

DELAWARE VALLEY SCIENCE FAIRS 2018-19 ANNUAL REPORT



INSPIRING FUTURE LEADERS

Delaware Valley Science Fairs has been inspiring youth in the fields of Science, Technology, Engineering, and Math since 1949. The enthusiasm and effort of this organization shows in the success of its students. Featured above are the medalists representing Delaware Valley Science Fairs at the 2019 Intel International Science and Engineering Fair, the world's largest international pre-college science research competition, in Phoenix, Arizona.

Established in 1949, DVSF began as a joint venture between the Philadelphia Inquirer and the Franklin Institute.

Currently, DVSF's programs provide a forum for students to conduct and present their research and interact with scientists in their field to receive feedback on their efforts.

DVSF develops and leads programs that provide student mentoring and teacher training on how to incorporate inquiry-based techniques into schools' Science, Technology, Engineering, and Math (STEM) curricula to facilitate students' participation in research. The philosophy behind our programs is that students LEARN science by DOING science.

Students learn how to think, how to identify problems that need to be solved, and design solutions to those problems. Many of the students who participate hold the key to tomorrow's innovations. DVSF seeks to facilitate their participation in science and engineering research and to create a science literate workforce.

The ultimate goal for Delaware Valley Science Fairs, is to spark interest in the fields of science, technology, engineering, and math and to encourage creativity so that students will strengthen their participation in this type of study and consider the possibility of pursuing an education and, eventually, a career in STEM.



Students present their research during the interview phase of the April 2019 DVSF Regional Fair in Oaks, PA.

Delaware Valley Science Fairs



3,093 STUDENTS

At thirteen 2019 local fairs, **3,093 students** presented **2,931 research projects**, joined by **347 teachers** representing **288 schools** from the Delaware Valley.

175 EDUCATORS

175 educators from the Delaware Valley attended one of the **52 free workshops** offered through the DVSF Teacher Professional Development Program in 2018-19. Each year, the impact of these workshops is felt by thousands of students in PA, DE, and NJ.

285 SCHOLARSHIPS

285 scholarships were offered to student presenters by Delaware Valley Science Fair partner organizations. These scholarships, totaling nearly **\$5 million**, were in addition to **600 special awards** totaling **\$32,725** in 2019.

DVSF PROGRAMS

Delaware Valley Science Fairs (DVSF), a 501(c)3 organization, strives to bring parents, teachers, and industry together to stimulate and nurture young people so that they grow and develop into contributing members of the community. To accomplish this mission, DVSF focuses on programs designed to inspire a love of science and math for students in middle and high school.

Science Fairs

DVSF supports thirteen regional science fairs held throughout the winter and early spring each year. During the 2018-2019 program year, these fairs saw **3,093 students in grades 6 through 12, representing 288 schools** enter science fair projects. These projects were entered into one of the fifteen categories which include:

1. Behavioral & Social
2. Biochemistry
3. Botany
4. Chemistry
5. Computer Science
6. Earth & Space
7. Engineering
8. Environmental Science
9. Mathematics
10. Medicine & Health
11. Microbiology
12. Physics
13. Zoology
14. Team
15. Consumer Science

Winners from regional science fairs move on to compete at the Delaware Valley Science Fairs Regional event in Oaks, Pennsylvania. The April 2019 event **hosted 896 entries and distributed nearly \$5 million in scholarships to future STEM innovators.**

In addition to hosting student scientists, the DVSF April 2019 event hosted **395 volunteer judges from the STEM community.** Many of these volunteers represented industry and more than 65 professional societies and organizations that support DVSF.

Teacher Professional Development Program

Through the Teacher Professional Development Program, DVSF organized **52 free workshops** during the 2018-19 program year for **175 middle and high school educators.**

These workshops are offered for teachers from under-represented schools and for teachers from schools that express a need for training in inquiry-based techniques. By training educators how to include inquiry-based techniques in their STEM curricula, DVSF aspires to facilitate students' participation in science and engineering research, creating a science literate workforce. The ultimate goal is to spark interest and encourage creativity so that students will strengthen their participation in science, technology, engineering, and math and to encourage their consideration of STEM as a career.

