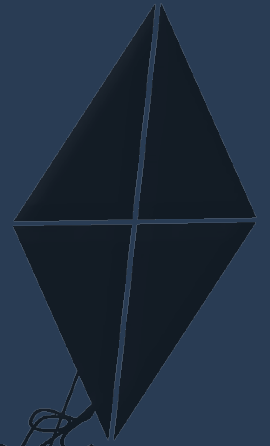


32<sup>nd</sup> Annual

# Virginia State Science and Engineering Fair



March 25, 2017

Virginia Military Institute

Center for Leadership & Ethics  
Lexington, Virginia





Dear Virginia State Science and Engineering Fair Attendees,

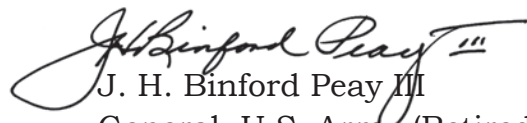
On behalf of the faculty, staff and Corps of Cadets, I would like to welcome you to the 2017 Virginia State Science and Engineering Fair (VSSEF) at Virginia Military Institute. Approximately 300 students representing 12 regional fairs will be exhibiting their science, technology, engineering and mathematics (STEM) projects this year, with the winners eligible to attend the Intel International Science and Engineering Fair, the world's largest pre-collegiate science competition, taking place in Los Angeles, California this May.

Like last year, we will be awarding The Governor's Award and Grand Prize to the Fair's overall grand prize winner, with cash awards given to category winners. Assisting us with the judging are representatives from the public and private sector, all donating their time to support the state's future STEM professionals.

Here at VMI, hosting VSSEF is just one of the ways in which we support STEM students in their academic and research endeavors. October 2017 will mark the sixth annual VMI STEM Education conference which emphasizes increasing student and teacher preparedness across the STEM disciplines. We encourage you to make the most of this VSSEF experience. We have cadets at VMI who are now majoring in STEM subjects because they were inspired by their own participation in science fairs.

Congratulations are in order to all students presenting here today. Each one has dedicated time and energy to completing his or her research and becoming eligible to compete at VSSEF 2017. Best of luck to all taking part!

Sincerely,

  
J. H. Binford Peay III  
General, U.S. Army (Retired)  
Superintendent

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## ACKNOWLEDGEMENTS

Governor of Virginia, Terry McAuliffe

General J.H. Binford Peay III, U.S. Army (Retired)  
Superintendent, Virginia Military Institute

Brigadier General Jeffrey G. Smith, Jr., U.S. Army (Retired)  
Deputy Superintendent for Academics and Dean of the Faculty, Virginia Military Institute

VSSEF Fair Director, MAJ Geoffrey Cox, Virginia Military Institute

Center for Leadership and Ethics, Virginia Military Institute

Department of Applied Mathematics, Virginia Military Institute

Office of the Chief of Staff, Virginia Military Institute

Office of Communications & Marketing, Virginia Military Institute

Management and Staff of Aramark, Virginia Military Institute

Physical Plant Staff, Virginia Military Institute

Virginia Military Institute Police

Faculty and Cadet Volunteers

VSSEF, Inc. Regional Fair Directors

Dat Le, Adrian Felts, Jenay Leach, Darryl Panaratz, Tom DeVore, Cheryl Lindeman

Julia Renberg, Odette Scovel, Jennifer Chang, Mark Levy, Abbie Martin

Chris Hermann, Kim Lane, Vonita Giddings, Chandra Wilkemeyer



## SCHEDULE OF EVENTS

### Friday, March 24, 2017 – Setup

6:00 p.m. – 8:00 p.m.

Registration and setup – VMI's Cameron Hall

1. Students must check in at the registration desk. All payments and paperwork must be filed.
2. Students set up exhibits.
3. Exhibits must be approved by the VSSEF Display & Safety Committee before leaving.

### Saturday, March 25, 2017 – Competition

7:00 a.m. – 7:30 a.m.

Judges check in.

8:00 a.m. – 12:30 p.m.

Judges interview presentors for category and special awards.

**Only presentors and judges will be allowed in the exhibit area during judging.**

11:30 a.m. – 12:30 p.m.

Lunches provided for presentors and judges.

1:00 p.m.

Announcement of Grand Prize nominees

**Nominees return to exhibits.**

1:00 p.m. – 2:30 p.m.

Judges interview Grand Prize nominees.

2:30 p.m. – 4:00 p.m.

Exhibits open to the public.

4:00 p.m. – 5:30 p.m.

AWARD CEREMONY IN CAMERON HALL

**Finalists must attend the award ceremony to receive their awards!**

Exhibits MAY NOT be dismantled during the ceremony.

Please see the Fair Director for instructions if you are unable to attend the ceremony.

