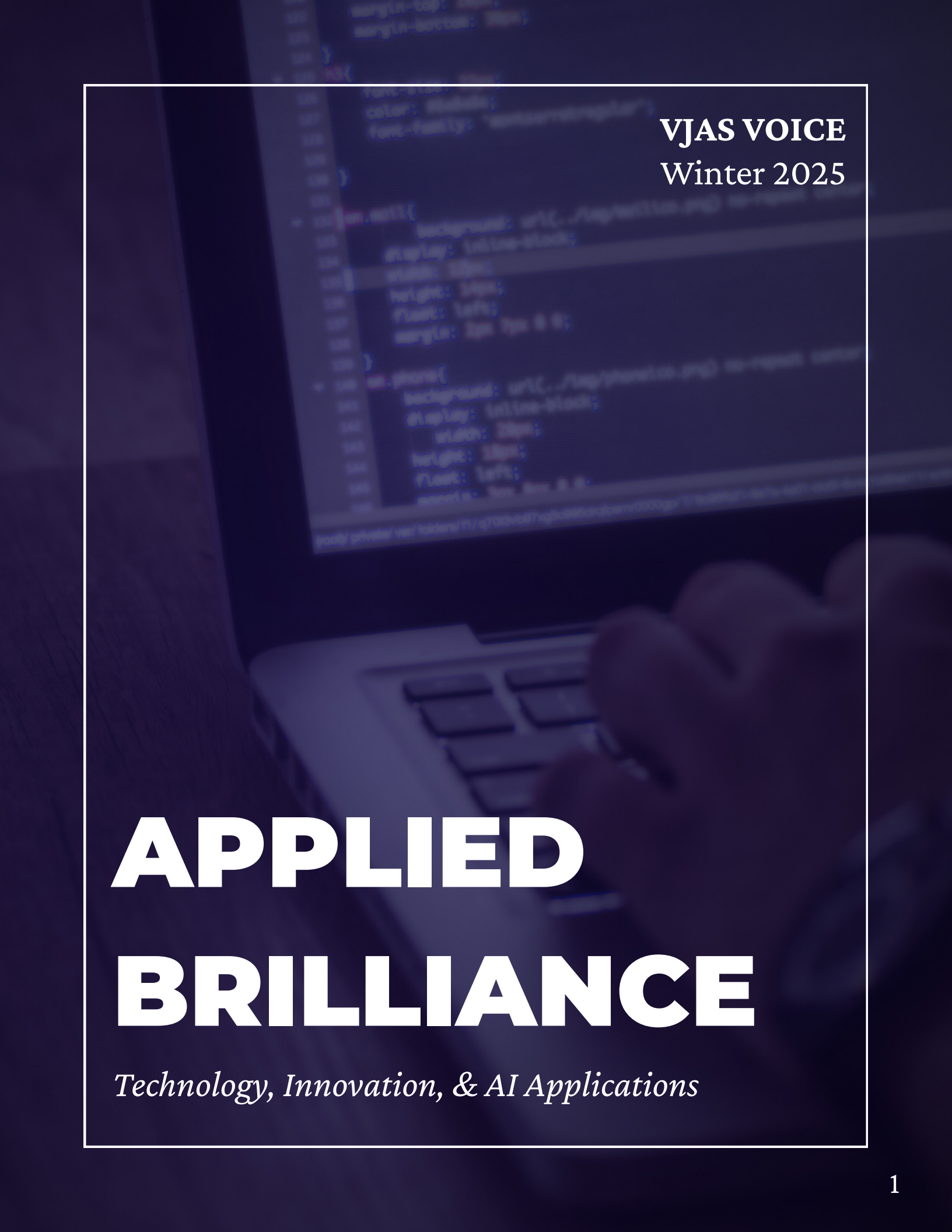
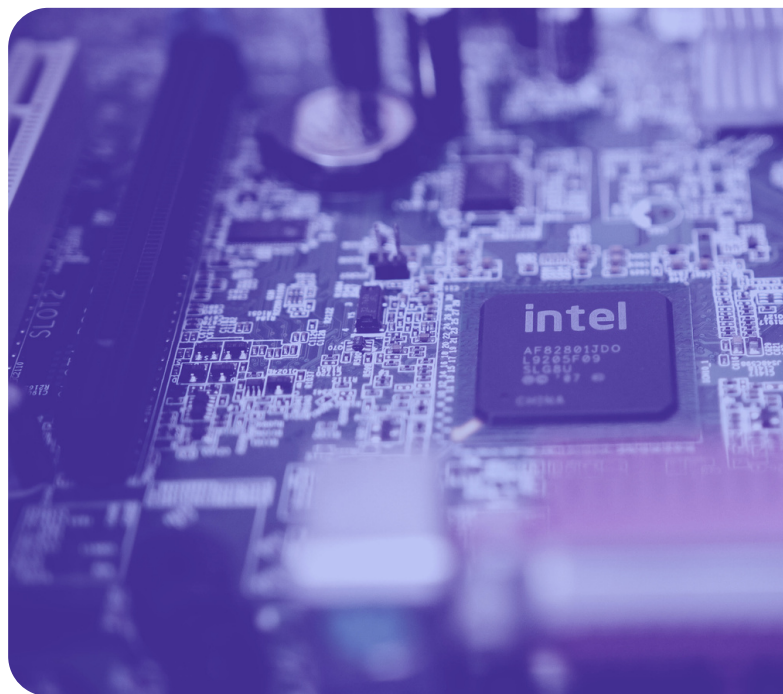