Mentorship program

DVSF recognizes the need to provide aspiring students with support and guidance. To accomplish this, the organization has established a mentorship program matching youth with leaders in the field of STEM. Students requesting mentors will find that their matched professional can provide them with technical expertise and resources that may not be available to them within their family unit or educational institution.

Intel International Science and Engineering Fair (ISEF)

15 DVSF student presenters, 5 teachers, 3 DVSF staff, and 1 volunteer joined 1,850 young scientists from 80 countries, regions, and territories around the world to compete at Intel ISEF 2019.

Three DVSF students received awards in three research categories. These included tenth grader, Carolyn Almonte, from Burlington, New Jersey who presented in the Animal Sciences; eleventh grader, Neil Deshmukh, from Bethlehem, Pennsylvania who presented a project in the Systems Software category, and tenth grader Prathysha Kothare, from Allentown, Pennsylvania who presented in the Biochemistry category.



A student presents her research during the interview phase of the April 2019 Delaware Valley Science Fairs' Regional Fair in Oaks, PA.

REGIONS SERVED

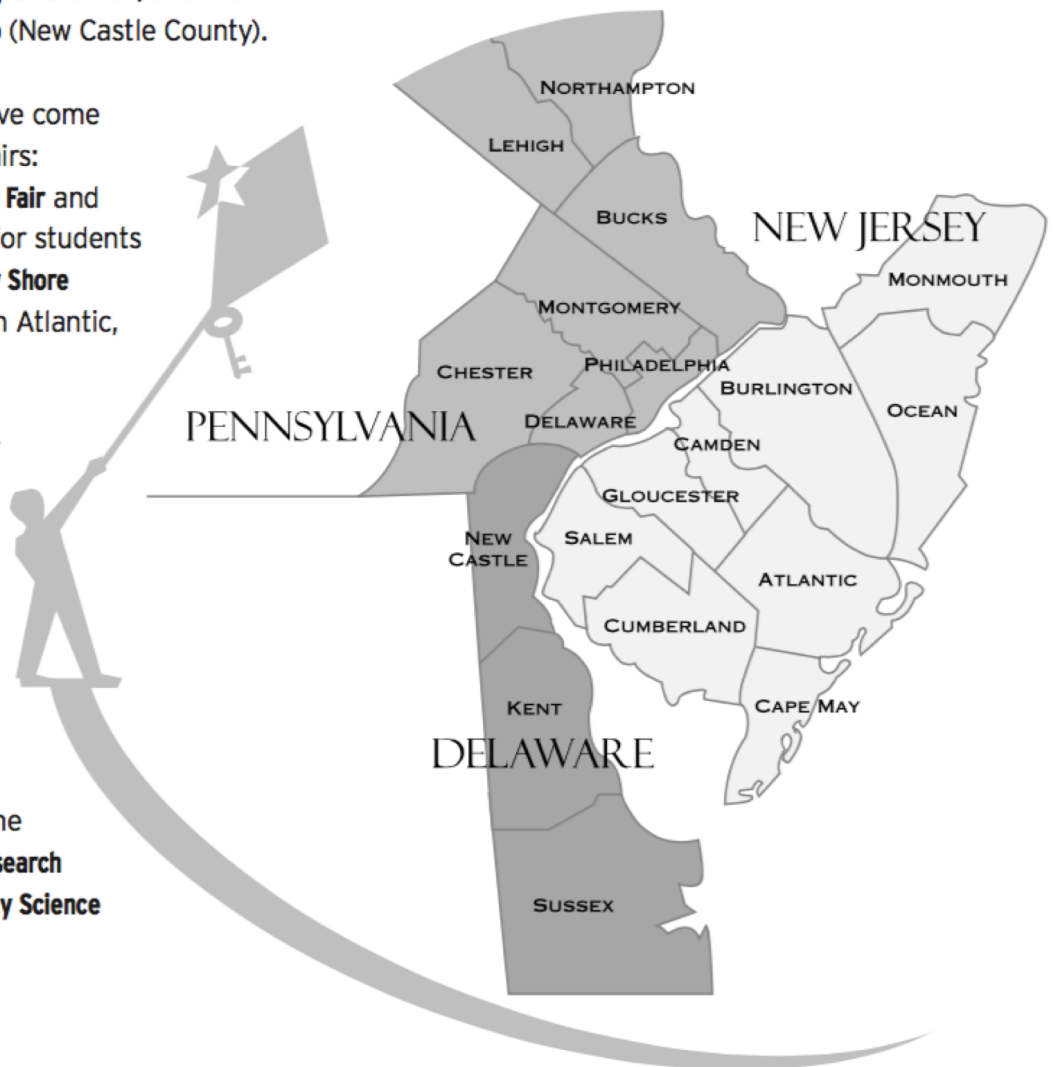
Each student who competes in the Delaware Valley Science Fairs (DVSF) is already a winner. They have won the right to compete in the DVSF by winning in one of thirteen regional fairs in Delaware, Southern New Jersey and Southeastern Pennsylvania.

