

ANIMAL SCIENCES A

Third Place

AS-A 6 The Effect of Paullinia cupana on the Heart Rate of Daphnia magna

Nolan Togo, Patrick Henry High School

Nicholas (Nich) Young, Patrick Henry High School

Second Place

AS-A 3 The Effect of Caffeine on Drosophila with Fragile X Syndrome

Jamileh (Jennah) Rasoul, Patrick Henry High School

Nadia Vile, Patrick Henry High School

First Place

AS-A 2 Toxicity of Toluene on Aquatic Organisms

Lera Gibson, Franklin County High School

First Place

AS-A 8 The Effect of Spirulina on Alzheimer's Symptoms and Tau Toxicity in Drosophila melanogaster

Kaleb Humerickhouse, Cave Spring High School

Benjamin Ogle, Glenvar High School

ANIMAL SCIENCES B

Third Place

AS-B 2 The Effect of Camellia Sinensis on the Heart Rate of *D. magna*

Hana Amo, Patrick Henry High School

Charlotte Gick, Patrick Henry High School

Second Place

AS-B 1 The Effect of *P. cupanna* on the Heart Rate of *Daphnia magna*

Blake Horne, Patrick Henry High School

Amelia Stockton, Patrick Henry High School

First Place

AS-B 4 The Effect of Fish Oil on Seizure Duration in *D. melanogaster* Epilepsy Models

Julia Batty, Patrick Henry High School

Maya Olson, Patrick Henry High School

ANIMAL SCIENCES C

Third Place

AS-C 3 The Effect of Hypericum perforatum on the Heart Rate of Daphnia magna

Megan Austin, Hidden Valley High School

Noah Stewart, Hidden Valley High School

Second Place

AS-C 1 The Effect of Red 40 Dye on the Heart Rate of Daphnia magna

Silas Calhoun, Patrick Henry High School

Henry Stephens, Patrick Henry High School

Second Place

AS-C 8 The Effect of Polyethylene Microplastics on Daphnia magna

Noah Johnstone, Patrick Henry High School

William (Parker) McCahill, Patrick Henry High School

First Place

AS-C 5 Using Optogenetics to Study Genetically Modified Drosophila melanogaster

Isabella (Izzy) Mather, Patrick Henry High School

First Place

AS-C 6 Milkweed as a Natural Deterrent to Lycorma delicatula

Lawson Fralin, Patrick Henry High School

Andrew (Lachlan) Thompson, Patrick Henry High School

BEHAVIORAL AND SOCIAL SCIENCES A

Third Place

BS-A 1 An Evaluation of the Relationship Between Music and Attention

Caiden Perry, Liberty High School

Third Place

BS-A 8 How Did the 2020 Pandemic Impact Children's Health?

Cullen Burke, Hidden Valley High School

Second Place

BS-A 7 The Effect of Driving Experience and Driving Behavior on Memory

Mason Killeen, Glenvar High School

First Place

BS-A 3 How Does Competition Affect Performance and Motivation?

Elliott Wiegard, Patrick Henry High School

BEHAVIORAL AND SOCIAL SCIENCES B

Third Place

BS-B 1 A Study on the Relationship Between Neuroticism and Autonomic Responses to Pain

Gabrielle (Gabby) Harig, Patrick Henry High School

Third Place

BS-B 8 A Study on the Relationship Between Impulsiveness and Social Media Usage

Riley Kerr, Staunton River High School

Second Place

BS-B 3 An Organizational Communication Audit Based in Healthcare

Emma Baldwin, Salem High School

First Place

BS-B 6 American Populism, Voting Behavior, and Political Rhetoric

Arrington Short, Staunton River High School

BIOMEDICAL AND HEALTH SCIENCES

Third Place

BH 5 PIEZO1 Inhibition as a Novel Therapy for Glioblastoma Plasticity

Aman Mengistu, Cave Spring High School

Second Place

BH 2 Investigating the Effect of Personalized, Low-Intensity Focused Ultrasound for Episodic Memory Enhancement

Zara Bhowansingh, Hidden Valley High School

First Place

BH 6 Threat-Induced Affiliation Under Targeted Neural Pathway Inhibition in Mice

Ayush Pinnamaraju, Cave Spring High School

CELLULAR AND MOLECULAR BIOLOGY

Third Place

CM 1 The Effect of p53 Knockout on the Response of Colon Cancer Cells to a Wnt Pathway Inhibitor

