

October 2023

GEORGIA PATHWAYS

M A G A Z I N E

Thinking AI First

By Rob Thomas / IBM

Neutrons - "inside"

Georgia State Robotics

The Technology Association of Georgia Education Collaborative (TAG-Ed) strengthens the future workforce by providing students with relevant, hands-on STEAM learning opportunities and connecting them to Technology Association of Georgia (TAG) resources. Formerly the TAG Foundation, TAG-Ed is a 501(C)(3) non-profit organization formed by TAG in 2000. Later, the organization's name was re-branded to TAG Education Collaborative to facilitate our role as the leaders for K-12 STEAM education in Georgia.

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Georgia Pathways Magazine services the STEAM education industry needs of the state of Georgia. This magazine is viewed by the consumer with the understanding that the information presented is from various sources from which there can be no warranty or responsibility by the Technology Association of Georgia, the Technology Association of Georgia Education Collaborative and/or their affiliates as to legality, completeness or accuracy.

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DEPT. OF COMPUTER SCIENCE

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VANESSA BRISEÑO

This month, we celebrate the thriving spirit of entrepreneurship that has firmly taken root in the heart of Georgia. As the home of culture-defining music, unicorn startups, and the establishment of gold-standard Fortune 1000 corporations, metro Atlanta has firmly secured its position as a global epicenter of creativity, talent and influence.



Our state has become a catalyst for innovation, and its dynamic technology ecosystem is ripe for new and established entrepreneurs alike. With a steadfast commitment to nurturing business ventures and cultivating a diverse and resourceful talent pool, Georgia stands as a beacon of opportunity. As such, Governor Kemp announced this month that Georgia is the top state for doing business, for the 10th year in a row.

In the tech realm, Georgia continues to assert its dominance. Georgia boasts over 17,500 technology companies, with industry giants like Apple, AT&T, Google, Honeywell, NCR and Microsoft leaving an indelible mark. The region's tech workforce surpasses 290,000 professionals, a testament to our educational institutions' unwavering commitment to developing tech talent. Atlanta, our capital city, has witnessed a 15% increase in tech jobs over the past five years, firmly establishing itself as a premier tech hub. This growth and innovation was recently showcased at InnovATL and Venture Atlanta - a series of events designed to showcase the rising stars in Georgia's tech ecosystem.

In an innovative move to bolster the state's workforce, the State of Georgia recently launched "GEORGIA MATCH," a program that streamlines higher education admissions by proactively informing high school graduates of their pre-emptive acceptance to institutions of higher-ed, thereby increasing

college enrollments, and fostering diversity. Informing students of their eligibility for admission without the necessity of navigating a protracted admissions process has the potential to enhance college enrollments and foster greater student diversity. This approach aims to simplify the application process by proactively reversing the typical application-admissions sequence, akin to receiving pre-approved mortgage offers.

Despite Georgia's proactive development of education initiatives aligned with employer needs, the talent gap endures, often due to students' limited awareness of the full scope of our ecosystem. TAG-Ed is committed to enlightening students about existing opportunities and challenges, empowering them with the skills essential to thrive in high-demand occupations. For more information, please visit the TAG-Ed website at [tagedonline.org](https://www.tagedonline.org)."

*Source of statistics for reference:

https://www.cyberstates.org/pdf/press_releases/CompTIA_StateOfTechWorkforce2023_Georgia_PR.pdf

Larry K. Williams

President

TAG / TAG-Ed

Larry K. Williams serves as the President and CEO of the TAG and the TAG Education Collaborative. TAG-Ed's mission is to strengthen Georgia's future workforce by providing students with relevant, hands-on STEM learning opportunities by connecting Technology Association of Georgia (TAG) resources with leading STEM education initiatives.

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1 Source: US Bureau of Labor Statistics