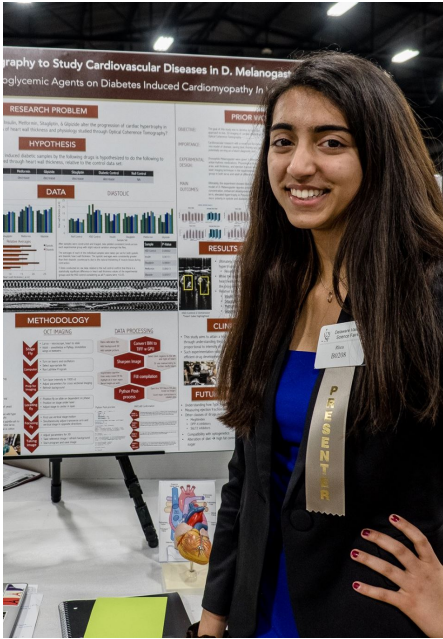
Delaware competitors have come from the **Sussex County Science Fair**, **Kent County Science Fair**, and from the **Delaware Tech Science Expo** (New Castle County).

New Jersey competitors have come from one of four regional fairs: the **Cumberland County Science Fair** and the **Salem County Science Fair** for students in those counties, the **Jersey Shore Science Fair** for students from Atlantic, Cape May, Monmouth, and Ocean Counties and the **Coriell Institute Science Fair** for students from Burlington, Camden, and Gloucester Counties.

Students from Southeastern Pennsylvania have come from the **Bucks County Science Fair**, the **Delaware County Science Fair**, the **Montgomery County Science Research Competition**, the **Chester County Science**

Fair, the **George Washington Carver Science Fair** for Philadelphia County, and the **Lehigh Valley Science and Engineering Fair** for Lehigh and Northampton Counties. Many students were honored as winners in earlier fairs held at their schools and by their school districts.





CORPORATE AND FOUNDATION DONORS

Without the philanthropic support of the local, regional, and national community, Delaware Valley Science Fairs (DVSF) would not be able to operate the annual Regional Science Fair or to provide local teachers the support and tools they need to spark students' creativity and foster multi-dimensional learning in the classroom.

