

ANIMAL SCIENCES A

Third Place

AS-A 5 The Effect of Potassium on the Heart Rate of *Daphnia magna*

Julia Landis, Staunton River High School

Caiden Perry, Liberty High School

Second Place

AS-A 3 The Effect of Curcumin on the Mobility of a *Drosophila* Model for Parkinson's Disease

Erica Gergely, Lord Botetourt High School

Ellie McClung, Lord Botetourt High School

Second Place

AS-A 7 The Effect of *Camellia Sinensis* on the Heart Rate of *Daphnia magna*

Kaitlin Jackson, Patrick Henry High School

Sean Powell, Patrick Henry High School

First Place

AS-A 2 The Ameliorative Effect of Carotenoid-Producing Yeast on the Memory of a *Drosophila* Model for Alzheimer's

Keaton Lucas, Lord Botetourt High School

ANIMAL SCIENCES B

Third Place

AS-B 7 The Effect of Garcinia kola on the Heart Rate of Daphnia magna

Lawson Fralin, Patrick Henry High School

Lachlan Thompson, Patrick Henry High School

Second Place

AS-B 6 The Effect of Hibiscus sabdariffa on the Heart Rate of Daphnia magna

Henry Fedak, Patrick Henry High School

Kai Warren, Patrick Henry High School

Second Place

AS-B 9 The absorption and effect of microplastics on C. elegans

Emma Baldwin, Salem High School

Dorothy Myers, Salem High School

First Place

AS-B 8 The Effect of Temperature on the Bleaching of Leptoseris Coral

Hannah Hertz, Patrick Henry High School

Brinna Seidel, Patrick Henry High School

ANIMAL SCIENCES C

Third Place

AS-C 4 The Effect of Capsicum annum on the Heart Rate of Daphnia magna

Lera Gibson, Franklin County High School

Helena Longstreth, Franklin County High School

Third Place

AS-C 9 The Effect of Arsenic on C. elegans

Gabby Harig, Patrick Henry High School

Second Place

AS-C 8 The Effect of Polyethylene Microplastics on C. elegans

Carrie Collins, Lord Botetourt High School

Mirabel Maked, Salem High School

Second Place

AS-C 10 The effect of hydrocortisone on the cellular regeneration of Girardia tigrina

Hana Sageer, Hidden Valley High School

First Place

AS-C 1 Effects of Air Pollution on Fruit Flies

CC Garcia-Quiroz, Patrick Henry High School

Phoenix O'Dell, Patrick Henry High School

BEHAVIORAL AND SOCIAL SCIENCES

Third Place

BS 3 Are Loneliness and Group Involvement Associated with Substance Use Disorder Recovery?

Grace Harig, Patrick Henry High School

Kira McGinnis, Patrick Henry High School

Second Place

BS 4 The Effect of Visual and Written Counter-Stereotypical Exemplars on Implicit Gender STEM Bias

Cameron McPhee, William Fleming High School

First Place

BS 6 A Study of Driver-Road Cyclist Interactions and Methods for Their Improvement

Annika Plunkett, Patrick Henry High School

First Place

BS 7 The Effect of Extracurricular Participation on Sleep and Mental Health

Penelope Roberts, Patrick Henry High School

BIOMEDICAL AND HEALTH SCIENCES

Third Place

BH 7 Sustainable synthesis of carbon quantum dots as a fluorescence probe in medical bioimaging via a zebrafish model
Sophia Zeng, Hidden Valley High School

Second Place

BH 1 Investigating the Associations Between Trait Neuroticism, Physiology, and the Effects of Low-Intensity Focused Ultrasound Neuromodulation
Elisabeth Tershak, Patrick Henry High School

First Place

BH 2 The Impact of Aerobic Exercise on Mitochondrial Function in the Hippocampus
Emma Batty, Patrick Henry High School

First Place

BH 3 Assessing the Affects of ACQUIRE Therapy for Children Using a Motor Learning Scale
Margaret Kauffman, Patrick Henry High School

