

Fall 2023

Physics &
Astronomy

VJAS Voice

Presented by the 2023-2024 VJAS Officers

VJAS Voice

Fall Edition



WELCOME TO THE VOICE

By Editors-in-Chief Brian Zhou and Reagan Labert

Hello! We are so excited to present to you the first edition of the 2023-24 VJAS Voice. If you could not tell by the cover, we are doing something different this year! Each edition will have its own miniature theme based on a VJAS Symposium category. 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 to reagan.labert@gmail.com and bzhou2024@gmail.com.

On that note, we are proud to announce that the theme for the next edition is **engineering!**

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“We will never have all the answers about the universe, but the quest to unravel its mysteries can be our greatest inspiration.”

- Tom Vassos, Member of the Royal Astronomical Society of Canada

CO-PRESIDENTS’ WELCOME

By Rania Lateef

Dear VJAS community, I hope you had a safe and restful summer. As we put away our pool paraphernalia and get ready to welcome the flavors of fall, there is no better time to start thinking about how science can infuse your upcoming academic year with facts, findings, and fun. Whether you wonder about the cosmos or despair at climate change, the possibilities of scientific research are endless. Regardless of your passion and pursuit of science, VJAS is here to support you as you initiate and conduct your research journey. Ask yourself what is known and what remains to be discovered. Carve out a little problem you wish you pursue and reach for those trusted tenets of the scientific method. Look around you for mentors in the classroom and VJAS community who can help guide your chosen project.

We are excited to announce our annual symposium will be on May 4, 2024, held in a virtual format, and hosted by the College of William and Mary. To help you prepare, we plan to host STEMinars, or virtual get togethers, showcasing mentorship opportunities and facilitating conversations with seasoned VJAS presenters. We encourage you to stay in touch, stay engaged, and most importantly, stay inspired by science and all its possibilities.

Rania Lateef
Co-President, Student Section
Virginia Junior Academy of Science

Meet Your 2023-24 Officers

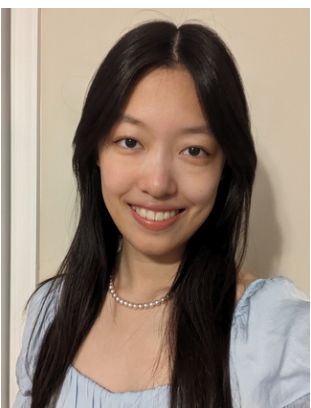


CO-PRESIDENT RANIA LATEEF

Rania Lateef is a junior at Colgan High School and Governor's School at Innovation Park in Manassas, Virginia. She has been a VJAS member since 7th grade and served as Editor-in-Chief of the VJAS Voice last year. This year, Rania is excited to serve as Co-President and expand VJAS's presence and outreach among all student scientists in Virginia. Rania's interest in scientific research stems from her passion for public health, psychology, and gender studies. In her free time, she enjoys traveling and spending time with friends and her family, which includes her three brothers and pet rabbit, Oreo.

CO-PRESIDENT YASH SAXENA

Yash Saxena is a Senior at Maggie L. Walker Governor's School in Richmond, Virginia. He has participated in the VJAS since 7th grade. He served the VJAS as the Secretary last year and as a member of the Student Advisory Committee the year before. As Co-President, Yash is excited to expand VJAS outreach and invite student researchers from all over Virginia to present their work at the VJAS Symposium. His research interests include applying machine learning to medicine and physics. In his spare time, Yash also enjoys playing academic trivia, where he specializes in answering science questions, and enjoys hiking with his friends.



VICE PRESIDENT HANNAH QI

Hannah is a senior at the Central Virginia Governor's School for Science and Technology. She has presented her research at the annual VJAS Symposium alongside other science fair competitions. Hannah's interest in science and the STEM field in general comes from her passion for computer science and biology, and, this year, she hopes to be able to inspire this same passion in other students across Virginia.



SECRETARY GRETCHEN GAFFNEY

Gretchen Gaffney is a current junior in the math and science specialty center at Clover Hill High School in Midlothian, Virginia. She participated in VJAS as a sophomore and is one of the current secretaries. Her love of science and biology only grew when she participated in VJAS, and she is excited to foster the same love in other participants.