# JUDGES

**THANK YOU TO ALL THE JUDGES  
WHO ARE DEVOTING THEIR TIME AND EXPERTISE TO THE  
2017 VIRGINIA STATE SCIENCE AND ENGINEERING FAIR  
AT VIRGINIA MILITARY INSTITUTE**

**A COMPLETE LISTING OF THE JUDGES FOR THIS YEAR'S COMPETITION  
CAN BE FOUND IN THE STUDENT PROJECT SUPPLEMENT**



## SPECIAL AWARD DESCRIPTIONS

### American Meteorological Society

Awards two certificates of Outstanding Achievement to student exhibitors with the best projects in the areas related to atmospheric, oceanic and hydrologic sciences.

### American Psychological Association

Awards a certificate for outstanding research in psychology in the category of Behavior & Social Science.

### ASM Materials Education Foundation

Awards a certificate and medallion to the best materials engineering project.

### Association for Women Geoscientists

Awards a certificate to a female student whose project, in the opinion of the judges, exemplify high standards of innovativeness and scientific excellence in the geosciences. Special consideration should be given to projects that increase the public awareness of the geosciences, illustrate the interdisciplinary nature of the geosciences or promote the sensitivity to the earth as a global system.

### ASU Walton Sustainability Solutions Initiatives

The ASU Walton Sustainability Solutions Initiatives will provide two awards consisting of a certificate and a chance to win a trip to Arizona for the 2016 Sustainability Solutions Festival. *Criteria: Eligible projects (from any category) will seek innovative solutions to humanity's most challenging problems in the fields of either social justice or environmental and economic prosperity.*

### Central Virginia Chapter INCOSE Award

Central Virginia Chapter (CVA) of International Council of System Engineers (INCOSE) provides three awards consisting of a monetary prize (1st-\$100, 2nd-\$75 and 3rd-\$50) and a certificate. *Criteria: The project can come from any category, but it must have been completely independent. That is, the project should have been completed without the mentorship of a professional and without access to professional/industrial resources.*

### INCOSE Award

The International Council of System Engineers (INCOSE) Central Virginia Chapter (CVA) will provide certificates and monetary awards for three outstanding science projects (\$100 – 1st, \$75 – 2nd, \$50 – 3rd).

### Intel Excellence in Computer Science

Awards a certificate and \$200 to the first place winner of the Computer Science category.

### Leidos

Leidos is a scientific, engineering and technology applications company that solves problems of vital importance in national security, health, and engineering. Leidos is proud to offer monetary awards in the fields of Microbiology, Physics/Astronomy, Applied Science, and Computational Science.

### Mark Licata Award for Biotechnology

The Mark Licata Award for Biotechnology focuses on the use of cellular and, molecular processes rather than chemical synthesis, to solve problems or develop products, plus other key areas of industry focus, such as bioinformatics, biodefense, biofuels, agricultural bio and industrial/environmental biotechnology.

### Mu Alpha Theta

This National High School and Two-Year College Mathematics Honor Society awards a certificate to the individual or team project, demonstrating the most challenging, original, thorough, and creative investigation of a problem involving modern mathematics. This project does not necessarily have to be entered in the mathematics category.

### NASA Earth System Science Award

Recognizes outstanding projects relating to earth system science. A certificate will be provided to the student whose project offers the Greatest Insight into Earth's Interconnected Systems.

### National Oceanic and Atmospheric Administration (NOAA)

Awards a certificate and lapel pin to the project selected from among all the general award categories whose research emphasizes NOAA's mission: "to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs."

### Ricoh Sustainable Development Award

Awards a certificate to one individual or team, whose principles and scientific innovations best reflect the principles of sustainability – balancing economic development with environmental responsibility.

### Society of In Vitro Biology

Awards a certificate to a high school junior in the category of plant or animal in vitro biology or tissue culture.

### Stockholm Junior Water Prize

Awards certificates to the top three most outstanding water-related research projects. Projects are assessed based on six criteria: relevance, creativity, methodology, subject knowledge, practical skill, and presentation.

### U.S. Metric Association

Awards a certificate to the student whose project involves a significant amount of quantitative measurement and which best uses the SI metric system for those measurements.

### U.S. Navy/Marine Corps – Office of Naval Research

The Office of Naval Research plans, executes, coordinates and promotes science and technology for the US Navy and Marine Corps through work performed at universities, naval laboratories and industrial research centers. Awards 5 projects a certificate of achievement, a medallion, and a \$75 gift certificate.

### Virginia Section of the American Water Works Association

The Virginia Section of the American Water Works Association (VAAWWA) is an international nonprofit scientific and educational society dedicated to the improvement of drinking water quality and supply. VAAWWA will present three monetary awards (1st-\$500; 2nd-\$200, 3rd-\$100) together with certificates. *Criteria: Projects must be related to water, but special consideration will be given to projects addressing drinking water issues.*

### Virginia Dental Association: Science Talent Awards Program

Promotes dentistry through the encouragement of experimental exploration of research; awards Certificates of Merit, career information, (10) \$100 awards and one Grand Award of \$1500.

