**ANIMAL SCIENCES A**

**Third Place**

**AS-A 6** An Investigation of the Bioaccumulation of Microplastics on Danio rerio

Martha (Mattie Rose) Keely, Lord Botetourt High School

**Second Place**

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

Savannah Cady, Craig County High School

Tyler VanDyke, Craig County High School

**First Place**

**AS-A 4** The Effect of Polyethylene Microplastic Concentration on Ingestion by Daphnia magna

Anna Dandridge, Patrick Henry High School

Grace Whitehead, Patrick Henry High School

**First Place**

**AS-A 7** The Effect of Bishpenols A, F, and S on the Development and Reproduction of Caenorhabitis elegans

London Paige, William Fleming High School

**ANIMAL SCIENCES B**

**Second Place**

**AS-B 8** The Effect of CBD oil on the Development of C. elegans

Katherine Aziz, Patrick Henry High School

Chloe Roberts, Patrick Henry High School

**First Place**

**AS-B 4** The Effect of Taurine on the Heart Rate of Daphnia magna

Maggie Parkhurst, William Byrd High School

Rebecca Qiu, William Byrd High School

**First Place**

**AS-B 7** The Effect of L-arginine on the Heart Rate of Daphnia magna

Aaron Henion, Cave Spring High School

Ainsley Robertson, Cave Spring High School

**ANIMAL SCIENCES C**

**Third Place**

**AS-C 3** The Effects of Fullerenes on the Heart Rate and Lifespan of Daphnia magna

Evelyn Kepley, Patrick Henry High School

**Second Place**

**AS-C 8** Investigation of the Role of Gut Bacteria in Plastic Digestion by Waxworm Larvae

Tracy (Harrison) Callis, Patrick Henry High School

**First Place**

**AS-C 1** The Impact of Pharmaceuticals on Aquatic Life using Danio rerio as a Model

Simran Gill, Salem High School

**First Place**

**AS-C 4** The Effect of Nicotine Vaping and CBD Vaping on the Associative Learning Behavior of C. elegans

Alysia Sanchez-Huerta, Lord Botetourt High School

**BIOMEDICAL AND BEHAVIORAL SCIENCES**

**Third Place**

**BB 6** Associations Between Time Perspective, Delay Discounting, and Length of Abstinence Among Individuals with Substance Dependence

Holly Acker, Lord Botetourt High School

**Second Place**

**BB 2** Development of a Biofilm-Resistant Bioink for Wound Repair

Maya Reddy, Salem High School

Kameron Washington-Brown, William Fleming High School

**Second Place**

**BB 8** Understanding the Relationship Between Motivation, Future Valuation, and Relapse in Individuals in Recovery from Substance Abuse

Elyse McFalls, William Fleming High School

**First Place**

**BB 5** Oncogenix: A Computational Pipeline to Identify Novel Drug Targets and Companion Diagnostics for Cancer

Kevin Sheng, Cave Spring High School

**CELLULAR AND MOLECULAR BIOLOGY**

**Third Place**

**CM 1** The Effect of a Flt-1 Knockout on the Expression of VEGF

Ella Higgins, Patrick Henry High School

Nathalie Lemon, Patrick Henry High School

**Third Place**

**CM 7** Comparative Analysis Regarding Sex of Patient and Genetic Mutations in Glioblastoma

Liala Sofi, Hidden Valley High School

**Second Place**

**CM 4** The Effect of Vaping on Bronchial/Tracheal Epithelial Cells

Ellyn Anama, Salem High School

**First Place**

**CM 8** The Effect of ODDD Mutation M147T on GJA1 Internal Translation, Protein Localization, and Function

Lauren Frampton, Cave Spring High School

**EARTH AND ENVIRONMENTAL SCIENCES A**

**Third Place**

**ES-A 7** Comparison of Automated Versus Human Watershed Delineation In Headwater Streams: Effects on Important Environmental Geographic Systems Metrics

