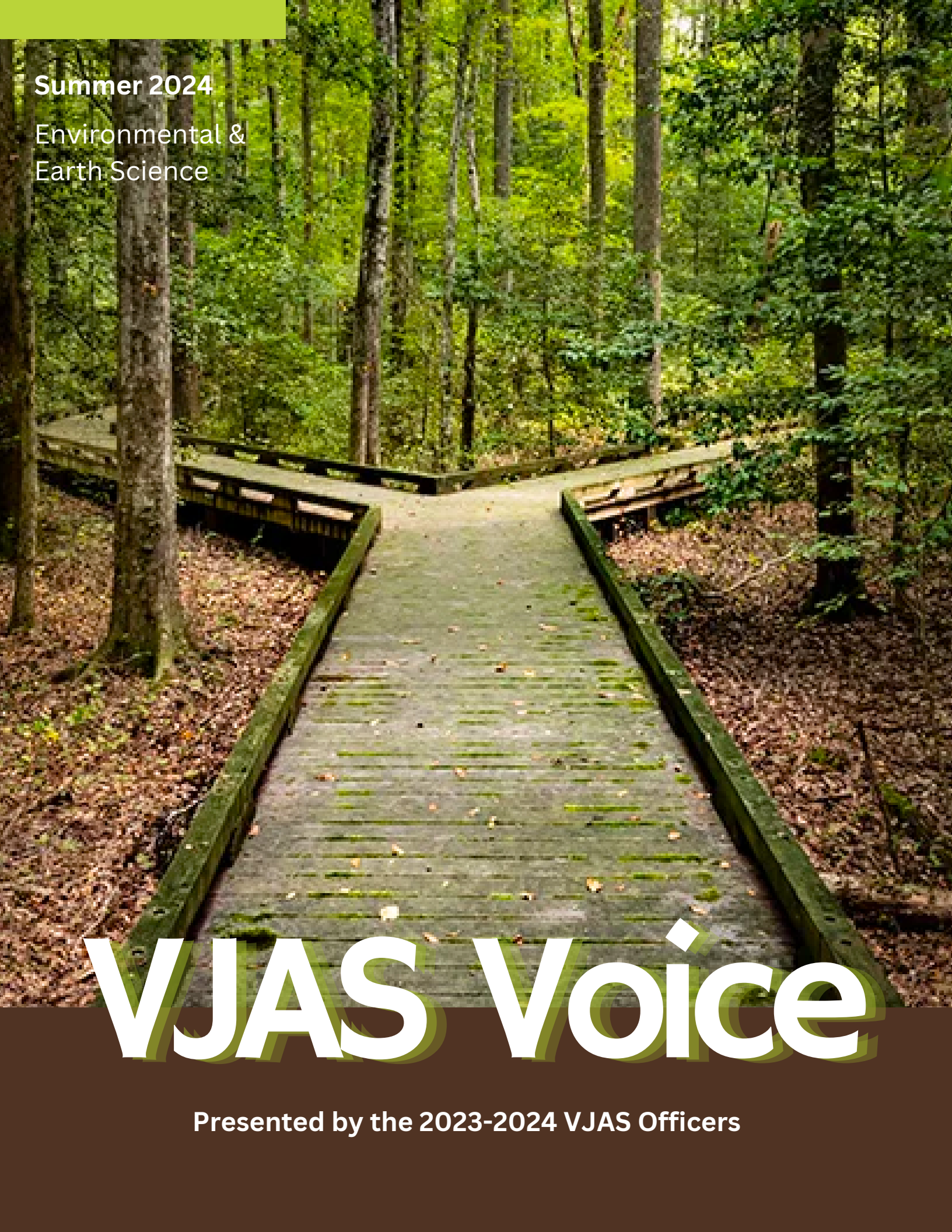




Summer 2024

**Environmental &
Earth Science**

VJAS Voice

Presented by the 2023-2024 VJAS Officers

VJAS Voice

Summer Edition

GOODBYE (FOR NOW)

By Editors-in-Chief Brian Zhou and Reagan Labert

It's hard to believe that the 2023-24 VJAS season is over! Before we go, we would like to communicate our gratitude on behalf of all of the VJAS officers and the VJAS senior committee.