### Yale Science & Engineering Association

Awards a certificate and medallion to the most outstanding 11th grade student exhibiting in the areas of Computer Science, Engineering, Physics or Chemistry.

# Awards Ceremony

Saturday, March 25 – 4:00-5:30 p.m.

## Opening Remarks

Brigadier General Jeffrey G. Smith, Jr.  
Deputy Superintendent for Academics and Dean of the Faculty, Virginia Military Institute

## Special Awards

American Meteorological Society  
American Psychological Association  
ASM Materials Education Foundation  
Association for Women Geoscientists  
INCOSE Award  
Intel Excellence in Computer Science  
Mu Alpha Theta  
NASA Earth System Science Award  
National Oceanic & Atmospheric Administration  
Ricoh Sustainable Development Award  
Society for In Vitro Biology  
Stockholm Jr. Water Prize  
U.S. Metric Association Award  
Yale Science and Engineering Award  
ASU Walton Sustainability Solutions Initiatives  
U.S. Navy/Marine Corps Award, Office of Naval Research  
Central Virginia Chapter INCOSE Award  
VA Section of the American Water Works Association  
Mark Licata Award for Biotechnology (VA Bio)  
Leidos Corporation  
VA Dental Association: Science Talent Awards Program

## Category Awards

Animal Science  
Behavioral and Social Sciences  
Biochemistry  
Cellular and Molecular Biology  
Chemistry  
Computer Science  
Earth and Planetary Science  
Energy and Transportation  
Engineering: Electrical and Mechanical  
Engineering: Materials and Bioengineering  
Environmental Management  
Environmental Sciences  
Mathematical Sciences  
Medical and Health Sciences  
Microbiology  
Physics and Astronomy  
Plant Sciences

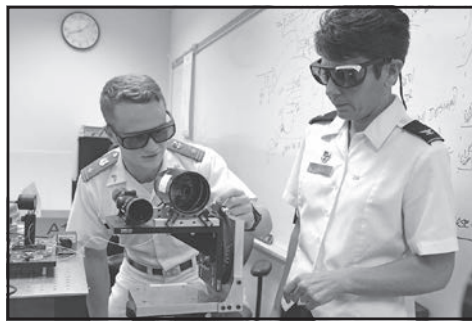
## Virginia State Science Fair Grand Prize Awards

Governor's Award and Grand Prize

Second Grand Prize

Third Grand Prize





## VIRGINIA MILITARY INSTITUTE

NO ORDINARY COLLEGE. NO ORDINARY LIFE.

### **The VMI Education**

Virginia Military Institute offers undergraduate education of highest quality – embracing engineering, science, social sciences, and the humanities – within a military environment. It's an education that develops character, engenders a sense of responsibility to others, and cultivates the ability to master adversity.

### **The VMI Experience**

Small classes where professors know you personally (11:1 cadet-faculty ratio).

Greater than 90-percent rate of job or graduation school placement for recent VMI graduates.

ROTC training that can lead to a commission in the Army, Air Force, Navy, or Marine Corps.

Opportunities to excel, including undergraduate research, international programs, Institute Honors, and service learning.

More academic opportunities, more physical training, more leadership – more challenge.

### **Engineering Programs**

B.S. in Civil Engineering, Electrical & Computer Engineering, and Mechanical Engineering

### **Information and Social Sciences**

B.S. in Computer Science; B.A. in Economics and Business; B.A. in International Studies and Political Science

### **Life Sciences**

B.S. and B.A. in Biology; B.S. in Psychology

### **Natural Sciences**

B.S. Applied Mathematics; B.S. and B.A. in Chemistry; B.S. in Physics

### **Arts & Humanities**

B.A. in English; B.A. in History; B.A. in Modern Languages and Cultures

Visit [admissions.vmi.edu](http://admissions.vmi.edu) for more information about academic programs and opportunities to visit.





# The VMI Center for Leadership and Ethics

VMI offers a relevant education within a military environment, developing character, engendering a sense of responsibility, and cultivating the ability to master adversity. These leadership traits are inculcated through cadet-led programming, including the Corps of Cadets, the Honor Court, and the class system. All cadets take part in Army, Navy, Marine Corps, or Air Force ROTC programs. The VMI experience is a leadership lab, preparing cadets for military and civilian careers alike.

The Center for Leadership and Ethics enhances VMI's system of leadership training by offering co-curricular cadet programming focused on leadership, ethics, and character development and a robust schedule of conferences on challenging topics of national and international interest.

The Center for Leadership and Ethics is supported in part by the Jackson-Hope Fund.

## **UPCOMING EVENTS:**

**April 4-6, 2017: Environment Virginia Symposium**

**October 3-4, 2017: STEM Conference, emphasis on Science**

**October 30-31, 2017: Leadership Conference**

VSSEF 2017 Sponsor



**Thank you from the  
VMI Center for Leadership and Ethics  
to all the VSSEF participants  
and parents over the past 5 years.**

Virginia State Science  
and Engineering Fair

Virginia Military Institute

March 24-25, 2017