Summer 2025

VJAS VOICE

Technology

VJAS VOICE

Summer 2025 Edition

Highlights

WELCOME TO THE VOICE

By Sriyutha Morishetty, Editor-in-Chief

Hello Voice Readers!

Teachers, sponsors, students, researchers, or whoever you may be, thank you for taking the time to read the July Issue of the VJAS Voice. VJAS has been busy! Over the next few pages, you'll be reading articles written by students from all across Virginia, as well as gaining some valuable insights and reminders about VJAS. This Issue will be a fitting end to the 2024-2025 school year, as VJAS transitions into the 2025-2026 season.

Keeping in track with last year, each edition will have its own miniature theme based on a popular STEM topic students enjoy researching. We hope this interests students who may be searching for inspiration, hesitant about starting a project in a new category, or just excited to learn more about their favorite scientific topic. We appreciate reader feedback, so if you have suggestions for any VJAS categories you would like to see in the Voice or if you are interested in writing an article for the Voice, be sure to reach out!

This issue's theme will be **Technology!**

A RECAP of the Symposium

By Shriya Bandla

The 2025 Virginia Junior Academy of Science (VJAS) Symposium brought together student researchers from across the Commonwealth in a vibrant celebration of scientific curiosity, scholarship, and innovation. Held in a hybrid format, this year's event provided participants with the flexibility to present their work either virtually or in person at Ferrum College, the host site for the in-person experience. The format allowed for both accessibility and engagement, making it possible for students of varying circumstances to take part in a shared academic endeavor.

With over 250 student participants representing both middle and high school divisions, the symposium showcased a compelling breadth of research topics from artificial intelligence and climate change to oncology, neuroscience, plant biology, and environmental engineering. Each project reflected months of dedicated effort, as students carefully designed experiments, analyzed data, and developed comprehensive research papers that adhered to professional scientific standards. The quality and range of work underscored the impressive depth of knowledge and skill among Virginia's rising young scientists.

For those attending in person, Ferrum College provided an immersive academic environment. Students had the opportunity to present their research to expert judges, engage in peer-to-peer discussions, and tour campus laboratories. The experience offered a meaningful preview of collegiate-level research and scholarship, giving students firsthand exposure to what the pursuit of science beyond high school entails from scholarly communication and public speaking to interdisciplinary collaboration and mentorship.

Though many participants entered the day with understandable nerves, the symposium quickly took on a collegial and collaborative tone. Students were eager to ask questions, exchange feedback, and support one another's work. Conversations continued beyond the formal presentation sessions, with students discussing everything from experimental design challenges to future aspirations in STEM. Whether investigating the effects of microplastics, developing predictive machine learning models, or examining agricultural sustainability, participants were united by a shared drive to explore and understand the world through science.

A highlight of the symposium included the George W. Jeffers Memorial Lecture, which offered insight into long-term water quality monitoring at Smith Mountain Lake, a project led by Ferrum College's Water Quality Monitoring Program. The presentation illustrated how science can contribute to addressing urgent environmental concerns and improving public well-being.

As the symposium concluded, attention turned to the upcoming VJAS awards ceremony, scheduled for June 16, where the most outstanding projects will be formally recognized. However, regardless of award outcomes, the event itself stood as a powerful affirmation of the potential, dedication, and vision of Virginia's next generation of scientific leaders. Through their participation, students demonstrated not only academic excellence but also a readiness to contribute meaningfully to the broader scientific community.

Celebrating Young Scientists: Highlights from the 2025 VJAS Awards Ceremony

By Sriyutha Morishetty

On June 16, 2025, students, educators, and families came together to honor a year of ambitious and inspiring research at the Virginia Junior Academy of Science (VJAS) Awards Ceremony. The event recognized the hard work of hundreds of young scientists, whose projects spanned a wide array of scientific disciplines. **While the following is just a small sampling, a full list of award recipients is available on the VJAS website.**

Category Awards: Excellence Across Disciplines

Middle and high school students were recognized in dozens of sections, including Chemical Sciences, Engineering, Human Behavior, Plant Science, and many more. Several schools stood out for their strong showings across multiple categories, reflecting the depth and breadth of student engagement statewide.