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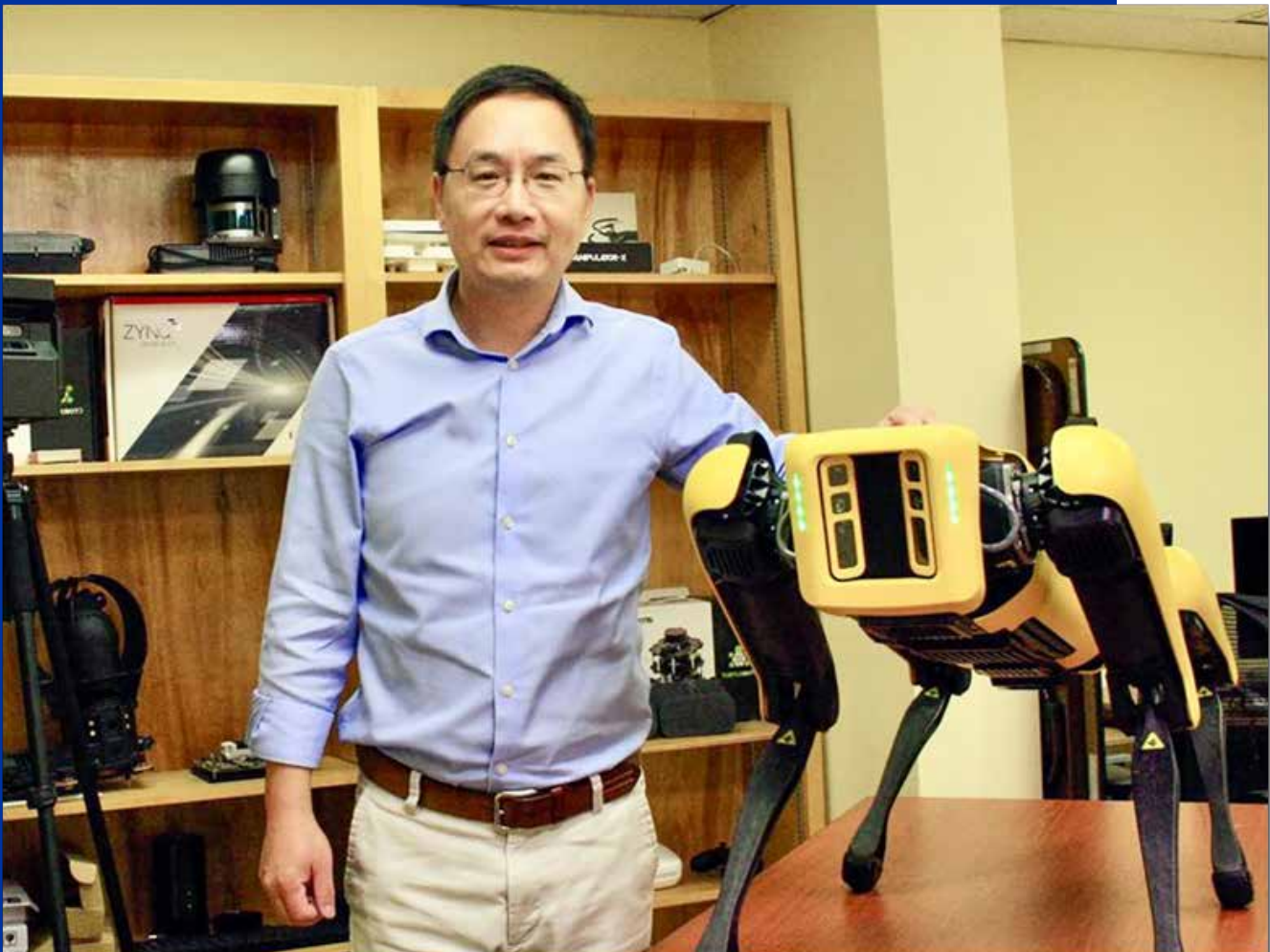
Georgia State Receives \$10M Grant

to Advance Research in Artificial Intelligence, Robotics and Edge Computing

Jonathan Shihao Ji, a computer science professor at Georgia State University, has received a \$10 million grant from the Department of Defense (DoD) to address critical problems in artificial intelligence (AI) and robotics with a focus on human-robot interaction, 3D

virtual environment reconstruction, edge computing and trustworthy AI.

In recent years, AI has become more and more prevalent in our world, powering search engines, voice assistants and self-driving cars.



But Ji thinks it can do more. “It has been claimed recently that AI is the new electricity,” Ji said. “It can empower and will transform almost every industry in the next several years.”

The research team at Georgia State includes co-principal investigators Professor Anu Bourgeois and Assistant Professor Yi Ding in the Department of Computer Science in the College of Arts & Sciences and Professor Balasubramaniam Ramesh, chair of the Department of Computer Information Systems in the J. Mack Robinson College of Business.

The grant will allow them to establish the Center of Excellence in Advanced Computing and Software (CoE-ACS) and foster collaborations with researchers from Duke’s Athena NSF AI Institute and partners from the U.S. Army Research Laboratory to work with students and professors at GSU.

“AI research is a rapidly-developing field, but the advancements we are seeing are typically years in the making,” said Sara Rosen, dean of the College of Arts & Sciences. “The award of the CoE-ACS represents the culmination of years of boundary-pushing research, which has spanned Dr. Ji’s time at Georgia State and in industry. I am excited to see this research taken to the next level, and am thrilled that Georgia

State is a player in advancing the frontiers of AI and robotics.”

One major area of research for the center will involve Boston Dynamics’ Spot — a four-legged, dog-like robot — which was acquired by Ji with another DoD grant last year. Using Spot, Ji hopes he and his fellow researchers will be able to advance AI technology by developing a natural language interface for the robot, which could increase the number of useful tasks that it can perform.

“We’ll be able to tell Spot, ‘Please go to the kitchen and see if the fridge door is closed properly. If not, please close it,’ and Spot should be able to understand it and go do that on its own,” he said. Ji also hopes to teach Spot how to navigate a variety of environments on its own.



“We can build a 3D virtual environment and train Spot in that environment then transfer the knowledge learnt from the simulator into the real world,” Ji said. That could be helpful in situations such as search and rescue, facility maintenance and emergency response that may be dangerous for humans.

Research will also focus on developing machine learning algorithms to increase the ease of human-computer interaction. To do this, researchers at the center will try to teach AI to understand humans in new ways, for example by human voices or through virtual reality goggles. In the next research phase, the center will explore visual demonstrations. “If you want to teach the robot how to pick up a water bottle, you can show the robot how to do it naturally by demonstration,” Ji said.

The center will also focus on increasing the security of AI devices and systems. In many cases, data that could be housed and processed on a device is instead uploaded to remote servers collectively referred to as the cloud, creating a risk that private information could be leaked, Ji said.