So, thank you, readers! Thank you for putting in the hard work, long hours, and dedication to complete your research. Thank you for stepping outside of your comfort zone to present in front judges. Thank you for reading the VJAS Voice. Most of all, thank you for being a part of the VJAS community. Each and every student plays an integral role in creating this constructive community, dedicated to personal growth and to uplifting others in the sciences.

As editors, we have had an exciting year getting to talk to students, interview professionals, and viewing student presentations during the symposium. VJAS is the forefront of innovation and creativity, and every participant has the overwhelming potential to succeed. We cannot wait to see what you accomplish!

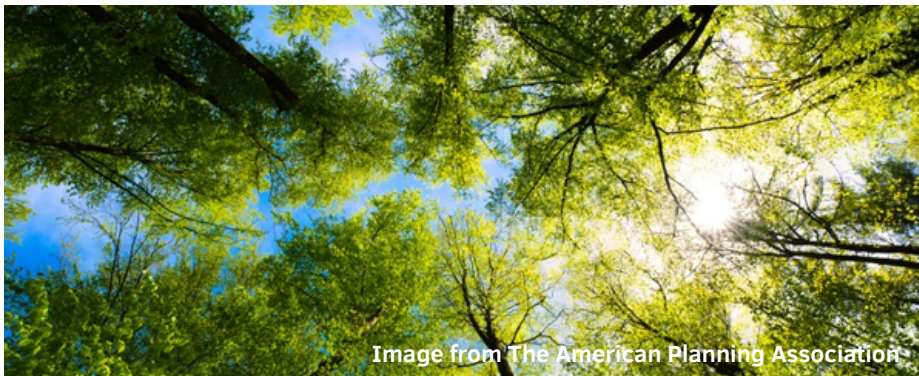


Image from The American Planning Association

Newsletter Highlights

2024-25 VJAS Officers

Page 03

2024 Symposium Awards Shoutout

Pages 04-05

The American Junior Academy of Science

Page 07

A Look Into The Governor's School At Innovation Park

Pages 08-10

Current Events In Environmental Science

Page 12



"The wilderness holds answers to questions man has not yet learned to ask"

- Margaret Murie, Naturalist and "Grandmother of the Conservation Movement"

2024 VJAS SYMPOSIUM

By Reagan Labert

The 2024 VJAS Symposium has now come to an end, with the final event, the Awards Ceremony, closing out the season on May 19th. There were so many spectacular projects this year, and the awards certainly reflected that! Some awards are listed below, but please note that there are many more awards (including section awards) listed on the VJAS website under the 2024 Symposium page. You can also visit this page to learn about the school and title of the project submitted by each winner. Who knows, maybe you'll find some unexpected inspiration for your next research investigation?

THE VEE SCHOLARSHIP

By Reagan Labert

The Virginia Environmental Endowment (VEE) has partnered with VJAS and provided scholarships to two deserving high school students every year since 1984, totaling over \$700,000 awarded to 78 students 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/> or on pages 41-43 of the VJAS handbook.**