CELLULAR AND MOLECULAR BIOLOGY

Third Place

CM 6 Investigating the Role of SNAI2 in the Proliferation of HCT116 Cancer Cells

Kathryn Ha, Salem High School

Claire Rawlins, Salem High School

Second Place

CM 5 Vitamin D's Effect on *Saccharomyces cerevisiae* Biofilm Formation

Luke Sumner, Franklin County High School

First Place

CM 1 Dlk1 Locus and Neurogenic Niche Regulation in Developing Cortex of

DiGeorge Syndrome Mouse Model

Nate Faulkner, Cave Spring High School

First Place

CM 2 Detection of SARS-CoV-2 Antibodies in Fluids from Various Sources

Diya Reddy, Cave Spring High School

COMPUTATIONAL BIOLOGY

Third Place

CB 1 Clinically Relevant Mutations in Genes Associated with Alzheimer's Disease

Kaleb Humerickhouse, Cave Spring High School

Ayush Pinnamaraju, Cave Spring High School

Third Place

CB 3 A Phylogenetic Analysis of the Origin of Neuronon Structures in Basal
Holozoa

Brett Smith, Lord Botetourt High School

Second Place

CB 4 A Meta-analysis of the Genetic Basis for Lymphoma Cancer Subtypes

Jack Janiga, Hidden Valley High School

First Place

CB 5 Analysis of a KRAS G-Quadruplex Pharmacophore for Targeted Cancer
Therapy

Griffin Yakob, William Byrd High School

EARTH AND ENVIRONMENTAL SCIENCE

Third Place

ES 7 The removal of silver nanoparticles in water using calcium bentonite
Rhiannon Stowe, Lord Botetourt High School

Second Place

ES 6 The comparison of chemical cleaner vs. naturally made persimmon calyx cleaner on the reduction of E. coli
Kyla Wooldridge, Patrick Henry High School

First Place

ES 1 Using Zebrafish as a Bioindicator to Test the Bioremediatory Potential of T. versicolor on PFOA
Aidan Callis, Patrick Henry High School

First Place

ES 4 The Correlation of Arctic Cyclones and Sea Ice Loss and its Relationship to Climate Change
Chloe Herold, Hidden Valley High School

ENGINEERING MECHANICS A

Third Place

EM-A 7 Educational Coding Language and Car

Katie Coles, Patrick Henry High School

Luke Thompson, Patrick Henry High School

Third Place

EM-A 8 Automated Seed Planting Robot

Faith Kuehl, Patrick Henry High School

Caroline O'Keeffe, Patrick Henry High School

Second Place

EM-A 4 Self-Playing Ukulele

Kaeli Berry, James River High School

Meribel Pan, Hidden Valley High School

First Place

EM-A 3 EMG Controlled Prosthetic Hand

William Henderson, Franklin County High School

Chase Noel, Franklin County High School

ENGINEERING MECHANICS B

Third Place

EM-B 4 Handwriting Robotic Arm

Sharmila Balaji, Cave Spring High School

Jeanne-Eugenie Picard, Cave Spring High School

Third Place

EM-B 7 Automatic Pill Sorter and Dispenser

Kensington Reynolds, Cave Spring High School

Jacob Stewart, Hidden Valley High School

Second Place

EM-B 3 Weight Dependent Automatic Sorting System

Seijin Campbell, Franklin County High School

Kalob Daniels, Lord Botetourt High School

First Place

EM-B 1 Autonomous Following Suitcase

Alpin Singh, Cave Spring High School

William Xiao, Northside High School

ENGINEERING MECHANICS C

Third Place

EM-C 4 Metal Shavings Collection Arm

Sean Cady, Craig County High School

Noah Svirsky, Cave Spring High School

Third Place

EM-C 5 TacTile: 3D Interactive Haptic Pin Display Using Novel Linear Motor Arrays

