



"Virginia Scientists" is the official newsletter of the Virginia Academy of Science (VAS). This publication offers information for VAS members such as upcoming events, past events, scholarships/awards information, accomplishments of VAS members and other timely information.

Editors:

Sujan Henkanaththegedara
Deborah Neely-Fisher

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Virginia Scientists

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THE ACADEMY'S CENTENNIAL YEAR: 2022-2023

Ninety-seven annual meetings, and counting ...

On April 26-27, 1923, scientists and science educators convened for the first meeting of the Virginia Academy of Science on the campus of the College of William and Mary in Williamsburg. Organized by UVA biologist Ivey Lewis and invited by William and Mary biologist Donald Davis, the 135 attendees became charter members of the new organization. The group developed a constitution, in which

they described the mission of the VAS this way:

"To promote the development of interest in scientific matters in the State; to provide means for the prompt publication of papers or abstracts; to provide opportunity for increased co-operation and fellowship among its members; to co-operate with other scientific bodies having similar aims; and to render public service in scientific matters."

Whether you are a new member or longtime member of the Academy or Junior Academy (VJAS), you probably notice the remarkable similarity between our aims now and the aims that were articulated in 1923.

The centennial of the Virginia Academy of Science is only a few years away. We have plenty to commemorate in the nearly ten decades since that first meeting in Williamsburg: nurturing successive generations ... *cont'd. P.5*



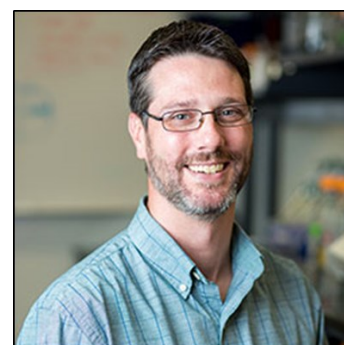
A historic photo of 1925 VAS Annual Meeting attendees © VAS Website

President's Message

As I write this note, my family and I are celebrating the birth of our little boy, Adam James Isaacs, who is now only 2 weeks old. It is hard to believe how fast time flies by, and I am reminded of this as my children (5 in total now) continue to grow up at lightning speed. Their ages span from 15 years old to a newborn so our family can appreciate the various seasons of change associated with a large family. As I parent them today, I often reflect on the events of the past and those times yet to come.

The Virginia Academy of Science also has much to celebrate as we count our current blessings and reflect on the past achievements and future endeavors. Thinking back to May 1999, I remember my first VAS meeting where I presented my undergraduate research project at the annual meeting at Old Dominion University. Little did I know then, that 20 years later I would be standing at the same location as VAS President to give the welcome address.

... *cont'd. P.5*



Gary D. Isaacs
President, VAS



2019 Fall Undergraduate Research Meeting at Christopher Newport University

This year's annual Fall Undergraduate Research Meeting is being held for the first time at Christopher Newport University in Newport News on November 2, 2019. Begun in 2001, the meeting is designed as a way for undergraduate scientists from across the Commonwealth to prepare research posters and compete for \$750 grants in support of their ongoing research. Winners of these grants will present their final projects in May at the Virginia Academy of Science Annual Meeting to be held in 2020 at James Madison University.



Thanks to the generosity of the Academy as well as several outside sponsors, at least 9 grants are expected to be awarded at the Meeting this year. Other highlights include a keynote presentation from Dr. Amorette Barber of Longwood University on her groundbreaking research in tumor immunology, a career panel featuring scientists in academic, government, and industrial positions, and a "lightning talk" section in which each participating institution will have a representative give a 5 minute oral presentation on their ongoing research to the group. The Meeting will also highlight the outstanding scientific facilities at Christopher Newport for supporting student-centered scholarly research.

Submitted by **Mike Wolyniak**
VAS President-Elect
Program Chair for the 2019 Fall Undergraduate Research Meeting



Photo credits:
www.virginiannaturalhistorysociety.org

The Second Conference of the Virginia Natural History Society

The Virginia Natural History Society (VNHS) was formed in 1992 to bring together persons interested in the natural history of the Commonwealth of Virginia. The VNHS defines natural history in a broad sense, from the study of plants, animals, and other organisms to the geology and ecology of the state, to the natural history of the native people who inhabit it. The goals of the VNHS are to promote research on the natural history of Virginia, educate the citizens of the Commonwealth on natural history topics, and to encourage the conservation of natural resources.

The second conference of the Virginia Natural History Society, which will be held from 10 am to 4 pm on Saturday, November 2, 2019 at the Virginia Museum of Natural History in Martinsville. We welcome submission of titles for presentations on any aspect of natural history, which is broadly defined as the study of plants, animals, and other organisms, the geology of the state, and the natural history of the native people who inhabit it.