Madeleine Taylor, Patrick Henry High School

Elisabeth Taylor, Patrick Henry High School

**Second Place**

**ES-A 4** The Effects of Sulfuric Acid on the Shells of Freshwater Gastropods and Bivalves

Ryan (Davis) Cooper, Lord Botetourt High School

Katherine Cross, Lord Botetourt High School

**First Place**

**ES-A 1** A Comparison of Muscari neglectum Starch to Corn and Rice Starches in Starch-Based Bioplastics

Catherine Chen, Cave Spring High School

Michelle Zheng, Cave Spring High School

**First Place**

**ES-A 3** Assessment of Neonicotinoids in Blue Ridge Honey

Shannon Filer, James River High School

**EARTH AND ENVIRONMENTAL SCIENCES B**

**Third Place**

**ES-B 1** Phytoremediation of Lead (II) Nitrate by Mosses Collected from Roanoke, Virginia

Emma Kate Greer, Patrick Henry High School

Fiona Murphy, Patrick Henry High School

**Second Place**

**ES-B 9** Utilization of Bacterial Cellulose as a Platform for Methylene Blue Detection and Adsorption

Adithya (Adi) Iyer, William Byrd High School

**First Place**

**ES-B 3** Using Bioprinted Algae Structures to Determine Which Algae Species is Most Effective at Removing Nitrates

Haley Day, William Byrd High School

Kendall Kelly, Patrick Henry High School

Dhruvi Patel, Glenvar High School

**First Place**

**ES-B 5** The Effect of Pyrolysis Temperature on the Adsorption Capacity of Rice-hull Derived Biochar in Comparison to Activated Carbon on Malachite Green Oxalate in Aqueous Solutions

