

ANIMAL SCIENCES A

Third Place

AS-A 1 The Effect of Acetylcholine on the Heart Rate of *Daphnia magna*
Malachi Schweitzer, Franklin County High School
Lucas Young, Lord Botetourt High School

Second Place

AS-A 2 The Effect of River Water on *Danio rerio* Eye Size and Expression of Estrogen-Responsive Gene
Anvita Panchumarthy, Cave Spring High School

Second Place

AS-A 3 The Effects of Polyethylene Microplastics on the Behavior and Stress Response of *Caenorhabditis elegans*
Kai Warren, Patrick Henry High School

First Place

AS-A 5 The Effect of Activated Charcoal on the Lifespan of *Apis mellifera* Exposed to Clothianidin
Augustine (Augie) Biviano, Floyd County High School
Prateek Reddy, Cave Spring High School

ANIMAL SCIENCES B

Third Place

AS-B 1 The Effect of *Coffea arabica* and *Paullinia cupana* on the Heart Rate of *Daphnia magna*

Carlee Coleman, Patrick Henry High School

Carter Naff, Patrick Henry High School

Second Place

AS-B 6 The Effect of Beta-alanine on the Heart Rate of *Daphnia magna*

Rowan Clark, Patrick Henry High School

Noah Johnstone, Patrick Henry High School

First Place

AS-B 3 The Effect of CBD on the Seizure Frequency of *D. melanogaster* with Epilepsy-causing Ion Channel Mutations

Elliott Wiegard, Patrick Henry High School

First Place

AS-B 4 Optimizing Feed Additives: A Computational Approach to Reducing Methane Emissions in Cattle

Anika Parashar, Hidden Valley High School

ANIMAL SCIENCES C

Third Place

AS-C 5 The Effect of Caffeine and Dietary Supplements on the Behavior of *Caenorhabditis elegans*
Caiden Perry, Liberty High School

Third Place

AS-C 7 The Effect of Citrus x aurantium on the Heart Rate of *D. magna*
Caleigh Aremia, William Byrd High School
Uma Patel, Salem High School

Second Place

AS-C 2 The Effect of Low Frequency Sound on *C. elegans*
Lucyna (Lucy) Laplante, Patrick Henry High School

First Place

AS-C 3 The Effect of Nicotine and Solanum melongena on the Mobility of a *D. melanogaster* Model for Parkinson's Disease
Stella Gillenwater, Patrick Henry High School
Caroline (Gracie) Greer, Patrick Henry High School

BEHAVIORAL AND SOCIAL SCIENCES

Third Place

BS 1 Episodic Future Thinking and Climate Conscientiousness

Margaret (Maggie) Jarrett, Patrick Henry High School

Second Place

BS 5 Episodic Future Thinking to Improve Management of Type 2 Diabetes:

Machine Learning Aided Analysis of Remote Delivery and Outcomes

Yufei (Sophia) Zeng, Hidden Valley High School

First Place

BS 10 The Role of Genetic Polymorphisms in Teenager's Sleep Habits

Charlotte Anstey, Patrick Henry High School

Brinna Seidel, Patrick Henry High School

BIOMEDICAL AND HEALTH SCIENCES

Third Place

BH 1 Identifying Convergent and Divergent mTOR Hyperactivation Targets using Pten and Tsc1 Loss-of-Function Neurons
Emily Duncan, Lord Botetourt High School
Meribel Pan, Hidden Valley High School

Third Place

BH 7 Investigating the Distinct Roles of the Anterior and Posterior Insula in Gating of Nociceptive Stimulus Using Low-Intensity Focused Ultrasound
Parneet Gill, Salem High School

Second Place

BH 2 A Comparison of Crustacean and Fungal Derived Chitosan Pads and Gauze
Cara Wardell, Patrick Henry High School

Second Place

BH 4 Investigating the Effect of Histotripsy on the Presence of Cell Death Markers, Proliferation Markers, and T-lymphocyte Populations in a murine osteosarcoma Model
Sydney Anderson, Patrick Henry High School

First Place

BH 6 The Effect of Manuka Honey on Pancreatic Adenocarcinoma Cells
Hannah Hertz, Patrick Henry High School

CELLULAR AND MOLECULAR BIOLOGY

Third Place

CM 3 The Difference in Effects of *G. officinalis* and Metformin on Colorectal Carcinoma Cells