Edge computing could be a solution. This technology involves storing and processing data locally, rather than in the cloud. In some cases, such as with drones, this can be difficult because the devices can’t carry much weight, limiting the amount of processing power they can house. One of the projects will focus on creating smaller and more power-efficient models to process the data on devices to decrease the chances of data leaks from them. Duke’s Athena, a research institute dedicated to edge computing, will help the GSU



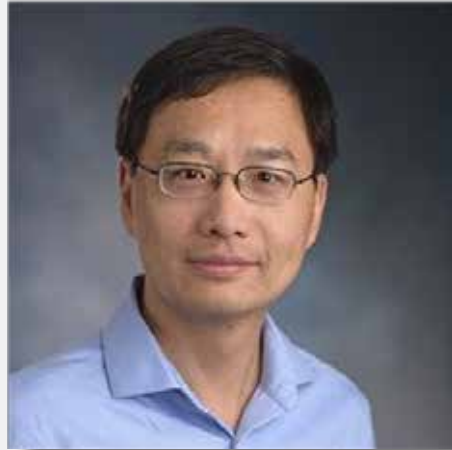
center to address the privacy and security challenges in the context of AI and robotics.

The grant will enable Ji and his fellow researchers at Georgia State to fund 12 Ph.D. students, 100 undergraduate students and multiple post-doctoral researchers at the university over the initial five years. The team also plans to partner with local high schools, hoping to spark interest in AI and robotics in younger generations.

“This very significant grant presents an incredible opportunity to establish a national presence for the university in cutting-edge research areas such as Human-AI Collaboration and the development of Responsible AI systems that are also well aligned with the strategic priorities of the university,” Ramesh said. “We are also excited by the opportunity provided by the grant to prepare a diverse group of students to pursue research and careers in artificial intelligence.”

Professor Yiran Chen, director of Athena NSF AI Institute and the Duke PI of the project, noted the longstanding collaboration between his team and colleagues at Georgia State.

“We eagerly anticipate a more productive partnership within this new center of excellence,” Chen said.



Jonathan Shihao Ji
Associate Professor / Computer
Science, Neuroscience

Ji's principal research interests lie in the area of machine learning and deep learning with an emphasis on high-performance computing. He is interested in developing efficient algorithms that can learn from a variety of data sources such as image, audio and text on a large scale and automate decision-making processes in dynamic environments.



Neutrons look inside working solid-state battery to discover its key to success

By Dawn Levy / ORNL

Researchers at the Department of Energy's Oak Ridge National Laboratory were the first to use neutron reflectometry to peer inside a working solid-state battery and monitor its electrochemistry. They discovered that its excellent performance results from an extremely thin layer, across which charged lithium atoms quickly flow as they move from anode to cathode and blend into a solid electrolyte.

"We want better batteries," said ORNL's Andrew Westover, who co-led a study published in ACS Energy Letters with James Browning at the lab's Spallation Neutron Source. "That means more energy density, lower cost, faster and safer battery charging and longer life."

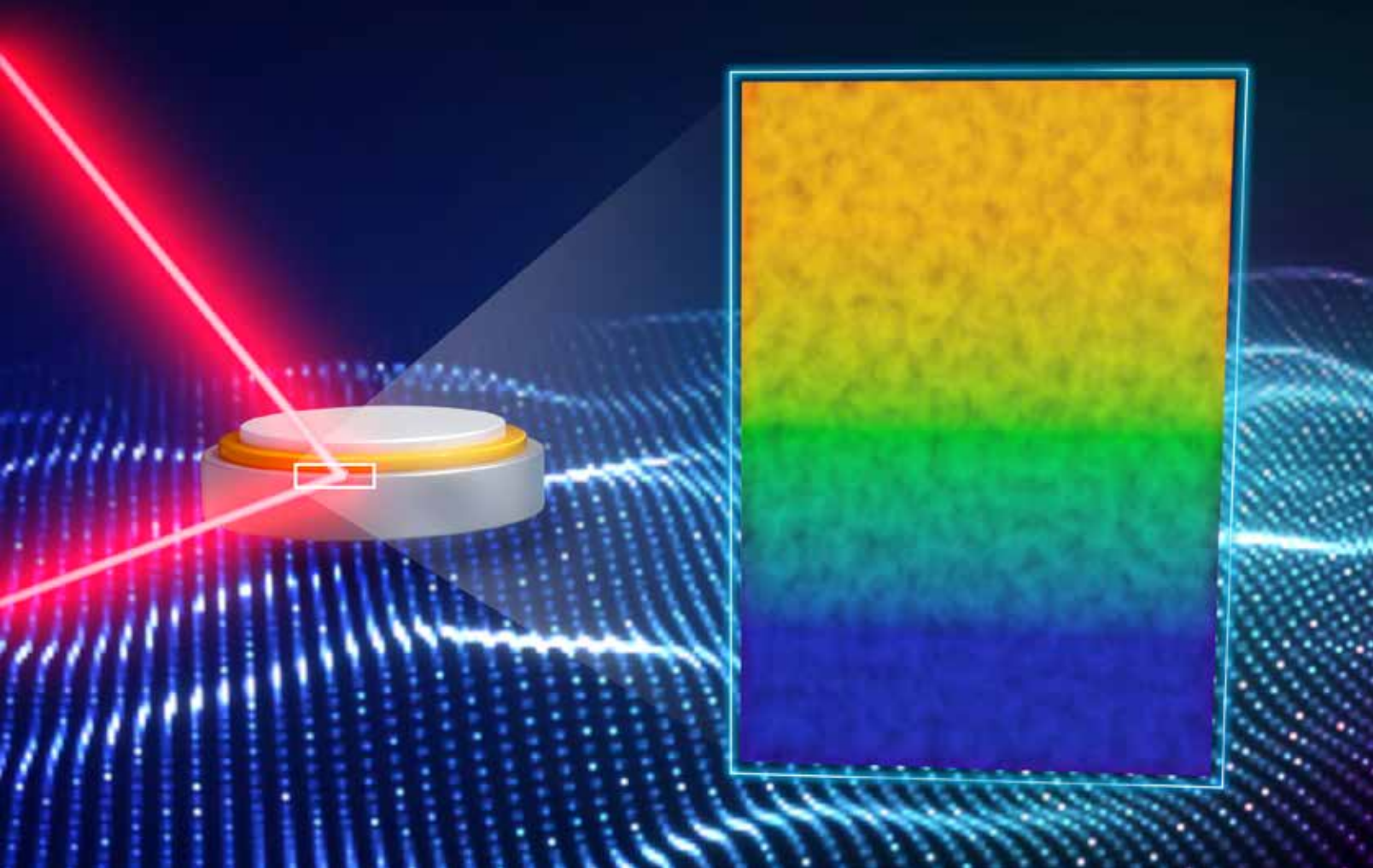
Rechargeable batteries rely on lithium, a small metal atom that packs tightly into the negatively charged anode to maximize energy density. However, lithium is unstable with most electro-