Carson Ray, Cave Spring High School

Second Place

EM-C 7 Braille Teaching Device

Isaac Olson, Patrick Henry High School

Ryan Prusakowski, Patrick Henry High School

First Place

EM-C 6 All Terrain Automatic Rover

Guillaume Preud'homme, Patrick Henry High School

Ben Schweitzer, Patrick Henry High School

ENGINEERING MECHANICS D

Third Place

EM-D 4 Automatic Plant Watering System

Divya Bharati, William Fleming High School

Sophie Tisdale, Franklin County High School

Second Place

EM-D 1 Rock-Paper-Scissors Robot

Isaiah Butler, Patrick Henry High School

Jamal Millner, Patrick Henry High School

Zachary Young, Patrick Henry High School

First Place

EM-D 6 Automatic Roof Painting Robot to Reduce Urban Heat and Energy Costs

Chloe DeKorse, Patrick Henry High School

First Place

EM-D 7 AT-CV Walker (All Terrain Combat Vehicle)

Zachary Easter, Salem High School

Diol Glele, Patrick Henry High School

ENVIRONMENTAL ENGINEERING/ENERGY

Third Place

EE 5 Comparing the efficiency of dye-sensitized solar cells made with different semiconductor nanoparticles

Charlotte Anstey, Patrick Henry High School

Second Place

EE 6 The effect of polysaccharide-based hydrogel beads on the removal of heavy metal ions from water

Claire McCahill, Patrick Henry High School

First Place

EE 3 The Effect of Different Substrates on the Efficiency of a Waste-Based Microbial Fuel Cell

Anika Parashar, Hidden Valley High School

MATERIALS SCIENCE/CHEMISTRY

Third Place

MS 1 The Effect of Various Substrates on the Strength of Mycelium-based Building Blocks

Frances Livingston, Patrick Henry High School

Sarah O'brien, Patrick Henry High School

Second Place

MS 3 The effect of drop height, drop angle, and floor material on the pattern of blood spatter

Claire Togo, Patrick Henry High School

First Place

MS 2 Removing pollutants from water using modified sodium alginate beads

Evelyn Anderson, Cave Spring High School

Heidi Thompson, Cave Spring High School

First Place

MS 6 Using Montmorillonite Clay to Remediate Algal Blooms

Laila Alam, Lord Botetourt High School

Emily Duncan, Lord Botetourt High School

MICROBIOLOGY A

Third Place

MI-A 6 The Effect of Citrus Juice and Essential Oil on *R. stolonifer*

Ella Dickerson, Lord Botetourt High School

Kinsley Milko, Lord Botetourt High School

Second Place

MI-A 8 The effect of common herbal remedies on the growth of *Escherichia coli* and *Staphylococcus epidermidis*

Sydney Anderson, Patrick Henry High School

First Place

MI-A 1 The Stability of *Bacillus* Strains When Applied on Bare and Avicita Corn Seeds

Mitchell Deese, Salem High School

First Place

MI-A 2 The Effects of Synthetic Peptide, Pineapple Enzymes, and Vinegar on the Growth and Formation of *Staphylococcus epidermidis* Biofilm

Adison Mayhue, Lord Botetourt High School

Nicole Scarlatescu, Hidden Valley High School

MICROBIOLOGY B

Third Place

MI-B 2 Investigating the Efficacy of Mechanical, Enzymatic, and Chemical Methods of *Candida albicans* Cell Lysis with Respect to Wastewater-Based Epidemiology
Aaron Bhowansingh, Hidden Valley High School

Second Place

MI-B 7 The effect of various nanoparticles on the inhibition of *Staphylococcus epidermidis*
Nolan Stokes, Patrick Henry High School

First Place

MI-B 1 The Effect of Cocoa Flavanols on *Pseudomonas fluorescens* Biofilm Formation and Quorum Sensing
Nafisah Izzat, Cave Spring High School
Anvita Panchumarthy, Cave Spring High School

First Place

MI-B 9 The Effect of Fluconazole Compared to Oregano Oil on *M. hiemalis*
Charlotte Hally, Patrick Henry High School

MICROBIOLOGY C

Third Place

MI-C 2 The Effect of Manuka Honey on *E. coli*

Claire Ricketts, Cave Spring High School

Second Place

MI-C 4 A Comparison of the Inhibitory Effect of Azole Antifungals vs. Oregano Essential Oil on *C. albicans*

Dylan De Meyts, Patrick Henry High School

Christopher Toner, Patrick Henry High School

First Place

MI-C 1 The Effect of Copper II Sulfate on Gene Expression and Evolution of *E. coli* B.