Anna Favor, Patrick Henry High School

Kaitlin Jackson, Patrick Henry High School

Second Place

CM 4 The Impact of PI3KB Inhibition on Melanoma

Mirabel Maked, Salem High School

Claire Rawlins, Salem High School

First Place

CM 1 Investigating the Effect of Drug Delivery Through Gold Nanoparticles on Cancer Cells

Gabrielle (Gabby) Harig, Patrick Henry High School

Claire McCahill, Patrick Henry High School

First Place

CM 6 The Effects of Cocoa Flavanols on Inhibiting the Growth of Colon and Pancreatic Cancer Cells

Archit Arora, Staunton River High School

COMPUTATIONAL BIOLOGY A

Third Place

CB-A 1 Constructing a Platform to Facilitate Future Coral Population Genomic Studies

Dorothy Myers, Salem High School

Third Place

CB-A 4 A Bioinformatics Study of Circular Plasmid 32 in *B. burgdorferi*

Emma Baldwin, Salem High School

Second Place

CB-A 6 Automatic Mutation Locator via Transcriptome Analysis

Michael (Brenden) Hartung, Northside High School

First Place

CB-A 2 Deep Learning Drug Repurposing Tool

Ayush Pinnamaraju, Cave Spring High School

Caleb Wang, Hidden Valley High School

COMPUTATIONAL BIOLOGY B

Third Place

CB-B 4 Systemic Review and Meta Analysis of Lung Cancer Patients with COVID-19 Vaccine

Rishika Sethumadhavan, Cave Spring High School

Second Place

CB-B 2 Targeted Genomic Screening for Mutations in the Dihydropyrimidine Dehydrogenase Gene Associated with 5-Flurouracil Susceptibility

John (Jack) Janiga, Hidden Valley High School

First Place

CB-B 5 Bioinformatics Study to Determine Biomarkers for Preeclampsia

Keely Garri, Franklin County High School

First Place

CB-B 7 miRNA Biomarkers as a Tool for the Early Detection of Breast Cancer

Aman Mengistu, Cave Spring High School

EARTH AND ENVIRONMENTAL SCIENCES A

Third Place

ES-A 7 Evaluating the Potential of *Chlorella vulgaris* and *Spirogyra* for Capturing and Absorbing Microplastic Contaminants in Freshwater Ecosystems

Vivienne Eaton, Salem High School

Ryan Hubbard, Salem High School

Second Place

ES-A 8 Investigating the Impacts of Atmospheric Circulation Systems on Patterns of Arctic and Antarctic Sea Ice Extent

Chloe Herold, Hidden Valley High School

First Place

ES-A 3 The Inhibitory Effects of UV-C Light on the Growth of *Botrytis cinerea*

Claire Ricketts, Cave Spring High School

EARTH AND ENVIRONMENTAL SCIENCES B

Third Place

ES-B 8 The Effect of a Nitrate Selective Ion Exchange Resin on the Concentration of Nitrate in Agricultural Runoff

Andrew (Lachlan) Thompson, Patrick Henry High School

Second Place

ES-B 1 Recycling Grey Water: Growing *Raphanus sativus* with Filtered Solutions

Ella Dickerson, Lord Botetourt High School

First Place

ES-B 4 The Effect of pH on the Ability of *Aspergillus niger* to Decolorize Congo Red Dye

Riley Beasley, Patrick Henry High School

First Place

ES-B 6 A General Analysis on the Effects of Invasive Earthworms on Soil Microbiomes in Virginia

Brett Smith, Lord Botetourt High School

ENGINEERING MECHANICS A

Third Place

EM-A 2 Piano Man

Miya Morton, Hidden Valley High School

Roy Wainwright, Franklin County High School

Second Place

EM-A 8 Bi-Loon

Guillaume Preud'homme, Patrick Henry High School

James (Ben) Schweitzer, Patrick Henry High School

First Place

EM-A 6 Handwriting Robotic Arm 2.0

Jeanne-Eugenie Picard, Cave Spring High School

First Place

EM-A 9 Robot Extraction Hive Mind

Jamal Millner, Patrick Henry High School

ENGINEERING MECHANICS B

Third Place

EM-B 3 Mobile Storage Containment Unit

Isaiah Butler, Patrick Henry High School

Walker (Jackson) Farrar, Patrick Henry High School

Second Place

EM-B 9 Automated Plant Rotation and Watering System

Molly (Morgan) Fitzgerald, Patrick Henry High School

Evelyn (Eve) Foster, Patrick Henry High School

First Place

EM-B 1 Automatic Pill Dispenser

Jacob Stewart, Hidden Valley High School

First Place

EM-B 5 Applying Human Factors Principles to Redesign a Crane Control Panel and 3-Axis Controller