2024-25 VJAS OFFICERS

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Editor-in-Chief VJAS VOICE

Sriyutha Morishetty

Maggie L. Walker High School

2024 SYMPOSIUM AWARDS SHOUTOUT

By Reagan Labert

CATEGORY AWARDS

VAS BOTANY AWARD

Thomas Bill and Leslie Yang

ANN M. HANCOCK CELLULAR BIOLOGY AWARD

Samvrit Rao

RODNEY C. BERRY CHEMISTRY AWARD

Neha Pilliai

VIRGINIA PENINSULA ENGINEERS ENGINEERING AWARD

Aashritha Penumudi

MATHEMATICS AWARD

Angelina Guo

PHYSICS AWARD

Minghui Zhang, Louis To, and Maxim
Lupariello

PSYCHOLOGY AWARD

Kabilan Prasanna

STATISTICS AWARD

Sriyutha Morishetty

VABE ZOOLOGY AWARD

Rania Lateef

SPECIAL INTEREST AWARDS

CANCER RESEARCH AWARDS

Kaur Bhoomika
Sabharwal Yashvir

DR. AND MRS. PRESTON H. LEAKE AWARD IN APPLIED CHEMISTRY

Madeline Levorson

Gamma Sigma Delta Award

Lucian Pozzi

ROSCOE HUGHES GENETICS AWARD

Alice Zhang

DR. SMITH SHADOMY INFECTIOUS DISEASES AWARD

Helen Hanke

VIRGINIA MUSEUM OF NATURAL HISTORY (VMNH) AWARD

Christopher Ransone

VIRGINIA SEA GRANT COLLEGE PROGRAM AWARD

Khadeejah Alsheikh, Kayla Minter, Willow
Weeks

SCHOLARSHIP WINNERS

BETHEL HIGH SCHOOL SCHOLARSHIP

Rania Lateef

HENRY W. MACKENZIE ENVIRONMENTAL SCHOLARSHIP (VEE)

Layla Leo

FRANCES AND SYDNEY LEWIS ENVIRONMENTAL SCHOLARSHIP (VEE)