High school divisions were especially competitive, with Governor's Schools and STEM-focused institutions represented among the top winners. These awards highlighted projects that demonstrated originality, rigor, and relevance to current scientific challenges.

Special Awards: Advancing Knowledge in Key Fields

VJAS also recognized the most outstanding contributions within specific disciplines. Students received top honors in areas ranging from botany and chemistry to mathematics, psychology, and statistics. These awards underscored the diversity of student inquiry and the importance of encouraging expertise across the full spectrum of scientific fields.

Scholarships: Investing in the Future of Science

Select students received scholarships in recognition of both academic excellence and the potential for long-term impact. These included awards supporting environmental research, community health, and leadership in science. With thousands of dollars awarded, these scholarships signal continued investment in the next generation of researchers and innovators.

Special Interest Awards

Several projects were honored by external organizations such as national scientific societies, environmental foundations, and research institutions. These awards celebrated real-world impact—recognizing research in areas like disease prevention, marine ecosystems, cancer treatment, and public health.

National Recognition: AJAS Delegates

A small number of top students were selected to represent Virginia at the American Junior Academy of Science (AJAS), set to take place in Phoenix, Arizona in February 2026. These delegates also received support through endowment awards that enable their participation and elevate their work on a national platform.

Honoring Educators and Mentors

VJAS also celebrated the crucial role educators play in guiding students through the research process. Awards were presented to teachers and mentors who demonstrated exceptional service, commitment to student development, and leadership in scientific education. Their behind-the-scenes work continues to be instrumental in shaping Virginia's vibrant student research community.

Looking Ahead

With over 500 students participating and tens of thousands of dollars in awards and scholarships distributed, the 2025 Symposium once again reaffirmed VJAS's role as a leader in youth scientific development. The organization now looks ahead to the 2026 Symposium, scheduled for May 30, where another generation of curious minds will be welcomed into the Commonwealth's tradition of scientific inquiry. Until then, congratulations to all who participated in making this year's event a celebration of science, discovery, and possibility.

Introducing New Student Leadership

Recognizing Talent: Symposium Winners

Co-President: Madeline Levorson
Thomas Jefferson High School for Science & Technology

Co-President: Kriesh Tivare
Langley High School

Vice President: Shriya Bandla
Mills E. Godwin High School

Co-Secretary: Madilyn Marsden
Blacksburg High School

Co-Secretary: Essam Shah
John Randolph Tucker High School

Co-Communication Liaison: Danyal Mian
Thomas Edison High School

Co-Communication Liaison: Priya Kumar
Maggie L. Walker Governor's School

Co-Editor-in-Chief: Anna Foster
Clover Hill High School

Co-Editor-in-Chief: Sajeela Ahmad
Osbourn Park High School

As we welcome the new student leadership, we're also saying goodbye to our 2024-2025 Student Leadership. To recognize their dedication and hard work over the past year, here's something special about each of them:

Rania Lateef, President: Rania was always on top of things, whether that would be sending on-time emails or leading meetings. Her easy-to-approach personality makes her a great leader and an awesome friend, and we were lucky to have her as our President.

Kriesh Tivare, Vice President: Although Kriesh is staying on the student leadership team as President, his dedication to the role of Vice President deserves to be recognized nonetheless. Kriesh is creative, fun, smart, and hardworking, and he always made sure to get the job done. One more year of Kriesh!

Amina Khan, Co-Communications Liaison: Amina is dependable, kind, and intelligent. She always volunteers to write articles for the Voice on top of her normal duties with as a Co-Communications Liaison. She's a team player, and a one-of-a-kind person.

Madeline Levorson, Co-Communications Liaison: Like for Kriesh, this isn't goodbye to Madeline just yet—she'll be serving as a Co-President of the 2025-2026 student committee. One of my favorite articles that I read this year was written by Madeline. It was about multi-drug resistant bacteria being a threat in the modern world, and I admired her ability to communicate a complicated topic in an easily accessible manner.

