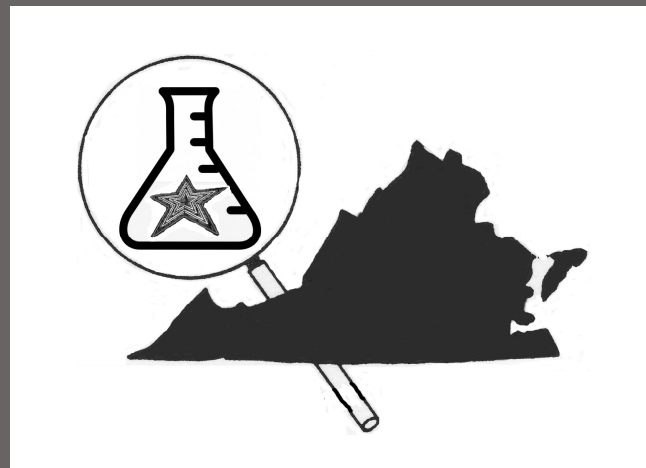


Western Virginia Regional Science Fair Awards



2019-2020

Acknowledgements and Thanks

Participating School Districts and Schools

Roanoke City Public Schools

Roanoke County Public Schools

Roanoke Valley Governor's School

Western Virginia Regional Science and Engineering Fair Hosts

Hollins University; Virginia Western Community College; Roanoke College

Regional Fair Planning Committee

Erin Barnett

Roanoke County Public Schools

Tom Fitzpatrick

Roanoke City Public Schools

Mark Levy

Roanoke Valley Governor's School

Acknowledgements and Thanks

Special Thanks

Dr. Dan Derringer and Hollins University event staff for developing plans for hosting the fair prior to the transition to virtual fair format

The judges for sharing their time and expertise

The organizations that provided special awards

Sponsorships

Grand Award Sponsor (\$2,500): RVGS Foundation

Grand Award Supporter (\$1,000): Novozymes

Additional Fair Sponsorship (\$400): Leidos Inc.

Affiliated Fairs

Virginia State Science and Engineering Fair

Hosted by Virginia Tech Carilion School of Medicine - April 18

VSSEF will be hosted virtually this year

Category Award 1st place projects advance to VSSEF

These students will receive further information in an email from Mr. Levy

Regeneron International Science and Engineering Fair

As of 3/22, no adjustments have been announced regarding this year's ISEF

The three Grand Award projects are selected to advance to ISEF

These students will receive further information in an email from Mr. Levy

Modifications due to COVID-19

Due to COVID-19 related closures and activity restrictions, the Western Virginia Regional Science Fair ran through a virtual format this year. The Middle School division has been delayed until students return to school full time. Updated information will be provided through the Roanoke Valley Governor's School website when available.

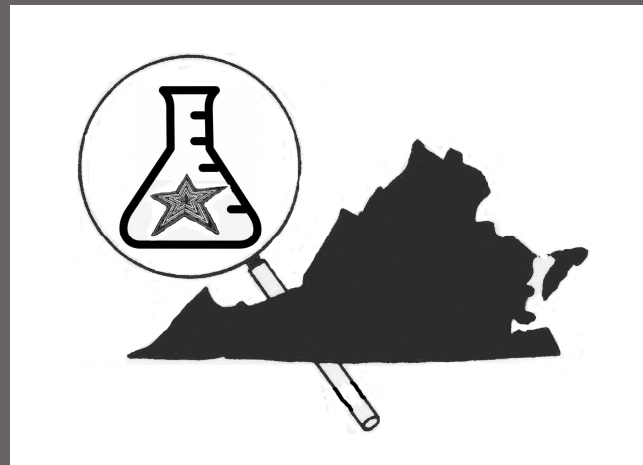
The Fair Coordinators would like to thank the following individuals for their assistance in these difficult circumstances:

Tonnie Pack, April Hill, and Jamey McKenna for brainstorming and assistance with the online fair infrastructure

Participating students and their teachers for adapting to the adjusted format and quickly providing materials online for judging

Our judges for doing their best to evaluate projects under difficult conditions

Special Awards



American Meteorological Society Award

Phytoremediation of Lead (II) Nitrate by Mosses Collected from Roanoke,
Virginia

Emma Kate Greer RVGS/Patrick Henry High School

Fiona Murphy RVGS/Patrick Henry High School

American Psychological Association Award

Associations Between Time Perspective, Delay Discounting, and Length of
Abstinence Among Individuals with Substance Dependence