Libbie Hospodar

MIDDLE SCHOOL HONOR AWARDS

DOROTHY KNOWLTON AWARD AND OUTSTANDING RESEARCH PROJECT, Grade 7

Deen Lateef

JOYCE K. PETERSON AWARD AND OUTSTANDING RESEARCH PROJECT, Grade 8

Eve Dodd and Ainsley Davis

HIGH SCHOOL HONOR AWARDS

JONES/ELLETT AWARD

Caitlin Murphy

VJAS GRAND HIGH SCHOOL AWARD, Grades 9-12

Rania Lateef

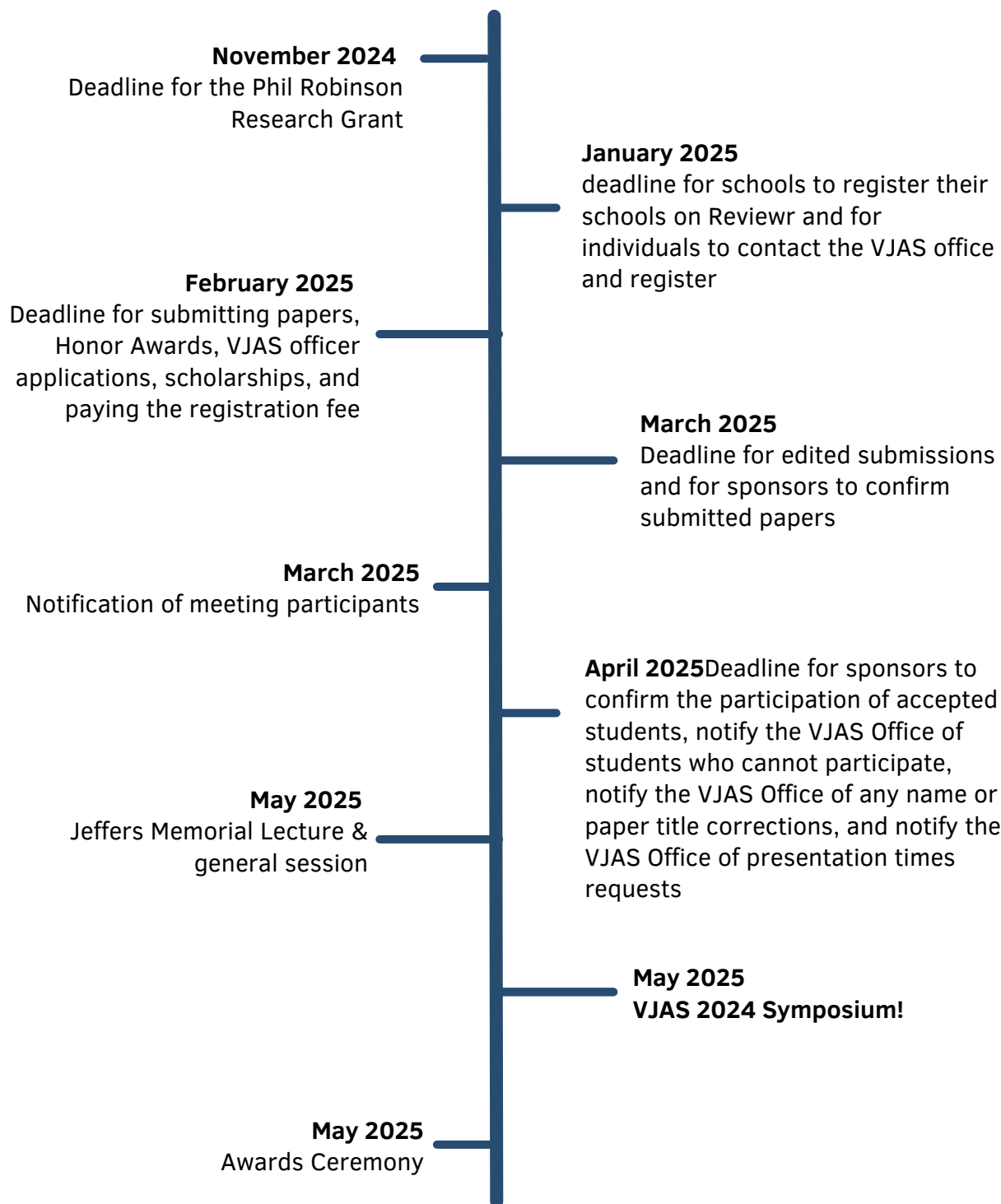
VJAS DELEGATES TO AJAS

The VJAS delegate chosen to attend the 2025 AJAS Symposium is Rania Lateef with her project “Rhythms and Blues: Examining Potential Health Hazards of Blue Light-induced Circadian Disruption in *Drosophila melanogaster*”

The alternates (in order) are Samvrit Rao, Ashrita Gandhari, and Siruthya Morishetty.

WAIT, WHEN IS THAT DUE?

A VJAS Timeline



Dates for the 2024-25 season will be finalized in September.

THE AMERICAN JUNIOR ACADEMY OF SCIENCE

By Hannah Qi

The American Junior Academy of Sciences (AJAS) recognizes America's high school students for outstanding research in various scientific fields. Each state's corresponding Junior Academy of Science is able to nominate two students as AJAS delegates. For the 2023-2024 school year, Erika Milhorn and Rania Lateef did an outstanding job representing Virginia, and took part in various exciting experiences. Here is what they had to say:

1. What are your general thoughts about AJAS? Was it what you were expecting?

Rania: "Attending AJAS was probably the highlight of my research journey...It was amazing to see the projects of my own peers from around the country and also learn from eminent researchers who were presenting their work."

Erika: "It was a wonderful experience and was better than anything I expected. It was amazing to meet people from around the country that love research and science"

2. Do you consider this to be a meaningful experience for young researchers?

Rania: "This is absolutely a meaningful experience and one worth striving for. It is a platform to share our findings, to learn from others and get excited about the future of science."

Erika: "Yes, it was amazing to see the opportunities inside of research and how people can continue research after high school and university."

3. Your favorite experience from attending AJAS?

Rania: "One of my favorite things to do was attending breakfast with the scientist. Here we got to meet in small groups with amazing scientific researchers who shared their own journey, tips on how to approach research and stem careers, and navigate college as STEM students."

4. What was the experience of presenting at the AAAS conference like?

Erika: "Everyone at AJAS presented a poster presentation where people could come and ask about your research. It was a unique experience because there was no pressure to compete, people were there because they wanted to learn more about your project."

A LOOK INTO THE GOVERNOR'S SCHOOL AT INNOVATION PARK

By Rania Lateef

I am a rising senior at the Governor's School at Innovation Park and at Charles J Colgan High School, in Manassas VA. You may be wondering how I attend two high schools. That is because of a special program agreement between George Mason University (GMU) and Prince William County Schools. A cohort of approximately 60 juniors and seniors, including me, attend George Mason University each morning, for our STEM courses, and we return to our base high school each afternoon for our English and humanities coursework. Being at GMU is an amazing experience – we even have real college IDs and, more importantly, real college professors teach us. We also conduct longitudinal research and present a final thesis at the end of each year, complete with an oral defense. This may sound intimidating, but it is an elevating experience supported by dedicated faculty.