VJAS VOICE
Winter 2025

APPLIED BRILLIANCE

Technology, Innovation, & AI Applications



WELCOME TO THE VOICE

The Voice is the student-led and student-written publication of the Virginia Junior Academy of Science. We, the Editors-in-Chief, are so excited to present the second issue of this academic year. The Voice aims to educate our readers on the process of scientific experimentation, present research, and cover general news and topics across various fields of science.

This Winter issue explores the theme of Applied Brilliance. Technology and innovation are evident across all fields of science, so we hope the articles presented in this edition inspire you to continue your research in, or learn more about new and emerging technologies and AI applications in your field of interest, and to present them at the VJAS Symposium in May!

As we said before, the VJAS Voice is student-written. Make your passion for science heard and submit an article for our upcoming issues later in the year!

Sajeela Ahmad and Taarun Ganesh
Editors-in-Chief, VJAS Voice
2025-2026

HIGHLIGHTS

SEMINAR RECAP
2025-2026

VJAS SYMPOSIUM
May 2, 2026 @ Hampden-Sydney

JUDGING W/ VJAS
In-Person @ Hampden-Sydney

MENTORSHIP
*VAS Mentorship Program in
Partnership with VJAS*

TIMELINE
Due Dates & Important Info

WRITING
Tips on Composing a Paper

VJAS VOICES
Listen to our New Podcast Episode!

VJAS GRANTS
Positive Highlights & Scholarships

SELECTED
ARTICLES
Dive into AI and Tech Innovation

STEMINAR RECAP

On December 7th, the Virginia Junior Academy of Science (VJAS) hosted its annual STEMinar, a virtual event created to support students as they begin or continue their research journeys. Led by the VJAS student officer team, the session brought together students from across Virginia and offered a clear, practical roadmap for navigating the VJAS program, developing strong research projects, and preparing for the 2026 VJAS Symposium.

The STEMinar opened with a welcome and introductions from the officers, followed by a short icebreaker that invited students to share their favorite science topics. This early interaction set the tone for the session, emphasizing that VJAS values curiosity across every field of science and welcomes students at all experience levels.

From there, officers grounded the discussion in VJAS's broader mission: to develop young scientists through mentorship, research training, leadership opportunities, and professional communication. Students learned that VJAS is more than a competition. It is a statewide community that supports their growth and offers pathways to publication, symposium participation, and leadership at the state level.

A central focus of the STEMinar was how to choose an effective research topic. Students were encouraged to pursue subjects they genuinely care about, while also considering feasibility, access to credible sources, and realistic data collection within their available time and resources. Officers emphasized starting with a broad idea and narrowing it early into a focused research question, explaining that clarity at this stage leads to stronger methods, cleaner analysis, and a more cohesive final paper. Participants were also advised to organize their work carefully using clear sections and subheadings to stay on track throughout the project.

The officers then walked students through the VJAS Handbook, highlighting its role as the primary guide for the entire research process. Each required paper section was reviewed, including the abstract, introduction, methods and materials, results, discussion, conclusion, literature cited, and optional appendix. Students were reminded that careful attention to formatting, citations, and organization is essential, and that common mistakes such as missing sections, plagiarism, unsafe experiments, altered data, or late submissions can result in disqualification.

Beyond the handbook, students were introduced to additional VJAS resources designed to support them throughout the year. These included the Navigating STEM Success podcast series, which explores every stage of the research process from topic selection to ethics and symposium preparation, as well as VJAS Voice, the organization's publication that allows students to share their writing, research insights, and science communication with a broader audience.

The session then transitioned into an interactive panel discussion featuring Ms. Seliskar, a recently retired physical science teacher with decades of VJAS involvement, along with officer panelists Kriesh and Sajeela. Together, they addressed common concerns about data collection, time management, research design, and paper development, offering practical advice based on real experience. Students were encouraged to ask questions and engage directly with the panel, making the discussion one of the most dynamic parts of the event.

Before closing, the officers outlined leadership opportunities within VJAS, including the process of becoming a VJAS Student Officer. They explained the responsibilities of the role, which include submitting research papers each year, attending committee meetings, participating in monthly leadership calls, and supporting outreach and student engagement initiatives.

The STEMinar concluded with important reminders about the 2026 VJAS Symposium, scheduled for Saturday, May 2, 2026, at Hampden-Sydney College. Students were encouraged to begin their projects early, follow all instructions carefully, and stay updated through the VJAS website and Reviewr submission system.

The event ended with an open Q&A session and words of encouragement from the officer team. By the end of the STEMinar, participants left with a stronger understanding of the research process, increased confidence in their abilities, and a sense of belonging within the VJAS scientific community.

Shriya Bandla, VJAS Vice President 2025-26

Watch previous STEMinars on the VJAS Website!