CO-EDITOR BRIAN ZHOU

Brian Zhou is a senior at Thomas Jefferson High School for Science and Technology in Alexandria, Virginia, and looks forward to editing and publishing the VJAS Voice this year. Brian's interests in research comes from his passions for artificial intelligence, physics, and robotics that intersect and interact with his interests in the humanities. Outside of researching, Brian enjoys high school debate and hiking new trails.



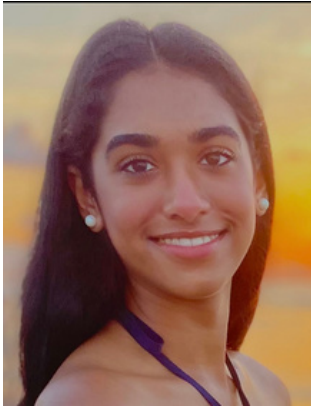
CO-EDITOR REAGAN LABERT

Reagan Labert is a current senior in the Math and Science Academy at Ocean Lakes High School in Virginia Beach, Virginia. She made her VJAS debut at the 2023 Symposium but has been conducting research in the field of biochemistry throughout high school. Outside of VJAS, Reagan also serves as the Editor-in-Chief of the Virginia Junior Classical League, and her publications through this organization have received national recognition. Reagan is excited to represent Southeastern Virginia and contribute to VJAS for the upcoming year!

COMMUNICATIONS LIAISON KRIESH TIVARE

Kriesh Tivare is a sophomore at Langley High School and is one of the social media and communications liaisons for VJAS. He has been passionate about STEM since middle school and has worked on research projects in the fields of mechanical engineering, electrical engineering, and biotechnology. In addition to being a VJAS officer, Kriesh is also a Youth Ambassador for Mentor Virginia and a Student Ambassador for Langley High School.

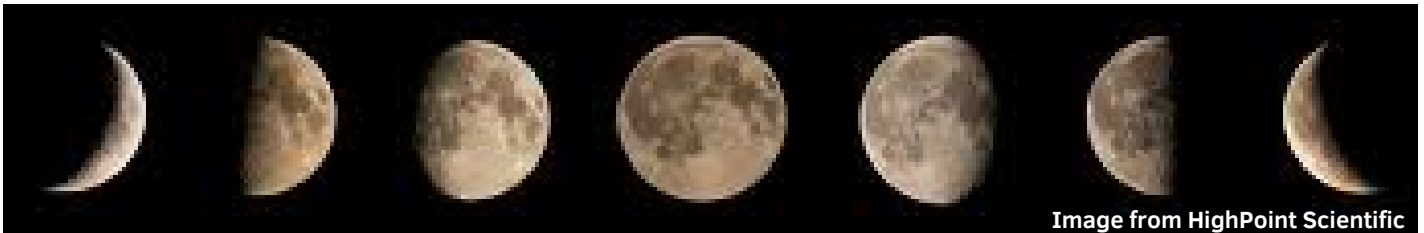




COMMUNICATIONS LIAISON

NITYA KUMAR

Nitya Kumar is a senior at Douglas Freeman High School and has served on the VJAS board as first an advisory member since 9th grade and then as the Communications Liaison in 11th grade. She will continue for her second year in a row to serve as VJAS's communication liaison. Nitya has been involved in scientific research since seventh grade and has participated in and won many accolades in science fairs like VJAS over the years. She is very passionate about scientific research and feels that it is a beneficial process to go through in order to learn, especially if someone is considering the science field. Nitya hopes to build VJAS and gain more members this year and is excited to see VJAS's growth this year.



STEM-INAR INFORMATION

By Reagan Labert

VJAS is not just a competition, but a community. One way that you can be a part of and benefit from this community is through attending STEMinars! STEMinars are virtual sessions featuring mentors, judges, and other individuals experienced in research, and they are designed for both students and teachers alike.

The first STEMinar of the 2023-24 competition season is currently scheduled for October 15th, 2023. It will advise students on how to design their project, begin their research, and start their presentations. Teachers and mentors are also invited to learn more about how they can help prepare their students.

Be sure to look out for more updates on this upcoming STEMinar through email, on X (formerly Twitter) at @VJASsymposium, and on Instagram at @vjassymposium. If you or someone you know has experience with research and would like to serve on the panel for the October STEMinar, please contact VJAS Director Susan Booth at director@vjas.org. We hope to see you there!