Holly Acker RVGS/Lord Botetourt High School

ASM Materials Education Foundation

An Arsenic Filtration Mechanism Using a 3D Bioprinted Cysteine and Silicon
Carbide Model

Madison Brown RVGS/Franklin County High School

Mu Alpha Theta Award

A Novel Multi-omic Approach to Identifying Cancer Recurrence- Associated Gene Signatures

Kevin Sheng

RVGS/Cave Spring High School

NASA Earth System Science Award

Assessment of Neonicotinoids in Blue Ridge Honey

Shannon Filer

RVGS/James River High School

National Oceanic and Atmospheric Administration (NOAA) Award

The Effect of Road Salts on the Amount of Chloride in the Watershed

Kara Hopkins

Cave Spring High School

Naval Science Award

A Novel Multi-omic Approach to Identifying Cancer Recurrence- Associated Gene Signatures

Kevin Sheng

RVGS/Cave Spring High School

The Impact of Visual Input on Glial Cell Development Within the Mouse Brain

Mary Grace Giles

RVGS/Patrick Henry High School

Sponsor: Melissa Fisher

Assessment of Neonicotinoids in Blue Ridge Honey

Shannon Filer

RVGS/James River High School

Ricoh Sustainable Development Award

Bioremediation of heterocyclic dyes by *Pseudomonads*

Murphy Johnson

RVGS/Patrick Henry High School

Jack Shepherd

RVGS/Patrick Henry High School

Society for In Vitro Biology Award

The Effect of Vaping on Bronchial/Tracheal Epithelial Cells

Ellyn Anama

RVGS/Salem High School

US Air Force Award

AFM-based Nanoindentation Technique: A Novel Approach to Determine the Nanoscale Degradation of PET

Uyen Tran

RVGS/William Fleming High School

Can Essential Oils be Allelopathic to *Lolium multiforum* Without Harming *Solanum lycopersicum*?

Shreya Madan

Hidden Valley High School

Associations Between Time Perspective, Delay Discounting, and Length of Abstinence Among Individuals with Substance Dependence

Holly Acker

RVGS/Lord Botetourt High School

Yale Science and Engineering Award

AFM-based Nanoindentation Technique: A Novel Approach to Determine the Nanoscale Degradation of PET

Uyen Tran

RVGS/William Fleming High School

Alfred D. Blease Award, Sponsored by VWCC

Developing a Bluetooth Enabled Pill Dispenser

Grady Brydges

RVGS/Cave Spring High School

Luke Arner

RVGS/Hidden Valley High School

Virginia Dental Association Award

A Novel Multi-omic Approach to Identifying Cancer Recurrence-Associated Gene Signatures

Kevin Sheng

RVGS/Cave Spring High School

Western Virginia Water Authority Awards

1st Use of Denitrifying Bacteria Isolated from the Environment on Remediation of Eutrophic Water

Megan McGinnis RVGS/Patrick Henry High School

Sarah Riddle RVGS/Patrick Henry High School

2nd Testing the Filtration Efficiency of Homemade Semi-Permeable Membranes

Joshua Campos Northside High School

Andrew Lin Northside High School

Jacob Phillips Northside High School

3rd The Effect of the Type of Element Used in a Filter on its Effectiveness in Removing Heavy Metals from Water

Elizabeth Moore Cave Spring High School

Caroline Moore Cave Spring High School

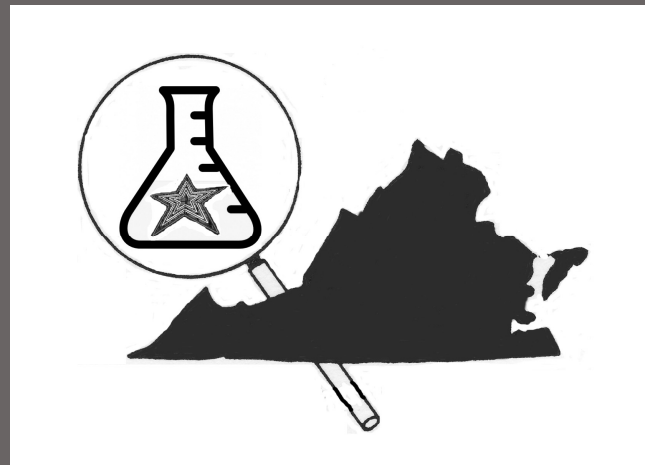
American Water Works Association Awards

- 1st An Arsenic Filtration Mechanism Using a 3D Bioprinted Cysteine and Silicon Carbide Model
Madison Brown RVGS/Franklin County High School
- 2nd Testing the Filtration Efficiency of Homemade Semi-Permeable Membranes
Joshua Campos Northside High School
Andrew Lin Northside High School
Jacob Phillips Northside High School