Online registration is now open (students \$10, VNHS Members \$15, and Non-members \$25). These fees include a box lunch and 2 coffee breaks. Registration is available online through October 23rd. After 23 October, registration will be available only on-site, and the fee will increase by \$5 for each category.

Presenters must register and provide a title by October 16, 2019.

Here is the link to registration www.virginiannaturalhistorysociety.org



Virginia Academy of Science Executive Officers, 2019-2020

Congratulations to our new Executive Committee Officers, the Academy applauds you for donating your time and talents to serve this organization. If you would like to nominate a member to join the Executive Committee rotation for 2020-2021, please contact Deborah Neely-Fisher, Chair, Nominations Committee, 2019-2020 at dneely-fisher@reynolds.edu. Nominee's should have some experience participating on a standing committee, ad hoc committee or may have served as an officer in a section. For more information concerning membership on the Executive Committee please see Article X, Election of Academy and Section Officers, in the Constitution, and Article II, Duties of Officers, in the By-laws at <https://vacadsci.org/about-vas/constitution-bylaws/>.

From left to right- Secretary, Christopher Osgood, Old Dominion University; Treasurer, Joseph D'Silva, Norfolk State University, Gary Isaacs, Liberty University; Amorette Barber, Vice-President, Longwood University, President-Elect, Michael Wolyniak, Hampden-Sydney College. Photography © Dr. Richard Groover, Assistant Dean, J. Sargeant Reynolds Community College.

Virginia Scientist in the Spotlight

“Virginia Scientist in the Spotlight” series introduces scientists in Virginia covering various scientific disciplines. Our guest scientist for this issue is:

Amorette Barber

Affiliation: I am an Associate Professor of Biology, the Director of Longwood’s summer research program PRISM, and I recently became the Director of the Office of Student Research at Longwood University. Prior to coming to Longwood in 2011, I was an adjunct assistant professor of Biology at Colby-Sawyer College in New Hampshire.

Education: I received my Bachelors of Science degree (Biology with Honors, minors in chemistry and physics) from the University of Richmond in 2003. In 2009, I earned my PhD in molecular and cellular biology from Dartmouth College. Then I completed a post-doctoral fellowship in the department of microbiology and immunology at Dartmouth Medical School in 2011.

Your teaching/classes? Primarily, I teach upper-level classes including Genetics, Immunology, and Biology of Cancer. These upper-level courses are focused not only on learning disciplinary content, but also on analysis of primary literature and experimental design. In addition to lectures, I spend class time discussing how to solve “big questions” in these fields, such as designing a vaccine for malaria or targeted cancer treatments. My teaching strategy stresses the integration of research in all of my classes and I am dedicated to incorporating semester-long research projects in the labs for these classes.

I also have had the pleasure to teach the biology senior capstone courses for many years. In the senior capstone classes, I have the opportunity to mentor students on how to write an NSF-style research proposal, evaluate and present scientific literature, and reflect on scientific ethics and the role of science in society.

Your research? Past and current projects? My research focuses on enhancing immune responses to cancer. Current cancer treatments such as surgery, chemotherapy, and radiation result in adverse side effects. Therefore, the development of novel therapies that specifically target tumor cells and minimize damage to healthy cells is desirable. One option is to use cells of the immune system, specifically T cells, which kill cells that appear dangerous or foreign. To maximize tumor cell-targeting by T cells, genetic engineering is used to express receptors that enhance tumor cell recognition. These receptors, named chimeric antigen receptors (CARs), endow the T cell with a way to recognize the tumor cells and activate many cellular functions to eradicate the tumor. Encouragingly, CAR-expressing T cells have recently received FDA-approval for cancer therapy and the chimeric antigen receptor that I developed during graduate school is currently in Phase II clinical trials.

My current research at Longwood University focuses on studying how to enhance T cell immunotherapy for many different types of cancer through 1) creation and testing of novel CARs, 2) investigation of immune cell function, and 3) study of how various compounds (including natural products and parabens) alter immune cell function. In addition to the applications to human health, my research also has implications in enhancing our understanding of general immunology and tumor therapies.

Notable work/publications? During the past eight years at Longwood University, I have published nine peer-reviewed research papers. Most importantly, the undergraduate research students in my lab played an integral role in the development and publishing of these studies, and I have published six peer-reviewed papers with eighteen Longwood undergraduate student co-authors. These papers are in two of the leading Immunology journals, *Molecular Immunology* and *Immunology*, and in a highly-ranked chemistry journal, *ACS Medicinal Chemistry*, and I



“Seek out opportunities, accept challenges, and never be afraid to try something new. Find what excites you and make it your career.”