JULY 15TH MEETING

By Brian Zhou

Twice each year, the VJAS Committee meets to update the annual handbook as well as establish additional initiatives raised by student officers of the VJAS. Here are some important recaps for all competitors to know from the July 15, 2023 meeting:

- The deadline for paper submissions is now in February! Make plans accordingly.
- VJAS will offer a new category of competition this year, computational biology, so that computation projects will not infiltrate other categories of the symposium.
- The Handbook's plagiarism statement will be updated to include clarifications on use of AI in paper writing as well as plagiarism-checking methods.
- When presenting at the symposium, a minor must now have an adult in the room.
- The costs for the 2024 VJAS Symposium is lowered to \$45 per paper. This includes the membership fee, paper submission fee, and registration and will be paid once during the paper submission process
- Additionally, be on the look-out for additional info for *new scholarships in Physics/Astronomy!*

You can find all handbook updates here:

https://vjas.org/uploads/3/5/6/5/35657139/vjas_updates_and_changes.pdf

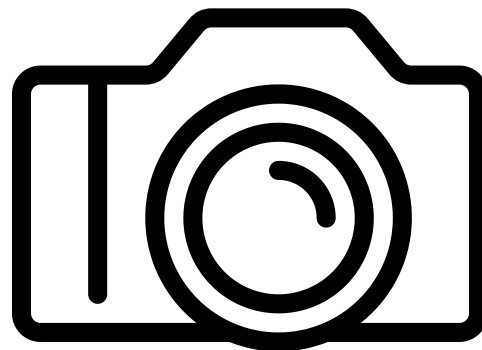
STUDENT PHOTO SUBMISSIONS

By Reagan Labert

We often get to hear about the “big names” of VJAS, such as the student officers, co-chairs, and Symposium winners. But, in reality, VJAS is a complex community made possible by the real MVPs: students. With this in mind, VJAS would love to see what you are up to in your scientific endeavors!

This year, VJAS has created a student photo submission form where students can submit photos to be featured in the VJAS Voice, on the VJAS website, and even on some of our social media platforms! You can submit pictures of something as ordinary as a science lab at school or something as unique as you winning an award! We just ask that you keep it school appropriate, make sure it relates to science in some way, and remember to fill out the Photo Release provided in the submission form.

We can't wait to see what Virginia science students are up to!
Submit your photos at: <https://forms.gle/HukFm7sYzoTCFjZs7>



WAIT, WHEN IS THAT DUE?

A VJAS Timeline

November 1, 2023:
deadline for the Phil Robinson Research Grant

February 23, 2024:
deadline for submitting papers, Honor Awards, VJAS officer applications, scholarships, and paying the registration fee

March 27, 2024:
notification of meeting participants

May 3, 2024:
Jeffers Memorial Lecture & general session

May 18, 2024:
Awards Ceremony

January 15, 2024:
deadline for schools to register their schools on Reviewr and for individuals to contact the VJAS office and register

March 4, 2024:
deadline for edited submissions and for sponsors to confirm submitted papers

April 19, 2024:
Deadline for sponsors to confirm the participation of accepted students, notify the VJAS Office of students who cannot participate, notify the VJAS Office of any name or paper title corrections, and notify the VJAS Office of presentation times requests

May 4, 2024:
VJAS 2024 Symposium!



Be sure to check out the VJAS Handbook for more information! The VJAS Handbook is a one-stop shop for any and all information on the Symposium and can be found online on the VJAS website.

THE VEE SCHOLARSHIP

By Reagan Labert

Seniors, worried about finding time to do research for the VJAS Symposium and apply to scholarships? Don't be! The Virginia Environmental Endowment (VEE) has partnered with VJAS and provided scholarships to two deserving high school students every year since 1984, totaling over \$70,000 awarded to date. High school seniors may apply to the VEE by indicating so on their regular VJAS Symposium application through Reviewr.

The Virginia Environmental Endowment is an organization dedicated to improving the environment “by using its capital, expertise and resources to encourage all sectors to work together to prevent pollution, conserve natural resources, and promote environmental literacy.” Check out more at <https://www.vee.org/>.