Virginia Water Environment Association/ Junior Stockholm Water Prize

- 1st The Impact of Pharmaceuticals on Aquatic Life using *Danio rerio* as a Model
Simran Gill RVGS/Salem High School
- 2nd The Effect of Pyrolysis Temperature on the Absorption Capacity of Rice-hull Derived Biochar in Comparison to Activated Carbon on Malachite Green Oxalate in Aqueous Solutions
Caroline Grant RVGS/Hidden Valley High School
Alicia Carvalho RVGS/Cave Spring High School

Category Awards



Animal Sciences

1st Place

AS1 - The Effect of Taurine on the Heart Rate of *Daphnia magna*

Maggie Parkhurst RVGS/William Byrd High School

Rebecca Qiu RVGS/William Byrd High School

Sponsor: Donald Wages

2nd Place

AS4 - The Impact of Pharmaceuticals on Aquatic Life using *Danio rerio* as a Model

Simran Gill RVGS/Salem High School

Sponsor: Steve Smith

3rd Place

AS8 - An Investigation of the Bioaccumulation of Microplastics on *Danio rerio*

Mattie Rose Keely RVGS/Lord Botetourt High School

Sponsor: Cindy Bohland

Behavioral and Biomedical Sciences

- | | | |
|-----------|---|--|
| 1st Place | BB4 - A Novel Multi-omic Approach to Identifying Cancer Recurrence-Associated Gene Signatures Kevin Sheng | RVGS/Cave Spring High School Sponsor: Cindy Bohland |
| 1st Place | BB3 - Associations Between Time Perspective, Delay Discounting, and Length of Abstinence Among Individuals with Substance Dependence Holly Acker | RVGS/Lord Botetourt High School Sponsor: Melissa Fisher |
| 2nd Place | BB6 - Development of a Biofilm-Resistant Bioink for Wound Repair Maya Reddy Kameron Washington-Brown | RVGS/Salem High School RVGS/William Fleming High School Sponsor: Cindy Bohland |
| 3rd Place | BB2 - Understanding the Relationship Between Motivation, Future Valuation, and Relapse in Individuals in Recovery from Substance Abuse Elyse McFalls | RVGS/William Fleming High School Sponsor: Melissa Fisher |

Cellular and Molecular Biology

- 1st Place **CM5 - The Impact of Visual Input on Glial Cell Development Within the Mouse Brain**
Mary Grace Giles RVGS/Patrick Henry High School
Sponsor: Melissa Fisher
- 2nd Place **CM2 - Comparative Analysis Regarding Sex of Patient and Genetic Mutations in Glioblastoma**
Liala Sofi RVGS/Hidden Valley High School
Sponsor: Steve Smith
- 3rd Place **CM3 - The Effect of ODDD Mutation M147T on GJA1 Internal Translation, Protein Localization, and Function**
Lauren Frampton RVGS/Cave Spring High School
Sponsor: Cindy Bohland

Chemistry

1st Place

CH5 - AFM-based Nanoindentation Technique: A Novel Approach to Determine the Nanoscale Degradation of PET

Uyen Tran

RVGS/William Fleming High School

Sponsor: Steve Smith

2nd Place

CH2 - The Effect of pH on the Cyclic Life of Electrochromic Prussian Blue Thin Films

Emiliano Gonzalez

William Byrd High School

Sponsor: Melissa Carr

3rd Place

CH4 - Sodium Hypochlorite Bleach's Effects on Various Organic Oils

Rachel Baffoe-Bonnie

Cave Spring High School

Sponsor: Sara Cann

3rd Place

CH6 - The Effect of Ambient Temperature on Luminol

Rose-Erline Guillaume

William Fleming High School

Sponsor: Christopher Barnes

Environmental Engineering

1st Place

EE9 - Phytoremediation of Lead (II) Nitrate Contaminated Soil by *Brassica juncea* and *Helianthus annuus*

Clara Higgins

RVGS/Patrick Henry High School

Olivia Reichardt

RVGS/Patrick Henry High School

Sponsor: Joanne Villers

2nd Place

EE4 - Using Bioprinted Algae Structures to Determine Which Algae Species is Most Effective at Removing Nitrates