Recognizing that this model is not necessarily well known across Virginia, I wanted to share my experience and publish an

interview with one of my impressive instructors, Dr. Alexis Patanarut (or Dr. P. to her students). Each student at the Governor's School much choose a specific track they wish to specialize in: our options are Physics, Chemistry, Biology, and Engineering. While we have similar math coursework, our track determines which science courses we will take, as well as our electives. I am in the Chemistry strand so I took College Chemistry with Dr. Patanarut this year, and next year I look forward to Organic Chemistry and Environmental Chemistry. Dr. P also supervised my yearlong Introduction to Research course which culminates in a thesis, oral defense, and poster symposium. My journey at Governor's school beautifully complemented the goals of VJAS and the requirement to write up our research paper and submit for the oral presentation. Given my positive experience I wanted to invite Dr. P to share her perspective as an educator. I hope you will find this interview as informative as I did!



Image from George Mason University

RANIA'S INTERVIEW WITH DR. P

Rania: I know you had a career in scientific research and industry prior to teaching, can you tell us a little bit about that? How have those experiences influenced your approach to teaching chemistry to high school students?

Dr. P: Prior to transitioning to teaching full-time, I spent around 7 years working in a biotechnology company that focused on developing diagnostic test kits that utilized functionalized nanoparticles. My role within the company involved developing new particle types as well as establishing baseline ranges for quality control/quality assurance purposes. The company that I worked for was based on the hydrogel nanoparticle technology that I helped develop when I was in graduate school. It was an opportunity that I am grateful to have experienced, since the combination of working in industry and carrying out graduate research has helped me really establish the important skills that I would like my students to learn. Skills such as oral and written communication, organization, and problem solving, are very valuable in any research and academic setting. They are also skills that I teach to my students in the time that they spend working on their Mentorship research projects. Industry and graduate school have also taught me to be a lifelong learner. Working in industry has specifically encouraged me to innovate and develop new solutions to old problems. Because of my experiences prior to entering education, I strive to foster a classroom culture of lifelong learning and to encourage my students to never lose their innate curiosity about the world around them.

Rania: In your opinion, what role do research and programs like VJAS play in enhancing the learning experience for high school students interested in STEM?

Dr. P: I believe programs like VJAS provide students with valuable experiences in STEM fields. By encouraging students to engage in research and present their findings to the public, it helps students hone their skills by presenting their work and effectively communicating their discoveries. The hands-on component of carrying out research projects that students are passionate about also enhances critical thinking and boosts their confidence. Probably most important though, research programs also help students see the connections between the real world and the education that they are receiving inside the classroom.



Image from Prince William County Public Schools

Rania: As your student, one thing I have enjoyed most is how you incorporate projects and experiential learning into our chemistry class - what advice do you have for educators on seeking out such assignments and keeping students engaged in the subject?

Dr. P: I guess it is my background in studio arts that served as a motivating factor for me to begin including art in my chemistry curriculum. One of the qualities that make an excellent scientist is creative thinking. Just like the sciences, studio arts also requires creative problem-solving. This can involve adapting old artistic techniques toward new applications or developing new art methods to achieve a desired effect in the final product. Another essential part of art is to be able to take one's own observations and assemble them into a format they can present to their audience as well. At the end of the day, there are more similarities between art and science than one may initially think! By incorporating art into a science curriculum, I believe students can become the next generation of excellent problem-solvers.



Rania: Do you have a favorite memory of experience from your years in teaching or research that you'd like to share with us?