STARTING YOUR VJAS PROJECT

By Reagan Labert

Whether you're a seasoned competitor or a student making their VJAS debut, conducting research can be a daunting process. Have no fear! The VJAS Handbook is a great place to start, and extra advice is included below:

1. **Finding inspiration:** Look through scientific newsletters, read through abstracts of past VJAS projects, or ask your science teacher to get some ideas. It's a good idea to come up with 2-3 potential projects and then narrow it down based on your schedule and resources.
2. **Researching your topic:** Sir Isaac Newton once said, "If I have seen further, it is by standing on the shoulders of giants." Know your "giants" by conducting extensive research on your topic and reading current scientific literature. Keep track of your sources in case you need to go back later.
3. **Reaching out to a mentor:** Remember to keep it professional. Research your mentor and include specific details about what you find interesting about their work and why you want to work with them. Consider having a friend or teacher read over your email to a possible mentor before hitting "send". It's also a good idea to attach your resume.
4. **Collecting data:** Start with the end in mind; one way to do this is by creating your data table before writing your protocol. This way, you can make sure that your protocol allows you to collect all of the data you need. Nothing is worse than writing your VJAS paper and realizing that you forgot to collect critical data.
5. **Tracking the details:** Be sure to keep a detailed lab notebook. Key word: detailed. The few extra seconds that you spend jotting down notes about your research will save you even more time when you go to write your paper.

INTERESTED IN BEING A MENTOR?

By Brian Zhou

Each year, the Virginia Academy of Science (VAS) offers its mentorship program for K-12 classrooms across Virginia, pairing scientists with K-12 classrooms to conduct long-term science projects.

Mentors (grad students, postdocs, instructors, scientists, researchers, etc.) have been critical to the success of the VAS Mentorship program! In the past, these mentorships have been in-person, hybrid, and virtual, conducive for sharing this opportunity for mentorship with as many across the Commonwealth as possible.

VAS's hope is to offer students and instructors the opportunity to conduct research projects of local significance or engage in citizen science, helping collect and analyze data for pressing issues in the state of Virginia and beyond.

If you are interested in becoming a mentor, please contact Dr. Mike Wolniak (mwolyniak@hsc.edu) if you would like to become a mentor, or even if you have any questions! We would greatly appreciate it if you could share this call for participation with other prospective mentors as well.