<https://vjas.org/vjas-steminars.html>

*The 85th Virginia Junior
Academy of Science*

**MEETING AND
RESEARCH
SYMPOSIUM**

May 2, 2026

Hampden-Sydney College

• • • • •

“The goal of the VJAS is to promote progress in the field of scientific research among secondary school students. [...] It is here that several facets of the VJAS program culminate.

Among them are the presentation of outstanding individual research projects, the announcement of state winners in VJAS competitions, guest speakers, and the annual business session at which VJAS student officers for the coming year are elected.”

VJAS Handbook

WE'RE LOOKING FOR JUDGES!

Do you want to cultivate the next generation of researchers, scientists, and Nobel Prize winners? Become a judge for VJAS!

Students complete projects on a range of topics—judging will always be a learning opportunity. Judges will attend in person at the host institution, Hampden-Sydney University in Farmville, Virginia.

<https://vjas.org/judges.html>

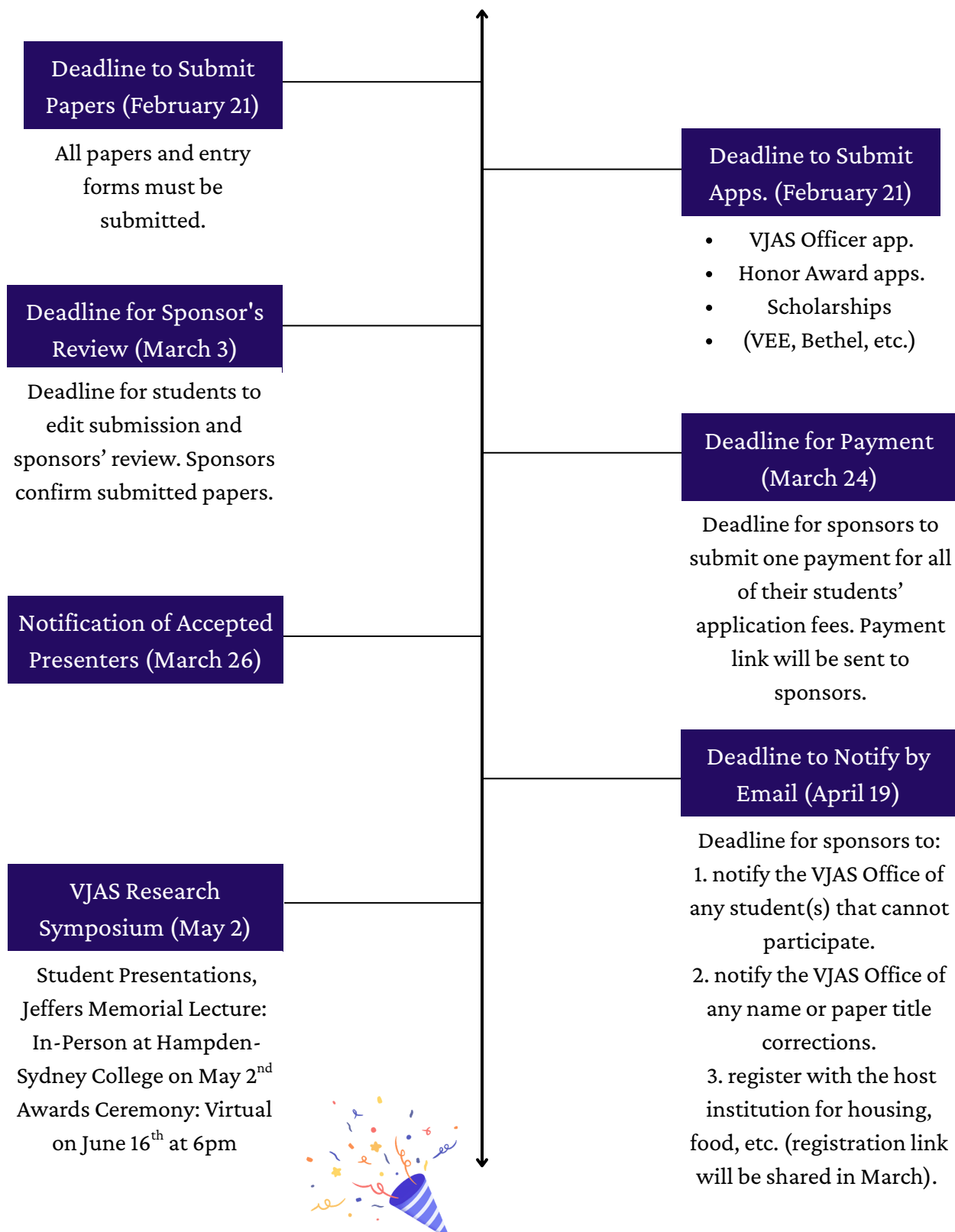
INTERESTED IN BEING A MENTOR?