Kaeli Berry, James River High School

ENGINEERING MECHANICS C

Third Place

EM-C 4 The "No Swim" Safety Clip

Isaac Olson, Patrick Henry High School

Ryan Prusakowski, Patrick Henry High School

Third Place

EM-C 6 Self-Stabilizing RC Car

Nathan Bulla, Cave Spring High School

Mann Patel, Glenvar High School

Second Place

EM-C 2 Car controlled by hand movements

Samuel Glenn, Patrick Henry High School

James O'Keeffe, Patrick Henry High School

First Place

EM-C 3 Autonomous Following Box V2

Alpinveer (Alpin) Singh, Cave Spring High School

ENGINEERING MECHANICS D

Third Place

EM-D 8 Machine-Learning Integrated Remote AI Guidance Engine (MIRAGE)

Seijin Campbell, Franklin County High School

Kalob Daniels, Lord Botetourt High School

Second Place

EM-D 1 Automatic Wire Straightener and Coiler

Sean Cady, Craig County High School

Second Place

EM-D 6 Automated Safety-Enhanced Paper Cutting Machine

Cora Reid, Staunton River High School

First Place

EM-D 2 Soft Robotic Glove for Neuromuscular Recovery

William (Will) Henderson, Franklin County High School

Jeremiah (Chase) Noel, Franklin County High School

ENVIRONMENTAL ENGINEERING/ENERGY

Third Place

EE 1 Deployable Aqua-Bacterial Analyzer

Zachary (Zach) Young, Patrick Henry High School

Second Place

EE 2 The Study of Kombucha-Grown SCOBY as an Alternative Living Ultrafiltration Membrane for Water

Josephine Eaton, Salem High School

Second Place

EE 7 Removal of Contaminants from Water Using Sodium Alginate Beads on Various Plants

Sachita (Sachita) Baskota, Patrick Henry High School

Himangi Tiwari, Patrick Henry High School

First Place

EE 4 A Comparison on the Biodegradation of HDPE and LDPE Plastics by *Bacillus subtilis* in Different Growth Mediums

John Aziz, Patrick Henry High School

Russell (McLure) Bailey, Patrick Henry High School

MATERIALS SCIENCE/CHEMISTRY

Third Place

MS 2 The Effects of Borosilicate Glass Powder on the Properties of Oil, Acrylic, and Tempera Paints

Charlotte Hally, Patrick Henry High School

Sadie Panko, Patrick Henry High School

Third Place

MS 10 The Effects of Various Polymers in a Solid Fuel Scramjet

Kensington Reynolds, Cave Spring High School

Second Place

MS 5 Testing various surface modification techniques for binding silver nanoparticles to clothing

Kylie Duke, Patrick Henry High School

Second Place

MS 8 Removal of Heavy Metal Ions from Aqueous Solutions using Clinoptilolite

Preston Vaughn, Lord Botetourt High School

First Place

MS 7 Removing Harmful Azo Dyes from Water Using Naturally Modified Chitosan Beads

Maxton (Max) Mizuba, Lord Botetourt High School

MICROBIOLOGY A

Third Place

MI-A 9 The Effect of Natural and Synthetic Antifungals on *S. cerevisiae* and *C. albicans*

Tara Farrokhpoor, Salem High School

Gillian Overstreet, Liberty High School

Second Place

MI-A 2 The Effect of Aloe Vera and Penicillin on *E. aerogenes* and *S. epidermidis*

Kassidy Corker, Patrick Henry High School

Audrey Kelley, Patrick Henry High School

Second Place

MI-A 6 The Effects of Peptide Nucleic Acids and Bromelain on the Inhibition of Biofilm in *Staphylococcus* Species

Nicole Scarlatescu, Hidden Valley High School

First Place

MI-A 3 Developing and Testing a Coagulative Anti-microbial Sponge on *Staphylococcus epidermidis* within a Simulated Wound Cavity

