



**VAST's Vision:**  
*Excellence in Science Education  
Through Innovation*

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# The Science Educator

Late Spring 2018

A Publication of VAST, The Virginia Association of Science Teachers

Vol. 66, No.5

## **VAST PDI 2018 Diversify and Strengthen Science for All**

**November 15-17, Williamsburg, VA**



**General Session Speakers for the 2018 PDI. From left to right:** Astronaut Scott "Scooter" Altman and Dr. Jeff D. Jordan, Dr. Okhee Lee, and Astronomer Munazza Alam.

The Virginia Association of Science Teachers Professional Development Institute theme for 2018 is ***Diversify and Strengthen Science for All***. We will be returning to historic Williamsburg. The theme calls on us to celebrate the ever-increasing diversity in our student population across the Commonwealth. The upcoming PDI will offer a wealth of information about science resources that are available throughout the state of Virginia. Please consider attending to share and gather information on how to better serve the rich tapestry of students we serve across the state.

We have an exciting array of speakers to motivate, inspire and expand your knowledge base. Astronaut Scot "Scooter" Altman and Dr. Jeff D. Jordan will share effective approaches for cultivating science and teacher leaders. Internationally respected science educator and researcher Dr. Okhee Lee will discuss and present a concurrent session on science and language assessment. Astronomer Munazza Alam will wow us

with her adventures as a National Geographic Young Explorer.

The 2018 VAST PDI is being designed so that all teachers of science and their resource teams can share their best practices, celebrate their accomplishments, and discuss learning and teaching practices that ***"Diversify and Strengthen Science for All."***

- In addition to sessions related to our theme there will be concurrent sessions in all subject areas for grades k-12.
- Learn about new online strategies, how to access low-budget instructional materials or sharpen your understanding of climate change.
- Interact with vendors in our Exhibit Hall as you collect samples of new instructional materials and explore cutting-edge technologies.
- As an added bonus you can shop for cool science themed stuff.
- Our vendors love science teachers!



## CARRYING THE TORCH

*VAST has become the voice for science teachers in Virginia and beyond. Our membership has served on committees and task forces, as well as, provided educational sessions and honed leadership skills. We must all carry the torch for this kind of engagement.*

*As your executive director, my priorities are to have financial stability so that a quality program is given to our membership. Next is the cultivation of new relationships with all, whether they are teachers, supervisors, principals, exhibitors, vendors and others.*

*Our message must continue to ring. Our message must inspire and make it worthwhile for building partnerships. Our ability to meet face to face and to learn and network within our community will lead to continued success for all.*

*I ask you to carry the torch and take the opportunity to get involved. Attend your VAST event, join a committee, sign up for a leadership position or just participate. Take the first step, meet and greet and find new people and new practices that strengthen your work. Enjoy those results and keep the light burning.*

*Susan Booth, EdS*  
EXECUTIVE DIRECTOR

*Teacher Appreciation Week*  
*“Thank You” for All the VAST things You Do*

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## From the desk of the VAST President

**Dr. Jackie McDonnough**  
VAST President 2018



This month will mark one year since I retired from a 28-year career in education. As I reflect on the past year I was struck by how many of the themes that were salient during my first years of teaching are currently playing out. After almost 30 years the old nurture or nature argument has been heightened by groundbreaking brain research and the question of who gets quality science instruction still confounds.

New research on the impact of trauma on the human brain underscores how devastating any type and amount of trauma is on children and how that in turn impacts learning. Traumatic experiences include physical, sexual, and emotional abuse; family and community violence; natural disasters; wars; and the ongoing, cumulative impact of poverty, racism, and oppression. The follow excerpt is taken from DeCandia & Guarino's 2015 article titled ***Trama-Informed Care: An Ecological Response published in Journal of Child and Youth Care Work.*** (I removed their references for easier reading. I highly recommend reading the entire article for a valuable background information.)

An event becomes traumatic when it overwhelms the neurophysiological system for coping with stress and leaves people feeling unsafe, vulnerable, and out of. In the face of a confirmed threat, the amygdala and hypothalamus, structures in the limbic system—the brain's emotional control center—activate the body's survival responses: fight (actively confronting the source of the stress), flight (avoiding the stress), or freeze (shutting down). Neurohormones, including adrenaline and cortisol, prepare the body for action to combat the threat and protect itself, and later, support a return to a physiological state of balance once the threat has passed. Real and perceived threats continually retrigger the stress response, causing a person's neurological system to go into a state of disequilibrium. In this constantly dysregulated state, an array of maladaptive behavioral responses can develop. For children, exposure to early and ongoing traumatic stress (e.g., child abuse, neglect, family violence) without adequate parental and other supports can lead to a "toxic stress" response that has profound effects on brain development. The neurobiological impact of prolonged heightened stress responses and elevated stress hormones includes changes to brain architecture and to the functioning of neural pathways including those associated with learning, memory, and the ability to self-regulate and cope. Also, it results in a heightened baseline state of physiological arousal and increased sensitivity to internal and external triggers. These alterations place children at greater risk for adverse developmental, emotional, functional, and academic outcomes. Page 11

Given what we now understand about the impacts of trauma in it's many forms on children, the next steps should include better equipping teachers to recognize and take appropriate action. Getting teachers to that point of competence requires a shift in teacher preparation and ongoing professional development. It also calls for teachers to undergo a shift in their reactions to what we have long labeled as children's misbehaviors. Accessing the resources of our colleagues in Special Education and Counseling is a courageous first step. Another step is evaluating our school and school system's policies and practices as they relate to children who have experienced trauma.

In my humble opinion, how the education community uses this new knowledge of trauma-informed care in developing new policies related to student codes of conduct, teacher professional development and student support services will set the stage for more equitable and enjoyable school experiences for teachers and students.

*Jackie*

**Dr. Jackie McDonnough, VAST President**



## 2018 ANNUAL PROFESSIONAL DEVELOPMENT INSTITUTE

### **“DIVERSIFY AND STRENGTHEN SCIENCE FOR ALL”**

#### **THURSDAY EVENING GENERAL SESSION SPEAKERS ASTRONAUT SCOTT “SCOOTER” D. ALTMAN AND DR. JEFFREY “JEFF” D. JORDAN**

(SPONSORED BY ASRC FEDERAL)



#### **“CREATING SCIENTIFIC LEADERS: STORIES OF EFFECTIVE APPROACHES TO TEACHING LEADERSHIP SKILLS IN K-12”**

**ASTRONAUT Scott “Scooter” D. Altman**

**United States Navy Captain, Engineer, Test Pilot, NASA Astronaut, and a veteran of four space flights,** Altman has logged over 51 days in space and more than 7000 hours flying over 40 types of aircraft. Hear about his exciting work on the Hubble Space telescope, experimental test aircraft, and his myriad experiences that have led him to his current leadership position as Senior Vice President Of Civil Operations for the Engineering, Aerospace and Mission Systems operating group. Relive the excitement of space travel as Scooter shares his many adventures both in space and on the Earth. Follow in his footsteps as he tells his story of an Illinois youth who aspired to be a pilot and who faced challenges and adversity along the way to realizing his dreams. Don't miss the opportunity to learn the history behind an American hero and meet this scientific leader in Williamsburg at VAST 2018!