Major Gift Donors

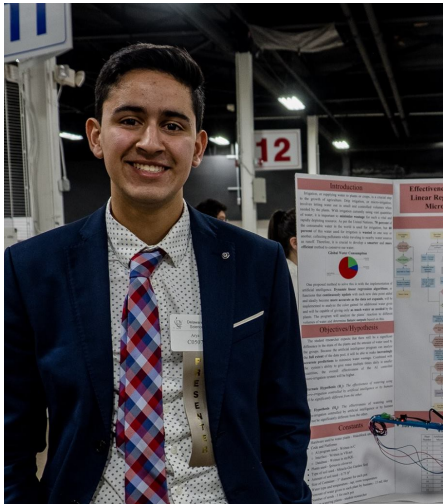
Major Gift Donors supported DVSF with a gift of \$10,000 or more during the 2018-19 Program Year

- Braskem America
- Bullpen Capital
- The Dietrich W. Botstiber Foundation
- Dow
- Drexel University
- DuPont
- FMC Corporation
- GSK
- Insaco, Inc.
- Janssen R&D
- Pfizer, Inc.
- Teva Pharmaceuticals
- Universal Display Corporation (OLED)
- University of the Sciences in Philadelphia
- West Pharmaceutical Services, Inc.

Sustaining Donors

Sustaining Donors supported DVSF with a gift of \$5,000-9,999 during the 2018-19 Program Year

- Endo Pharmaceuticals
- Exelon Generation
- Lockheed Martin
- Janssen Biotech



Contributors

Contributors supported DVSF with a gift of \$1,000-4,999 during the 2018-19 Program Year

- Countryside Consulting
- DNB First
- Harrisburg University of Science and Technology
- John and Marie Cwik Family Foundation
- Lacy Foundation (Chester County Community Foundation)
- Lehigh Valley Community Foundation
- Philadelphia Society for Coatings Technology, Inc.

Individual Supporters

Delaware Valley Science Fairs extends sincere gratitude to more than 84 Friends of DVSF who provided financial support through direct donations and employee matching gift programs, as well as those who contribute through United Way.

In addition, DVSF recognizes the dedication and commitment of its Board of Trustees who each donate to the mission in an effort to secure the future of Delaware Valley Science Fairs.

Support from individual contributors is vital to the success, sustainability, and financial security of Delaware Valley Science Fairs.

SPECIAL AWARD PARTNERS

In 2019, 600 special awards were given by 68 scientific, professional, industrial, educational and governmental organizations, including the following partners.

Air Products Young Innovator Award
American Association for Cancer Research
American Chemical Society–Delaware Division
American Entomological Society/Calvert Award
American Meteorological Society
American Psychological Association
American Society of Civil Engineers, Philadelphia Section
American Society of Highway Engineers, Delaware Valley Section
American Society for Microbiology/Eastern PA
American Society of Naval Engineers
American Statistical Association, Philadelphia (ASAP)
Armed Forces Communications and Electronics Association (AFCEA)
ASM International – Phila. Liberty Bell Chapter
ASM Materials Education Foundation
Association for Women Geoscientists

BioPhysical Society
Broadcom MASTERS
Chromatography Forum of Delaware Valley
Dietrich Botstiber Foundation
Dow
Drexel/Academy of Natural Sciences– BEES
Drexel University
DuPont Excellence in Teaching Awards
Engineers' Club of Philadelphia
Esther Borish Memorial Fund
Fighting ALS Disease
FMC Corporation
The Franklin Institute
Future Scientist Award/USDA–ERRC
Harrisburg University Science & Technology
Institute of Electrical and Electronics Engineers, Inc. (IEEE)
Institute of Food Technologists
Intel Excellence in Computer Science Award
Jack Mixit Award
Jacob M. Weiner Director's Award
Janssen Biotech Biotechnology Award
Janssen R&D Excellence in Cardiovascular and Metabolism Research
John C. Sargent, Jr. Memorial Award
Lemelson Invention Prize
Leonardo DaVinci Society
Leon Reznik Memorial Award
Merck Science Achievement Award
Mid-Atlantic Society of Toxicology (MASOT)
Mu Alpha Theta
NASA EARTH System Science Award

