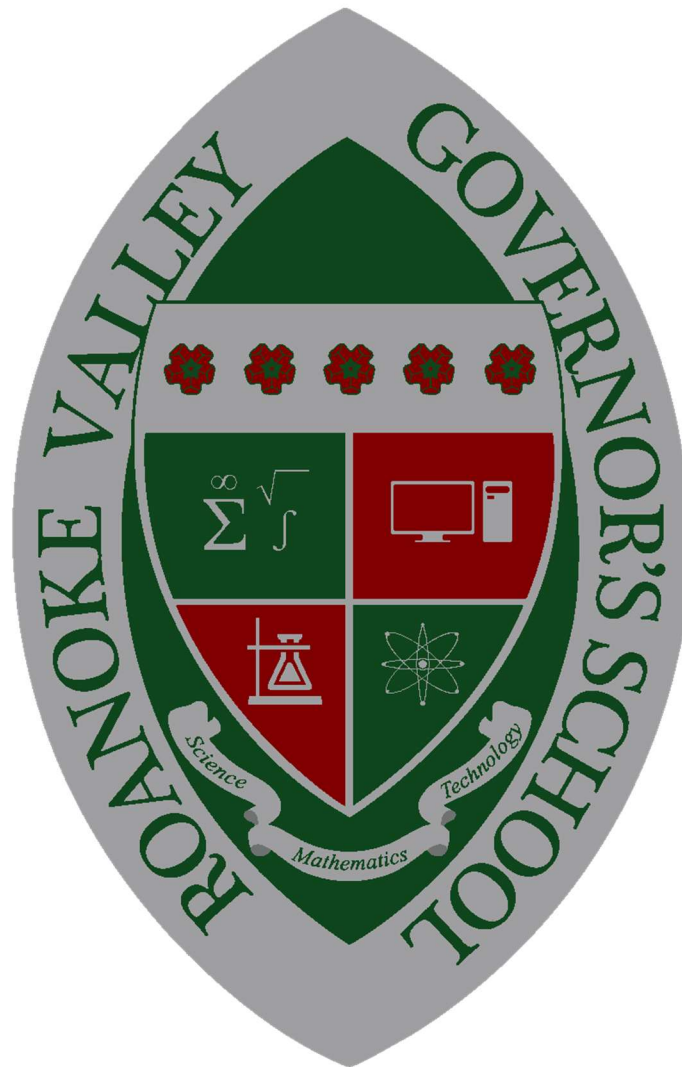


The Roanoke Valley Governor's School For Science and Technology 2025 Student Project Forum



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Melissa Fisher (Chair), Matthew Browning, Doug Divers, Tracy Jenkins, Brandon Taylor, Don Wages

Science Faculty

Cindy Bohland (Chair), Drew Hurst, Steve Smith, Joanne Villers, Steve Villers, Connor Wade

Additional Staff

Ra Siv (Operations staff); Fred Hoffman (Adjunct Faculty/Intersession Support); Terri Janiga (Community Outreach Coordinator)

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Category Abbreviations Key

Animal Sciences A	AS-A	Engineering Mechanics C	EM-C
Animal Sciences B	AS-B	Engineering Mechanics D	EM-D
Animal Sciences C	AS-C	Environmental Engineering/ Energy	EE
Behavioral & Social Sciences	BS	Materials Science/Chemistry	MS
Biomedical & Health Sciences	BH	Microbiology A	MI-A
Cellular & Molecular Biology	CM	Microbiology B	MI-B
Computational Biology A	CB-A	Microbiology C	MI-C
Computational Biology B	CB-B	Plant Sciences A	PS-A
Earth & Environmental Sciences A	ES - A	Plant Sciences B	PS-B
Earth & Environmental Sciences B	ES - B	Systems Software A	SS-A
Engineering Mechanics A	EM-A	Systems Software B	SS-B
Engineering Mechanics B	EM-B		

KITCHEN

OUT TO MAIN HALLWAY →

1 CB-A 2	3 CB-A 4	5 CB-A 6	1 CB-B 2	3 CB-B 4	5 CB-B 6	CB-B 7
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1 EM-A 2	EM-A 3	4 EM-A 5	EM-A 6
EM-B 3	2 EM-B 1	EM-A 9	8 EM-A 7