**Dr. Jeffrey “Jeff” D. Jordan**

**Dr. Jordan has dedicated much of his career to supporting the NASA mission** as both a civil servant and a contractor at the NASA Langley Research Center, where he has mentored students in leadership skills for nearly two decades. These experiences have provided valuable insights into the challenges facing young scientific leaders and informed approaches for successfully coaching leadership skills that result in the development of effective teams. In this presentation, Dr. Jordan will highlight some of his experiences and observations mentoring students in scientific leadership positions, and lead an interactive discussion on effective approaches for cultivating scientific leaders.

CONTINUED...





## GENERAL SESSION SPEAKERS

### FRIDAY MORNING SPEAKER

## MUNAZZA ALAM, NATIONAL GEOGRAPHIC YOUNG EXPLORER

(SPONSORED BY NATIONAL GEOGRAPHIC LEARNING/CENGAGE)



### “BUILDING STRONGER CLASSROOMS: DIVERSITY, EQUITY, AND INCLUSIVITY”

While efforts to build inclusive spheres of learning have typically been linked to welcoming diverse perspectives and backgrounds, these attempts do not address longstanding barriers that result in social disparities. In this talk, I will discuss the challenges to tackling equity, the importance of fostering equitable learning environments, and daily practices to create more equitable classrooms.

**Munazza Alam** is a second year graduate student in the Department of Astronomy at Harvard University. She was a physics major at CUNY Hunter College in New York City, and has worked in various research groups in the Astrophysics Department at the American Museum of Natural History. Munazza’s

research interests include the detection and detailed characterization of the atmospheres of exoplanets, or planets beyond the Solar System. Her work involves using data from the Hubble Space Telescope to infer the presence of different molecules in their atmospheres.

To collect data for her research, Munazza has used world-class telescopes at the Kitt Peak National Observatory in Tucson, Arizona; the Mauna Kea Observatories in Hilo, Hawai’i; and the Las Campanas Observatory in La Serena, Chile. When Munazza isn’t contemplating the cosmos, she is reading anything she can get her hands on, trying new ethnic foods, and learning new languages.

CONTINUED...



## GENERAL SESSION SPEAKERS

### SATURDAY MORNING SPEAKER

**DR. OKHEE LEE, NEW YORK UNIVERSITY**

(Sponsored by the Virginia Space Grant Consortium)



### **“DIVERSIFY AND STRENGTHEN SCIENCE FOR ALL”**

***“Science for All: Instructional Shifts to Promote Science and Language Learning With All Students Including English Learners”***

In recent years, there have been fundamental shifts in thinking about both science and language learning with all students and English learners (ELs) in particular. Science instructional shifts promote language learning with ELs, while language instructional shifts promote science learning with ELs. Recognizing the science and language instructional shifts as mutually supportive can lead to better and more coherent instructional approaches that promote both science and language learning for all students, especially ELs. This presentation will address a conceptual framework along with examples from science curriculum materials and classroom instruction.

Dr. Okhee Lee is a professor in the Steinhardt School of Culture, Education, and Human Development at New York University. Her research areas include

science education, language and culture, and teacher education. She is currently leading collaborative research between New York University and Stanford University to develop instructional materials aligned with the Next Generation Science Standards (NGSS) in order to promote science learning and language learning of elementary students including English learners. She is also leading collaborative research with MIT and Vanderbilt University to integrate computational thinking and modeling in NGSS-aligned instructional materials. She was a member of the NGSS writing team and served as leader for the NGSS Diversity and Equity Team. She was also a member of the Steering Committee for the Understanding Language Initiative at Stanford University.

# VAST SCHEDULE AT A GLANCE - 2018



## Wednesday, November 14, 2018

7:00 p.m. - 8:30 p.m. VAST Board of Directors Meeting & Dinner

## Thursday, November 15, 2018

7:30 a.m. Ticketed Donna Sterling Institute Preconference Short Course

8:00 a.m. - 3:00 p.m. Short Course Continental Breakfast and check in

2:30 p.m. - 5:15 p.m. Short Course Presentations and Lunch

3:15 - 4:45 p.m. Title: *Collaborative Teaching in Science Content Areas*

**PDI Registration Desk Open**

**Pre-Conference Ticketed Workshops**

*Elementary: Take a Walk on the High Wire! Exploring Balanced and Unbalanced Forces through Inquiry and Practices of Science! (Sponsored by Delta Education)*

*Middle School: Integrating Science, Math, and Workplace Skills (Sponsored by Longwood University)*

*High School: Diversity in Science and Inclusive in the Classroom (Sponsored by National Geographic/Cengage)*

5:30 p.m. - 6:45 p.m.

**General Session I** – Welcome to the PDI

Speaker: Astronaut Scott “Scooter” D. Altman and Dr. Jeff D. Jordan

Title: *Creating Scientific Leaders: Stories of Effective Approaches to Teaching Leadership Skills in K-12.*  
(door prize giveaway at the end of the session) (Sponsored by ASRC Federal)

6:45 p.m. - 7:30 p.m.

**Regional Science Challenge** (general session room)

7:30 p.m. - 9:00 p.m.

**Night with the Exhibitors** (Cash Bar)

## Friday, November 16, 2018

7:15 a.m. - 5:00 p.m.

**Registration Desk Open**

7:30 a.m.

**Continental Breakfast in the Exhibit Hall**

7:30 a.m. - 10:30 a.m.

**Exhibit Hall Open**

8:30 a.m. - 9:20 a.m.

**Concurrent Session 1 breakout presentations**

9:35 a.m. - 10:25 a.m.

**Concurrent Session 2 breakout presentations**

10:40 a.m. - noon

**General Session II** - Business Meeting

Speaker: Munazza Alam, National Geographic Young Explorer

Title: *Building Stronger Classrooms: Diversity, Equity, and Inclusivity*

(door prize giveaway at the end of the session) (Sponsored by National Geographic Learning/Cengage)

Noon - 1:00 p.m.

**Ticketed Buffet Lunch**

12:30 p.m. - 6:00 p.m.

**Exhibit Hall Open**

1:10 p.m. - 2:00 p.m.

**Concurrent Session 3 breakout presentations**

2:15 p.m. - 3:05 p.m.

**Concurrent Session 4 breakout presentations**

3:20 p.m. - 4:10 p.m.

**Concurrent Session 5 breakout presentations**

4:25 p.m. - 5:15 p.m.

**Concurrent Session 6 breakout presentations**

6:15 p.m. - 7:00 p.m.

**Ticketed Dinner** (Cash Bar)

7:00 p.m. - 8:15 p.m.

**Awards Ceremony**

8:30 p.m. - 10:00 p.m.

**Auction and DJ** (Sponsored by Legends of Learning)

## Saturday, November 17, 2018

7:30 a.m. - 10:30 a.m.

**Registration Desk Open**

7:30 a.m.

**Continental Breakfast in the Exhibit Hall**

7:30 a.m. - 11:15 a.m.

**Exhibit Hall open**

8:30 a.m. - 9:20 a.m.

**Concurrent Session 7 breakout presentations**

9:35 a.m. - 10:25 a.m.

**Concurrent Session 8 breakout presentations**

10:25 a.m. - 11:15pm

**Last Chance to Visit the Exhibit Hall**

(no other events scheduled, all exhibitors will remain open until 11:15.)

11:00 a.m. - 11:25 a.m.

**Pickup ticketed box lunch to eat during General Session III**

11:30 a.m. - 12:45 p.m.