National Oceanographic and Atmospheric Administration (NOAA)
Parenteral Drug Association, Delaware Valley Chapter
Pennsylvania Council of Professional Geologists, Inc. (PCPG)
Pennsylvania Society for Biomedical Research
Pennsylvania Society of Professional Engineers, Valley Forge Chapter
Philadelphia Society for Coatings Technology
Quaker Chemical Company
Ricoh Corporation
Ronald C. Lorenzon Cancer Research Memorial Award
Roy F. Weston Memorial Environmental Award
Society of Environmental Toxicology and Chemistry–Hudson, Delaware Chapter
Society of Tribologists & Lubrication Engineers (STLE)
Society for In Vitro Biology
Society for Women Engineers – SWE
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United States Air Force
United States Metric Association
United States Navy/United States Marine Corps
University of the Sciences
Water Environment Federation
West Pharmaceuticals Services, Inc.
W.L. Gore & Associates, Inc.
Yale Science and Engineering Associati



Medalists from the April 2019 DVSF Regional Science Fair visit the Northeast Dow Center in Collegeville, PA where they present their research and explore the facility.

VOLUNTEERS

Delaware Valley Science Fairs has graciously received the support of nearly 400 volunteers during the 2018-2019 program year. DVSF volunteers serve as mentors for students, event and office support for year-round activities, and judges at the Delaware Valley Science Fair in Oaks, PA.

Volunteers participating as judges dedicate an entire day to their role, sharing expertise, providing feedback, and supporting the Delaware Valley Science Fairs mission to bring parents, teachers, and industry together to stimulate and nurture young people so that they grow and develop into contributing members of the community.

DVSF also recognizes the contribution of professionals who offer services pro-bono to support the staff and mission of DVSF.

These volunteers represent leading STEM companies in the country, many of whom support DVSF as donors and as sponsorship and special award partners. Their gift of time and dedication encourage and inspire future innovators.

BOARD OF TRUSTEES

We are committed to preparing tomorrow's innovators. I believe that if we provide the opportunity for the natural curiosity of our young people to blossom, they will provide us with a bright future.

Henry Disston, Jr.

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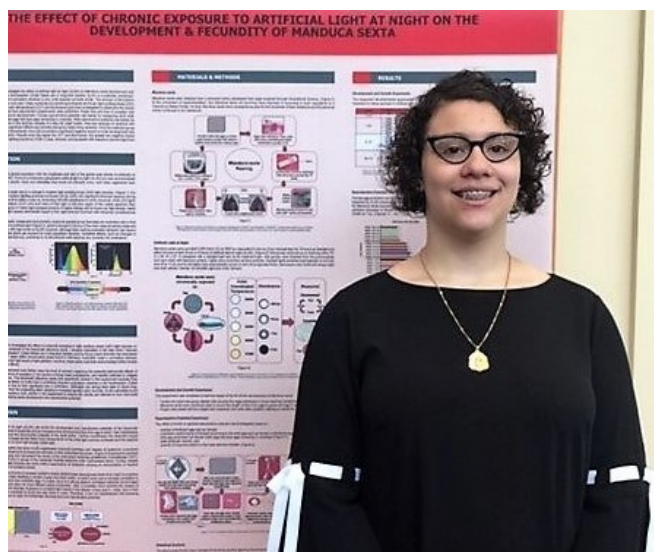
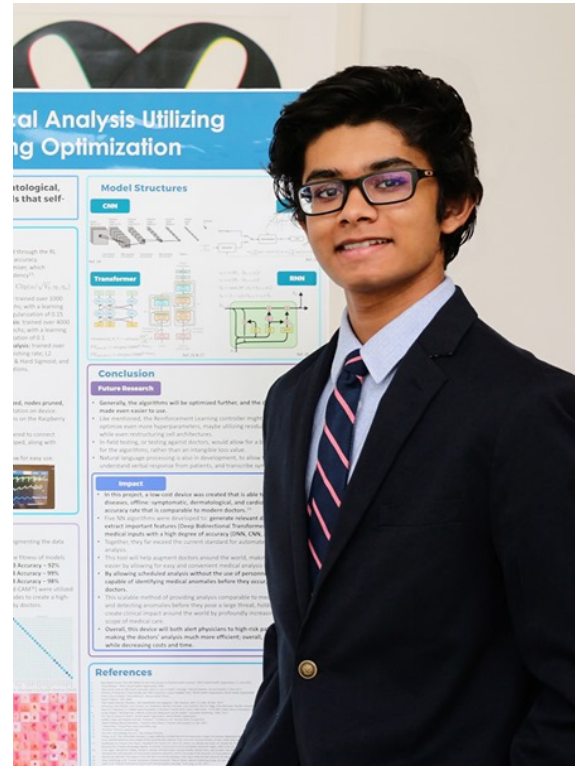
Linda Higginbotham