-Amorette Barber

received the VAS J. Shelton Horsley Award for one of these publications in 2015. One of my most recent publications described my lab’s creation of a novel CAR for tumor therapy (chPD1) and has garnered much interest among the research community, including being highlighted in “Cell Therapy News” in July 2017 and being one of the Top 5 Cited articles in Immunology in 2017. Furthermore, I developed a human version of this chPD1 receptor and received an international patent for the receptor and my research was featured in NPR’s “Academic Minute” in fall 2019. I also have been invited to give seminars on my research at various conferences including at the American Association for Cancer Research conference, the Cell Symposia: Cancer, Inflammation, and Immunity conference, at Kite Pharma (one of the leading biotechnology company that develops CARs for cancer therapy), the Cleveland Clinic, an International Conference in Biotechnology in Morocco, and I was the Sidney S. Negus Memorial Lecturer at the Virginia Academy of Science annual meeting in 2018.

Hobbies? I enjoy spending time with my husband, daughter, and dog at our lake house where we love to swim, fish, hike, and star gaze.

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"It is a new initiative of the VAS Science Education Committee to bring Academy scientists into K-12 classrooms across the Commonwealth."

Science Education Committee launches new classroom mentoring initiative

The Academy's Science Education Committee is excited to launch a new mentoring program this year designed to bring Academy scientists into K-12 classrooms across the Commonwealth. The program was inspired by the Virginia Department of Education's new Seal for Excellence in Science and the Environment Program available to students starting with those entering ninth grade for the first time in 2018-19. Under this program, students that complete laboratory or field science research and present the findings in a formal, juried setting will be eligible to receive the Seal for

for Excellence in Science and the Environment on their high school diploma. The Academy initiative brings Academy scientists to classrooms interested in pursuing this program to act as a mentor and guide for their research work in conjunction with their classroom teacher. The Virginia Junior Academy of Science provides an ideal setting in which to present their work to complete the work necessary for the Seal.

The goals of the program are to expand the presence of the Academy in the K-12 science education efforts of the Commonwealth, to provide a mechanism

for Virginia students to earn the Seal for Excellence in Science and the Environment recognition, and to increase the capacity for high-impact educational practices in the form of research work to be done by K-12 students across Virginia, especially in traditionally underserved regions such as Southside and the Southwest.

Please contact **Mike Wolyniak** at Hampden-Sydney College (mwolyniak@hsc.edu) for more information about the program or to get involved as a mentor or a mentored classroom.

Governor Northam's Executive Order Covering Environmental Issues



The Final Report for Governor Northam's Executive Order 6 (covering the Department of Environmental Quality and environmental issues) is published. It is 13 pages long and does highlight some thoughts about DEQ and what they should do as changes. DEQ's initial review and stakeholder meetings identified a list of actions that the Northam Administration and the agency could take or initiate in advance of this report to help protect Virginia's environment and strengthen DEQ service and performance. Actions completed or initiated to date include:

- The Commonwealth began utilizing funding provided by the Volkswagen emissions cheating scandal, including a \$14 million contract to build out Virginia's electric vehicle charging network and an additional \$14 million grant round to electrify regional transit buses.
- In September of 2018, Virginia joined the Transportation and Climate Initiative (TCI) to work with other East Coast states to develop solutions for carbon pollution reductions in the transportation sector.

- Also in September of 2018, Virginia joined the International Alliance to Combat Ocean Acidification (OA Alliance). DEQ and the Virginia Marine Resources Commission (VMRC) are in the process of drafting an Ocean Acidification Action Plan with strategies for reducing the impacts of more corrosive waters driven by climate change on Virginia's fish and shellfish populations, as well as the oyster and clam aquaculture industry.

- Virginia developed an agreement with the National Oceanic and Atmospheric Administration (NOAA) to permanently establish the Commonwealth's Coastal Zone Management Program and better protect our fragile and productive coastal environment.
- Through Executive Order 29, a new Virginia Council on Environmental Justice was established. The Office of the Secretary of Natural Resources worked with the Secretary of the Commonwealth to select a diverse membership for the Council, and DEQ and OSNR will

provide staff support for the Council as it meets over the next year.