**General Session III** - Meet your new VAST officers

Speaker: Dr. Okhee Lee, New York University

Title: *Science for All: Instructional Shifts to Promote Science and Language Learning With All Students Including English Learners* (door prize giveaway at the end of the session)  
(Sponsored by Virginia Space Grant Consortium)

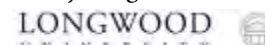
1:00 p.m. - 1:50 p.m.

**Concurrent Session 9 breakout presentations**

2:05 p.m. - 2:55 p.m.

**Concurrent Session 10 breakout presentations**

(\$50.00 gift card giveaway at the end of each concurrent session.)



[Menu](#)

# VAST PDI 2018

## Diversify & Strengthen Science for All

November 15 - 17, Williamsburg, VA



### Doubletree by Hilton, Williamsburg

50 Kingsmill Rd. Williamsburg, VA 23185

[Williamsburg.DoubleTree.com](http://Williamsburg.DoubleTree.com)

TEL: +1-757-220-2500

Have you gone to the PDI and had to stay at a different hotel? It is easier to attend more sessions, events and to have time to network and socialize when you stay in the conference hotel. Consider making your reservations early to insure that you have a room.

Complete information about the 2018 VAST hotel can be found on the “annual PDI” page ([VAST.org](http://VAST.org)). Click on [Hotel Information, Prices, Online Reservation Form, WiFi, Menus, and Parking](#). The link to access the 2018 VAST PDI Double Tree reservation page is active now.

**Hotel Room rate:** \$101.00 + 11% tax + \$2.00 fee per night = \$114.11 (*per diem government rate*) (*This rate may increase for reservations made beginning on October 1*)

Make your reservations **online** or by phoning the hotel (1-757-220-2500) and be sure to get the lower conference rate by using the code, **TEA**. The cut off date for using this code is 30 days prior to arrival. All reservations need to be booked before **October 13, 2018**.

**Be sure to check the VAST Website for updates and if needed over-flow hotels if they are needed.**

## PDI SCIENCE AUCTION

Before you do inventory and pack-up your classroom for the summer, remember the Friday night science auction that is held at the PDI. It is a fun for all event and an opportunity to get rid of items you no longer use, have up-date, or have in surplus. You may also be able to get classroom or even lab items you would like to have. The best part is that to participate, it will cost you exactly nothing. That's right – NOTHING! Besides, real money isn't good at the auction!

Do you have a box of glassware sitting in the back of your stockroom that has only a future of collecting dust? Maybe you have an old telescope that you would love to use, if only you could find a replacement part? Wouldn't it be great to be able to trade these and other surplus bits with your fellow teachers of science, and have a good time doing it?

All you need to do is to visit the exhibitors to receive VAST Bucks that are only good at the auction to be held Friday night, November 15th. You could have a chance to burn through hundreds and thousands of VAST bucks to bid on items you would like.

All that you have to do to “earn” VAST Bucks is to visit the exhibitors during the open hours of the Exhibit Hall Thursday night and all day Friday. You may need to remind Exhibitors to give you some VAST Bucks!!

### A FEW RULES TO FOLLOW FOR THE AUCTION:

- First, and foremost is safety – if the item is not safe to use, then consider disposing of this item another way. Please don't donate such items. On the other hand, if an item is broken and could be repaired or is useful for parts, tag it as such.
- Second, don't bring chemicals to the auction. There are just too many safety and storage issues, and besides, passing off a problem to someone else just isn't nice!
- Third, you need to make sure that if you are “buying” something, you intend to use it in the teaching of science and not selling it at your next yard sale.
- Fourth, is permission, make sure that any item you donate is yours to donate OR that you have permission to donate the item for our auction. No live specimens.
- Fifth, you need to make sure that anything you buy you can carry away. We don't deliver and we don't store, so if you bought it, you're taking it that evening!

Start collecting items to donate now. If you do you will have items already to bring to the PDI. See you there!





# VAST IS PLEASED TO ANNOUNCE THE 2018 DONNA STERLING PRE-CONFERENCE: POWERFUL COLLABORATIONS SCIENCE AND SPED INSTRUCTORS WORKING TOGETHER FOR STUDENTS' SUCCESS

VAST has brought together a group of experts from across the nation and teams of our best Virginia science and SPED teachers to lead this pre-conference. The morning will be led by Dr. Sami Kahn and four colleagues from various institutions, all of whom are nationally recognized researchers in science and special education (SPED). The afternoon will be led by teacher-teams of Virginia teachers.

In the morning, Dr. Kahn and her colleagues will lead participants through three mini-master classes focusing on the critical topics of inclusion and collaboration, drawing from their book, *Towards Inclusion of All Learners through Science Teacher Education*. The book serves as an indispensable resource for teachers and teacher educators wishing to understand how to educate students with exceptionalities in science. It begins with the voices and stories of the experts: current and former K-12 students with disabilities sharing their experiences in science education classrooms. The voices of students with disabilities are then connected to the work of leading experts in the area of science education for individuals with disabilities in an effort to address the goals of national reform documents by

ensuring rigorous science experiences for all students. It is written in a highly accessible and practical manner, making it ideal for all educators including pre-service and in-service teachers, teacher educators, researchers, and curriculum developers.

After lunch each participant will attend one of 4 sessions led by a team of a collaborative and a science classroom teacher in the areas of Elementary (3-5), Middle (6-8), Biology and Earth Science. These sessions will include strategies to further raise student performance for high stakes testing.

Each participant will receive a copy of *Towards Inclusion of All Learners through Science Teacher Education*, breakfast, and lunch, as well as ideas and strategies for successful collaborative science teaching.

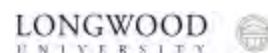
The registration fee for the pre-conference is \$100. Please note that this does not include registration to the VAST PDI Nov. 15-17. The VAST PDI begins at 5 pm on Nov. 15 after the pre-conference. To register for the pre-conference please go to [www.VAST.org](http://www.VAST.org). Use the PDI tab.

## TICKETED DONNA STERLING INSTITUTE PRE-CONFERENCE SHORT COURSE

Thursday, November 15, 2018 **Donna Sterling Short Course:**  
7:30 a.m. Short Course Continental Breakfast and check in  
8:00 a.m. - 3:00 p.m. Short Course Presentations and Lunch  
Title: ***Collaborative Teaching in Science Content Areas***  
2:30 p.m. - 5:15 p.m. **PDI Registration Desk Open**

## AFTERNOON TICKETED WORKSHOPS

Thursday, November 15, 2018 **Pre-Conference Ticketed Workshops:**  
3:15 - 4:45 p.m. *Elementary: Take a Walk on the High Wire! Exploring Balanced and Unbalanced Forces through Inquiry and Practices of Science!*  
(Sponsored by Delta Education)  
3:15 - 4:45 p.m. *Middle School: Integrating Science, Math, and Workplace Skills*  
(Sponsored by Longwood University)  
3:15 - 4:45 p.m. *High School: Diversity in Science and Inclusive in the Classroom*  
(Sponsored by National Geographic/Cengage)



# 2017 Standards of Accreditation Clarification

Dr. Anne Peterson, Science Coordinator VDOE



## 2017 Standards of Accreditation

### 8VAC20-131-70. Program of Instruction and Learning Objectives.

Each school shall establish learning objectives to be achieved by students at successive grade levels that meet or exceed the knowledge and skills contained in the Standards of Learning for English, mathematics, science, and history and social science adopted by the board and shall continually assess the progress of each student in relation to the objectives.