VJAS RECIEVES POWER FOUNDATION GRANT

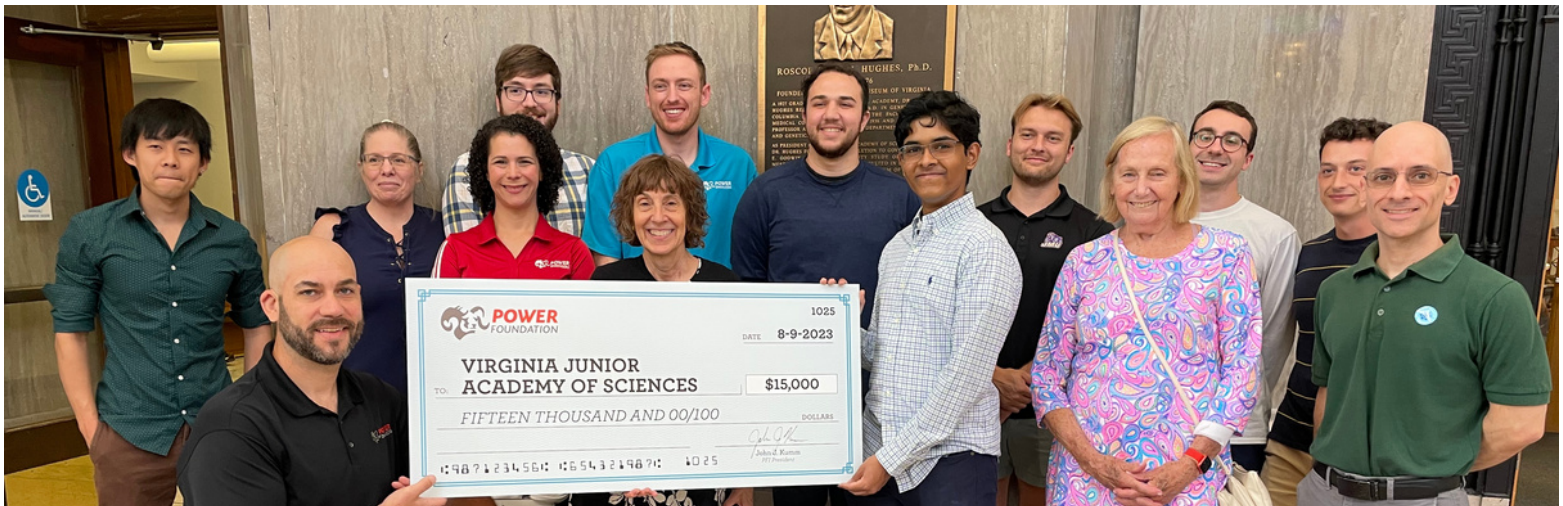
By Yash Saxena

Over the summer, the Virginia Junior Academy of Science received a \$15,000 grant from the POWER Foundation, the non-profit arm of the engineering and consulting firm POWER Engineers that is dedicated to supporting STEM education and activities in local communities. The POWER Foundation aims to make the world a better place by inspiring, nurturing and empowering future generations of problem solvers. The Junior Academy will be allocating the \$15,000 to help support student researchers as such:

- \$5,000 will be added to the Don Cottingham Fund, which provides financial assistance to students who cannot afford to attend the symposium.

- \$1,000 will be added to the Phil Robinson Research Fund, which provides grants for student researchers to purchase necessary materials for conducting their research.
- \$9,000 will be for subsidizing the attendance of female and non-white students to make future VJAS symposiums more easily accessible to historically underrepresented groups in student scientific research.

For information about applying for a grant from the Phil Robinson Research Fund, please complete the form in the VJAS Handbook and send it to Mrs. Susan Booth, Director of the VJAS, at this email: director@vjas.org, by November 1st , 2023. If you or your organization would like to support the Virginia Junior Academy of Science in any way, please contact Mrs. Susan Booth, Director of the VJAS, at this email: director@vjas.org.



ASTRONOMICAL EVENTS OF 2023

By Sattwik Nath

There are only a few months left in the year of 2023, but there are still so many astronomical events and space missions that remain to happen. Some of the spectacular celestial events that have occurred this year are the meteor showers, comet C/2022 E3 reaching its brightest, and the super blue moon of August. There were also a number of space missions that happened this year like ESA's Jupiter Icy Moons Explorer as well as several missions to the moon like Luna 25, Chandrayaan 3, and SpaceX's Starship.

What lies ahead is no less exciting. A solar eclipse on October 14th will be visible from southwestern US. This will be followed by the Orionids Meteor Shower that will be visible from Richmond on the nights of October 21st and 22nd. October 28th will bring a partial lunar eclipse. From November 19th to December 24th, we will be able to experience the Geminid meteor shower.

There are also some interesting space missions that will be happening; NASA's Osiris-rex may send a capsule of asteroid samples to Earth on September 24th. This mission started in 2016, with NASA's mission to land on an asteroid named Bennu, about 334 million kilometers away. The goal of the mission was to bring samples from Bennu. This mission is significant as this may help us explain the origin of life on Earth. It is believed that asteroids like Bennu may have been instrumental in bringing life into existence on Earth and other planets.

My favorite event will be NASA's launch of the Psyche mission to a metallic asteroid, also named Psyche, on October 5th, 2023. The spacecraft will reach Psyche in the year 2029. The spacecraft consists of cameras to take pictures up close. A gamma ray neutron spectrometer would let it measure the elements that compose the surface of Psyche. It will also have a magnetometer to detect magnetic fields at Psyche. Psyche is a metal rich asteroid that is three times farther away from the Sun than is Earth. It orbits the Sun between Mars and Jupiter. Scientists believe this to be the remnant core of a miniature planet (planetesimal) that was formed in the early stages of the creation of our solar system. After the outer body of the planet would have cooled and solidified, it would have collided with other objects. This collision would have stripped off its rocky outer layer, thus leaving just the core.