lytes — a factor in flammability of smartphone, laptop and electric vehicle batteries that use liquid electrolytes.

"To fix the flammability issue, we want to switch to solid electrolytes," Westover said.

Enter lithium phosphorus oxynitride, or LiPON, a solid electrolyte invented at ORNL nearly 30 years ago. "It's never been understood why it works really well," Westover said. "We want to make what works with LiPON work on a much larger scale. But we have to understand it first."

Prior work showed the solid electrolyte interphase, or SEI — a layer that forms to protect and stabilize the solid-state battery — is key to its ability to charge and discharge repeatedly. In this case, the interphase is a chemical gradient consisting of a lithium-rich layer whose



lithium content decreases as it blends into pure LiPON.

“In a normal battery, an interphase forms between the electrolyte and the working electrode,” Browning said. “Over time as you cycle a battery — charge and discharge it — that material can change in composition and thickness.”

“If you have a good SEI, your battery works. If you have a bad SEI, it doesn’t,” Westover said. “The reason that the capacity of your cell phone battery slowly decreases year after year is because your SEI is expanding and consuming your electrolyte in the liquid-based battery.”

In a LiPON-based solid-state battery, however, a thin SEI layer forms to passivate lithium, making it unreactive, and does not grow like the SEI in a traditional battery.

Scientists coupled neutron reflectometry with electrochemistry to measure this stable interphase between LiPON and lithium for the first time. It was as thin as 7 nanometers. “We discovered with this study that the layer formed is about 70 atoms thick,” Westover said. “This work shows it is possible to make interfaces in solid-state batteries that are thin and provide excellent performance.”

That small scale plus the solid state of

the materials drove the researchers to use neutrons to look inside the battery.

“Prior to the discovery of X-rays, you couldn’t look under skin to see bones inside a body. You had to cut the skin open,” Westover said. “Until now, that’s basically been the approach that most people have used to look at interphases in batteries. In this case the scale is too small to cut anything open. We needed a tool that would allow us to go through the material, to probe it nondestructively at that scale and understand what’s happening at the interphase. That’s where neutron reflectometry came in.”

Browning added, “We’re interested in how a battery is performing, so we need a way of looking inside while it’s doing its thing, operating on a length scale that’s important to the functioning of the device, to explore stability, long-term cyclability, etc. Because neutrons are weakly interacting, we can get them to the point we want to probe without any interference and then, more importantly, get them back out so we can determine what happened at the place of interest — the interphase in this case.”

Coupling neutron reflectometry with electrochemistry accelerated understanding of the interphase between lithium metal and solid electrolytes in solid-state batteries.

“This combination of techniques opens the door for us to look at the entire spectrum of solid-state electrolyte materials and determine which ones will enable your fast-charging, high-energy batteries,” Westover said. “We’ve already started version 2.0, where we’re looking at a different type of solid electrolytes and starting to understand what they look like.”

He added, “New materials need to be invented that have this stability.” Design of future high-performance batteries will depend on it.

The title of the paper is “In Situ Measurement of Buried Electrolyte–Electrode Interfaces for Solid State Batteries with Nanometer Level Precision.”

The work was funded by DOE’s Office of Energy Efficiency and Renewable Energy for the Vehicle Technologies Office. This research used resources at SNS, a DOE Office of Science user facility operated by ORNL.

UT-Battelle manages ORNL for DOE’s Office of Science, the single largest supporter of basic research in the physical sciences in the United States. The Office of Science is working to address some of the most pressing challenges of our time. For more information, please visit energy.gov/science.



