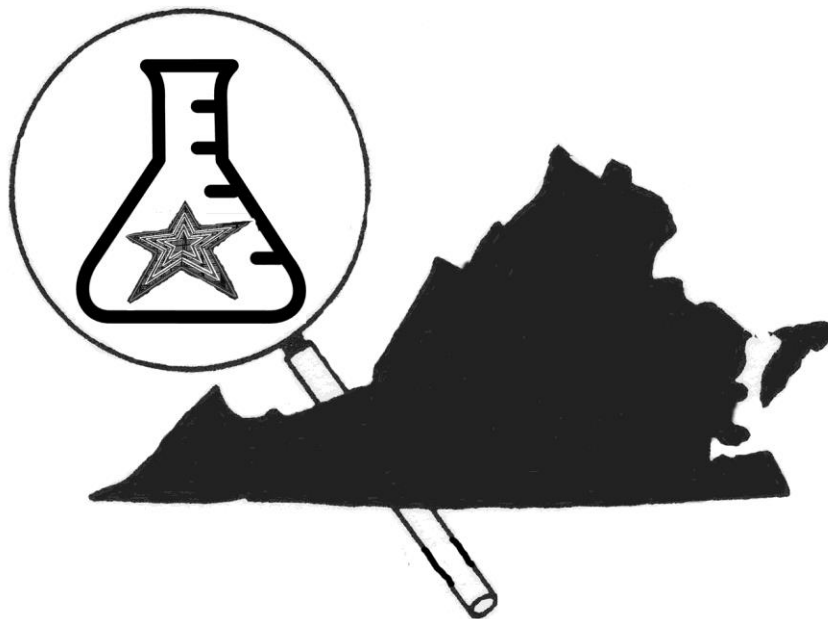


2021 WESTERN VIRGINIA REGIONAL SCIENCE FAIR



20 March 2021

PRESENTED BY THE AEP FOUNDATION



Schedule of Events

1:30 P.M. – 3:30 P.M.

Virtual Open House

4:00 P.M.

Awards Presentations

The public virtual activities above can be accessed from the Roanoke Valley Governor's School website – www.rvgs.k12.va.us

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 Host Institutions

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

Special Thanks

The many individuals who volunteered their time to help with the fair
The judges for sharing their time and expertise
The organizations that provided special awards

Donors and Sponsors

Fair Sponsor (\$5,000):	American Elective Power Foundation
Other Fair Sponsors:	Leidos Inc. RVGS Foundation

Affiliated Fairs

Virginia Science and Engineering Fair: Hosted by Virginia Tech Carilion School of Medicine (Virtual) on April 10
International Science and Engineering Fair (Virtual) May 9-15

Awards

Special Awards Sponsored by the Intel International Science and Engineering Fair:

American Meteorological Society
American Psychological Association
ASM Materials Education Foundation
Association for Women Geoscientists
Mu Alpha Theta
NASA Earth System Science Award
National Oceanic and Atmospheric Administration
Ricoh Sustainable Development Award
Society for In Vitro Biology
U.S. Agency for International Development (USAID)
U.S. Metric Association
U.S. Stockholm Junior Water Prize
Yale Science and Engineering Association

Special Awards Sponsored by WVRSF and Associated Organizations:

Virginia Dental Association Award
Alfred D. Blease award, sponsored by Virginia Western Community College
American Water Works Association
Western Virginia Water Authority Awards
Virginia Lakes and Watershed Association Awards

High School Category Awards

First place, Second place, Third place

Alternate Grand Awards

Three Alternate Grand Award projects

Grand Awards, presented by American Electric Power Foundation

Three Grand Award projects

Winners advance to the International Science and Engineering Fair

2021 Western Virginia Regional Science Fair High School Projects

Animal Sciences

- AS1 The Effect of Holothuroidea on the Regeneration Rate of *Dugesia tigrina*
Thomas (Trey) Joyce, III, RVGS/Salem High School
Barbara (Ayla) Lampros, RVGS/Salem High School
Teacher Sponsor: Don Wages
- AS2 The Effect of *Aloe vera* on the Regeneration Rate of *Dugesia tigrina*
Evelyn Anderson, RVGS/Cave Spring High School
Kiersten Lauer, RVGS/Northside High School
Teacher Sponsor: Don Wages
- AS3 The Effect of Propolis on the Regeneration Rate of *Dugesia tigrina*
Courtney Monard, RVGS/Hidden Valley High School
Griffin Yakob, RVGS/William Byrd High School
Teacher Sponsor: Don Wages
- AS4 Investigation of Bioprinted Hydrogels for Purification of *Danio rerio* Habitats
During Embryonic Development
Alicia Carvalho, RVGS/Cave Spring High School
Liala Sofi, RVGS/Hidden Valley High School
Teacher Sponsor: Cindy Bohland
- AS5 The Effect of *Catharanthus roseus* on the Regeneration Rate of *Dugesia tigrina*
Seth Huard, RVGS/Lord Botetourt High School
Keaton Lucas, RVGS/Lord Botetourt High School
Teacher Sponsor: Don Wages
- AS6 Using the Embryonic *Danio rerio* Stress Response System to Investigate the
Toxicity of Metal Oxide Nanoparticles
Uyen Tran, RVGS/William Fleming High School
Teacher Sponsor: Cindy Bohland