Haley Day

RVGS/William Byrd High School

Kendall Kelly

RVGS/Patrick Henry High School

Dhruvi Patel

RVGS/Glenvar High School

Sponsor: Joanne Villers

3rd Place

EE6 - Effects of *Acinetobacter* and *Serratia* Bacteria on Bioremediation of Gasoline

Cecilia Fratacelli

RVGS/Glenvar High School

Sponsor: Joanne Villers

Engineering Mechanics

1st Place

EM2 - Developing a Bluetooth Enabled Pill Dispenser

Grady Brydges

RVGS/Cave Spring High School

Luke Arner

RVGS/Hidden Valley High School

Sponsor: Brent Holt

2nd Place

EM3 - Mirroring Prosthetic Robotic Arm

Dylan Tran

RVGS/Northside High School

Sponsor: Brent Holt

2nd Place

EM9 - CAD-Designed Autonomous Seed-Planting Robot

Tate Berenbaum

RVGS/Salem High School

Jodeci Dawson

RVGS/William Fleming High School

Leah Germain

RVGS/Lord Botetourt High School

Sponsor: Nancy Aldridge

3rd Place

EM6 - Neuropathy Navigational Assistance Device

Hayden Gray

RVGS/Patrick Henry High School

Sponsor: Brent Holt

Earth and Environmental Sciences

- 1st Place** **ES6 - Assessment of Neonicotinoids in Blue Ridge Honey**
Shannon Filer RVGS/James River High School
Sponsor: Steve Smith
- 1st Place** **ES1 - The Effect of Pyrolysis Temperature on the Absorption Capacity of Rice-hull Derived Biochar in Comparison to Activated Carbon on Malachite Green Oxalate in Aqueous Solutions**
Caroline Grant RVGS/Hidden Valley High School
Alicia Carvalho RVGS/Cave Spring High School
Sponsor: Joanne Villers
- 2nd Place** **ES5 - Phytoremediation of Lead (II) Nitrate by Mosses Collected from Roanoke, Virginia**
Emma Kate Greer RVGS/Patrick Henry High School
Fiona Murphy RVGS/Patrick Henry High School
Sponsor: Joanne Villers
- 3rd Place** **ES7 - Photocatalytic Degradation of Methylene Blue Using Titanium Dioxide**
Cathryn Little RVGS/Patrick Henry High School
Sponsor: Steve Smith

Materials Science / Physics

1st Place

MS7 - Novel Process for Polylactic Acid Synthesis From Kudzu Root

Luke Gardner

RVGS/Patrick Henry High School

Ryan Rigatti

RVGS/Lord Botetourt High School

Luke Suess

RVGS/Patrick Henry High School

Sponsor: Cindy Bohland

2nd Place

MS2 - A Comparison of *Muscari neglectum* Starch to Corn and Rice Starches in Starch-Based Bioplastics

Catherine Chen

RVGS/Cave Spring High School

Michelle Zheng

RVGS/Cave Spring High School

Sponsor: Joanne Villers

2nd Place

MS6 - An Arsenic Filtration Mechanism Using a 3D Bioprinted Cysteine and Silicon Carbide Model

Madison Brown

RVGS/Franklin County High School

Sponsor: Joanne Villers

3rd Place

MS5 - The Effect of Different Types of Threads in Dog Tug Toy Material on Tensile Strain and Stress

Evan Langhammer

Patrick Henry High School

Sponsor: Kyle LaFollette

Microbiology

1st Place

MI5 - Bioremediation of heterocyclic dyes by *Pseudomonads*

Murphy Johnson

RVGS/Patrick Henry High School

Jack Shepherd

RVGS/Patrick Henry High School

Sponsor: Cindy Bohland

1st Place

MI4 - Use of Denitrifying Bacteria Isolated from the Environment on Remediation of Eutrophic Water

Megan McGinnis

RVGS/Patrick Henry High School

Sarah Riddle

RVGS/Patrick Henry High School

Sponsor: Cindy Bohland

2nd Place

MI9 - The Inhibitory Effects of *Brassica nigra* Seed Distillate on *E. coli*

Sophia Schumaecker

RVGS/Cave Spring High School

Claire Wei

RVGS/Cave Spring High School

Sponsor: Laura Roark

3rd Place

MI2 - The Effect of Nanoparticles on the Growth of *E. coli* and *S. epidermidis*

Claire Nichols

RVGS/Hidden Valley High School

Sponsor: Steve Smith

Plant Sciences

1st Place

PS3 - Can Essential Oils be Allelopathic to *Lolium multiflorum* Without Harming *Solanum lycopersicum*?