Dr. P: Project-based learning is a big component of my classes, and one of my favorite memories involves a case study that I assigned to my environmental chemistry students focusing on the health effects of pollution. The students form small teams of experts in different fields and are provided with details about the case that are specific to their areas of expertise. Once the student groups have analyzed the details of the case, they come back together as a class to discuss their findings and develop solutions to fix the pollution issue. This year is my sixth year of assigning this case study, and it is nothing short of amazing to see my students become so involved and passionate about the case study year after year. Even more heart-warming is witnessing their willingness to work together and make compromises to develop solutions that everyone can agree on. During the time that the students spend working on the case study, I can see their eagerness to make a difference in the world around them. Making the career change to become a teacher is one of the best decisions of my life. Every day that I am in the classroom, I get to see my students' motivation, resiliency, and empathy. These kids are talented and remarkable in their unique ways, and they continue to inspire me to make a difference in their lives.

EMPOWERING YOUTH THROUGH EDUCATION: THE ROLE OF STUDENT RESEARCH VOLUNTEERS AND THE VIRGINIA JUNIOR ACADEMY OF SCIENCE

By Rania Lateef

Amid the persistent challenges surrounding vaccine hesitancy, particularly among young individuals, initiatives aimed at bolstering vaccine knowledge and confidence play a pivotal role in public health endeavors. Harnessing the power of education, especially within school settings, emerges as a potent tool in combating misinformation and fostering informed decision-making regarding immunization.

A Research study sponsored by VAS, VJAS, and researchers from Georgetown University and Emory University was just published earlier this year in the American Journal of Health Education. This study looked at the efficacy of vaccine education videos on enhancing vaccine science knowledge among VA high schoolers. The

VJAS officers helped to advertise the study and recruit subjects. [Check out the publication!](#)

This study highlights the potential for integrating comprehensive vaccine education into state curricula, equipping students to make informed public health decisions as they transition into adulthood. By bridging the gap between scientific expertise and educational outreach, initiatives spearheaded by student researchers and organizations like VJAS hold immense promise in shaping a generation of health-literate individuals capable of safeguarding their well-being and that of their communities.



Image from Cedars-Sinai

CURRENT EVENTS IN ENVIRONMENTAL SCIENCE

By Gretchen Gaffney

Although the year of 2024 is only halfway done, there have been many exciting discoveries in the field of environmental and Earth science. From attempting to help fight against climate change to new advancements in biotechnology and its usage in medicine, scientific research has offered many new experiments and discoveries. Two specific examples of these groundbreaking findings include but are not limited to a new water treatment method and improvements in green chemistry.

According to the University of California, there may possibly be a new process of water sanitation and filtration called electrochemical oxidation. By treating the water with ultraviolet light and sulfite, the polyfluoroalkyl and perfluoroalkyl substances, or PFAS, are broken down. These substances are what contaminate the majority of our drinking water. This process also works for other concentrated organic compounds in water. A few reasons for this method is to combat the water pollution done by fire-suppressant foams, which are linked to a higher risk of cancer. Feel free to learn more here: [Water Filtration and Sanitation](#).

The chemical processes used to make many commercial products have been harming the Earth and our ecosystem for many years. Luckily, innovations have been made to fight against the ever growing pollution. Researchers are beginning to develop computational tools and models that are able to predict the effect of certain chemical processes on the surrounding environment. There have also been advancements in plastic reduction and

sustainable catalysts. MiTerro, one of the main innovators in the reduction of plastic, has set an example by creating ways to repurpose and reuse industrial by-products and biomass waste. Please feel free to learn more about their process at <https://www.miterro.com/>. Another improvement has been in the finding and usage of catalysts used to speed up or slow down chemical reactions. Most catalysts used today leave a hefty carbon footprint and are expensive and harmful to mine. A group of scientists have been able to figure out ways to reduce humanity's carbon footprint by finding and creating sustainable, eco-friendly catalysts. One can easily learn more about this from [Chia-Wei Hsu](#), a prominent figure in this new move to sustainable catalysts.