Alicia Carvalho, Cave Spring High School

Caroline Grant, Hidden Valley High School

**ENERGY AND ENVIRONMENTAL ENGINEERING**

**Third Place**

**EE 2** Bioethanol from Fruit Waste Using Saccharomyces cerevisiae

Reesa Devers, Patrick Henry High School

**Third Place**

**EE 8** Photocatalytic Degradation of Methylene Blue Using Titanium Dioxide

Cathryn (Rynn) Little, Patrick Henry High School

**Second Place**

**EE 5** Effects of Acinetobacter and Serratia Bacteria on Bioremediation of Gasoline

Cecilia Fratacelli, Glenvar High School

**First Place**

**EE 10** Comparison of Pueraria montana versus Spent Grain in the Production of Biomethane

Cole Konstance, Hidden Valley High School

**ENGINEERING MECHANICS A**

**Third Place**

**EM-A 4** Arduino Cereal Scooper

James (Ford) Beasley, Patrick Henry High School

Declan Morrill, Patrick Henry High School

**Second Place**

**EM-A 5** Chess Playing Robot

Andrew Gloudemans, Staunton River High School

**First Place**

**EM-A 1** The Automated Laundry Folder

Jackson Konstance, Hidden Valley High School

Jacob Tozier, Cave Spring High School

**First Place**

**EM-A 9** Statistical Analysis with PIR Motion Sensors to Aid Alzheimer's Patients

Katherine (Rosie) Giles, Patrick Henry High School

Rachel Roberts, Patrick Henry High School

**ENGINEERING MECHANICS B**

**Third Place**

**EM-B 9** Arduino Robotic Scribe

Sydnee Durham, Patrick Henry High School

Ruby Isbell, Patrick Henry High School

**Second Place**

**EM-B 5** CAD-Designed Autonomous Seed-Planting Robot

Tate Berenbaum, Salem High School

Jodeci Dawson, William Fleming High School

Leah Germain, Lord Botetourt High School

**First Place**

**EM-B 4** A 3D Printed Rigid Headcast for Magnetoencephalography

Jonah Vanke, Patrick Henry High School

**First Place**

**EM-B 8** Automated Weekly Pill Sorter and Dispenser

Joshua Taibbi, Patrick Henry High School

**ENGINEERING MECHANICS C**

**Third Place**

**EM-C 4** Lower Body Power Multiplying Exosuit

Benjamin Anderson, Patrick Henry High School

Stephen (Frank) Andes, Patrick Henry High School

**Second Place**

**EM-C 7** Voice Activated Light Switch Controller

Matthew Scarlatescu, Hidden Valley High School

James Voight, James River High School

**First Place**

**EM-C 3** Caretaker Controlled Robotic Pill Dispenser

Chloe Beasley, Lord Botetourt High School

Kierstyn Stanley, Lord Botetourt High School

**First Place**

**EM-C 6** Mirroring Robotic Prosthetic Arm

Dylan Tran, Northside High School

**ENGINEERING MECHANICS D**

**Third Place**

**EM-D 3** LaDy Magnet

Parker Hudson, Lord Botetourt High School

Sydney Vokus, Lord Botetourt High School

**Second Place**

**EM-D 4** Braille Box: A Reusable Device for Deaf-Blind Communication

Reece Derrick, Northside High School

Venkata (Sujith) Panchumarthy, Cave Spring High School

**Second Place**

**EM-D 9** Neuropathy Navigational Assistance Device

Hayden Gray, Patrick Henry High School

**First Place**

**EM-D 2** Developing a Bluetooth Enabled Pill Dispensor

David (Luke) Arner, Hidden Valley High School

Grady Brydges, Cave Spring High School

**MATERIALS SCIENCE/CHEMISTRY**

**Third Place**

**MC 1** Physical Properties of Various Metal Foam Compositions

Merryn Isbell, Patrick Henry High School

Lillian (Libby) Jamison, Patrick Henry High School

**Third Place**

**MC 6** AFM-based Nanoindentation Technique: A Novel Approach to Determine the Nanoscale Degradation of PET

Uyen Tran, William Fleming High School

**Second Place**

**MC 3** Various Physical Properties of Simple Biodegradable Plastics

Taylor Frazier, Patrick Henry High School

**First Place**

**MC 4** Novel Process for Polylactic Acid Synthesis From Kudzu Root

Luke Gardner, Patrick Henry High School

Ryan Rigatti, Lord Botetourt High School

Luke Suess, Patrick Henry High School

**First Place**

**MC 5** An Arsenic Filtration Mechanism Using a 3D Bioprinted Cysteine and Silicon Carbide Model

Madison Brown, Franklin County High School

**MICROBIOLOGY A**

**Third Place**

**MI-A 5** The Synergistic Effect of Tea Tree Oil and Eucalyptus Oil on E. coli

Trinity Breedlove, Patrick Henry High School

Cameron Snyder, Patrick Henry High School

**Second Place**

**MI-A 2** Optimization of Ethanol Production in Yeast Using 3-D Bioprinted Scaffolds

Noah Gettings, Patrick Henry High School

Henry Holbrook, Patrick Henry High School

**First Place**

**MI-A 6** Use of Denitrifying Bacteria Isolated from the Environment on Remediation of Eutrophic Water

Megan McGinnis, Patrick Henry High School

Sarah Riddle, Patrick Henry High School

**First Place**

**MI-A 8** The Effect of Nanoparticles on the Growth of E. coli and S. epidermidis

Claire Nichols, Hidden Valley High School