GSK

2019 ISEF EXPERIENCE

The Society for Science and the Public, in partnership with the Intel Foundation hosts the annual Intel International Science and Engineering Fair (ISEF). **This year, fifteen students, representing DVSF as winners of 2019 regional science fair in Oaks, Pennsylvania, traveled to Phoenix, Arizona to compete for top prizes, awards, and scholarships.** Accompanied by five teachers, three DVSF staff members, and one adult volunteer, these students joined approximately 1,850 other young scientists selected from 422 affiliate fairs held in more than 80 countries, regions, and territories.

Of the fifteen DVSF students who traveled to Intel ISEF in 2019, three students earned awards. Eleventh Grader, **Neil Deshmukh, from Bethlehem, Pennsylvania** presented a project in the **Systems Software** category and won Grand Prize, Fourth Place with a \$500 prize, a Special Award from USAID Science for Development, 3rd Place and \$2,000, and a Special Award from the Association for the Advancement of Artificial Intelligence, Honorable Mention. He researched "An Adaptive, Low-Cost Device for Automated & Offline Medical Analysis Utilizing Neural Networks with Reinforcement Learning Optimization." Neil explains, "my science project this year is essentially an AI doctor that can conduct a 5-minute, private, preliminary medical analysis, right in your home with an accuracy comparable to medical personnel; it can recognize skin afflictions, detect cardiac anomalies, and identify biomarkers of cognitive decline; it also helps alert medical professionals if there are any medical conditions present by processing symptoms. **I was inspired to undertake this project after seeing the sparsity of healthcare in less-fortunate areas, and I hope that my project will be able to identify high-risk patients, helping people get treatment, and eventually, saving lives.**" When asked how entering a Science Fair impacted his life, Neil wrote, "Science fair has allowed me to be creative and innovative while finding solutions to the problems I care about. It has reinforced my passion with STEM, and, more importantly, helped me find a group of people that I love to be around... **I would not be where or who I am today without Science Fairs.**"



Tenth grader, **Carolyn Almonte, from Burlington, New Jersey** presented a project in the **Animal Sciences** category and won Grand Award, Fourth Place with a \$500 prize. Carolyn, when asked how her participation in a Science Fair impacted her life, stated "Entering Science Fairs helped me find my people... **Science Fairs made me happier, knowing that people like me exist.**" Carolyn's 2019 entry, "The Effect of Chronic Exposure to Artificial Light at Night on the Development & Fecundity of Manduca sexta" took her lifelong passion for insects and turned it into research. Carolyn explains, "I encourage other students to pick projects that interest them. Explore your passion. The best part of my project was turning a room into a hawkmoth rearing laboratory of sorts. The worst part of my project was cleaning up everything that came with rearing hundreds and hundreds of hawkmoths from egg to adult moth. At times it seemed like a never-ending sea of caterpillar frass, but **the long hours were worth every minute because I am doing the type of research I want to do as my profession.**"