ORNL has developed the SolidPAC tool to help researchers design energy-dense, long-lived and safe solid-state batteries. Credit: Andy Sproles/ORNL, U.S. Dept. of Energy



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The Georgia AI Manufacturing (GA-AIM) coalition, led by the Georgia Tech Research Corporation, will receive approximately \$65 million to accelerate the adoption of artificial intelligence across the state's legacy industrial sectors. The coalition recognizes artificial intelligence (AI) will soon be a ubiquitous feature of any successful manufacturer.

The GA-AIM coalition will establish the United States as a leader in AI manufacturing while ensuring these systems complement rather than replace existing workers. Coalition members across the state – such as the Technical College System of Georgia, Spelman College, and the Georgia Minority Business Development Agency – will execute projects to expand awareness, training, and job opportunities to underserved communities and businesses.

Fall 2023 TAG-Ed events:

You will want to take note of and browse the challenging and informative events planned for this fall.

Artificial Intelligence for Business Professionals – November 8, 8:00-10:00 AM

[Learn More](#)

Data Science for Business Professionals – December 6, 8:00-10:00 AM

[Learn More](#)



Why Every Business Leader Should Be Thinking AI-First

By Rob Thomas

Senior Vice President, Software and Chief Commercial Officer

IBM



As I shared when I was with many of you at the Georgia Technology Summit back in May, AI is the opportunity of a lifetime. Technology has become more accessible today than ever before. And each of you in your roles has a chance to bring AI into your business in a way that has never been done before.

In fact, since 2017, the number of companies leveraging AI has doubled. Foundation models are the reason. These are reusable AI models that require minimal training have become more open, accessible and prevalent.

Now, business leaders like yourselves are plotting a course for how to use AI to radically change how businesses operate — and quickly.

From +AI to AI+

Businesses are transitioning from +AI to AI-first. In our +AI past, we concentrated on running our core business, while thinking about how automation and analytics could improve an existing process. We saved a few minutes and a few dollars. But now being AI-first, we have the opportunity to fundamentally reimagine how work gets done. This will mean the difference in leading our industries or getting left behind.

Being AI-first starts with secure and easily accessible data — your AI is only as good as your data. Then, a hybrid cloud strategy that makes that data usable. The result is faster and more informed decision-making. The bonus is the reduction of overall costs.

This way you are ready for hybrid cloud, big data and AI — and whatever comes next. That is why IBM introduced our new AI and data platform, watsonx, to help enterprises implement and scale AI.

Leading use cases

Since the conversations are happening in every boardroom, you are likely wondering where you should start. There are three use cases that are, not only relevant to every business in the world, but where the return on investment is clear. These use cases move you beyond experimentation into real outcomes.

First, talent, and even more broadly, automating any repetitive tasks. HR has been an early adopter, finding 40% productivity gains. Those same generative AI tasks, like classification and content generation, also benefit finance, procurement and supply chain. Second, customer service. When you bring large language models and generative AI tasks like augmented generation, summarization and classification, accuracy skyrockets – allowing 70% of cases to resolve with zero human interaction. Third, application modernization, where developers are experiencing 30% productivity gains, specifically around code, because they accept up to 85% of the generated code.

Model choice matters

Over a five-year period, the only source of competitive advantage in generative AI is likely proprietary data. With that being the case, having model choice is really important. Different models will be better at some tasks than they are at other tasks. That is where a builder's studio, like watsonx.ai, comes in. A place where you can train, tune, validate and deploy AI models.

The beauty of foundation models is, once they are set up with your proprietary data, they can be trained to work on multiple workflows across your business. With a pre-trained foundation model – your own, from IBM or open source like Hugging Face - labeled data requirements are dramatically reduced. And with the right governance like watsonx.governance, you can be assured that those workflows are compliant with ever-changing government regulations and free of bias.

We're on the cusp of an opportunity of a lifetime. The exciting results we're seeing from enterprise AI today are only the beginning. Generative AI is ready to train, tune, validate and deploy models on any cloud to solve our toughest business challenges. As leaders begin to integrate foundation models into your businesses, start thinking about the use cases, the speed to value and how to ensure the outputs are trustworthy and empowering for your teams.



Changing The Conversation:

The importance and practice of inclusive science communication

By Elaine Shen

Interested in moving the needle on science communication and public engagement? The University of Rhode Island Metcalf Institute¹ is convening the fourth biennial InclusiveSciComm-Symposium later this fall, and you're invited!

Launched in 2018, the Inclusive-SciComm symposium brings together science communicators and researchers from all over the world to exchange ideas and practical solutions for advancing inclusive science communication (ISC) in their various organizations and fields. Symposium sessions have included a wide range of topics, from practical tools for communicating across multiple languages and abilities to lessons learned from community science initiatives. As a previous participant expressed: *"I genuinely believe*

we will see lasting impact from this symposium, which so beautifully co-created knowledge and facilitated capacity-building for our community and beyond."

The symposium was created to support a larger movement towards incorporating principles of inclusivity, intersectionality, equity, and justice into science communication. While science communication broadly includes the formal and informal exchange of scientific information, ISC emphasizes how scientific practices and related public conversations are inherently context-laden.