Charlotte Hally, Patrick Henry High School

Lucyna (Lucy) Laplante, Patrick Henry High School

Second Place

CM 5 Exploring Targeted MAPK Pathway Inhibition on Pancreatic and Colorectal Adenocarcinoma Lines

Brodie Eanes, Franklin County High School

Second Place

CM 7 Natural Compounds as Anticancer Agents: Cell Viability and RNF31 Expression in p53-Wild-Type and p53-Null Adenocarcinoma Cells Treated with Dandelion Root Extract and Taraxasterol

Claire Ricketts, Cave Spring High School

First Place

CM 6 The Impact of Desmoplakin Knockdown on Kir2.1 and N-cadherin Expression in Mouse Ventricular Tissue

Preston Vaughn, Lord Botetourt High School

CHEMISTRY/MATERIALS SCIENCE

Third Place

CH 3 Enzymatic Catalyst Vs. Acid Catalyst in Esterification

Isabella (Bella) Godfrey, Franklin County High School

Third Place

CH 4 Nanoparticles as a Technique for the Removal of Estradiol from Water

Brynne Wiegard, Patrick Henry High School

Second Place

CH 7 Investigating Cable Strain Reliefs

Jeanne-Eugenie Picard, Cave Spring High School

First Place

CH 6 Optimizing the Structure of Liquid Marbles for Future Environmental Applications

Darby Kerr, Patrick Henry High School

Anders Plunkett, Patrick Henry High School

COMPUTATIONAL BIOLOGY

Third Place

CB 2 Analysis of Genes and SNPs Correlated to Schizophrenia

Nathan Cloutier, Franklin County High School

Aadesh Mittal, Cave Spring High School

Third Place

CB 6 A Genetic Analysis of the Impact of Colonization on Indigenous Populations

Isaiah Butler, Patrick Henry High School

Madison Renick, Cave Spring High School

Second Place

CB 3 Analysis of Gene Expression During Respiratory Viruses

Priya Patel, Glenvar High School

Heidi Wienke, William Byrd High School

Second Place

CB 5 Conservation-Matching as a Predictor of Mutation Impact in Protein-Protein Systems

John (Jack) Janiga, Hidden Valley High School

First Place

CB 4 The Effect of Alcohol Use Disorder Diagnosis in Major Depressive Patients on the Choice of Anesthetic During Electroconvulsive Therapy

Caroline (Gracie) Greer, Patrick Henry High School

First Place

CB 7 Risk Stratifier for Cancer Recurrence using Machine Learning

Elijah (Eli) Harl, Franklin County High School

Prateek Reddy, Cave Spring High School

EARTH AND ENVIRONMENTAL SCIENCES

Third Place

ES 6 The Interactive Effect of Dissolved Carbon and Salinity on Aquatic Microbial Respiration

Chloe Herold, Hidden Valley High School

Second Place

ES 2 The Effect of Bridge Construction on the Microbial Community of the Roanoke River

Helena Longstreth, Franklin County High School

Second Place

ES 3 The Effects of Wildfire Ash on Coral Bleaching

Aeryn Thompson, William Fleming High School

First Place

ES 8 The Generational Effects of Lead II on the Learning Capabilities of Drosophila Larvae

Audrey Kelley, Patrick Henry High School

ENGINEERING TECHNOLOGY A

Third Place

ET-A 1 Robotic Hand for American Sign Language Translation

Samuel Dandridge, Patrick Henry High School

Zachary Young, Patrick Henry High School

Third Place

ET-A 7 Designing a Mechatronic System to Prevent Bay Door-Truck Collisions and Property Damage

Dorothy Myers, Salem High School

Second Place

ET-A 2 Remote Controlled Stop Light Drone

Lachlan Robrecht, Patrick Henry High School

Timothy Yemey, Patrick Henry High School

Second Place

ET-A 6 Automated Pipette: Precise Liquid Transfer

Caralyn (Carrie) Collins, Lord Botetourt High School

Ariana Markham, Northside High School

First Place

ET-A 4 Newborn Neonatal EMS Transport Harness

Miya Morton, Hidden Valley High School

ENGINEERING TECHNOLOGY B

Third Place

ET-B 5 Power Generating Shoe Attachment

Gage Allran, Cave Spring High School

Anish Suryapeta, Cave Spring High School

Third Place

ET-B 6 Automated Recycling Sorter

Jack Le Roy, Floyd County High School

Eli Peters, Franklin County High School

Second Place

ET-B 1 Creating a Self-Balancing Platform with Arduino Programming and CAD Software