Biomedical and Health Sciences

- BH1 Comparing the Efficacy of Different Face Masks Using T4 Bacteriophage Droplets
Alexandra (Lexie) Rhodes, RVGS/Hidden Valley High School
Camly Tran, RVGS/Northside High School
Teacher Sponsor: Cindy Bohland
- BH2 The Effect of Gold Nanoparticles on Cell Viability and Collagen Production in Neonatal Human Dermal Fibroblasts
Michelle Zheng, RVGS/Cave Spring High School
Margaret Laflam, RVGS/Hidden Valley High School
Natalie Saville, RVGS/William Fleming High School
Teacher Sponsor: Cindy Bohland
- BH3 A Review of the Sensitivity and Specificity of Lung Ultrasound Compared with Chest X-Rays in Diagnosing Pneumonia
Meitra Kazemi, RVGS/Hidden Valley High School
Teacher Sponsor: Brandon Taylor
- BH4 Application of Raman Spectroscopy Biomarkers to Rametrix
Lacey Ngo, RVGS/William Fleming High School
Teacher Sponsor: Cindy Bohland
- BH5 Assessing the Efficacy of Current Vaccines Against Emerging SARS-Cov-2 Variants
Abhinav (Abhi) Karri, RVGS/Hidden Valley High School
Teacher Sponsor: Mark Levy

Computational Biology

- CB1 The Genetic Correlation Between Multiple Sclerosis and Various Autoimmune and Neurodegenerative Diseases
Holly Hinchy, RVGS/Cave Spring High School
Ella Bryant, RVGS/Northside High School
Teacher Sponsor: Mark Levy
- CB2 The Effect of Air Quality on the Risk of Pancreatic Cancer
Sarah Hall, RVGS/William Fleming High School
Ethan Johnson, RVGS/William Fleming High School
Teacher Sponsor: Mark Levy
- CB3 Investigating Alternatives to Conventional Chronic Kidney Disease Treatment Through Analysis of Differential Gene Expression
London Paige, RVGS/William Fleming High School
Teacher Sponsor: Mark Levy
- CB4 Comparing the Change in Genetic Composition of the HA Protein of Influenza A Subtypes Over Time
Owen McKenna, RVGS/Patrick Henry High School
Taylor Dawson, RVGS/William Byrd High School
Teacher Sponsor: Mark Levy
- CB5 An Investigation of the Accumulation of Mutations in the COVID19 Genome
Tracy (Harrison) Callis, RVGS/Patrick Henry High School
Elizabeth Fedor, RVGS/William Byrd High School
Teacher Sponsor: Mark Levy

Cellular and Molecular Biology

- CM1 Analyzing the Cell Viability and Cell Signaling Activity of an Alginate-based Synthetic Extra-Cellular Matrix Scaffold
Catherine Chen, RVGS/Cave Spring High School
Caroline Grant, RVGS/Hidden Valley High School
Vineel Kavuru, RVGS/Hidden Valley High School
Teacher Sponsor: Cindy Bohland
- CM2 Viral Hijacking of Intercellular Junctions Facilitates Spread
David Whitacre, RVGS/Hidden Valley High School
Teacher Sponsor: Brandon Taylor
- CM3 Using CRISPR-Cas9 to Edit Human Breast Cancer Fibroblasts in Cell Culture
Madison Brown, RVGS/Franklin County High School
Dhruvi Patel, RVGS/Glenvar High School
Teacher Sponsor: Cindy Bohland
- CM4 The Effect of Kaempferol and Myricetin on Breast Cancer Cell Proliferation and the Expression of the Bcl-2 Gene
Lynn Park, RVGS/Lord Botetourt High School
Annelise Wolfe, RVGS/Lord Botetourt High School
Teacher Sponsor: Brandon Taylor