Therefore, ISC embraces different forms of knowledge, expertise, and engagement with STEM fields. Shifts towards ISC efforts are happening at



Photo: Ti'Era Worsley / Univ. of North Carolina

multiple scales and sectors, from improving individuals' senses of belonging in STEM classrooms to encouraging institutional paradigm shifts that address systemic challenges.²

Why is inclusive science communication important?

As interest in science communication grows, science educators are increasingly incorporating effective communication strategies as part of their curricula. After all, the work of communicating science is an important facet of generating scientific knowledge and can serve many goals, such as building curiosity about scientific topics, changing public behavior, or ad-

vocating for particular policies. Science communication is everywhere, taking place in a wide range of settings such as social media, news media, after-school programs, museums, classrooms, and community meetings.

It is no surprise, then, that how public audiences perceive and engage with scientific processes and research can have major impacts on how they judge STEM-relevant policies at local to national levels and influence overall trust in STEM research. In addition, impactful science communication can galvanize individuals and communities to take action on behalf of pressing issues facing society, as well as inspire the next generation of STEM leaders.

Effective science communication, like other forms of communication or reporting, requires an understanding of one's audience. Conventionally, science communication has mainly benefitted a particular audience - one that is predominantly White, middle class, college-educated, and non-disabled.

This limited conception of who might be interested in STEM continues to exclude many marginalized groups from the conversation, and may deepen existing inequities of representation and access to the sciences. An ISC approach is thus critical for ensuring that such inequities in science communication and the practice of science itself are not perpetuated.

How can you be inclusive in science communication?

- In practicing ISC, it is important to reject assumptions that potential audiences are less interested in or capable of understanding STEM topics. Instead, some strategies to make science communication inclusive include:

- Engaging with diverse ways of knowing and learning
- Understanding the historical, cultural, and political contexts of oneself, one's organization, and those one wishes to communicate with

- Being intentional about one's language use and choices
- Recognizing power dynamics within a communication practice
- Viewing inclusive science communication as a marathon and not a sprint or singular exchange

These strategies are offered as part of a starter kit available online³ developed by Metcalf Institute, a global leader in inclusive science communication.

The Metcalf Institute advances informed discussions of environmental issues and equitable environmental communication. They achieve this by running programs with journalists, scientists, and other science communicators to discuss how to translate environmental issues for new audiences using effective and inclusive language. The InclusiveSciComm Symposium is its largest programming initiative to date: over 600 people from 37 nations registered for the 2021 virtual symposium, a 300% increase over the previous symposium, highlighting the growing momentum of the global ISC movement.

A community of practice in inclusive science communication

Attending the InclusiveSciComm Symposium is another great step for de-

veloping more inclusive practices in science communication. Importantly, the symposium provides a space for creating community among emerging and experienced ISC practitioners and researchers.

The principles of ISC extend to the values of the symposium: centering the voices of marginalized groups, nurturing an environment where diversity is celebrated, and ensuring that symposium sessions are accessible across abilities, languages, and geographies. One participant noted:

“I also loved the openness of the community that was created here as well as the diversity represented. At every conference I am always conscious of who else looks like me there and which dif-

ferent perspectives and people are being represented and recognized. This space felt safe where I could participate and express my thoughts and ideas and felt that people were genuinely interested in listening to me as well as open to sharing their ideas with me.”

Supporting inclusive science communication

Contributing to the Inclusive SciComm Symposium is not just limited to ISC practitioners, researchers, and those curious about implementing ISC in their work, but many generous donors have also helped keep the movement going. Sponsors have included the Science Sandbox Initiative of the Simons Foundation, Rita Allen Foundation,





Chan Zuckerberg Foundation, Kavli Foundation, Burroughs Wellcome Fund, Monterey Bay Aquarium Research Institute, American Association for the Advancement of Science, Union of Concerned Scientists, and more.

www.inclusivesciomm.org

Science communication, like science itself, goes through phases of theoretical development and practice. As we move toward a better understanding of how to address some of society's most pressing issues--many of which relate to STEM--it is crucial to do so in ways that do not perpetuate existing harms or ignore marginalized voices.

References:

¹ [Metcalf Institute](#)

² [Science Communication Demands A Critical Approach that Centers Inclusion, Equity, and Intersectionality](#)

³ [Inclusive Science Communication Starter Kit](#)

Centering inclusivity, equity, and justice in science communication may be the key to shifting not only how we talk about environmental, public health, and technological issues like artificial intelligence, but how we do scientific research, policy, and advocacy for a future that includes everyone. The InclusiveSciComm Symposium is just the beginning - and we hope you'll join us.

About the author -

Dr. Elaine Shen is an interdisciplinary marine community ecologist who recently got her PhD from the University of Rhode Island. She is a freelance science writer and has been involved with the Metcalf Institute and Inclusive SciComm Symposium since 2018.





A **Critical** Shortage Of Medical Laboratory Professionals On The Horizon

By Judy Stone / Infectious Disease specialist and author

Behind the scenes at every hospital are indispensable medical laboratory professionals. They performed an estimated 13 billion laboratory tests in the United States each year before Covid. Since the pandemic began, they have also conducted almost 997 million diagnostic tests for Covid-19. The accuracy and timeliness of lab tests are critically important, as they shape approximately two-thirds of all medical decisions made by physicians.