- DEQ released a request for proposals to find an outside entity that will help the agency develop a plan to better integrate environmental justice considerations into its work. DEQ expects to establish a contract in 2019.
- Pursuant to the directive of September 12, 2018, DEQ has established an ad hoc work group to advise and assist the agency in the development of a framework for limiting methane leakage from natural gas infrastructure. This group will support DEQ in its collection and evaluation of data to inform development of a regulation. Methane is roughly 30 times more potent than carbon dioxide (CO₂) as a greenhouse gas (GHG) and unregulated methane leakage can threaten emissions reductions achieved by switching from coal to natural gas. DEQ will begin the formal rulemaking process in 2019.

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Virginia Scientist in the Spotlight *Cont'd from P 3.*

Advice for students? Seek out opportunities, accept challenges, and never be afraid to try something new. Find what excites you and make it your career.

Advice for peers? Try to instill your passion for research and your discipline into your classes. Be open to new collaborations and opportunities, you never know where your next big idea might come from. Try to be a role model for the next generation of scientists. I helped to initiate a Science Outreach project with local high schools and I have thoroughly enjoyed this experience. The love of science was sparked in me by a middle school science teacher and I hope to light that spark in some of the high school students I have been working with.

When did you join VAS? I joined VAS in 2011 when I came to Longwood University.

Your Role in VAS? Since joining VAS, I have had the pleasure of working with many committees including the Publications committee from 2013-2018, and I currently serve on the Science Education committee, Finance and Endowment committee, and the Trust committee. In addition, I served as the Treasurer in 2018-2019 and I am currently the Vice President. I also have helped to organize the Undergraduate Research Showcase at the Virginia State Capitol in 2016 and 2017 and the Virginia Academy of Science Annual Meeting held at Longwood University in 2018.

Something "cool" about you? Although I have always loved science and biology, all through high school I dreamed of being a Radio City Rockette (until I found out I was one inch too short!). I started dance when I was three years old and I was part of a dance company even through college. Dancing helps keep me well-rounded and is a great stress reliever.



Submitted by **Amorette Barber**
VAS Vice-president

The Academy's Centennial Year *Cont'd from P 1.*

of scientists, advocacy for science education, support of scientific research, and promotion of informed science-based decision-making in our Commonwealth and in society.

The "centennial year" actually covers parts of two calendar years. The 100th Annual Meeting of the Academy will occur in May 2022. Our hundredth year will end in May 2023.

At the Academy Council's May 2019 meeting, VAS President Gary Isaacs announced the

formation of an ad hoc committee to oversee the publicity and celebrations in connection with the VAS centennial. Will you help? If you would like to volunteer, contact Gary. Academy members are needed to develop the vision and implement the plans for commemorating the accomplishments of the VAS and VJAS and appropriately celebrating the centennial milestone.

Meanwhile, take the time to read the detailed discussion of the Academy's history on our website. It's a historical analysis, not

merely a chronology. Decide how you will become involved in the VJAS and VAS, claiming and shaping our future as we enter our second century of service to the Commonwealth.

Submitted by **Woodward S. Bousquet**
Professor Emeritus, Environmental Studies and Biology, Shenandoah University
Immediate Past President, Virginia Academy of Science

President's Message *Cont'd from P 1.*

Even as an undergraduate student I noticed the faithful service of academy members and felt the direct and indirect influence of faculty mentors focused on training young scientists for their future careers. Having seen first-hand the events of then and now, I can earnestly say that although times have changed the academy has held true. We not only celebrate the academy's past but we find ourselves joyfully in the work of the present. Plans are currently well underway for the 2019 Fall Undergraduate Research Meeting at Christopher Newport University on November 2nd. This meeting serves to encourage young scientists and support the work of their faculty advisors in training our future science champions. The meeting also awards grant money for meritorious undergraduate proposals with an

invitation to present their findings the following May at the annual meeting. This year, James Madison University has graciously agreed to host the VAS Annual Meeting in May so be on the lookout for updates concerning this event.

As we look to the future, a major milestone for the academy is rapidly coming into view. We will celebrate our 100th annual meeting in 2022. With less than 3 years to prepare, we are working hard to raise funds, secure space, and promote this centennial event across the state in order to have a meeting to remember. Join us as we prepare to reflect on our past achievements and charge forward for what is to come.

In closing, I would like to express my gratitude to the VAS Executive Council for the honor of working alongside them as I serve

in the role of president this year. So far it has been a true joy to learn about the business of the academy, and I look forward to many years of service with the executive team and its associated standing committees. I hope this message has encouraged you as we reflect on where we have been and where we are going. I invite you to be a part of the Virginia Academy of Science so we can celebrate together!