Dylan De Meyts, Patrick Henry High School

Matthew Feldmann, Patrick Henry High School

Second Place

ET-B 3 Smart Navigation Cane

Hayston Chappell, Patrick Henry High School

Benjamin Grindstaff, Patrick Henry High School

First Place

ET-B 8 EMG-Controlled Hand Exoskeleton for Assistive and Rehabilitative Use

Benjamin Meyer, Cave Spring High School

Maxton (Max) Mizuba, Lord Botetourt High School

ENGINEERING TECHNOLOGY C

Third Place

ET-C 5 Mobile Tower Crane

Nathan Amos, Franklin County High School

Second Place

ET-C 4 Mechanical Crane

Nathan Dickens, Glenvar High School

Palmer Hartberger, Staunton River High School

Second Place

ET-C 8 Motorized Window Blinds with Remote Control

Carter Biscotte, Salem High School

Jack Lawrence, Salem High School

First Place

ET-C 1 Basic Executive-Functionality Assistive Robot

Molly Caroline(Morgan) Fitzgerald, Patrick Henry High School

ENVIRONMENTAL ENGINEERING

Third Place

EE 2 The Bioremediation of Iron(III) Ions Using Biofilms

Joshua Manning, Staunton River High School

Dev Patel, Salem High School

Second Place

EE 5 Removal of Pharmaceuticals from Wastewater Using Biochar

Uma Patel, Salem High School

First Place

EE 1 Design and Evaluation of a Microplastic Filtration System

Anika Parashar, Hidden Valley High School

First Place

EE 4 Environmental Monitor and Wildfire Detector

Augustine (Augie) Biviano, Floyd County High School

Devin Blankenship, Floyd County High School

Sebastian Sowards, Liberty High School

MICROBIOLOGY A

Third Place

MI-A 3 The Effect of *Bacillus subtilis* on the Degradation of PET Plastic

Reeyanna Casseus, William Fleming High School

Nayeli (Naya) Castaneda-Holston, William Fleming High School

Third Place

MI-A 7 The Effect of PET Crystallinity on Enzymatic Degradation by PETase from *Ideonella sakaiensis* Expressed in *E. coli*

Mary (Meg) Greer, Patrick Henry High School

Norah Harper, Patrick Henry High School

Marie Tulou, Patrick Henry High School

Second Place

MI-A 5 Investigating the Adaptability of *P. polycephalum*

Mollie Hughes, Patrick Henry High School

Daisy (Sloth) Sharrer, Patrick Henry High School

First Place

MI-A 8 The Effect of Melittin, Alone and in Conjunction with Traditional Antibiotics, on the Growth and Biofilm Formation of *Staphylococcus epidermidis*

Henry Fedak, Patrick Henry High School

Kai Warren, Patrick Henry High School

First Place

MI-A 9 The Effects of Vancomycin and Thyme Essential Oil on *Bacillus cereus*

Brooklyn Hemphill, Glenvar High School

Katherine Karolyi, Hidden Valley High School

MICROBIOLOGY B

Third Place

MI-B 2 The Effect of Streptomycin and Oregano Oil on *S. epidermidis*

Reni O'Brien, Patrick Henry High School

Amirah Rasoul, Patrick Henry High School

Second Place

MI-B 5 The Effect of Neomycin and Natural Oils on *S. salivarius*

Colin Batty, Patrick Henry High School

Cash Hunley, Patrick Henry High School

Second Place

MI-B 8 The Effect of Chloramphenicol and Oregano Oil on *Vibrio fischeri*

Makenzie Dulaney, Floyd County High School

Macyn Woody, Lord Botetourt High School

First Place

MI-B 6 The Effect of *Allium sativum* on Quorum-Sensing Regulated Gene

Expression in *Serratia marcescens*

Kylie Duke, Patrick Henry High School

MICROBIOLOGY C

Third Place

MI-C 2 The Analysis of the Combined Antimicrobial Dynamics Between Ascorbic Acid (Vitamin C) and Penicillin on *Lactobacillus acidophilus*

Thomas Pan, Hidden Valley High School

Geet Patel, Hidden Valley High School

Third Place

MI-C 9 The Ability of SCOBY to Resist *E. coli* Contamination in Kombucha

Lillian (Lily) Davis-Craighead, Franklin County High School

Second Place

MI-C 3 Identifying Carbapenem-Resistant Microbes Using Chromogenic Agar Plates in Pediatric and Adult ICUs