Sage Lahmers, Co-Secretary: Sage is thorough, kind, and hardworking. The job of a Secretary isn't the most glamorous one, yet she handled it with grace and dedication. She's easy to communicate with, and someone that any organization would be lucky to have. She's the best!

Shriya Bandla, Co-Secretary: Shriya was the youngest person on the team this year, but that didn't stop her from going above and beyond to contribute to VJAS in any way she could. She always stepped in when I needed help, and is a great person, friend, and colleague. Next year, she'll serve as Vice President!

Without the student leadership team, I wouldn't have been able to put together the Voice. Thank you!

Sincerely,
Sriyutha

A Year in Review: Recapping VJAS

By Amina Khan

As we wrap up this wonderful year, VJAS stands strong in its purpose to support and empower young scientists across the state of Virginia. Through dynamic STEMinars, the debut of a new podcast series, and the ongoing excellence of our annual symposium, the organization continues to build a solid foundation for individuals looking to explore their scientific interests, expand their level of intellect, and cultivate qualitative leadership abilities.

The STEMinar hosted this December was able to bring together an eagerly diverse pool of participants, ranging from young students to qualified professionals. This virtual discussion focused on concepts such as preparation for professional presentations and effective tips for conducting research. It came to a close with an interactive Q&A session for students seeking personalized advice from panelist members. STEMinars remain to be an event that fosters curiosity and provides guidance and encouragement towards the frontiers of modern research.

Although STEMinars have been a cherished custom, the officers this year were able to launch a new student-led series called VJAS Voices: Navigating STEM Success. Following a weekly release schedule, officers interviewed different guest speakers to learn about their personal experiences within scientific fields. These conversations created a unique platform where authentic insight was shared, various aspects of STEM were discussed, and a distinctive form of engagement was stimulated. The emergence of this recent series has become a valuable source of unity and inspiration for people across the community.

A significant moment for VJAS this year was being able to host the annual Symposium under a hybrid schedule, with in-person presenters and judges and virtual presenters and judges. Since the Covid-19 pandemic, students have only been given the option to display their projects virtually, diminishing a crucial aspect of scientific presentation. However, with dedicated efforts, the Symposium successfully took place at Ferrum college this year. This gave students who were able to attend the fortunate opportunity of presenting in-person, while still allowing those who could not make it the chance to present digitally. All in all, Symposium was a rewarding experience that showcased student-effort and innovation, as well as reflected the values that VJAS confidently upholds.

Moving forward, VJAS remains to be a source of opportunity and growth for the upcoming generations of scientific leaders. This year's milestones have displayed the strength of our STEM enthusiasts, and further fuel our enthusiasm to keep evolving towards a brighter future.

Summer 2025

From Science Fair to Published Author: VJAS Alum Jack Lohmann Illuminates the Story of *White Light*

By Sriyutha Morishetty

Jack Lohmann still remembers presenting his first research project at the Virginia Junior Academy of Science (VJAS) over a decade ago. Back then, he was a high school student studying nutrient pollution in the Chesapeake Bay. Today, he's a published author—his debut book, *White Light*, is a sweeping exploration of phosphorus, life, death, and the fragile cycles that connect them.

Released this spring by Penguin Random House, *White Light* has already earned praise from Pulitzer Prize-winning science writer Elizabeth Kolbert, who described the book as "lyrical and exacting, clear-sighted and deeply informed—a beautiful book."

In White Light, Lohmann traces the story of phosphorus across continents and centuries. He begins in 1842 Suffolk, England, where botanist John Stevens Henslow (Darwin's mentor) first discovered phosphate-rich rock as a potent fertilizer. Wxhat followed was an industrial scramble—one that, shockingly, involved grinding up human bones and mummified Egyptian cats to feed the land.

From the phosphate mines of Bone Valley, Florida, to the ecological collapse of Nauru, an island nation once rich in phosphorus, Lohmann exposes how this essential element has been commodified, consumed, and carelessly discarded. He also delves into lesser-known histories, like seventeenth-century Japan, where people paid rent with their waste, maintaining a more circular—and sustainable—nutrient economy.