The way the divisions choose to instruct these courses is up to the individual divisions.

That being said, some divisions are choosing to combine 4th and 5th grade science content into one year of instruction. This practice, done effectively to include rich experiences in scientific investigation and opportunities to build scientific skills and processes, can meet the mandate to teach all of the knowledge and skills contained in the Standards of Learning.

However, is it in the best interest of students? And is this compacting done effectively in all classrooms? I would argue no. We are sacrificing time in the science and social studies classroom for the sake of testing. I do not feel this is appropriate for students. I have been

receiving calls from parents and supervisors about the lack of science instruction and I am disheartened to hear this practice is occurring. I certainly understand the pressure that teachers and administrators are under to increase student performance on Standards of Learning assessments, but to sacrifice science instruction is not the answer.

One supervisor at VSELA this week told me that she was told by a school leader that VDOE said it is ok to not teach 4th grade science....I want it on record that we feel that science instruction is important at every grade level. Science instruction is not regurgitation of facts, it is not reading about science. Science instruction is DOING science.

Please be assured that the expectation from VDOE is that all students have science instruction in ALL of the science Standards of Learning and that all students should have robust instruction that includes the development of science skills and processes. Again, how the division chooses pursue science instruction is up to the leadership of the division, but please keep in mind what is best for students.

Anne Petersen, Ph.D.  
Science Coordinator  
Virginia Department of Education

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## VDOE Opportunities from *Teacher Direct*



### Summer Computer Science Opportunities

CodeVA offers free [Professional Development](#) to all Virginia public school teachers to support the teaching of computer science classes or to integrate into classrooms. Teachers may choose from six different training options and seven different training locations around the state beginning this summer!

### Health Smart Virginia

Check out [Health Smart Virginia's teaching resources!](#)

There are hundreds of teacher-reviewed curriculum and instructional resources for social, emotional, physical and environmental health aligned with Virginia Standards of Learning!

### Professional Learning and Development

Go to VDOE [Professional Learning and Development](#) to search the Professional Learning Calendar

### [Science Professional Development Resources](#)

### From the Superintendent's Memos:

Weekly memoranda from the Superintendent of Public Instruction are the means by which the Virginia Department of Education communicates official information to the Commonwealth's school divisions.

- MEMO 080-18

[Teaching Science in the Co-Taught Classroom: Physics Science and Earth Science](#)

# Launching a Weather Balloon to the Blackness of Space

Norm Marshall

HS Chemistry and MS Science Research

Franklin Military Academy

Richmond Public Schools

*Funding for this project was generously provided by the  
2016 Donna Sterling Exemplary Science Teaching Award.*

I think I may be an impostor. I teach chemistry, among other things, in Richmond Public Schools. My SOL End of Course exam scores are not the highest in the city, nor is my pass rate. I teach AP chemistry, but never in my five years have I had a passing score on the AP exam. Training to become an educator, my mentors and professors extolled the power of inquiry and the importance of laboratory experience, but for the past several years, I have been so bogged down in dragging unwilling students through the mathematics of chemistry that I have almost eschewed the laboratory altogether. Through the years, my principal has assigned me to teach various “science research” electives invented for the sole purpose of getting students to produce science fair projects. Last year, however, between my two sections of this elective course, I submitted only one poster to the city’s local fair. The more prestigious regional STEM fair, which requires a written paper in addition to the poster, is still far-off and out of reach. So too are VJAS and the ISEF Science Fair. I feel like I am spinning my wheels. I often don’t feel particularly good at my job. Is there something wrong with me that I cannot seem to inspire my students? I feel like an impostor... and I wonder if any of my colleagues sometimes feel this way too.

A little more than two years ago at the 2015 VAST PDI in Manassas, I was suddenly thunderstruck by an idea that I was sure would quickly and irrevocably transform STEM education at my school: we would launch a high altitude balloon to the edge of space. Why a weather balloon? In 2009, three MIT students made national news when they published photographs of the blackness of space from a camera nestled inside a cheap Styrofoam cooler. The headlines jauntily pronounced that the students had beaten NASA “on a beer budget.” The thing that struck me, however, about the news coverage, was how smart the MIT students appeared. It occurred to me that the only difference between those students and mine is that MIT students are expected to accomplish great and exciting things. I wanted the world to expect great things from my “inner city” students for a change, and I wanted them to learn to expect great things from themselves. The plan was simple: learn how to launch a high altitude balloon, develop innovative and engaging lessons to scaffold the process for inquiring students, launch and recover the balloon, post the pictures, and drink from the keg of glory forever.



High altitude ballooning is nothing new. Accessible to civilians since at least the 1970’s, ballooning has become a growing hobby, with numerous groups claiming their 215 minutes of fame on YouTube. It is, however, still relatively uncommon in secondary education, and two full years after the idea took hold in my mind, I understand why. This is an incredibly difficult undertaking. Launching a weather balloon is, at first glance, relatively easy. A short list of materials will get you flying. The harder part is designing the payload in such a way that it can be recovered after the flight. Harder still is configuring the on board hardware and software so that they can collect and transmit meaningful data throughout the flight. Weather and flight predictions require input of a substantial number of interdependent variables; and, predictions can only be made a few days in advance, making launch day planning difficult. In addition, launching so close to Richmond International Airport and within city limits, we needed special permission from the FAA. Actually, doesn’t all of this sound perfect for small teams of students, each working on one aspect of the project, solving problems as they arise and communicating their progress with the rest of the class? It’s the ultimate inquiry-based STEM project. Just imagine the science fair posters that could be made after the launch!

Continued...

As often happens when the best of intentions meet reality of the classroom, there was a disparity between what I accomplished as a teacher and what I set out to accomplish. When I began, I imagined exactly what Dr. Matt Shields described in his excellent article from 2011. (Journal of Virginia Science Education, vol. 4, n. 2) In my mind's eye, I envisioned students taking the initiative to teach themselves everything they needed to know for all aspects of this project. I saw my role as "wise consultant", pointing enthusiastic kids at different problems and helping them distinguish between resources of varying quality. Instead, never having used a radio transmitter, programmed a Raspberry Pi, nor coordinated with the FAA, I felt that I had to learn everything for myself before I could direct students anywhere. I earned my amateur radio license, I learned the basics of Linux and Python programming, and I watched every single how-to video on the Internet. It took months upon months to work it all out, and I brought my students into the learning process whenever they were willing. I found that while they were happy to do specific tasks if I told them what to do, they were also happy to spend weeks at a time staring at a computer screen if I told them to figure out how to do it for themselves. They, like me, had no idea how to launch a weather balloon, but they also had very little practice solving problems from the ground up.

After many delays, our launch day finally arrived clear and sunny, not too warm, maybe just a little bit windier than I would have liked. My principal generously provided a substitute for my classes so that I could run around making last minute preparations. Suddenly, many, many moving parts converged together to form a machine that was beyond my control. The district's PR office had invited a slew of dignitaries, and students in their military classes began setting up chairs and ushering guests out to our soccer field. A couple of colleagues helped monitor the radio receiver up on the roof. My own students, many of whom had been involved with building the apparatus the previous school year, began setting up the equipment. The mayor arrived, and the news crew. We got the payload attached to the radar deflector and parachute, turned on the radio transmitter. We started filling the huge balloon with helium. I said a few words to the student body, all of whom were assembled and - to my happy surprise - interested in the spacecraft unfolding before them. And then we had to wait. It took almost 45 minutes to inflate the balloon. The middle school students had to go into the building for lunch. The remaining high school students were remarkably patient, but interest began to wane. Finally, we completed the nerve wracking step of attaching the balloon to the payload. We counted down from ten and let go. I don't even remember if anyone cheered. It was one of the highest points of my career so far. Please forgive the pun.