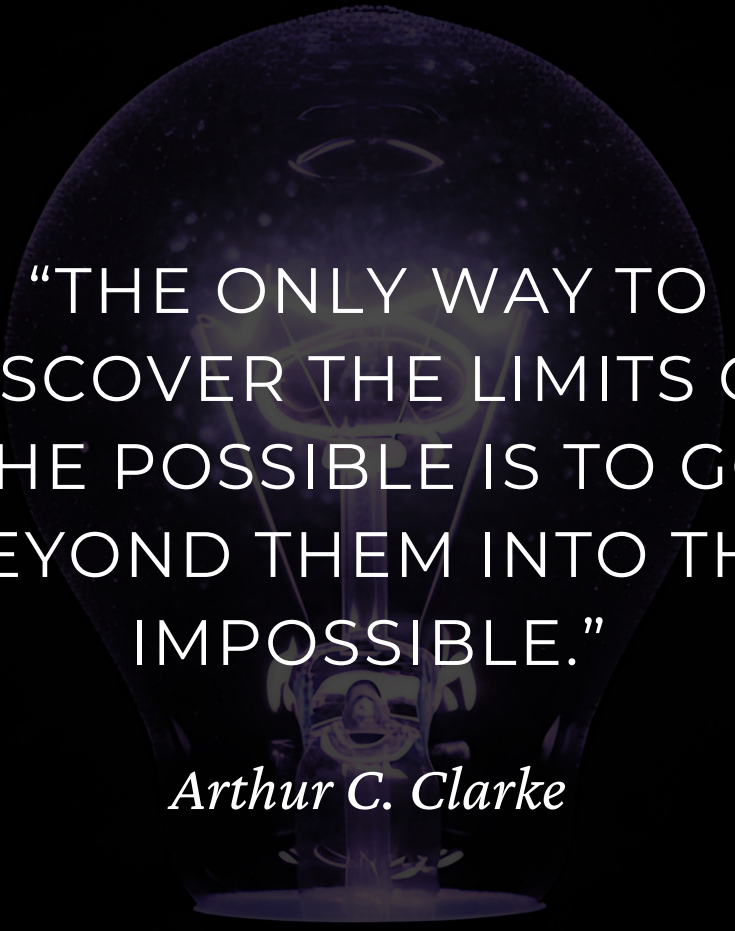
At VJAS, some of the most curious and driven student researchers in the state come together to ask real scientific questions and present original work. What makes that experience truly transformative is mentoring.

The Virginia Academy of Science (VAS) is excited to offer its mentorship program in partnership with VJAS, pairing scientists with K-12 classes to perform long-term science projects. The VAS is seeking to recruit both mentors (graduate students, post-doctoral fellows, instructors, scientists, etc.) and high school teachers who would like their students to participate in a virtually-driven long-term research project.

For more information and links to sign up for this year, visit the VJAS website at <http://vjas.org/resources.html>.

DATES TO REMEMBER





“THE ONLY WAY TO
DISCOVER THE LIMITS OF
THE POSSIBLE IS TO GO
BEYOND THEM INTO THE
IMPOSSIBLE.”

Arthur C. Clarke

WRITING YOUR PAPER

Sajeela Ahmad, VJAS Co-Editor-in-Chief 2025-26

Writing a paper for the VJAS symposium is one of the features that sets the VJAS symposium apart from others. It allows students to practice one of the most important forms of scientific communication. Writing a proper research paper can seem daunting to many students; however, there are many helpful tips in the VJAS handbook and style guide to help get started. Here are some tips I personally have after writing research papers for the past four years:

Start with the Science

Before worrying about the font or margins of your paper, it is important to ensure your research question is precise and your methods are defensible. Strong papers have a clear hypothesis, a logical experimental design with controls, enough trials to support conclusions, and data that are analyzed deeply. It is extremely important in scientific research to maintain transparency; the readers should be able to know any limitations of your project, and your conclusions should take into account those limitations to prevent overclaiming. Having a solid experiment and being transparent about your methods creates a reputable and reproducible project, which is what we are all aiming for when we communicate our science.

Write like a Scientist

It is better to be clear than complex. Scientists use direct language, define any technical terms before they are used, and avoid using unnecessary adjectives. This “flowery” language might be respected in other forms of writing, but in science, the goal is to get the message accurately across in the fewest words possible. The VJAS Handbook outlines clearly what each section of the paper entails, making it easy for anyone writing to make sure they cover all the points, but also do not get off track.



Using Data Correctly

Data should be organized so the reader can clearly understand the results. Don't add extra graphs just to fill space; only add them if they are necessary for clarity, and when a graph or table is added, make sure to have a clear title, axes/units if applicable, and a figure number to refer to in the text. For example, instead of writing, "The graph above..." write "Figure 1 shows...". In the Results section, report the trends, averages, and other measures of central tendency or statistical test results. Do not try to explain why those results happened in the Results section, and instead, save interpretation for the Discussion. Continuing on the point of transparency, make sure to report all valid data you collected. Do not ignore unexpected data points, but acknowledge them, and consider possible sources of error or variability that could cause those data points in the Discussion section. Having honest reporting and analysis is more important than having the data support the hypothesis.