Shreya Madan

Hidden Valley High School

Sponsor: Caitlin Pannel

1st Place

PS9 - The Allelopathic Effect of *T. patula* Organs on the Germination & Growth of *L. lycopersicum* and *T. repens*

Madalyn Likens

RVGS/Patrick Henry High School

Eleanor Little

RVGS/Patrick Henry High School

Sponsor: Matthew Browning

2nd Place

PS6 - The Effect of *Manduca sexta* on the Total Phenolic Content of *Solanum lycopersicum*

Margaret Laflam

RVGS/Hidden Valley High School

Sponsor: Steve Smith

2nd Place

PS8 - The Effect of Synthetic and Organic Pesticides on the Growth and Germination of *Vigna radiata*

Anna Frittman

RVGS/Lord Botetourt High School

Spencer Kearns

RVGS/Staunton River High School

Sponsor: Joanne Villers

3rd Place

PS7 - The Effect of a Natural Multi-Plant Herbicide on Terrestrial and Aquatic Plants

Ryan Mollin

RVGS/Franklin County High School

Sponsor: Steve Smith

Systems Software

1st Place

SS4 - A Novel Algorithm for Cooperative GPS Navigation

Siddhartha Lamichhane

RVGS/Patrick Henry High School

Charles Murphy

RVGS/Patrick Henry High School

Sponsor: Doug Divers

2nd Place

SS1 - Cohesive Multi-Agent Sequencing Algorithm Auto-curricula for Traffic Stop Simulations

Michael Lin

RVGS/Hidden Valley High School

Sponsor: Doug Divers

3rd Place

SS3 - Physics Engine for Calculating Geodesics of Particles on a Lorentzian Manifold

James Whiting

RVGS/William Fleming High School

Sponsor: Doug Divers

3rd Place

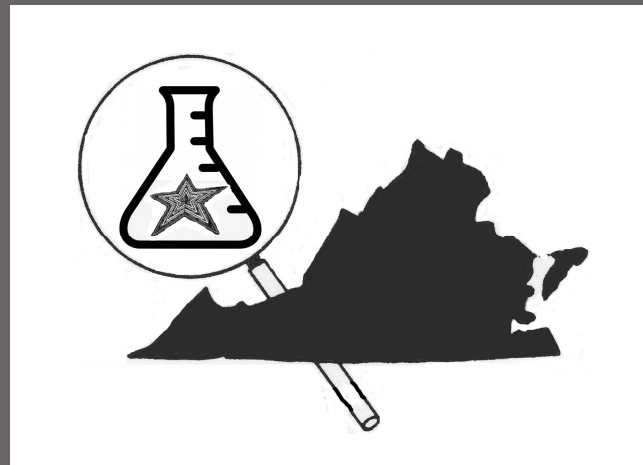
SS5 - The Development of a Secure School Application

Jagger LaDouceur

RVGS/Hidden Valley High School

Sponsor: Melissa Fisher

Grand Awards



Alternate Grand Award Winners

Assessment of Neonicotinoids in Blue Ridge Honey

Shannon Filer

RVGS/James River High School

Sponsor: Steve Smith

Bioremediation of heterocyclic dyes by Pseudomonads

Murphy Johnson

RVGS/Patrick Henry High School

Jack Shepherd

RVGS/Patrick Henry High School

Sponsor: Cindy Bohland

A Novel Algorithm for Cooperative GPS Navigation

Siddhartha Lamichhane RVGS/Patrick Henry High School

Charles Murphy

RVGS/Patrick Henry High School

Sponsor: Doug Divers

Grand Award Winners

These projects qualify for the International Science and Engineering Fair

A Novel Multi-omic Approach to Identifying Cancer Recurrence-Associated Gene Signatures

Kevin Sheng RVGS/Cave Spring High School
Sponsor: Cindy Bohland

The Impact of Visual Input on Glial Cell Development Within the Mouse Brain

Mary Grace Giles RVGS/Patrick Henry High School
Sponsor: Melissa Fisher

Developing a Bluetooth Enabled Pill Dispenser

Grady Brydges RVGS/Cave Spring High School
Luke Arner RVGS/Hidden Valley High School
Sponsor: Brent Holt

Congratulations to the Award Winners

Category Award 1st place winning students advance to the Virginia State Science and Engineering Fair. The Grand Award Winners advancing to the International Science and Engineering Fair should contact Mr. Levy by emailing mlevy@rvgs.k12.va.us for more information.