**MICROBIOLOGY B**

**Third Place**

**MI-B 8** The Effect of Hydrochloric Acid and Main Active Ingredients in an Antacid on E. coli

Autumn O'Connor, Patrick Henry High School

John Paul (JP) Prusakowski, Patrick Henry High School

**Second Place**

**MI-B 2** The Inhibitory Effects of Brassica nigra Seed Distillate on E. coli

Sophia Schumaecker, Cave Spring High School

Claire Wei, Cave Spring High School

**Second Place**

**MI-B 5** The Analysis of Curcumin in Preventing Ultraviolet Radiation Damage to the DNA of Escherichia coli

Coleman Blanton, Hidden Valley High School

Erin Wienke, William Byrd High School

**First Place**

**MI-B 1** The Effect of Kombucha Fermentation on Level of Peanut Allergens

Elizabeth Fedor, William Byrd High School

Jennie Pham, William Fleming High School

**MICROBIOLOGY C**

**Third Place**

**MI-C 3** The Synergistic Effect of Clove Oil and Cinnamaldehyde on the Inhibition of E. coli K-12

Autumn Reed, Patrick Henry High School

Emma Seidel, Patrick Henry High School

**Third Place**

**MI-C 6** The Effect of Silver and Antibiotics on the Growth of E. coli

Claire Dozier, Lord Botetourt High School

**Second Place**

**MI-C 1** The Synergistic Effect of Clindamycin Phosphate and Tetracycline on S. epidermidis

Benjamin Blevins, Staunton River High School

Emily Kiser, Staunton River High School

**First Place**

**MI-C 4** Bioremediation of heterocyclic dyes by Pseudomonads

Murphy Johnson, Patrick Henry High School

Richard (Jack) Shepherd, Patrick Henry High School

**PLANT SCIENCES A**

**Third Place**

**PS-A 3** The Effect of Synthetic and Organic Pesticides on the Growth and Germination of Vigna radiata

Anna Frittman, Lord Botetourt High School

Spencer Kearns, Staunton River High School

**Third Place**

**PS-A 7** The Allelopathic Effect of F. arundinacea on the Germination of G. max & A. retroflexus

Josephine (Josie) Fratacelli, Glenvar High School

Nicholas Louvet, Glenvar High School

**Second Place**

**PS-A 5** The Effect of Manduca sexta on the Total Phenolic Content of Solanum Lycopersicum

Margaret Laflam, Hidden Valley High School

**First Place**

**PS-A 4** The Allelopathic Effect of T. patula Organs on the Germination & Growth of L. lycopersicum and T. repens

Madalyn Likens, Patrick Henry High School

Eleanor Little, Patrick Henry High School

**First Place**

**PS-A 8** The Effect of Carbon Dioxide on Pisum sativum Growth

Evan Hahn, Franklin County High School

Hannah Largen, Franklin County High School

**PLANT SCIENCES B**

**Third Place**

**PS-B 4** Phytoremediation of Lead (II) Nitrate Contaminated Soil by Brassica juncea and Helianthus annuus

Clara Higgins, Patrick Henry High School

Olivia Reichardt, Patrick Henry High School

**Second Place**

**PS-B 8** The Effect of a Natural Multi-Plant Herbicide on Terrestrial and Aquatic Plants

Ryan Mollin, Franklin County High School

**First Place**

**PS-B 2** The Allelopathic Effect of R. officinalis on the Germination and Growth of V. radiata and T. aestivum

Abby Wyatt, Staunton River High School

**First Place**

**PS-B 7** Analyzing Sunflowers' Phytoremediation Capacities for Heavy Metal Pollutants

Kevin Cruz, William Fleming High School

Benjamin Newman, Salem High School

**SYSTEMS SOFTWARE A**

**Third Place**

**SS-A 4** Designing a Roller Coaster Based on Components

Alexandra (Lexie) Rhodes, Cave Spring High School

**Second Place**

**SS-A 1** Language Assessment Software and Digital Assistant for Primary Progressive Aphasia Variants

Liam Heaslip, Franklin County High School

Mason McGrady, Franklin County High School

**Second Place**

**SS-A 7** A Program to Assess the Efficiency and Growth of Medical Residents

Meitra Kazemi, Hidden Valley High School

**First Place**

**SS-A 3** The Development of a Secure School Application

Jagger LaDouceur, Hidden Valley High School

**First Place**

**SS-A 6** Physics Engine for Calculating Geodesics of Particles on a Lorentzian Manifold

James Whiting, William Fleming High School

**SYSTEMS SOFTWARE B**

**Third Place**

**SS-B 4** Using Python and OpenCV to Create a Real Time American Sign Language Gesture Translator

Ella Bryant, Northside High School

Holly Hinchy, Cave Spring High School

**Second Place**

**SS-B 5** Cohesive Multi-Agent Reinforcement Learning Algorithm Auto-curricula for Traffic Stop Simulations

Michael Lin, Hidden Valley High School

**First Place**

**SS-B 1** Python Program to Detect Problem Behaviors in Individuals

Rafid Mirza, Glenvar High School

Kaden Whitenack, Hidden Valley High School

**First Place**

**SS-B 7** A Novel Algorithm for Cooperative GPS Navigation

Siddhartha (Sid) Lamichhane, Patrick Henry High School

Charles Murphy, Patrick Henry High School