Follow the Style Guide

The VJAS Handbook contains a Disqualification rubric, and the VJAS website also has a style guide, which can help students ensure their paper meets the requirements to prevent disqualification. This formatting step may seem unnecessary; however, it is important, as it helps judges stay focused on the paper, and it shows the paper was written with care and attention to detail. VJAS has certain limits on font, font size, line spacing, heading formatting, page limits, and citation rules, which are important to check again and again before submitting to make sure your hard work is not disqualified just due to a small mistake like formatting.

Reread, Remove, Rewrite

Strong papers take time to write. Once a draft is written, check the paper for scientific accuracy, unnecessary words or repetition, grammar, and clarity. Also, make sure all references are cited and figures are labeled properly. One very helpful thing you could do is ask your mentor or another teacher to read the paper, as this will allow them to highlight areas that are confusing or could be improved.

All in all, writing a paper for VJAS gives students experience that most never receive: learning how scientists actually communicate their work. By following professional standards of clarity, transparency, and formatting, students move from simply completing their project to practicing a core skill used in real research settings.



VJAS Voices

View the new episode on Spotify!

In this episode, Taarun, the Co Editor-In-Chief of student officers, interviews Harrish Ganesh, former VJAS President. In their conversation, Harrish talks about his experiences in the symposium as well as his leadership role.

What is VJAS Voices?

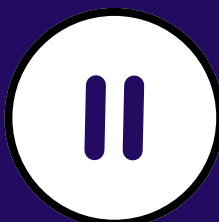
It is a podcast created by the Virginia Junior Academy of Science (VJAS), with a goal of helping students and mentors navigate the process of conducting, submitting, and presenting scientific research for the VJAS Symposium.

Where to Listen:

You can listen to the podcast on the official VJAS website. The podcast is also available [on Spotify](#).

Examples of Episode Topics:

Research ethics, Navigating symposium day, Preparing for presentations, Writing a scientific paper, Conducting effective research, Choosing a research topic, Introduction to the VJAS program.



HISTORIC AMOUNT OF VIRGINIA PROGRAM GRANTS AWARDED IN OCTOBER 2025 AS VEE HELPS TO “MEET THE MOMENT”

The Virginia Environmental Endowment’s (VEE) Board of Directors awarded a historic amount of Virginia Program grants at its October meeting. VEE had received a record number of applications, including several responding to its decision last April to consider general operating requests from those affected by federal grant cancellations and reductions.

In making its decisions, the Endowment placed a priority on sustaining investments in long-time nonprofit partners; supporting ongoing priority projects and programs; and assisting those impacted by federal funding reductions. In an effort to “meet the moment,” the Board awarded 23 grants totaling \$611,005, the largest single Virginia Program grant round in many years.

With these October awards, it exceeded the annual 5% spending cap, awarding a total of over \$850,000 in VEE’s FY 2026 (April 2025 – March 2026).

In addition, the Board approved two James River Water Quality Improvement Grants totaling \$817,369. It previously awarded three Community Conservation Program grants totaling \$317,592 last April.

Altogether, in FY 2026, VEE awarded 38 grants for \$1,745,968.

The VA Junior Academy of Science was one of its recipients. Joe Maroon, Executive Director of the Virginia Environmental Endowment (VEE), is advising VAS of the VEE Board's recent award of \$24,000 in support of the "Lewis and MacKenzie Scholarships 2026 & 2027" proposal. Congratulations!

AI IS TURNING LEARNING INTO AN ENGINEERING CHALLENGE

Cary Wright & Tyler Hunt, T.E.A.C.H., LLC

Artificial intelligence is cool when it can generate an essay draft or summarize a chapter. But the real shift is deeper: AI is becoming a reasoning interface—a tool that helps humans translate messy problems into structured decisions, faster iterations, and clearer explanations.

That's why AI is transforming fields like engineering, medicine, finance, logistics, and cybersecurity. And it's why AI is inevitably transforming education too—not as a “tech trend,” but as a systems challenge: How do we design learning environments that develop expertise efficiently, ethically, and at scale?

Education isn't just a subject—it's the infrastructure layer. If you're a student aiming for competitive universities and science-driven careers, you're competing in two arenas at once:

your personal achievement (knowledge, performance, research experiences, portfolio work), and your learning system (how effectively your environment helps you develop advanced skills over time).

Across the country, schools are actively rethinking what it means to be “prepared.” AI literacy is accelerating that shift—not by making learning easier, but by raising the expectations of what capable students can do. In high-performance environments, the baseline is moving from knowing facts to building solutions, defending reasoning, and improving work through iteration.

Look at education from an engineering lens: learning systems have inputs, processes, outputs, and failure modes. When we work with districts as K–12 AI education consultants, we approach their AI use the way strong engineering teams approach technology: guardrails first, then iteration, then scale.

A learning system has:

Inputs: time, curriculum, student needs, assessment data, teacher capacity, device access

Processes: instruction, practice, feedback, revision cycles, interventions

Outputs: mastery, performance, long-term capability

Failure modes: misalignment, inequity, privacy risks, overreliance, “confidence without correctness”

AI has the potential to strengthen the process without increasing risk—tightening feedback loops and improving decision-making while preserving human judgment.

