tunable light-emitting diodes, and more sensitive x-ray detectors. The technology also received a bronze special recognition medal for market disruptor-products. Wanyi Nie (MPA-CINT) led the team.

Receiving an R&D 100 Finalist Award, **Acoustic resonance spectroscopy mechanical condition monitoring** provides in situ, real-time wear and damage measurements of inaccessible rotating machinery during operation. The technology also provides critical data to enable preventive maintenance and boost operational performance to improve safety, save time, and reduce costs. MPA team members were Cristian Pantea and John Greenhall (both MPA-11). ■

MPA staff go above and beyond

Los Alamos Awards Program

Well done and thank you! The following MPA Division staff members were recognized with LAAP awards for their exceptional service in support of the Laboratory mission.



MPA-CINT: Center for Integrated Nanotechnologies

Aiping Chen
Ekaterina Dolgoplova
Han Htoon
Mihee Kim
Brandon Lovato
Angela Martinez
Wanyi Nie

MPA-DO: Division Office

Susan Duran

MPA-MAGLAB: National High Magnetic Field Laboratory

Sonya Almeida
Leonard Gonzales
Hazuki Teshima

MPA-Q: Quantum

Adam Dioguardi

MPA-11: Materials Synthesis and Integrated Devices

Eric Brosha
Benjamin Davis
Jazlynn Gonzales
Marcella Medina
Christopher Romero
Elmer John Rowley

Spot Awards

A big "thank you" goes to the following members of MPA who were "spot on" in pitching in outside the scope of their normal duties. Congratulations to the recipients!

MPA-CINT: Center for Integrated Nanotechnologies

| | |
|----------------|----------------------|
| Jon Baldwin | Sundar Kunwar |
| Eric Bowes | Mikayla Martinez |
| Carl Cady | Daniel Martinez |
| Jesse Callanan | Victoria Nisoli |
| Agnieszka Cruz | Prashant Padmanabhan |
| Benjamin Derby | Kamaya Ronning |
| Andrew Jones | Duncan Ryan |
| David Jones | Chris Sheehan |
| Kyungtae Kim | James Valdez |
| Camari Knox | Darrick Williams |

MPA-Q: Quantum

| | |
|-----------------------------|------------------|
| Malcolm Boshier | Michael Malone |
| Vigneshwaran Chandrasekaran | Phillip Martin |
| Dominique Chavez | Leonardo de Melo |
| Adam Dioguardi | Shaun Newman |
| Aaron Goodman | Allen Scheie |
| Andrew Harter | Sean Thomas |
| Katarzyna Krzyzanowska | Ceren Uzun |

MPA-11: Materials Synthesis and Integrated Devices

| | |
|------------------------------|--------------------|
| Tanya Agarwal | Alexandria Marchi |
| Henry Chance | John Matteson |
| Matthew Cover | Sandipkumar Maurya |
| Michael Dugas | Quinn McCulloch |
| Tatyana Elkin | Luigi Osmieri |
| Henriquez Escobar Jacqueline | Melissa Rier |
| Alexander Howard | Christopher Romero |
| Jeremy Jernigen | Rajinder Singh |
| Cortney Kreller | Elida Summers |
| Victoria Kwei | Xiaojing Wang |
| Christopher Leibman | David Yapell |
| Daniel Leonard | |

MPA-MAGLAB: National High Magnetic Field Laboratory

| | |
|-----------------|------------------------|
| Scott Betts | Gary Noe |
| Ashish Bhardwaj | Jonathan Noerper |
| Joanna Blawat | Josiah Srock |
| Thomas Kline | Oscar Ayala Valenzuela |
| James Michel | Daniel Wirth |

HeadsUP!

Timely chemical inventory honored

For their efforts in putting MPA-MAGLAB across the finish line first in completing the annual wall-to-wall chemical inventory, Hazuki Teshima (right) and Tim Noe (far right) were recognized with the inaugural MPA "Chemical inventory champion" trophy.

"Chemical inventory is really important and partially drives the Lab's investments in chemical management. So even though it takes a ton of time, I thank everyone for their hard work in finishing the 2024 inventory," said MPA Deputy Division Leader Jen Martinez. "I also appreciate that Ricardo (Martí-Arbona) is coming up with ways to incentivize the process."

The award is a traveling trophy. If you would like to see your group featured here next year, contact your group leader for help in planning and scheduling your wall-to-wall chemical inventory.



Inclusive-language guide helps build supportive culture

The Lab's Research Library has published a guide to share resources about why and how to use gender-neutral and gender-inclusive language in situations ranging from presentations to healthcare. Produced in collaboration with Prism, the Lab's LGBTQ+ employee resource group, the guide aims to increase awareness of language and underscore how using inclusive language respects and supports your colleagues.

"Demonstrating respect through inclusive language is one of the top things we can do to make our LGBTQ+

co-workers, especially transgender and nonbinary ones, feel like they belong," said Prism ERG Co-chair Sara Mason (Performance Assurance, IQPA-PA).

What's inside

The searchable guide includes videos, links to resources, and suggestions for extra reading on topics such as:

- Communicating in professional settings
- Using inclusive language as healthcare personnel
- Using pronouns correctly
- Identifying and combating gender bias. ■

Celebrating service

Congratulations to the following MPA Division employees who recently celebrated service anniversaries.

| | |
|--------------------------------|----------|
| Gregory Wagner, MPA-11 | 25 years |
| Linda Chavez, MPA-CINT | 20 years |
| Raymond Newell, MPA-Q | 20 years |
| Michael Rabin, MPA-Q | 20 years |
| Vivien Zapf, MPA-MAGLAB | 20 years |
| Aiping Chen, MPA-CINT | 10 years |
| Michael Malone, MPA-Q | 10 years |
| Jazlynn Gonzales, MPA-11 | 5 years |
| Leonard Gonzales, MPA-Q | 5 years |
| Katarzyna Krzyzanowska, MPA-Q | 5 years |
| Calvin Lear, MPA-CINT | 5 years |
| Michael Martin, MPA-Q | 5 years |
| Prashant Padmanabhan, MPA-CINT | 5 years |
| Michael Pettes, MPA-CINT | 5 years |
| Xiaojing Wang, MPA-11 | 5 years |
| John Watt, MPA-CINT | 5 years |

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To submit news items or for more information, contact ALDPS Communications at aldps-comm@lanl.gov.

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