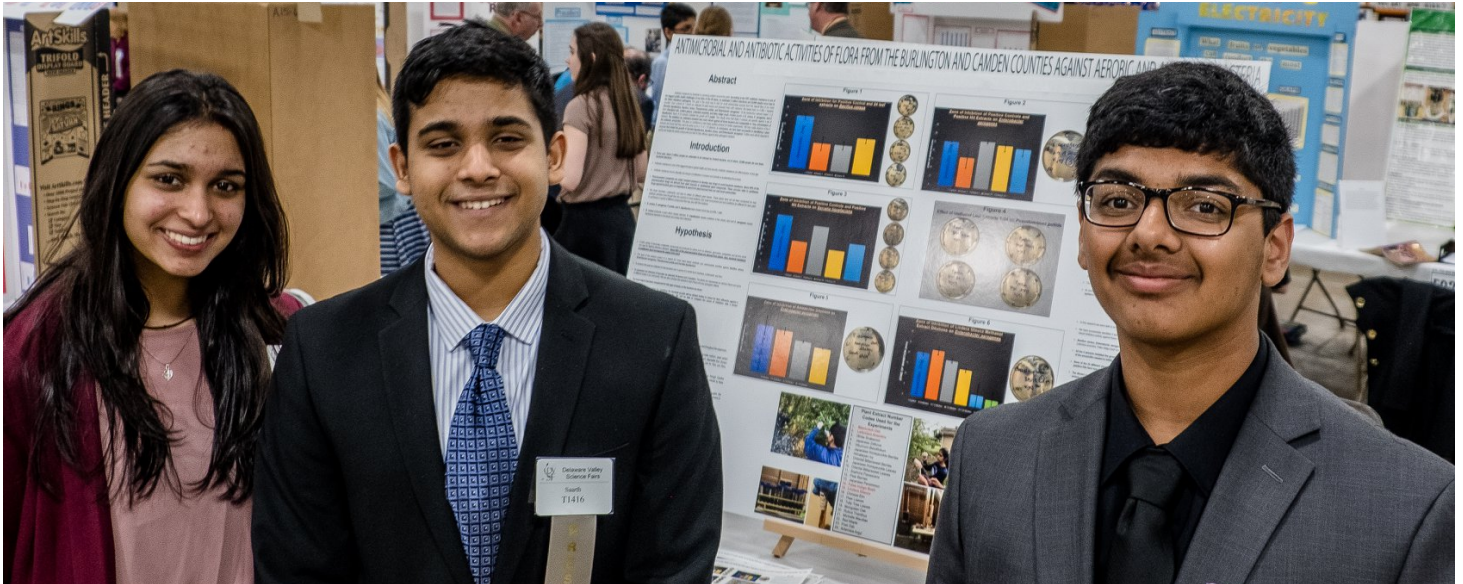
Tenth grader, **Prathysha Kothare**, from **Allentown, Pennsylvania** presented in the **Biochemistry** category and won Grand Prize, Third Place with a \$1,000 prize with her project entitled "Re-envisioning Erythrocyte Dynamics: Computational vs. Experimental Modeling of RBC in Capillary Shearing." Prathysha, a two time ISEF participant, explained her research and goals: "I wanted to explore the mechanical properties of red blood cells. We are probably all familiar with heart pumps and diseases like sickle cell and anemia, but **if someone asked us to explain how red blood cells behave molecularly during circulation in each of these situations, we'd probably scratch our heads. Thus, I sought to study how these cells and their molecular structures respond to different blood flow conditions.** I went about accomplishing this goal using computer models combined with laboratory studies. The long-term goal of this research is to publish a simple mathematical model that can predict red blood cells' responses to different circulation environments that can be accessed by pharmaceutical researchers and bioengineers to understand disease mechanisms and optimize biomedical device designs."



2019 Delaware Valley Science Fairs representatives enjoy the opportunity to participate and compete in the Intel International Science and Engineering Fair (ISEF) in Phoenix, Arizona.

DELAWARE VALLEY SCIENCE FAIRS

WHERE YOU CAN MAKE A DIFFERENCE



Delaware Valley Science Fairs

3201 Arch Street
Suite 310A
Philadelphia, PA 19104
215-895-5840
www.dvsf.org