Riley Beasley, Patrick Henry High School

First Place

MI-C 9 The effects of silver, copper, and nickel infused gauze on *Staphylococcus aureus*

Gabrielle Romeo, William Byrd High School

PLANT SCIENCES A

Third Place

PS-A 4 Allelopathic effects of *M. oreades* on *L. perenne*

Lucy Atwood, Patrick Henry High School

Emily Dewire, Patrick Henry High School

Third Place

PS-A 7 The Allelopathic Effect of *S. oleracea* Organs on the Germination of *S. lycopersicum*

Vivienne Eaton, Salem High School

Ryan Hubbard, Salem High School

Second Place

PS-A 8 The Allelopathic Effect of *Triticum aestivum* on the Germination of *Glycine max*

Claire Grindo, Liberty High School

Ariana Markham, Northside High School

First Place

PS-A 1 Evaluation of *Cuscuta* interaction with *Arabidopsis thaliana* Expressing RUBY Reporter

Hannah Mizuba, Lord Botetourt High School

Kane Reczek, Lord Botetourt High School

First Place

PS-A 3 Determining which cryptochrome gene in *A. thaliana* exhibits the most growth in the presence of a magnetic field

Meera Raichura, William Byrd High School

PLANT SCIENCES B

Third Place

PS-B 5 The Allelopathic Effects of *Raphanus sativus* on *Zea mays* L.

Charles Rucker, Patrick Henry High School

Timothy Yemey, Patrick Henry High School

Second Place

PS-B 6 The Allelopathic Effect of *Tagetes patula* on the Germination of *Solanum lycopersicum*

Trey Hipes, James River High School

Tyler McCarren, Lord Botetourt High School

First Place

PS-B 2 The effect of melatonin on *Rhizobium*-inoculated mung beans

Benjamin King, Northside High School

PLANT SCIENCES C

Third Place

PS-C 6 The Allelopathic Effects of Sunflower (*Helianthus annuus*) on Barley (*Hordeum vulgare*)

Augie Biviano, Floyd County High School

Devin Blankenship, Floyd County High School

Second Place

PS-C 2 Removal of copper(II) and lead(II) ions from water with *C. demersum*

Aman Mengistu, Cave Spring High School

Second Place

PS-C 4 The Effect of *Poa pratensis* (Kentucky Bluegrass) Filtrate on the Germination Rate of *Trifolium repens* (White Clover) Seeds

Kassidy Corker, Patrick Henry High School

Kylie Duke, Patrick Henry High School

First Place

PS-C 1 Effectiveness of *Glycine max* on Microplastic Removal from Soil

Josephine Eaton, Salem High School

SYSTEMS SOFTWARE A

Third Place

SS-A 6 Converting English Speech to German Text Using Python

Graham Dietrich, Lord Botetourt High School

Second Place

SS-A 3 Using Machine Learning and Image Recognition to Identify Plant Species

Samuel Crawford, Patrick Henry High School

Seth Perry, Patrick Henry High School

Second Place

SS-A 5 Using Python to Escape the Comfort Zone

Miya Morton, Hidden Valley High School

First Place

SS-A 1 Machine Learning Enhanced Security Surveillance

Mann Patel, Glenvar High School

Caleb Wang, Hidden Valley High School

SYSTEMS SOFTWARE B

Third Place

SS-B 3 Sentiment Analysis: A Lexicon-Based Approach

Evan Shifflett, Patrick Henry High School

Second Place

SS-B 1 Investment Diversification and Management with Python

Rishika Sethumadhavan, Cave Spring High School

First Place

SS-B 2 Using Python to Identify Ghost Jobs

Nathan Bulla, Cave Spring High School