Submitted by **Gary D. Isaacs**

Professor of Biology, Liberty University
President, Virginia Academy of Science

Know your VAS logo



1. What is the flower depicted in the inner circle of the VAS Logo?

2. Who are the four famous Virginia Scientists listed in the middle ring of the Seal or Logo?

3. What is the Academy's Maxim?

Answers: 1. The flower is the Dogwood. It is in full bloom at the top of the seal and as a bud at the bottom of the seal. 2. The four famous scientists are Walter Reed, a physician, Matthew Fontaine Maury, an explorer and cartographer, John Clayton, a botanist, and Thomas Jefferson, an agriculturist and educator. 3. Of course everyone should get the last question correct, the maxim is "Ignorantia Supremus Tyrannus" Ignorance is the greatest tyrant.

VAS Office Mailing Address:

Virginia Academy of Science
Science Museum of Virginia
2500 West Broad Street
Richmond, Virginia 23220

VAS Office Phones:

804-864-1450
804-864-1451
804-864-1488 (Fax)

VAS Office Email:

vasoffice@vacadsci.org

VAS Office Staff:

Philip Sheridan, Executive Officer
psheridan@vacadsci.org
Carolyn Conway, Associate Executive Officer
vasoffice@vacadsci.org
Arthur Conway, Executive Officer Emeritus
aconway@vacadsci.org

VAS Office Hours:

Tuesday & Thursday ~11 am to ~1 pm

Governor Northam's Executive Order *Cont'd from P 4.*

- DEQ will update renewable energy "permit by rule" (PBR) regulations to make the permitting process for solar projects of 150 megawatts or less faster, clearer, and more transparent. DEQ is poised to release the proposed updated regulation for solar projects for public comment in 2019 and plans to finalize it in 2020.

- DEQ will begin work to update the State Water Control Board's stormwater management and erosion and sediment control regulations to improve program administration in the wake of legislation requiring consolidation of the programs. A Notice of Intended Regulatory Action (NOIRA) to begin this process has been issued with the hope that the Board's regulatory action on this can conclude in 2020.

- DEQ completed its work on a regulation to reduce carbon pollution from fossil fuel fired power plants by 30 percent over the next

decade. The rule will allow (but does not require) Virginia to link to the Regional Greenhouse Gas Initiative (RGGI) carbon trading market to reduce carbon pollution at the lowest possible cost. The State Air Pollution Control Board (Air Board) has approved the final regulation.

- DEQ has engaged the Office of the Attorney General (OAG) to take on more referrals for enforcement action. With the assistance of the Office of the Secretary of Natural Resources, DEQ and the OAG have developed an informal agreement to improve communication and collaboration on major enforcement cases. To date, the OAG has accepted several referrals and is in the process of taking stronger enforcement action against polluters. Referrals include the Mountain Valley Pipeline erosion and sediment control violations and unpermitted land disturbing activities and water quality violations at Fones Cliffs on the Rappahannock River.

- DEQ plans to update its website to improve usability, and increase public communications through media advisories and social media. At the Administration's request, DEQ received funding in the budget to proceed with the website overhaul, which will be completed in spring of 2020. DEQ also hired a new communications director to bring a more proactive and strategic approach to public engagement and communicating with the media.

- DEQ is working to increase the transparency and ease of access to information regarding DEQ's regulatory boards and to make presentations and other information provided to the boards clearer and easier for the public to understand and access.

Submitted By **Richard Groover**

We Invite You to Contribute to *Virginia Scientists*

Virginia Scientists is the official newsletter of the Virginia Academy of Science (VAS). This publication offers information for VAS members such as upcoming events, past events, scholarships/awards information, accomplishments of VAS members and other timely information. We electronically publish Virginia Scientists twice every year and circulate to all current members and academic institutions.

We would like to extend an invitation to you to submit articles to Virginia Scientists and/or use the advertising space. We are currently accepting articles for the next issue.

The length of the article should not exceed 500 words. Any exceptions must be get approved by the editors prior to submission. Please consider following categories to submit.

- Member achievements – your publications, awards and other professional achievements related to science
- Upcoming events – information about educational and professional events
- Historical notes – articles related to history of science and scientists in Virginia, and VAS

- Summaries of scientific studies related to Virginia
- Advertisements (commercial events, products etc.)

If you have ideas beyond these categories and think it is suitable for publication here, please check with editors before you proceed. Article and any accompanying high quality photographs must be electronically submitted to Sujan Henkanaththedegara (henkanaththedegara@longwood.edu).

If you would like more information about the advertising space, please contact Debbie Neely-Fisher (dneely-fisher@reynolds.edu).

Please let us know if you need more information and/or have any questions.

Sujan Henkanaththedegara
Deborah Neely-Fisher
Editors, Virginia Scientist