That's the core of T.E.A.C.H.'s approach: humanity-first design, standards alignment, ethical guardrails, and data-to-action cycles. We don't treat AI as a shortcut. We treat it as a tool that supports disciplined thinking.

AI is a cognitive tool—and cognitive tools change the game.

In engineering, you don't judge a tool by whether it looks impressive.

You judge it by whether it improves outcomes under real constraints.

The value of an AI tool comes from -

1) Compression

It can reduce complexity by summarizing information, extracting patterns, and organizing details into usable forms.

2) Translation

It can move ideas between formats: turning a concept into an explanation, a goal into a plan, or data into a claim.

3) Iteration

It can generate multiple versions of an approach—so a human can evaluate tradeoffs and refine the best option.

But here's the critical part: AI does not replace expertise. It exposes it.

If you ask weak questions, you get weak outputs.

If you accept unverified results, you build on shaky ground.

If you treat AI like a vending machine for answers, you lose the advantage.

The students who will lead the next era are the ones who treat AI the way researchers and engineers do: as a junior assistant whose work must be tested.

Where AI intersects with engineering, innovation, and other fields

AI in education matters because it's the training ground for the skills demanded everywhere else.

Engineers expect revision. They expect prototypes to fail. They expect the first solution to be incomplete.

AI accelerates the cycle: draft → critique → refine → test → repeat

That's the same process behind improving:

a lab report

a code project

a research argument

a design challenge

a persuasive essay grounded in evidence

The goal isn't perfection. The goal is measurable improvement over iterations.

AI gives feedback loops that build real mastery.

Strong learning depends on fast feedback. The longer it takes to identify misunderstandings, the harder they are to correct.

AI can support high-performing students by helping them:

generate retrieval practice questions

identify misconceptions

compare two competing explanations

create structured study plans based on weak areas

strengthen reasoning through counterarguments

Used correctly, AI doesn't lower rigor—it increases it, because it helps students practice at the edge of their capability.

How do ethics enter into AI use?

This is the part serious students cannot ignore: AI introduces power that scales quickly, which means mistakes scale quickly too.

Ethical AI use requires:

- privacy awareness
- source validation
- transparency in authorship
- understanding bias and limitations
- resisting overreliance

In other fields—medicine, aviation, engineering design—verification is non-negotiable. Education in the new world of AI tools is slowly catching up to that reality.

If you want to use AI like a future engineer, scientist, or physician, don't use it to get quick answers. Use it to improve the quality of your thinking.

Here's a high-performance student protocol:

A) Treat AI as a hypothesis generator, not a truth machine

- "Give three competing hypotheses and what evidence would falsify each."
- "What assumptions am I making, and which are most fragile?"

B) Build verification into your workflow
Adopt a "trust, then verify" rule:

- cross-check with primary sources
- test outputs against known facts
- compare to teacher notes, standards, and rubrics
- identify uncertainty explicitly

C) Produce artifacts that top programs respect
Selective colleges and internships are increasingly drawn to students who show evidence of process:

- research memos with citations
- design notebooks with iterations
- error analysis reflections
- version history showing growth

and finally a brief AI-use disclosure describing what was assisted and what was independently reasoned.

That is applied brilliance: not using AI the most—but using it with discipline.

Education is entering a new phase.
For decades, the central question was: What should students learn?

Now the question is: How do we design learning systems that develop expertise efficiently, ethically, and at scale?

That is where AI intersects with engineering and innovation. And for students preparing to lead in science and technology, AI is not just something to use—it's something to understand.

Because the future belongs to people who can do both:

- build powerful tools
- and use them responsibly

That is applied brilliance.

INTEGRATING AI INTO CONSTRUCTION

Danyal Mian, VJAS Communications Liaison 2025-26

Artificial intelligence (AI) has quickly become one of the most influential forces shaping modern engineering. As engineers work to create safer, more efficient, and more sustainable systems, AI provides new ways to analyze data, automate processes, and develop innovative designs. Its rapid integration across engineering disciplines has changed how professionals solve problems and approach the design process.

One of AI's greatest strengths is its ability to analyze large amounts of data with speed and precision. In fields such as mechanical, civil, and structural engineering, AI models can detect patterns in material behavior, structural stress, and environmental conditions that are tedious and time consuming for humans to identify. These insights help engineers predict failures, optimize structural designs, and improve the safety of major infrastructure systems.



AI has also transformed engineering design. Generative design software allows engineers to enter specific constraints, such as cost, weight, material type, or sustainability goals, and then uses AI to create multiple optimized design options. This process expands creativity by revealing solutions that may not have been considered through traditional design methods. In electrical and computer engineering, AI advances the development of circuits, autonomous systems, robotics, and smart vehicles, improving both performance and reliability.

My own experience this past summer showed how AI can impact real-world engineering environments. While working for my dad's construction company, my primary responsibility was helping integrate AI-based tools into everyday operations. This involved researching software that could automate project scheduling, improve the accuracy of cost estimates, and support safety monitoring on job sites. By adopting AI systems capable of analyzing material usage, tracking labor efficiency, and forecasting project timelines, the company will soon be able to automate tasks that were once tedious. This experience revealed how AI is not only reshaping large engineering firms but also transforming smaller businesses that depend on efficient planning and execution.