Nafisah Izzat, Cave Spring High School

Gabrielle (Gabby) Romeo, William Byrd High School

MICROBIOLOGY B

Third Place

MI-B 4 An Analysis of the Prevalence of OXA-23 in Clinical Isolates of *Acinetobacter baumannii* Collected in a Southwest Virginia Hospital from 2009-2016

Aaron Bhowansingh, Hidden Valley High School

Second Place

MI-B 1 Optimizing PET Plastic Degradation Through Engineered *E. coli* Expressing *I. sakaiensis* Gene

Samyak (Sam) Srivastava, Cave Spring High School

Second Place

MI-B 3 Evaluating the Efficacy of Silver and Zinc Oxide Nanoparticles in Inhibiting Biofilm Formation and Bacterial Growth

Hana Sageer, Hidden Valley High School

First Place

MI-B 5 The UV-Protective Ability of Mycosporine-like Amino Acids on Survival and Telomere Length of *Saccharomyces cerevisiae*

Raimee Sykes, Lord Botetourt High School

MICROBIOLOGY C

Third Place

MI-C 2 Testing the Antibiotic Potency of Metal Nanoparticles on *E. coli*

Lera Gibson, Franklin County High School

Second Place

MI-C 7 Testing the Bioremediation Potential of *P. fluorescens* on Lead and Nickel

Zara Bhowansingh, Hidden Valley High School

First Place

MI-C 1 The Effect of *Lactobacillus* on *S. mutans* Biofilm

Benjamin King, Northside High School

Joshua (Josh) Manning, Staunton River High School

First Place

MI-C 5 Can Bacteriophages Solve Antibiotic Resistance?

Nolan Stokes, Patrick Henry High School

Claire Togo, Patrick Henry High School

PLANT SCIENCES A

Third Place

PS-A 7 A Study of the Allelopathic Effect of *Vigna umbellata* on *Oryza sativa*

Nathan Dickens, Glenvar High School

Gryphon Flint, Northside High School

Third Place

PS-A 8 A Study of the Allelopathic Effect of *Pisum sativum* on the Germination of *Lolium multiflorum*

Hilary Gutierrez, Lord Botetourt High School

Jordan Lin, Lord Botetourt High School

Second Place

PS-A 3 Rooting for Positive Thinking: How Magnets Affect Root Growth

Meera Raichura, William Byrd High School

Second Place

PS-A 5 A Study of the Allelopathic Effect of *Coffea canephora* and *Coffea arabica* on *Trifolium repens*

William (Parker) McCahill, Patrick Henry High School

James (Carter) Russell, Patrick Henry High School

First Place

PS-A 6 The Effect of Polyethylene Beads on the Chlorophyll Content of *Raphanus sativus*

Eslly Cruz-Nolasco, William Fleming High School

PLANT SCIENCES B

Third Place

PS-B 3 A Study of the Allopathic Effect of a Filtrate of *Ocimum basilicum* Seeds on the Growth of *Cucumis sativus* and *Spinacia oleracea*

Palmer Hartberger, Patrick Henry High School

Louis Pace, Patrick Henry High School

Second Place

PS-B 7 A Study of the Allelopathic Effect of Acetic Acid on *Zea mays*

Cullen Burke, Hidden Valley High School

Madison (Madi) Renick, Cave Spring High School

First Place

PS-B 5 *Arabidopsis* Modification to Express Down-regulated Defense Genes for Resistance against *Cuscuta*

Hannah Mizuba, Lord Botetourt High School

Kane Reczek, Lord Botetourt High School

SYSTEMS SOFTWARE A

Third Place

SS-A 2 Using Machine Learning to Analyze and Inform of Bias in News Articles

Devin Blankenship, Floyd County High School

Sebastian Sowards, Liberty High School

Second Place

SS-A 5 Custom Emojis Using Facial Landmarks In Python

Ariana Markham, Northside High School

First Place

SS-A 7 Advancing Coronary Artery Disease Risk Prediction using Machine Learning:
A Meta-Ensemble Approach

Aryan Madan, Hidden Valley High School

SYSTEMS SOFTWARE B

Third Place

SS-B 4 Bias Detection System for Letters of Recommendation

Luke Thompson, Patrick Henry High School

Second Place

SS-B 5 Mental Melody

Sharmila Balaji, Cave Spring High School

First Place

SS-B 6 Signature Authenticator

Elijah (Eli) Harl, Franklin County High School

Benjamin (Ben) Meyer, Cave Spring High School