Claire McCahill, Patrick Henry High School

First Place

MI-C 6 Isolation and Characterization of Bacteriophages of Pathogenic Bacterial Strains

Parneet Gill, Salem High School

MICROBIOLOGY D

Third Place

MI-D 7 The Effect of Tetracycline and Ciprofloxacin vs. Ciprofloxacin and Curcuma longa on Pseudomonas fluorescens

Lily Borloz, Salem High School

Raelynn Stamper, Craig County High School

Third Place

MI-D 8 The Effects of Amoxicillin and Oregano Oil on Staphylococcus epidermidis

Bentley (Miles) Gibson, Franklin County High School

Dashall (Dash) Willard, Franklin County High School

Second Place

MI-D 1 The Effect of Ciprofloxacin and Cinnamon Oil on Serratia marcescens

Adelaide Coffman, Patrick Henry High School

Cora Hertz, Patrick Henry High School

First Place

MI-D 5 The Effect of Kanamycin and Kelp extract on Vibrio anguillarum

Darby Haire, Patrick Henry High School

Emelia (Emmy) Schweitzer, Patrick Henry High School

MICROBIOLOGY E

Third Place

MI-E 1 The Effect of Gentamicin and Rosmarinus officinalis L. on Bacillus subtilis
Willow Boucher, Patrick Henry High School
Eva Johnstone, Patrick Henry High School

Third Place

MI-E 2 The Effect of Chloramphenicol, M. piperita Oil, and Ciprofloxacin on P. fluorescens and N. sicca
Diana Dietz, Patrick Henry High School
Mae Todd, Patrick Henry High School

Second Place

MI-E 7 The Antifungal Effects of Common Household Liquids on P. notatum Bread Mold
Akshat Jain, Cave Spring High School
Colin Ray, Cave Spring High School

First Place

MI-E 5 Examining the Role of Root Exudates on Soil Microbes Using Transgenic Arabidopsis thaliana
Emily Dewire, Patrick Henry High School

PLANT SCIENCES

Third Place

PS 3 A study of the Allelopathic Effect of *Coleus scutellarioides* on *Raphanus sativus*

Kailin Johnson, Franklin County High School

Elena Preston, Lord Botetourt High School

Second Place

PS 2 Abscisic Acid as a Hormonal Regulator of Abiotic Stress Resilience in *Arabidopsis thaliana*

Vivienne Eaton, Salem High School

Ryan Hubbard, Salem High School

First Place

PS 6 Translational Genomics: Utilizing AgNORs, Chromosomal Aberrations, and the Mitotic Index in *Allium cepa* to Identify Genomic Targets for Salinity Resistance in Rice

Prisha Tiwari, Hidden Valley High School

First Place

PS 7 The Use of Bacterial Cellulose in Plant Wound Repair

Charlotte Anstey, Patrick Henry High School

SYSTEMS SOFTWARE A

Third Place

SS-A 6 Using Neural Networks to Improve Mental Health in Young Adults

Jamal Millner, Patrick Henry High School

Second Place

SS-A 4 Using Computer Vision and Statistical Analysis to Aid in Soccer Training

Mattox Jalbert, Franklin County High School

Jayden Wainwright, Franklin County High School

First Place

SS-A 1 A Novel Multi-Stage Deep Learning Framework Utilizing Convolutional Neural Networks for the Segmentation of Lung Nodules in Thoracic CT Scans

Aryan Madan, Hidden Valley High School

First Place

SS-A 3 A System-Level Software Architecture for Multi-Omics Data Harmonization and Machine Learning based Computational Analysis of the Elite Controller HIV Phenotype

Samyak Srivastava, Cave Spring High School

SYSTEMS SOFTWARE B

Third Place

SS-B 3 Personalized Digital Phenotyping to Improve Symptoms of Mild Psychological Distress in Young Adults
Yufei (Sophia) Zeng, Hidden Valley High School

Second Place

SS-B 2 Automatic Censorship of Personal Data
Nathan Bulla, Cave Spring High School

Second Place

SS-B 5 Predicting the Severity of El Nino
Rishika Sethumadhavan, Cave Spring High School

First Place

SS-B 6 PPE Surveillance System
Caleb Wang, Hidden Valley High School