We recovered the payload almost three weeks later, and with it hundreds of pictures and thousands of flight data. My students and I celebrated, and we discussed some of the things we learned from the whole experience. At the very least, it is a story that they will be able to tell for years when they look back on their glory days in high school. As for me, I learned enough to be confident about launching another balloon this Spring. I have a middle school Scientific Research and Design class, and I'm excited to try giving them little bits of this project to work on "from scratch". I am not ready for open inquiry, and I'm not sure my students are either. Even guided inquiry is still a little ways off. However, I know there are several opportunities for inquiry that I can structure for young students. We'll get there.

Dr. Arthur Eisenkraft, during a lecture at the 2013 NSTA National Conference, said that the challenge before us as science educators is that we must do it all, and we must do it right now. He meant that we do not have the luxury of slow, incremental actions, but rather we need a revolution in our classrooms and curriculum. I don't disagree with his sense of urgency. We are rightly admonished that we must make learning fun and engaging, or risk shutting the door on a new generation of scientists and engineers. Teaching and learning steeped in inquiry, creativity, and problem solving is the only way that we will stay competitive in the world's economy. However, I also believe teachers need to be mindful of our own humanness and our own process of discovery. The reality of science - and science education - is long days and nights, usually lonely, hungry, and tired, filled with relentless, mundane procedures and tests. Most of the time, progress is slow, meeting dead end after dead end. Science - and science education - makes progress incrementally. Most discoveries are small and less-than-earth-shattering, but good scientists work intentionally to improve their methods.

Science is a dark and unfamiliar road, and it takes real courage to turn down each new alleyway. The journey is long and laborious, but it is punctuated by small leaps forward. Those epiphanies buoy us along, and occasionally you end up with a mountain top experience, a stunning moment of insight that makes your heart race and your hands quiver. Students and teachers alike need to understand both of these truths. Sir Isaac Newton said, "If I have seen further, it is by standing on the shoulders of giants." There is an unexpected corollary, translated into English over a century earlier: "Rome was not built in a day."

## FUTURE PDIs

2018	DoubleTree by Hilton Hotel, Williamsburg, Nov. 15 - 17
2019	Hotel Roanoke, Roanoke, Nov. 14 - 16
2020	DoubleTree by Hilton Hotel, Williamsburg, Nov. 12 - 14
2021	Hotel Madison and Shenandoah Valley Conference Center, Harrisonburg (JMU), Nov. 17 - 20

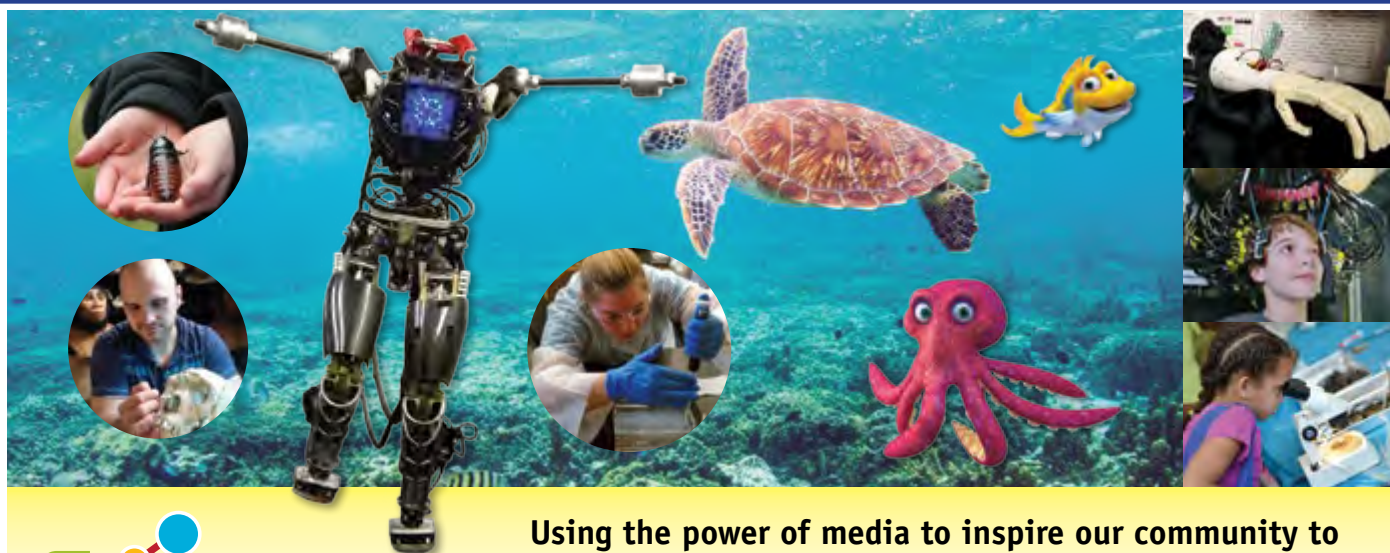


## SUMMER 2018 4-DAY SCIENCE TEACHERS WORKSHOP: "THE SCIENCE OF NUCLEAR ENERGY & RADIATION"

Middle and high school science teachers are invited to enjoy four days of lectures, labs, hands-on activities and tours in an immersive all-inclusive workshop that will provide educators with the opportunity to sharpen their knowledge and understanding of nuclear energy and radiation, enabling them to provide their students with factual and up-to-date information about nuclear science and technology. The workshop will be hosted by Virginia Commonwealth University College of Engineering in Richmond from Tuesday July 17 to Saturday July 21, 2018, and will feature tours of the Surry Nuclear Power Station and VCU's Nuclear Medicine Facilities, as well as numerous laboratories and hands-on activities full with ideas to implement in the classroom. The \$75 registration fee includes 4 days of accommodations on the VCU campus, all meals, all tours, four Continuing Education Credits, a Geiger-Mueller meter to use in your classroom and all educational materials. Please visit <http://local.ans.org/virginia/public-education/> to learn more and to register. The registration deadline is June 15, 2018 and there are limited seats in this workshop.

Please contact Supy Phongikaroon, (804) 827-2278  
[virginia-4dstw@local.ans.org](mailto:virginia-4dstw@local.ans.org) if you have any questions.

## The Science of Nuclear Energy and Radiation



Using the power of media to inspire our community to  
 value science and understand its importance to our future

**Educational Resources** for Teachers and Parents

**Hot Shots & Hot Jobs** in STEM fields

**Green Kids** encouraging Environmental Stewardship

**Community Events Calendar** a hub for Science Events

**Science  
 MATTERS**



[ideastations.org/sciencematters](http://ideastations.org/sciencematters) • [f sciencemattersva](https://www.facebook.com/sciencemattersva)

# Professional Development Opportunities

## Teach students about renewable energy?

**Enroll in the 2018 REcharge Academy – you can even win a scholarship!**

About the REcharge Academy  
The REcharge Academy is a week-long educator training workshop on renewable energy. The intensive training blends lectures from experts and tours of energy facilities with replicable hands-on K-12 lessons to give educators content, as well as context. Participants learn how to build solar-powered cars and boats and wind turbines, as well get a deep understanding of the science behind these projects so they can teach renewable energy concepts in their classrooms. Check out the 2017 REcharge Academy Report to see what educators learned.