Despite its many benefits, the integration of AI also presents challenges. Engineers must address concerns surrounding data privacy, reliability, and ethical responsibility. Ensuring that AI systems remain transparent, unbiased, and safe is critical as these tools take on greater roles in decision-making. Human oversight will remain essential to prevent misuse and maintain accountability.

In conclusion, AI is reshaping modern engineering by improving data analysis, enhancing design capabilities, and increasing operational efficiency. My hands-on experience in the construction industry demonstrated the real, practical value of integrating AI tools. As the technology continues to evolve, engineers will play a key role in applying it responsibly to build a smarter and more innovative future.

MACHINE LEARNING-ENABLED INNOVATION IN HEALTHCARE: THE EVERY CURE PROJECT

Sajeela Ahmad, VJAS Co-Editor-in-Chief 2025-26

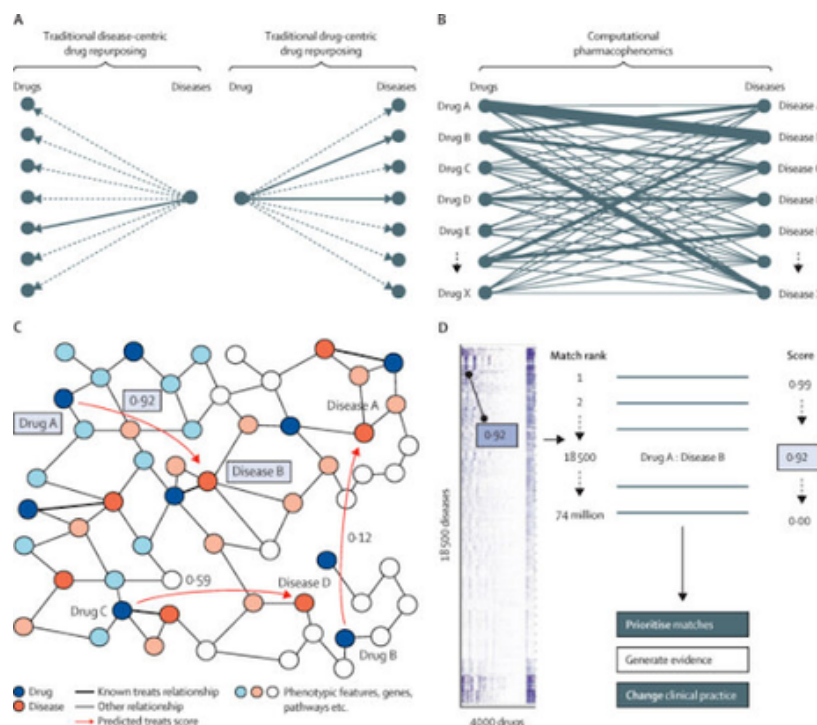
Medicine is one field of the many that are currently being transformed by technologies, whether it be through telemedicine, medical devices, or machine learning in research. Even with these advances, health disparities still remain, and diseases yet incurable. This field, characterized by the slow pace of research and drug development, is the field that has the potential to develop medicines that could save many lives. The decades-long timeline to first develop, and then ensure drug safety, is unlikely to get shorter anytime soon. But the people who need these treatments don't have much time left to wait.

Dr. David Fajgenbaum and his team at the Every Cure project took a different path to help get treatments for chronic illnesses faster. Instead of trying to develop new medicines, Fajgenbaum realized the potential of the drugs already approved as safe for human use. Doctors in the United States prescribe off-label drugs—medicines that are made for one illness/symptom but can be used to treat another—as much as 12-38% of all their prescriptions (Sheikh, 2021). This shows that drugs already made have the potential to save or improve the lives of those for whom it was not made. Fajgenbaum illustrates this possibility clearly, stating, "I'd walk past the CVS near my house over and over again, never realizing that inside, on one of those shelves, was a bottle of sirolimus—the drug that would eventually save my life, [...] For the last ten years, I haven't been able to stop thinking about this. How many more drugs are sitting on pharmacy shelves right now, waiting to be discovered as life-saving treatments for other diseases?" (Fajgenbaum, 2024).

The problem stopping people from studying these already approved drugs is that it wouldn't provide the financial return in the same way a new drug would. Fajgenbaum and his team solved this problem in two ways. First, the Every Cure project is non-profit, so the profit incentive that disincentivizes pharmaceutical companies from studying those drugs no longer available to be patented and milked for money no longer affects their research. Secondly, and more relevant to the theme of technology and innovation, they cut down the costs of their research by creating a machine learning algorithm called MATRIX to pinpoint which drugs are most likely to be repurposed for specific diseases.

Although the specific mechanisms of the MATRIX algorithm remain undisclosed, likely due to proprietary reasons, a general progression is given of how the AI catalyzes finding old drugs to treat new diseases. Their approach, entitled computational pharmacophenomics, consists of an AI trained on hundreds of biomedical datasets, along with real medical data.