Lohmann, now living in the Western Isles of Scotland, reflects on phosphorus with the curiosity of a scientist, the precision of an investigative journalist, and the depth of a poet. The book moves effortlessly between geology, agriculture, economics, and ethics, asking us to reconsider not just how we farm, but how we relate to the planet—and to death itself.
"There would be no life without constant death," Lohmann writes. It's a line that reflects the ethos of the book: that life is made possible by decay, and the systems we've built to extract rather than renew have left us out of sync with nature's cycles.

Jack credits his years at VJAS as foundational in shaping his scientific perspective. "Those five years I spent designing projects and presenting them at science fairs were instrumental in encouraging me to think about the world in a different way," he shared. His journey—from high school research on nutrient runoff to a widely acclaimed book on the global phosphorus crisis—speaks to the long-term impact of early scientific engagement.

Last March, Lohmann returned to Richmond for a book event at Book People and hopes to remain connected to the VJAS community. He's also expressed interest in mentoring and speaking with students, offering the kind of inspiration he once received.

White Light is more than a science book. It's a meditation on the elements that build life—and what happens when we forget how to live with them wisely. For VJAS students, it's also a powerful reminder that the questions we ask in high school can grow into lifelong pursuits that matter.

The Prestigious VEE Scholarship

By Shriya Bandla

Each year, the Virginia Junior Academy of Science proudly recognizes the next generation of scientific leaders whose work not only demonstrates academic excellence but also reflects a strong commitment to environmental stewardship. Among the most prestigious honors presented at the annual VJAS Research Symposium are the environmental science scholarships awarded in partnership with the Virginia Environmental Endowment.

The Virginia Environmental Endowment was founded in 1977. It is the first philanthropic foundation in the country focused exclusively on environmental improvement. Since its founding, VEE has awarded more than 1,400 grants totaling over 100 million dollars to support environmental progress throughout Virginia and beyond. In addition to its grantmaking, VEE has awarded over 660,000 dollars in scholarship funds to 70 outstanding high school students since 1984. These scholarships are administered by VJAS and are named in honor of three of VEE's founding board members whose dedication continues to inspire students across the Commonwealth.

The Henry W. MacKenzie Jr. Environmental Scholarship, a 5,000 dollar four-year award, was presented to Charlotte Phillips, a twelfth-grade student whose research made a significant contribution to environmental science related to the James River Basin and Chesapeake Bay. Her paper, titled Investigating Microplastic Trapping Efficiency of Coral Reef Regrowth Structures in Simulated Ocean Currents in the Presence of Modeled Acropora cervicornis, explored innovative strategies to mitigate oceanic microplastic pollution through biologically inspired coral reef structures. Charlotte's work reimagines coral regrowth not only as ecological restoration but as a practical and effective tool for environmental cleanup, offering a unique blend of creativity and scientific precision.

This scholarship is given in honor of Judge Henry W. MacKenzie Jr., a founding member of the VEE Board of Directors, who devoted his life to protecting the James River and Chesapeake Bay. Charlotte's research carries forward this legacy with a project that reflects both environmental passion and scientific rigor.

The Frances and Sydney Lewis Environmental Scholarship, also a 5,000 dollar four-year award, recognizes the best overall contribution to the field of environmental science by a senior student. This year's recipient was Emily Paul, whose project, The Effects of Heavy Metal Contaminants on Negative Phototropism Behaviors in Ephemeroptera Species, investigated how exposure to toxic substances affects the behavior of aquatic insects. Her findings contribute to our understanding of freshwater ecosystem health and raise awareness about the broader ecological consequences of industrial pollution.

This award honors Frances and Sydney Lewis, influential philanthropists who believed in the power of science and education to transform society. Emily's work exemplifies that belief, offering data-driven insight with the potential to shape future environmental monitoring and policy.

Joe Maroon, Executive Director of the Virginia Environmental Endowment, remarked, "We are incredibly proud of Charlotte and Emily. Their work stands out not only for its academic excellence but also for its direct relevance to the urgent environmental challenges facing our region." As we look ahead to the future of environmental science, students like Charlotte and Emily offer hope and direction. Their work exemplifies the core mission of both VJAS and VEE, reminding us that meaningful change begins with thoughtful research and a commitment to the greater good.