**Dates: July 23-27, 2018**  
**Location: James Madison University in Harrisonburg**

### Win a Scholarship!

The Department of Energy's National Renewable Energy Laboratory (NREL) is funding REcharge Academy scholarships for teachers in the 12 Wind For School States, including Virginia. Educators can apply for the scholarships through REcharge Labs here. Applications will be accepted through May 31, 2018. Have a question? Send a note to: [michael@kidwind.org](mailto:michael@kidwind.org).



## SCHOOL WEBINAR:

NHC is partnering with NOAA's Southeast and Caribbean Regional Team (SECR) and the University of Rhode Island to offer public webinars this May.

A free 4-6th grade live school webinar will take place from the Hurricane Awareness Tour on **May 9th at 11am ET**. Information on the webinar can be found here:

<http://hurricanescience.org/resources/nhcwebinar/>

- This webinar is open to schools, classrooms, and home school groups.
- The webinar will include a look into the NOAA Hurricane Hunter aircraft.
- Teachers are asked to register in advance, but there is no cost to register.
- WFOs are welcome to share this information on social media and can contact Dan Brown at NHC if there are any questions.

## Plan a Field Trip to Shenandoah National Park!

Do you want to bring your students to the park for a field trip? Teacher workshop attendance is required before bringing students on a Parks As Classroom program.

We are offering two teacher workshops for kindergarten through 5th grade teachers! These workshops are FREE of charge, but reservations are required. Workshop attendance may satisfy school district requirements for **professional development and re-certification points**. Please see the links below to flyers for more information about the workshops and how to make reservations.

Dates of our workshops are as follows:

- Thursday, **August 9, 2018** - K - 1st grade teachers - [Flyer](#)
- Friday, **September 28, 2018** - 2nd-5th grade teachers - [Flyer](#)

**To register**, or for more information, please call Shenandoah National Park Education Office at 540-999-3500, ext 3489, or email [shen.education@nps.gov](mailto:shen.education@nps.gov)

We look forward to working with you and your students!

**Emily Guss - Park Ranger-Education/ Interpretation**  
[Emily\\_Guss@nps.gov](mailto:Emily_Guss@nps.gov),  
540-999-3500 x3728



# MAYMONT

## TEACHER WORKSHOP PROJECT-BASED LEARNING FOR TEACHERS, GRADES 3-12

FRIDAY, JULY 6, 2018  
9AM-4PM

Register Online Today!  
[maymont.org/pbl](http://maymont.org/pbl)

Get everything you need to implement an exciting learning experience! This one-day workshop on place-based, project-based learning (PBL) opportunities includes an environmental education PBL overview and three sessions on local environmental issues, plus field trip options and tips for using technology to record and submit real world scientific data. For more information, contact [environedu@maymont.org](mailto:environedu@maymont.org) or 804-358-7168.



# Book Review: STEM ROAD MAP CURRICULUM SERIES FOR K-12

EDITED BY CARLA C. JOHNSON, JANET B. WALTON, AND

ERIN PETERS-BURTON

Have you been asked to teach “STEM” in your classroom? Well, you may want to look at a series of books that use an integrated approach to teach science, technology, engineering, and math for K-12 students. It also brings in other disciplines such as social studies as well. One of our own VAST members, Dr. Erin Peters, is one of the series authors, and she is excited about how each book in the series introduces a STEM theme and then uses real-world challenges and problems to solve, usually over a 5-week period. Project-based and problem-based learning are key components used to show how students can tackle problems, challenges, or dilemmas as they learn the integrated content. The books in the series can be taught independently of each other or taught in grade level bands depending on what is needed.

The first five books in the series focus on the theme Innovation and Progress, exploring transportation, solar energy, wind energy, amusement parks, and construction materials. As you use the books you will see how students develop their own solutions to the problem or challenge. For example, the 4th grade module, *Harnessing Solar Energy*, is about energy and energy sources with a focus on solar energy and explores potential and kinetic energy, solar energy, greenhouse effect, and salinity. Students discover how resources can be limited in the world and using an integrated approach to learning. The challenge for the students is to use solar energy to provide the world with clean water in the *Water for All Challenge*. In addition, they participate in a *Water Conservation Expo* to show their understanding of solar energy, water scarcity, and desalination. The energy theme is well-mapped out to allow the teacher to conduct the lessons and assess the students as they complete the unit. The lessons include an overview, essential questions, objectives, content standards, and background information for teachers, meaningful activities, misconceptions, connections to other disciplines, and detailed instructions including how to conduct and assess the lesson. A STEM Notebook prompt is included in each

lesson. Student friendly handouts and a student packet for each engineering challenge are included.

The first five books in the series focus on the theme Innovation and Progress: Click on link below to see read a chapter from each book.

[\*Transportation in the Future, Grade 3: STEM Road Map for Elementary School\*](#) challenges students to design a new kind of train as they learn about geography, magnetic levitation (maglev) trains, and calculating distances and time intervals.

[\*Harnessing Solar Energy, Grade 4: STEM Road Map for Elementary School\*](#) involves investigating energy and energy sources, with a focus on solar energy and water scarcity, as part of the Water for All Challenge.

[\*Wind Energy, Grade 5: STEM Road Map for Elementary School\*](#) engages students in developing a wind farm based on their investigations of the Earth’s interactive systems, including geography, weather, and wind.

[\*Amusement Park of the Future, Grade 6: STEM Road Map for Middle School\*](#) challenges students to design new rides using concepts from science, social studies, math, and English language arts

[\*Construction Materials, Grade 11: STEM Road Map for High School\*](#) gives students an inside look at the complex engineering and technologies behind buildings, and especially high-rises, as they examine micro- and macro-properties of construction materials.

If you were looking for ways to engage students in real world problems then this series may be useful. The STEM Road Map books give you a good start introducing problem and project-based learning. As the kids say “Are we there yet?” I would answer “We are on the right track so start the journey so try this series.”

Reviewed by Dr. Anne Mannarino





# Fishing to Survive

## A STEM Activity About Fishing



### Objectives:

Students will: 1) investigate historic and modern methods of fishing; 2) develop a method to catch fish using found objects based on a scenario and 3) use an interdisciplinary approach to solving a problem/issue.

### Background:

Fishing techniques from the earliest times has been a question of solving the issue of securing enough protein to meet the needs of the family and community. The process had to be energy efficient in order to feed the family, tribe or village. Through trial and error, modern fishing methods have evolved, providing opportunities for recreation as well as a source of food. This activity engages students in a scenario where they need to catch a fish without traditional fishing gear. How might early men have caught fish? How could they have caught enough for their family to eat?

For early naturalists, being able to observe the natural world was a necessary skill in order to find food and survive. Watching where fish sought cover, what they ate, as well as watching other predators catch fish, provided important information.

Great blue herons wade slowly in the shallows, barely moving as fish swim around them. Early man may have tried to stand still and then grab a nearby fish with varying degrees of success. However, the small fish in the shallows wouldn't have fed many family members. Even a spider spinning a web to catch insects may have helped someone envision how they could weave a net to catch multiple fish. Learning from nature is a new field of science called biomimicry, although man has been observing, learning from, and duplicating nature for thousands of years. What other species may have contributed to man's development of fishing skills?