Energy and Environmental Engineering

- EE1 The Effect of Fertilizers on the Hydrocarbon Degradation Ability of *Acinetobacter sp. NF22*
Cecilia Fraticelli, RVGS/Glenvar High School
Nicholas Louvet, RVGS/Glenvar High School
Teacher Sponsor: Joanne Villers
- EE2 Photocatalytic Degredation of Methylene Blue Using Titanium Dioixde Coated Glass Beads
Cathryn (Rynn) Little, RVGS/Patrick Henry High School
Teacher Sponsor: Steve Smith
- EE3 The Effect of a Whale Fin Shaped Blade on the Energy Output of a Wind Turbine
Charles (Bass) Beasley, Jr., RVGS/Patrick Henry High School
Maximillian Roberson, RVGS/Patrick Henry High School
Teacher Sponsor: Joanne Villers
- EE4 Alternatives for Corn Based Biofuel
Paulo Carey, RVGS/Franklin County High School
Parker Chapman, RVGS/Franklin County High School
Teacher Sponsor: Steve Smith
- EE5 The Effect of Natural Dyes on the Efficiency of Dye-Sensitized Solar Cells
Josephine (Josie) Fraticelli, RVGS/Glenvar High School
Cole Price, RVGS/Staunton River High School
Teacher Sponsor: Steve Smith

Engineering Mechanics A

- EM-A1 Room Occupancy Tracker
 Matthew Scarlatescu, RVGS/Hidden Valley High School
 Teacher Sponsor: Drew Hurst
- EM-A2 WiFi-Enabled Webcam for Educators
 William (Maxwell) Stevens, RVGS/Patrick Henry High School
 Tobias (Toby) Tate, RVGS/Patrick Henry High School
 Teacher Sponsor: Drew Hurst
- EM-A3 Rotating Weekly Pill Dispenser
 Kierstyn Stanley, RVGS/Lord Botetourt High School
 Sydney Vokus, RVGS/Lord Botetourt High School
 Teacher Sponsor: Drew Hurst
- EM-A5 Electronic Doorman
 Troy (Andrew) Harmon, RVGS/Patrick Henry High School
 Micah Keyser-Rothgery, RVGS/Patrick Henry High School
 Teacher Sponsor: Drew Hurst
- EM-A6 Robotic Coronavirus Testing
 Merryn Isbell, RVGS/Patrick Henry High School
 Lillian (Libby) Jamison, RVGS/Patrick Henry High School
 Teacher Sponsor: Connor Wade

Engineering Mechanics B

- EM-B1 UV Light Sanitation Hood
 Sydney Durham, RVGS/Patrick Henry High School
 Ruby Isbell, RVGS/Patrick Henry High School
 Teacher Sponsor: Drew Hurst
- EM-B3 The COVID Bot
 Ethan Fouch, RVGS/Lord Botetourt High School
 Fady Abdelmalak, RVGS/Salem High School
 Teacher Sponsor: Drew Hurst
- EM-B4 Mini Theremin
 Riley Kerr, RVGS/Patrick Henry High School
 Teacher Sponsor: Drew Hurst
- EM-B5 Mini Wind Turbine
 Griffin Kauffman, RVGS/Patrick Henry High School
 Riley VanAken, RVGS/Patrick Henry High School
 Teacher Sponsor: Drew Hurst
- EM-B6 Plant Watering Robotic Arm
 Nathan Sprouse, RVGS/Cave Spring High School
 Ethan Su, RVGS/Hidden Valley High School
 Teacher Sponsor: Connor Wade

Earth and Environmental Sciences

- ES1 Assessing the Presence of Microplastics and Nanoplastics in Local Freshwater
Walker Wright, RVGS/Cave Spring High School
Leah Germain, RVGS/Lord Botetourt High School
Teacher Sponsor: Joanne Villers
- ES2 Analysis of Microbial Diversity in PCB-Contaminated Soils
Eleanor Little, RVGS/Patrick Henry High School
Teacher Sponsor: Joanne Villers
- ES3 Assessment of Glyphosate in Blue Ridge Honey
Shannon Filer, RVGS/James River High School
Teacher Sponsor: Steve Smith
- ES4 Use of Titanium Dioxide Nanoparticle Enhanced Paint to Reduce Nitrogen Dioxide Pollution
Lillian Holt, RVGS/Patrick Henry High School
Megan McGinnis, RVGS/Patrick Henry High School
Sarah Riddle, RVGS/Patrick Henry High School
Teacher Sponsor: Joanne Villers