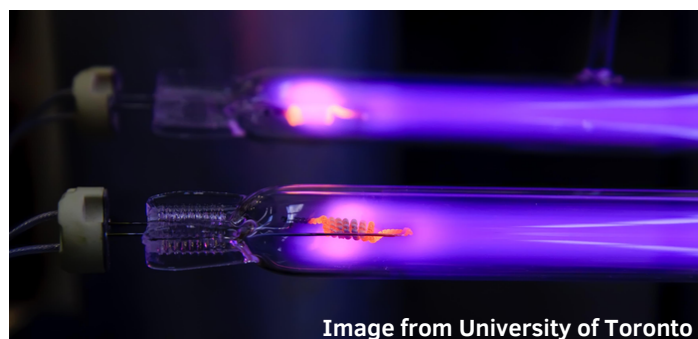
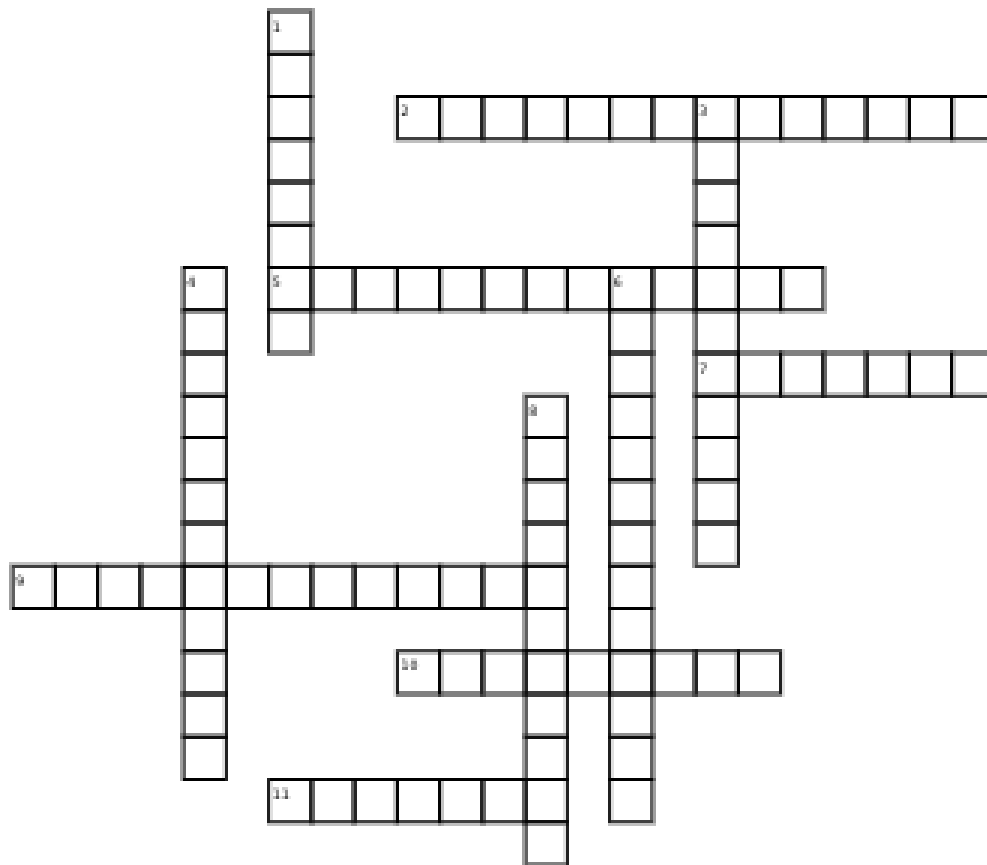


Image from University of Toronto

There is even more fascinating information on these subjects plus others. The pages listed above and [Science Daily](#) can give more information on all the innovations talked about including ones not discussed. Scientists are working everyday to make more advancements in environmental and Earth science and these links can open a world of new discovery which I highly recommend.

Environment Crossword

[PRINTABLE VERSION](#)
[ANSWER KEY](#)


Down:

1. A variety of a plant developed from a natural species and maintained under cultivation
3. The process during which an individual organism undergoes morphological and/or physiological adaptation to one or more abiotic elements
4. The variety and variability of life on Earth
6. A process in which the pH drops as the conditions become more acidic
8. The controlled cultivation of aquatic organisms such as fish and crustaceans

Across:

2. A social goal for people to co-exist on Earth over a long time
5. Planting trees to increase the area of forest
7. A process that takes place in the presence of oxygen
9. Caused by or related to human action
10. The introduction of harmful substances or products into the environment
11. An underground layer of water-bearing material

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

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

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