Fishing hooks have been found in archaeological digs shaped from shell and bone from over 10,000 years ago. We can still see the outline of weirs that were created by Native Americans and were used to catch migratory fish in stream bottoms and shallow rivers.

Create a timeline with bare hands on one end and a modern recreational fishing boat on the other to compare early fishing techniques with more modern techniques. Use the Internet to research fishing methods of early Americans as well as current fishing tools. Even in the past 100 years there have been vast changes in the gear used by recreational fishermen. We can't step back in time to determine how man engineered the perfect fishing gear. It was most likely different in various climates and ecosystems. In coastal areas, the spring migration of salmon, shad, sturgeon, and other anadromous fishes provided a seasonal feast, and methods of drying the fish for lean times were soon developed.

In the following activity students invent methods to catch fish using only "found" items and explore how they could catch enough fish to survive.



John White, Roanoke Colony 1585

### Materials needed:

- Assorted small balls that include those that float and those that don't (e.g., tennis balls, whiffle balls, ping-pong balls, etc.) These will represent different species and sizes of fish.
- Tub or child's wading pool filled with water in which to place the balls.
- Assorted types of string and rope (e.g., string, yarn, fishing line, shoe laces, twine, etc.)
- Sticks or dowels
- Items such as water bottles, washers, nails, old shoes, shells, etc. to represent things found in a location that might be used to create fishing equipment, see scenarios below.

Continued...



## Procedure:

Discuss the history of fishing, including conducting library and/or web research if time permits.

Go to [www.dgif.virginia.gov/fishing](http://www.dgif.virginia.gov/fishing) and <http://www.mrc.virginia.gov/regulations/swrecfishingrules.shtm> to see what species are found and fished for in the Commonwealth. Students may also want to review fishing gear regulations for each species. Ask students if they have ever fished or eaten any of the species featured on the websites. Some species are easily caught, some are easily cleaned and some have a better flavor.

Divide the class into small groups. Give each group a scenario that includes them being stranded with no easily available food source. Not knowing what plants may be safely eaten; the group must rely on animals as their primary food source. Fish are abundant and are generally easier to catch and prepare than birds or mammals.

The goal is to catch enough fish to feed the group for three days. The fish are the balls floating or hanging out on the bottom of the tub filled with water. Larger balls (fish) will feed more students than a smaller ball.

Teachers may assign a “food value” to each type of ball based on its size. Students will be able to graph their success at fishing for each “species”.

Instead of using different size balls, collect different size water bottles to use as fish. Place colored sand mixed with a small amount of white glue inside the bottles; lay the bottles on their side to dry. Be sure to leave the lid off until the glue dries. By varying the amount of sand in the bottle, they will float at different levels of the water column as fish actually do. Another option is to work with the art teacher and paint the bottles using an oil based paint to look like fish.

## Scenarios:

1) Your boat has capsized and you managed to make it to a small island. Your team doesn't recognize any of the plants and have heard that some plant species in the region are highly poisonous if eaten. The island is near a shipping channel so you are sure to be rescued within a few days or a week at the most.

There are plenty of fish in a small lagoon and in the sea that can be caught. One of the team has found a broken bottle, and using a piece of the broken glass, has managed to start a fire by magnifying the heat of the sun and lighting dried grasses. The fire will help the group signal passing boats as well as provide a way to cook the fish. After searching the beach, you have gathered an assortment of items that you may use to catch fish. You have found: a board with two nails in it, three plastic water bottles, a Mylar balloon with string still attached, and lots of shells and sea grasses. Someone has found some long sticks at the edge of the jungle. Let's go fishing!

2) You and some friends decide to go hiking in the forest. You forget to take extra batteries for your GPS unit and after a long day of hiking and talking, you realize you are lost, don't know what direction is out, and the trail is no longer visible. There is no cell phone coverage. You have told other friends where the group was starting from, but it may be days before your group is missed and the rangers realize the car has been in the parking lot for a while. After a day without food, your group members realize they need to find food. You have been lucky to find an old shack with some junk that may be useful and there is a stream nearby with trout. Pooling your resources from your day packs and what you were able to find in the shack, come up with a method to catch fish. You have four plastic water bottles, a tin can with a few screws and washers in it, a rusty saw blade, about six feet of rope, and an old shoe. Let's go fishing!

3) **Develop your own scenario.** Decide ahead of time the number of fish that will need to be caught for one meal. This may be a combination of big and small fish or one large fish. Students should develop some “fishing regulations” such as:

- You must be three feet from the tub.
- You may not use hands or feet to snare (catch) the fish.
- Each team has three tries to catch their dinner.

After the teams have had some time to engineer their fishing gear, give them the opportunity to try it out. Teams can regroup after their turn at fishing to make changes to their gear. Teams should share what they “invented” as well as strategies for catching fish with the other teams. Teams can trade fishing gear and see if they are as successful with the other teams' gear.

Based on the success level of the groups, teachers may want to add to the “found” items that can be used.

Continued...

After trying out the fishing implements made, share types of rods and reels available commercially. A local sporting goods store may be willing to bring in fishing equipment or students who do fish can bring in family gear. You may also contact the Department of Game and Inland Fisheries Angling Education program (<http://www.dgif.virginia.gov/education/fishing/>) to borrow tackle or for information on local fishing opportunities.

See Project WILD Aquatic activity “Net Gain Net Effect” that discusses commercial fishing methods for additional background.

**Help us Field Test This Activity**  
**We will send you a Fish of Virginia Poster as a thank you.**

Try out this activity with your students, answer the questions below and let us know what work and what didn't. When we receive your comments, we will mail you an 11" X 17" fish poster for your bulletin board.

What grade level / subject do you teach? Did you use the lesson as written?

What changes would you make to the lesson or feel we should make to it?

Did your students enjoy the scenarios and creating the fishing gear? If you took any pictures please share them with us.

Will you do this activity again next school year?

Thank you. Email your comments to [Suzie.Gilley@dgif.virginia.gov](mailto:Suzie.Gilley@dgif.virginia.gov) Please provide us with a mailing address to send the poster.

Name: \_\_\_\_\_ School: \_\_\_\_\_ Address: \_\_\_\_\_

[Click Here for a form for Field Test.](#)

If you would like to review other lessons, please include your email address.



## Teachers Who Do Their Homework Choose Regent

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# Become a Citizen Scientist at Longwood's Lancer Park

Dr. Ed Kinman, Longwood University



Dr. Sujan Henkanaththegedara explained how to identify crayfish.

You don't always need to be a botanist or zoologist to contribute to science. Thanks to Longwood University's Department of Biological and Environmental Sciences participation in BioBlitz, anyone can play the role of research assistant.

The third annual Longwood BioBlitz is set for Saturday, April 21, from 9 a.m. to noon, is open to all students, teachers, staff, alumni and community members.

Longwood Department of Biological Sciences and Virginia Geographic Alliance hosted the first Longwood BioBlitz In 2016 to document species in Longwood's Lancer Park. "We had a team of over 140 volunteers that worked together to find and identify as many species of plants, animals, fungi and other organisms as possible in one day," notes Biology Assistant Professor Sujan Henkanaththegedara. "Our efforts yielded over 200 species, much more than I had anticipated given Lancer Park's proximity to town."