This is a journey that will help us understand what lies deep within our own planet, i.e. the core of the Earth. The extreme temperature and pressure makes it almost impossible to reach near the core of the Earth. A 2,900 km layer of solid rock lies in the way of us reaching the molten layer of earth. Temperature in excess of 5,000 degree celsius and the pressure which is 3.6 million times more than the surface of the Earth makes it impossible to see what lies within the Earth. Hence, Psyche would give us a glimpse of what lies within our own planet. You can read more about this at <https://www.nasa.gov/psyche>.

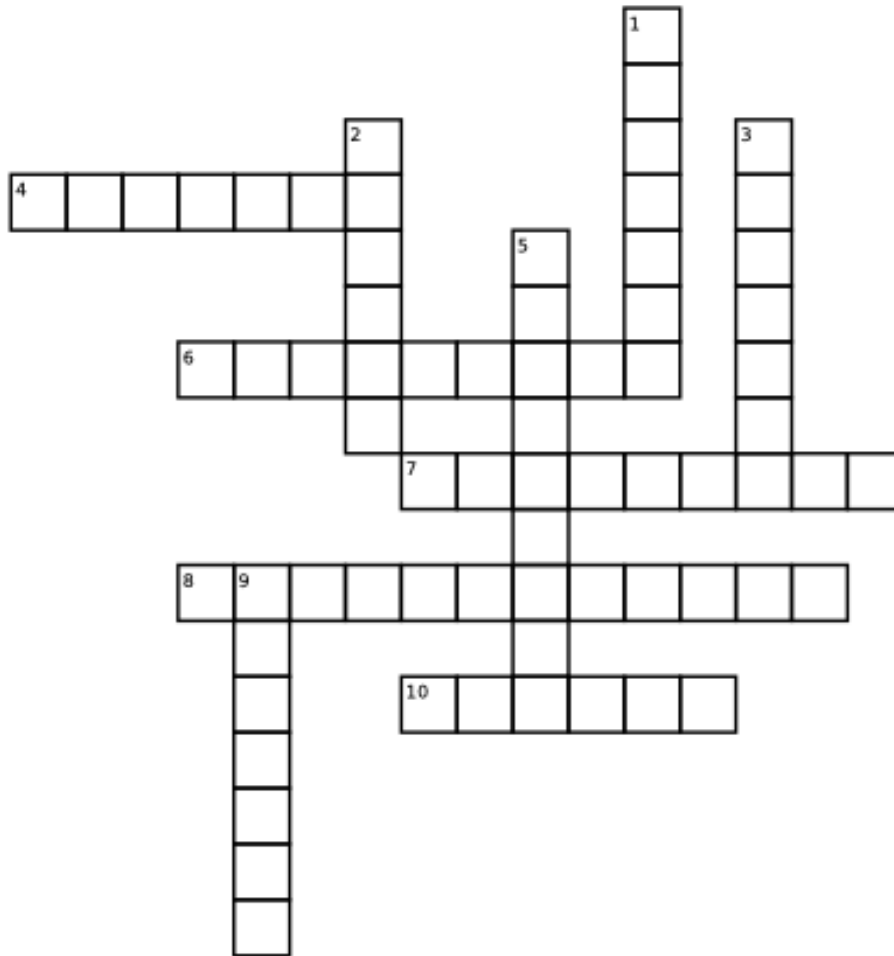


The Psyche Asteroid
Image from The Conversation

VJAS Astronomy Crossword

[PRINTABLE VERSION](#)

[ANSWER KEY](#)



Down:

1. A type of small, dense star formed from the collapsed core of a massive supergiant star
2. A cloud composed of dust and gas in outer space
3. Italian astronomer who observed the moons of Jupiter
5. A measurement of time based on its namesake's ability to travel nearly 6 trillion miles in one year
9. A biannual occurrence in which the Sun appears to travel exactly over the equator

Across:

4. Term used by Johannes Kepler to describe a planet's orbit
6. American astronomer who researched the possibility the extraterrestrial life
7. A body floating in outer space either rocky or metallic in composition; smaller than an asteroid
8. The astronomical model in which the Earth and other planets revolve around the Sun
10. The outer layer of the Sun's atmosphere; comprised of various gases

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VJAS Website: <https://vjas.org/index.html>

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

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X (formerly Twitter): @VJASsymposium

Instagram: @vjassymposium

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