As Dr. Rodney Rohde, professor of clinical laboratory science at Texas State University, said, “Lab testing is the single highest-volume medical activity affecting Americans...Simply put, every time you enter a hospital or health care facility for care, your life is in the hands of a medical laboratory professional.”

There is a critical shortage of medical laboratory professionals in the US and in Canada. Here, we are 20-25,000 short on staff, with only 337,800 practicing. That is roughly one medical laboratory scientist per 1,000 people.

Why is this? A survey of laboratory professionals by the American Society for Clinical Pathology showed that 85.3% reported burnout. An additional 36.5% complained of inadequate staffing and almost as many of a too heavy workload. Lack of recognition was cited by 14.9%. There are vacancy rates of 7%-11% in almost every area, up to 25% in some spots.

To become a technician requires only a 2-year associate's medical laboratory technician degree. A laboratory science degree requires an average of five years of schooling. After you gain your degree, you need to be certified by the American Society for Clinical Pathology (ASCP).

One of the problems is that while there is a great need for more lab personnel, the number of training programs is declining. There are only ~240 medical laboratory technician and scientist training programs in the US, a 7% drop from 2000.



Some states have no training programs. One of the other problems in the US is that licensing requirements are different from state to state. Christine Nielsen, CEO of the Canadian Society for Medical Laboratory Science, explained that Canada requires clinical placement before licensure, but this is not a requirement in most of the US, except for CA, NY, FL, and AZ.

Nielsen said the cost of training for an MLS is ~\$100,000. In Canada, unlike in the US, this education is heavily subsidized by the government. They don't have the recruitment problem the US has, where many don't feel the salary is worth the high investment. Medical lab professionals are paid 40%-60% less than nurses, physical therapists, or

pharmacists. In Canada, the bottleneck isn't the disparity between debt and potential income; it is the lack of spaces to do internships.

The Bureau of Labor and Statistics "projects a nationwide need for a 13% average increase in medical laboratory technologists and technicians between 2016 and 2026, nearly double the underlying average increase in all occupations of 7%." Staff retention is a huge problem, particularly in the US, because of the stress and burnout issues. Nielsen noted in Canada, "70% of our people work in public hospitals, and those are all union. That's state funding." So one of the advantages for the lab personnel is that "you would know your schedule here, months out in

some cases...and if you're the senior, you have the first choice of shifts." That makes work-life balance more manageable, especially for parents juggling childcare responsibilities.

"Retention of workers is going to need to be a major area of focus for all employers because there are no new grads coming," Nielsen said. "That's gonna be the game because even if we all agree today that we will increase enrollments in school, the production's not coming off the line for two to four years."

Rohde notes that "the American Society for Clinical Laboratory Science is calling for the expansion of the Title VII health professions program – which provides education and training opportunities in high-demand disciplines – to include medical (clinical) laboratory science." He also suggests outreach to middle and high school STEM programs, to familiarize students early with career opportunities in the medical laboratory profession.

One interim solution might also be to focus more on bringing in foreign practitioners and, through bridging programs, bring them up to equivalency in our local practices and laws and perhaps upgrade their training, if necessary. Asked about solutions, Nielsen turned her focus back to a favorite topic, the "Choose Wisely" campaign.

She said, "I believe that some focus is going to need to happen at the institutional level on how we how we order lab tests, and is it truly an unlimited shopping list or an all you can eat buffet?"

Or do we now need to have some guidance around appropriateness, because there's no way the lab can continue in this marathon with 25% of the staff missing."



As mentioned in an earlier post about blood drawing tube shortages, an educational campaign, “Using Labs Wisely,” part of a broader “Choosing Wisely” effort, is prominent in Canada. Their suggestions include:

- Don’t do annual screening blood tests unless directly indicated by the risk profile

If you do enough tests, something will come back abnormal and lead to needless further investigation. “Abnormal” results are found in at least 5% of people—though it may be their norm.

- Don’t routinely measure vitamin D in low-risk adults. Instead, just give Vitamin D supplements. Consider if and how a test result will change patient management, which is often overlooked in routine screening labs.

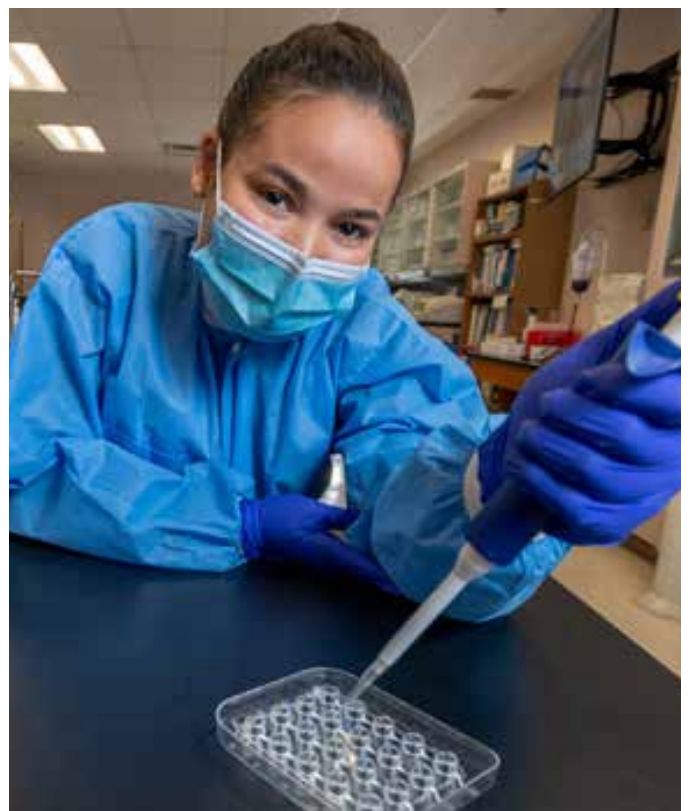
For inpatients, Using Labs Wisely has two particularly useful suggestions:

- “In the inpatient setting, don’t order repeated CBC and chemistry testing in the face of clinical stability. That just one blood draw per day for ‘routine’ daily lab testing can add up to removing the equivalent of 1/2 a unit of blood per week? The result is 20-30 blood tubes wasted, and iatrogenic anemia has a negative effect on patient outcomes.”

- Don’t order baseline laboratory studies (complete blood count, coagulation testing, or serum biochemistry) for asymptomatic patients undergoing low-risk non-cardiac surgery.

Shortages in Canada are severe enough that there has been talk of needing to limit outpatient testing.

Before we get to such a crisis level, we would be wise to adopt such an education campaign among both health care workers and patients, where all seem to want everything done yesterday. We would also do well to standardize certification across state lines, so there is more mobility of staff and flexibility in responding to needs. Primarily, we need to reduce the stress and workload of the lab professionals before we reach a greater crisis.







The Lemelson Foundation Commemorates Founder's 100th Birthday with the Launch of a \$50 Million Climate Initiative

"This new global effort will focus funds on innovation, justice, and learning"

By Vanessa Briseño

The Lemelson Foundation recently announced a targeted Climate Initiative that will invest \$50 million to support climate action. This announcement deepens the Foundation's commitment to the most urgent issue of our time. It comes on the 100th birthday of Jerome "Jerry" Lemelson, the late independent inventor who founded the Foundation in 1992 with his wife Dorothy.

"As one of the most prolific inventors of our time, my father was keen to identify new and innovative solutions to real-world problems," said Rob Lemelson, the Foundation's President.

"Climate change is the greatest challenge of our time, already devastating communities across the globe. We must innovate and imagine novel approaches to solving the problem;

certainly that's the lens my father and mother would have had on the climate crisis, and we are confident the Foundation's efforts can make an impact."

Since 1994, The Lemelson Foundation has helped to improve lives through invention, cultivating the next generation of inventors to create a better world. The Foundation has supported a number of climate-related projects in the United States and the developing world in recent years and across a variety of sectors, including health and agriculture. This announcement signals an increased commitment, including a \$50 million targeted investment over the next seven years, to support innovative approaches to decarbonize the global economy and remove greenhouse gases from the atmosphere.

“It’s past time for decisive global action to respond to the climate emergency we have created—we must act now because existing mitigation efforts simply aren’t enough,” states Eric Lemelson, the Foundation’s Vice President. “I have no doubt that my father, were he alive today, would be inventing in the areas of renewable energy, adaptation technologies, carbon dioxide removal, and the decarbonization of emissions-intensive industries such as steel and concrete. Jerry understood the importance of environmental protection. The Foundation’s investment in climate action is a natural evolution of our strategy.”

The Lemelson Foundation recently welcomed Joel Clement as Senior Program Officer to lead the Climate Initiative. Clement is an award-winning policy expert, scientist, and former federal executive with 20 years of experience in climate and energy policy, resilience and climate adaptation, and philanthropy. In addition to his full-time role at The Lemelson Foundation, Clement is a Senior Fellow at the Harvard Belfer Center and is an Associate at the Stockholm Environment Institute. “The Lemelson Foundation’s staff, Board of Directors, and Advisory Committee have decades of experience building entrepreneurial ecosystems, improving access to catalytic capital and training the next generation of world-changers,



Joel Clement

Senior Program Officer to lead the Climate Initiative.

making us a unique and dynamic innovation partner to help propel solutions for the climate crisis,” said Clement.

“We’re not the biggest funders in this space, but we have an inventive team that will prioritize the support of front-line communities, foster innovation at scale, and bring together key partners to help make change.”

“At the Foundation’s core, we believe everyone has the ability to invent, innovate, and make change—that’s why we’ve been fostering the spirit of invention for almost 30 years,” shares the Foundation’s Executive Director, Rob Schneider. “Individuals, schools, businesses, governments and philanthropies all have a role to play in ensuring



that we get to net zero emissions of greenhouse gases, and we welcome the opportunity to learn, grow and build a better future with both our existing and new partners in this space.”

For more information about the Climate Initiative, please visit our website www.lemelson.org.

About The Lemelson Foundation. The Lemelson Foundation uses the power of invention to improve lives. Established by prolific U.S. inventor Jerome “Jerry” Lemelson and his wife Dorothy in the early 1990s, and guided today by the Lemelson family, the Foundation believes invention can solve many of the biggest economic, social, and environmental challenges of our time.

A private philanthropy located in Portland, Oregon and operating globally, The Lemelson Foundation has provided over \$300 million in grants and other investments to hundreds of organizations around the world. For more information, visit- <http://www.lemelson.org>

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