To learn more about the Virginia Environmental Endowment and its ongoing support of student research and environmental progress, visit www.vee.org.

Farewell from the Editor

By Sriyutha Morishetty

Dear VJAS Community,

Serving as the Editor-in-Chief of the Voice was one of the most rewarding parts of my high school experience. I tried my best to explore journalism-related work in high school, running my high school's student publication and even working for a local city magazine one summer.

Being the EIC of the Voice, however, was an entirely new experience. I read articles written by students all across Virginia, as well as articles written by students who went to the same high school as me; the variety of authors, readership, and topic areas always captivated me. Nonetheless, one thing remained constant: I was always learning something new. Whether that was about emerging science technology or a part of the Junior Academy that I hadn't been exposed to yet, it was intriguing to learn and stay active in the VJAS community.

I've been involved with VJAS since I was in 6th grade. I've submitted multiple papers for consideration to the Symposium, and each time, I was scared I would be disqualified because I mis-formatted something! VJAS taught me to be a better writer, thinker, and scientist. Sometimes, when I'm particularly bored or when I'm putting off doing something important, I'll rummage through my Google Drive, and read the first research paper I ever wrote. It's quite humbling to say the least.

Before I conclude, I wanted to thank a few inspiring individuals I met as EIC. Firstly, Dr. Lateef. Dr. Lateef was an amazing sponsor for the VJAS Student Committee, and she made sure that we all kept our heads on straight and our eyes on the ball. When I think about how much she must have on her plate, managing her many roles, I appreciate the time and effort she spends with the Student Committee even more—thank you, Dr. Lateef. And the same goes for Ms. Booth, Ms. Curtis, and Mr. Lovrencic: their work is oftentimes done behind the scenes, but without them, VJAS surely would not be able to operate. And lastly, my fellow student officers: Rania, Kriesh, Amina, Madeline, Sage, and Shriya. You guys were an awesome team to work with this past year, and I'm thankful for your advice, shared wisdom, and friendship.

My last thank you goes out to anyone who's reading this. Supporting VJAS and student-run publications are two of my favorite things, so I very much appreciate you, the reader, who takes the time to do the one thing I love most: read.

Warmly,
Sriyutha Morishetty

WANT TO LEARN SOMETHING NEW?

How Telemedicine Transformed Healthcare

By Priya Kumar

Virtual healthcare, also called telehealth or telemedicine, has increased in popularity in recent years, especially during the COVID-19 pandemic. But why exactly is telemedicine so significant in the overall context of healthcare, and how can it be expanded for future years?

Telehealth was existent before the March of 2020, but it was not commonly used due to federal restrictions as well as complex regulations surrounding which patients could actually be treated virtually. Although surveys from before March of 2020 showed that patients that were treated virtually generally had positive experiences, the overall rhetoric surrounding virtual health care was that it was a weak replacement for in-patient treatment.

However, the popularity of telemedicine in the United States considerably escalated when the COVID-19 pandemic began in 2020. To help avert the spread of COVID, check-ups and patient visits were cancelled. Check-ins over video conference or phone calls replaced in-person visits, and the use of telemedicine increased by a whopping 766% in just the first three months of the pandemic. The proliferation of telehealth visits was partially due to the easing up of limitations surrounding virtual healthcare. For instance, on the federal level, the Coronavirus Aid, Relief, and Economic Security Act (CARES) and the CMS 1135 Waiver substantially changed the regulations for telemedicine. It allowed audio-only telehealth visits, expanded the authorized technology platforms for telehealth visits, including Skype and Zoom, and let patients and physicians conduct telemedicine visits from their homes.

Over the course of the pandemic, telehealth evolved to help match the capacities of physicians and patients. Five years later, telemedicine use has decreased, but it still makes up a substantial portion of patient visits. 54% of Americans used telehealth in 2024. Even though the necessity for telemedicine has diminished, it still provides important benefits for patients that are valuable for the future of healthcare.