Microbiology

- MI1 The Effect of *Melaleuca alternifolia* EO on the Growth of *E. coli*
Faith Kuehl, RVGS/Patrick Henry High School
Annika Plunkett, RVGS/Patrick Henry High School
Teacher Sponsor: Laura Roark
- MI3 The Synergistic Effect of Pomegranate Rind Extract and Ciprofloxacin on the Growth of *E. coli*
Reese Redford, RVGS/Salem High School
Teacher Sponsor: Laura Roark
- MI4 The Use of a Fluorescent pH-Biosensor to Image Yeast Organelles
Grace Kahoun, RVGS/Patrick Henry High School
Emma Thielecke, RVGS/Patrick Henry High School
Teacher Sponsor: Cindy Bohland
- MI5 The Effect of Clove Oil on the Growth of *E. coli*
Thomas (TJ) Hinson, RVGS/Salem High School
Zane Ellis, RVGS/Staunton River High School
Teacher Sponsor: Laura Roark
- MI7 The Effect of *Trametes vericolor* Infused Bandages on *Staphylococcus epidermidis*
Cynthia Lin, RVGS/Franklin County High School
Emma Kate Greer, RVGS/Patrick Henry High School
Jennie Pham, RVGS/William Fleming High School
Teacher Sponsor: Joanne Villers

Materials Science

- MS1 The Effect of Natural Polymers on the Sustainability of Adhesive Hydrogels for Tissue Repair
Katherine Cross, RVGS/Lord Botetourt High School
Haley Day, RVGS/William Byrd High School
Teacher Sponsor: Steve Smith
- MS3 The Effect of Various Temperatures on the Growth and Piezoelectricity of Rochelle Salt Crystal
Emiliano Gonzalez, William Byrd High School
Teacher Sponsor: Melissa Carr
- MS4 The Effect of Various Amounts of Water Added During Polymerization on the Sound Absorption of Polyurethane Foam
Anna Halsdorf, RVGS/Patrick Henry High School
Penelope Smith, RVGS/Patrick Henry High School
Teacher Sponsor: Steve Smith
- MS6 The Application of a Chitosan Cross-linked Poly(acrylic acid) Hydrogel in the Removal of a Model Pollutant from an Aqueous Solution
Ainsley Robertson, RVGS/Cave Spring High School
Rebecca Qiu, RVGS/William Byrd High School
Teacher Sponsor: Steve Smith

Plant Sciences

- PS1 The Effect of Silver Nanoparticles on the Tobacco Mosaic Virus
Sara Drewry, RVGS/Patrick Henry High School
Teacher Sponsor: Cindy Bohland
- PS2 The Autotoxic Effect of *P. americana*
Grace Bowman, RVGS/Franklin County High School
Teacher Sponsor: Matthew Browning
- PS3 The Allelopathic Effect of *A. millefolium* on the Germination and Growth of *T. aestivum*
Chloe DeKorsey, RVGS/Patrick Henry High School
Mieko DeKorsey, RVGS/Patrick Henry High School
Teacher Sponsor: Matthew Browning
- PS4 The Effect of an Invasive Species-Derived Herbicide on Other Inhibitory, Non-Native Flora
Ryan Mollin, RVGS/Franklin County High School
Teacher Sponsor: Steve Smith
- PS5 The Synergistic Allelopathic Effect of Extracts from Two Invasive Species on Germination and Growth of *E. hystrix*
Daniel Han, RVGS/Cave Spring High School
Carson Ray, RVGS/Cave Spring High School
Teacher Sponsor: Matthew Browning
- PS6 The Effect of Different Color Lights on Hard Red Winter Wheat Growth
Emily Gard, Glenvar High School
Teacher Sponsor: Karen Hicks
- PS7 The Allelopathic Effect of *C. esculentus v. chufa* on the Germination & Growth of *L. vulgaris*
Emma Pope, RVGS/Glenvar High School
Aidan Mayhue, RVGS/Lord Botetourt High School
Teacher Sponsor: Matthew Browning
- PS8 The Allelopathic Effect of *P. persica* on the Germination & Growth of *F. ananassa*
Joshua Ruppel, RVGS/Patrick Henry High School
Teacher Sponsor: Matthew Browning

Systems Software

- SS1 Utilizing Python and Machine Learning to Analyze the Validity of News Articles
Brayden Whitlow, RVGS/Franklin County High School
Timothy Wilson, RVGS/James River High School
Teacher Sponsor: Doug Divers
- SS3 Verto.exchange
Tate Berenbaum, RVGS/Salem High School
Teacher Sponsor: Drew Hurst
- SS4 Programming a Game in Python
William (Alexander) Branscom, RVGS/Patrick Henry High School
Anna West, RVGS/Patrick Henry High School
Teacher Sponsor: Doug Divers
- SS5 Time Management Assistance Program
Shane Cockram, RVGS/Franklin County High School
Liam May, RVGS/Franklin County High School
Teacher Sponsor: Doug Divers
- SS6 Scholarship Finder
Cole Konstance, RVGS/Hidden Valley High School
Jackson Konstance, RVGS/Hidden Valley High School
Teacher Sponsor: Doug Divers
- SS7 Transferring Text to Auditory Language for the Visually Impaired
Alex Kurtz, RVGS/Franklin County High School
Eliza Quesenberry, RVGS/Franklin County High School
Teacher Sponsor: Doug Divers