This allows the AI to predict plausible matches based on patterns seen in the mechanisms and interactions of the drug with the human body through genes or pathways. The LLM (Large Language Model) component of MATRIX helps them to test the reasoning of the matches the AI made. At the end of this system comes the scientists, doctors, and other stakeholders, who discuss the feasibility of continuing with the match MATRIX made, choosing to work on the drugs that can reach patients as efficiently as possible (Every Cure, 2025).



(Every Cure, 2025a)

Dr. Fajgenbaum and his Every Cure team took initiative by starting the field of computational pharmacophenomics and taking onto themselves the responsibility to repurpose drugs when little other researchers were incentivized to. But their key was AI—AI has changed the rules of discovery in biology, accelerating timelines by researching, correlating, and modeling in ways human researchers could never have done before. As of 2024, had already confirmed two drug repurposing opportunities, along with having advanced 28 drugs to be repurposed as well (The Audacious Project, 2024). Their work exemplifies a broader trend across scientific disciplines: as AI, technology, and innovations advance, they will continue to transform research to unlock new possibilities, solve complex challenges, and ultimately, change the world for the better.

References:

- Every Cure. (2025). *Our Work – Every Cure*. Everycure.org. <https://everycure.org/our-work/>
- Every Cure. (2025a). *Every Cure Publishes Paper in Lancet Haematology Pioneering a New Field of Medicine Called Computational Pharmacophenomics – Every Cure*. Everycure.org. <https://everycure.org/lancet/>
- Fajgenbaum, D. (2024, October 18). For years, I was battling Castleman Disease, in and out of the ICU, barely hanging on. I'd walk past the CVS near my house over and over again, never realizing that inside, on one of those shelves, was a bottle of sirolimus—the drug that would eventually save my life. It had been sitting there all along, approved for kidney transplant rejection, helping people all over the world, but I didn't know it could help me too. For the last ten years, I haven't been able to stop thinking about this. How many more drugs are sitting on pharmacy shelves right now, waiting to be discovered as life-saving treatments for other diseases? That's why at Every Cure, we're dedicated to finding those drugs and making sure they reach the people who need them. #Doctor #medicine #raredisease. Facebook. <https://www.facebook.com/davidfajgenbaum/videos/for-years-i-was-battling-castleman-disease-in-and-out-of-the-icu-barely-hanging-/1063852555331595/>
- Sheikh, H. (2021). Off-Label Use of Prescription Drugs. https://www.congress.gov/crs_external_products/R/PDF/R45792/R45792.3.pdf
- The Audacious Project. (2024). *Every Cure | The Audacious Project*. Audaciousproject.org. <https://www.audaciousproject.org/grantees/every-cure>

FROM PREDICTION TO STRATEGY: HOW AGENTIC AI REDEFINES ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Aarav Saxena

In today's world, Artificial Intelligence (AI) and Machine Learning (ML) are among the most influential technologies. AI is the simulation of human intelligence in machines, while ML is a subset of AI that focuses on how models learn patterns from data and form predictions. Over the past few years, traditional ML has revolutionized the world, particularly in areas such as image classification, text and image generation, and prediction generation. These models are extremely powerful and advanced, yet remain passive, following a simple process: receiving an input, computing, and giving an output.

However, a new wave of AI systems challenges the weaknesses of traditional ML models. Instead of only making predictions, these systems are able to act, think with reason, and make decisions on their own. This new era in AI development marks the rise of Agentic Artificial Intelligence (Agentic AI). These systems form a new class of highly intelligent AI that improves on the flaws of static traditional AI by becoming active in their operations. Agentic AI builds on the way in which traditional machine learning models learn, adapt, and interact with the world around them, turning passive predictions into new purposeful outcomes (Amazon Web Services [AWS], 2025).

At the heart of Agentic AI is a type of machine learning called reinforcement learning, where algorithms within Agentic AI learn from the feedback given based on their decisions. Through a system based on rewards and penalties, Agentic AI models create actual strategies, unlike traditional AI, which is only able to formulate predictions. Furthermore, unlike conventional systems that follow fixed instructions, Agentic AI can adapt and make future decisions based on its determined goals. It can also effectively handle real-world workflows under defined goals, like investigating cybersecurity threats and attempting to fix them. By planning, acting, and revising its approaches, Agentic AI can learn from past decisions and improve itself (IBM, 2025).

The rise of Agentic AI marks a revolutionary change in modern-day AI and machine learning, allowing for newer, stronger, and more complex solutions to problems. By adapting, learning, and using their own abilities to solve problems, Agentic AI benefits the world in ways that traditional AI could never do. While it does contain many complex ideas and pathways, the future of AI and ML still provides many open roads and opportunities to advance.

References:

- IBM. (2025). Agentic AI's strategic ascent: Shifting operations from incremental gains to net-new impact. <https://www.ibm.com/thought-leadership/institute-business-value/en-us/report/agentic-ai-operating-model>
- Amazon Web Services. (2025, July 25). What is agentic AI? <https://aws.amazon.com/what-is/agentic-ai>

Thanks for reading this issue of the VJAS Voice!

To submit an article for the next issue, please look on our
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voice@vjas.org

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VJAS Handbook: <https://vjas.org/handbook.html>

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Published February 2026