Then it became a tradition and a major outreach program of the Department of Biological Sciences to promote the importance of conservation and exploration, highlight the biodiversity of Longwood and generate data that can be used by scientists and citizen scientists.

"While data obtained from these events can be useful," according Geography Professor Edward Kinman, "I like how this event promotes observation. As we learn how to see, we begin a journey to try and make sense of those



Longwood students organized "touch tables" for budding naturalists with local native species.

observations. I hope this event promotes a sense of wonder in participants to better understand the intricate and interconnected systems of the world around us."

The Environmental Educational Center at Lancer Park will be "BioBlitz central." You will be able to learn and see local wildlife, help collect data on local biodiversity, and participate several other activities such as a scavenger hunt, bird watching, and "walking" on a Virginia map as you learn natural history and geography of the state. "If you want to catch some salamanders and hold them in your hands, show up. This is going to be educational and fun," says Dr. Henkanaththegedara. "This is a family event and a community event."

Participants are encouraged to download the iNaturalist app [available for free on Google Play for Android and the Appstore for Mac] to their phones or tablets before arrival. The app will be used to record observations after participants are assigned to various specialty groups led by faculty members and majors from Longwood's Department of Biological and Environmental Sciences. They will work in the Appomattox River floodplain behind the Environmental Education Center, which includes wooded areas, grassy meadows and several ponds, with access to Buffalo Creek and the Appomattox River.

For more information, visit the Longwood Bioblitz @ Lancer Park website at: <https://blogs.longwood.edu/longwoodbioblitz/game-plan/>.





# Enhancing Your Authentic Research Skills

Virginia Junior Academy of Science and Virginia Academy of Science

Longwood University . . . May 23-24, 2018

Dr. Julia H. Cothron, VJAS Representative to VAST Board

**Overview:** On **May 23**, observe over 600 students, grades 7-8 and 9-12, present research papers on various natural and applied sciences, mathematics, engineering, and computer sciences. Learn how the VJAS Symposium develops important educational outcomes: workplace skills (the 5 Cs), career and civic responsibility, and understanding of Virginia's SOL. After the presentations, network with symposium participants and attend the George W. Jeffers Memorial Lecture, given by an outstanding Virginia scientist. On **May 24**, interact with VAS members through concurrent presentations, poster sessions, and discussions of research by their students. Learn how you can build relationships with Academy members to support student research. You can attend on May 23 or May 23-24, 2018.

**General Schedule:** Detailed programs will be available in mid-May.

May 23 – Virginia Junior Academy of Science		May 24 – Virginia Academy of Science	
7:30 am – 8:30 am	Check-In (Willett Lobby)		
8:55 am – 12:00 pm	Concurrent Student Sessions	8 – 11:00 am	Concurrent VAS Morning Sessions
12:15 – 1:30 pm	Buffet Luncheon & Networking (Dorrill Annex)	11 – 11:30 am	VJAS Award Paper Presentations at VAS Sections
1:45 – 4 pm	Concurrent Student Sessions	12 – 2 pm	VAS Poster Sessions & President's Reception (heavy hors d' oeuvre)
4 – 4:30 pm	Check-Out – Evaluation & Reimbursement ( <i>Day 1 only</i> )	2:30 – 3:30 pm	Using Databases and CODAP to Conduct Research, Dr. Ginger Lewis, Longwood University
5 – 6:30 pm	Networking & VJAS Dinner ( <i>optional for commuters</i> )	4 – 4:30 pm	Check-Out – Evaluation & Reimbursement (Day 1-2)
7 – 8:30 pm	VJAS General Meeting & George W. Jeffers Memorial Lecture ( <i>optional for commuters</i> )	3:45 – 5 pm 5:30 – 7 pm	Concurrent VAS Sessions ( <i>optional</i> ) Negus Memorial lecture ( <i>optional – open to public</i> )

**Benefits:** Sponsors will provide free registration, event programs, and stated on-campus meals. Participants will be reimbursed for mileage. Participants (who travel more than 100 miles per day round trip) will be reimbursed for hotel and dinner on May 22 – 23. Participants are responsible for making hotel reservation. Conference can be used for certificate renewal credits.

**How to Register:** You can register for May 23 or May 23-24, 2018. More details are available at: <https://www.surveymonkey.com/r/VJASteacher>. Statewide registration deadline is MAY 10, 2018.

**Questions:** For logistical questions and registration, contact Barbara Scott ([Barbara@ittip.org](mailto:Barbara@ittip.org)) at ITTIP. For program questions, contact Julia Cothron, VJAS & VMSC Board Member ([cothron9293@gmail.com](mailto:cothron9293@gmail.com)).

## Sponsors

Virginia Academy of Science

Virginia Junior Academy of Science

Virginia Mathematics & Science Coalition

Institute for Teaching through Technology and Innovative Practices (ITTIP) at Longwood University



## Secondary Teachers (6-12): Apply for the 2018 Donna Sterling Exemplary Science Teaching Award



Donna Sterling was a visionary science educator with a passion for working with science teachers and developing habits of inquiry-based teaching. Most recently, her leadership in the Virginia Initiative for Science Teaching and Achievement (VISTA) focused on elementary and secondary teacher professional development. This award recognizes that exemplary teachers engage in continuous improvement, and is designed to support a professional development plan for the improvement of science teaching. In 2018, the award will be given to an exemplary secondary teacher. The award alternates between elementary and middle/secondary.

The awardee will receive a total of **\$4000**. In addition, travel costs will be reimbursed to attend the 2018 VAST PDI to receive the award and to the 2019 VAST PDI to present a session on the professional development experience and outcomes. The awardee will receive \$3000 at the VAST PDI in 2018. The remainder will be awarded after the awardee presents at the next VAST PDI and also submits an article to either the newsletter *The Science Educator* or the *Journal of Virginia Science Education*.

**Deadline for applications: July 15, 2018**

### To apply:

1. In your cover letter, include information on yourself, including your preferred name, your home and school addresses, and phone numbers and email address(es) where you can be reached. Tell us how many years you have taught, where, and what grade levels.
2. In no more than two pages, single-spaced, describe an inquiry-based science unit that you taught. Describe how your unit is student-centered and includes community engagement. Give evidence that the unit was effective. Evidence documents such as student work can be submitted separately, and will not count toward the two-page limit.
3. In no more than two pages, single-spaced, describe your plan for professional development, using the funds received through the Sterling award. These plans may include summer courses, attendance at workshops, study abroad opportunities, instructional materials development under the guidance of experts on-site, etc. Feel free to be creative in your plan. Submit the professional development description with anticipated outcomes, including plans for a presentation at the 2018 VAST PDI. Tell how this award will help you become a better teacher of science and will support the development of leadership skills. Tell about your plans for writing an article about your experiences.
4. Submit three letters of recommendation based on direct observations of teaching. One letter must be from the science supervisor or someone serving in that capacity, a second letter must be from the principal, assistant principal, or instructional leader, and a third letter must be from a fellow teacher or a parent. Letters should address the following: Why is this teacher a good candidate for this award? What qualities do they exhibit as teachers that make the recommender think they will use the funds from the award to improve their practice as teachers of science?

All materials must be submitted by 5 pm on July 15, 2018.

**Submit applications and letters of recommendation to Dr. Juanita Jo Matkins,  
[jjmatk@wm.edu](mailto:jjmatk@wm.edu)**



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