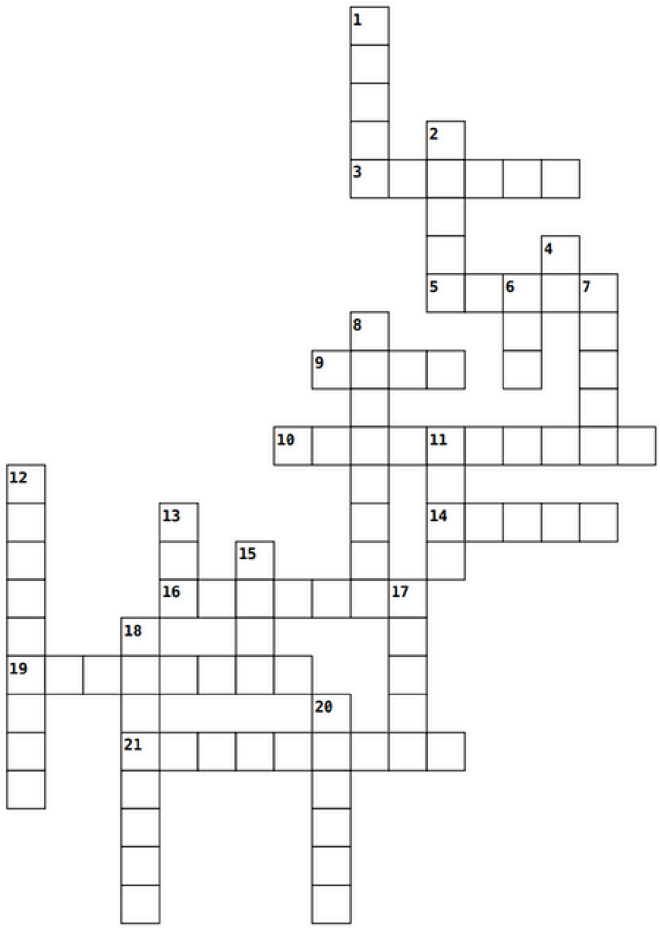
First, telemedicine has the potential to lower costs for patients, especially in terms of ER visits. Going to the ER for medical emergencies often results in long wait times, and ER visits are up to 12x more expensive than typical clinical check-ups. More than $32 billion is squandered in ER visits every year, according to the Harvard Business Review. 24/7 video health centers are an excellent alternative for ER visits, as they allow doctors to rapidly diagnose patients and determine if the emergency is life threatening, in which case the patient should go to the ER for in-patient care.

Next, telemedicine is beneficial for individuals diagnosed with chronic disease, which is the number one leading cause of death and disability in the United States. Individuals with chronic diseases usually need schedule check-ups frequently, depending on the intensity of their illness. Virtual health check-ups are a great alternative for in-person check-ups, which are often inconvenient, not to mention expensive, for patients.

Lastly, virtual healthcare can help address health care inequalities. Knowledge about how to navigate technological platforms such as Zoom has become common among the public due to the pandemic, and access to technology through computers or even smartphones is ubiquitous in the 21st century. Scheduling telehealth visits is much more convenient for individuals living in rural areas far away from the nearest clinic or urgent care centers. Overall, telehealth has the ability to make healthcare more accessible, with patients getting to see their physicians whenever they need it and on their own time, thus bridging disparities in health care across the country.

Information retrieved from Harvard Business Review, Forbes, and National Library of Medicine.

CROSSWORD *TECHNOLOGY*



Across

3. Where images and videos appear on devices

5. Digital letter sent over the internet

9. Wireless method to access the internet

10. Device that combines calling, texting, and computing

14. Internet-based storage system

16. Software used to navigate the web

19. Global network that connects billions of devices

21. Wireless technology for short-distance communication

Down

1. Malicious software that can harm your computer

2. Unmanned flying device

4. Abbreviation for artificial intelligence

6. Short term for a software application

7. Required step to access private digital accounts

8. Approximately a billion bytes

11. Short word for "technology"

12. Set of instructions followed by computers

13. Common connector for devices and data transfer

15. Instructions written for a computer

17. Programmable machine often used in manufacturing

18. Device used to type on a computer

20. Device that provides internet connection in a home