AS-A 6	5 AS-A 4	AS-A 3	2 AS-A 1
7 AS-A 8	AS-B 1	2 AS-B 3	AS-B 4

4 EM-B 5	EM-B 6	7 EM-B 8	EM-B 9
EM-C 6	5 EM-C 4	EM-C 3	2 EM-C 1

AS-C 3	2 AS-C 1	AS-B 7	6 AS-B 5
4 AS-C 5	AS-C 6	AS-C 7 / PS-A 1	PS-A 2

DOOR

7 EM-C 8	EM-D 1	2 EM-D 3	EM-D 4
ES-A 2	ES-A 1 / EMD-8	EM-D 7	6 EM-D 5

PS-A 8	7 PS-A 6	PS-A 5	4 PS-A 3
1 PS-B 2	PS-B 3	4 PS-B 5	PS-B 6

DOOR

3 ES-A 4	ES-A 5	6 ES-A 7	ES-A 8
ES-B 4	3 ES-B 2	ES-B 1	10 ES-A 9

MS 4	3 MS 2	MS 1	8 PS-B 7
5 MS 6	MS 7	8 MS 9	MS 10

5 ES-B 6	ES-B 7	8 ES-B 9	BH 1
BH 7	6 BH 5	BH 4	3 BH 2

CM 1	2 CM 3	CM 4	5 CM 6
5 SS-A 4	SS-A 3	2 SS-A 1	CM 7

1 BS 2	BS 3	4 BS 5	BS 6
EE 2	BS 10 / EE 1	BS 9	8 BS 7

SS-A 6	7 SS-A / SS-B 1	SS-B 2	3 SS-B 4
4 MI-C 3	MI-C 2	1 MI-C / SS-B 6	SS-B 5

3 EE 4	EE 5
EE 8	7 EE 6

MI-C 5	6 MI-C 7	MI-C 8	1 MI-B 2
8 MI-B 7	MI-B 6	5 MI-B 4	3 MI-B

MI-A 1	2 MI-A 3	MI-A 4
9 MI-A 8	MI-A 7	6 MI-A 5

OUT TO MAIN HALLWAY →

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ANIMAL SCIENCES A

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

Teacher sponsor: Mr. Don Wages

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

Teacher sponsor: Mr. Brandon Taylor

AS-A 3 The Effects of Polyethylene Microplastics on the Behavior and Stress Response of *Caenorhabditis elegans*

Kai Warren, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

AS-A 4 Effects of Different Types of Plastics on *Tenebrio molitor* (mealworms)

Hope (Hope) Dolan, Staunton River High School

Julia Landis, Staunton River High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Mrs. Joanne Villers

AS-A 6 The Effect of Doxylamine on the Heart Rate of *Daphnia magna*

Seth Lee, Salem High School

Gavin Thornton, William Byrd High School

Teacher sponsor: Mr. Don Wages

AS-A 7 The Effect of *Sambucus nigra* on the heart rate of *Daphnia magna*

Kathryn Rincon, Patrick Henry High School

Nadia Vile, Patrick Henry High School

Teacher sponsor: Mr. Don Wages

AS-A 8 The Correlation between Kidney Damage and Cardiovascular Disease (CVD)

Prisha Tiwari, Hidden Valley High School

Teacher sponsor: Mr. Don Wages

ANIMAL SCIENCES B

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

Teacher sponsor: Mr. Don Wages

AS-B 2 The Effect of *Crataegus monogyna* on the Heart Rate of *Daphnia magna*

Lilly Hawkins, Floyd County High School

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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

Teacher sponsor: Ms. Cindy Bohland

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

Anika Parashar, Hidden Valley High School

Teacher sponsor: Mr. Mark Levy

AS-B 5 The Effect of Ammonium nitrate on the Heart Rate of *D. magna*

Reeyanna Casseus, William Fleming High School

Nayeli Castaneda-Holston, William Fleming High School

Teacher sponsor: Mr. Don Wages

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

Teacher sponsor: Mr. Don Wages

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

Garrett Gent, Patrick Henry High School

Teacher sponsor: Mr. Don Wages

ANIMAL SCIENCES C

AS-C 1 The Effect of Vitamin B6 on the Heart Rate of *Daphnia magna*

Reja Moja, Patrick Henry High School

Fiona Schwarz, Patrick Henry High School

Teacher sponsor: Mr. Don Wages

AS-C 2 The Effect of Low Frequency Sound on *C. elegans*

Lucyna (Lucy) Laplante, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

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

Teacher sponsor: Ms. Cindy Bohland

AS-C 4 The Effect of *Valeriana officinalis* on the Heart Rate of *D. magna*

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

Isabella (Bella) Godfrey, Franklin County High School

Teacher sponsor: Mr. Don Wages

AS-C 5 The Effect of Caffeine and Dietary Supplements on the Behavior of *Caenorhabditis elegans*

Caiden Perry, Liberty High School

Teacher sponsor: Ms. Cindy Bohland

AS-C 6 The Effect of *Gingko biloba* on the Heart Rate of *D. magna*

Riley Kerr, Staunton River High School

Teacher sponsor: Mr. Don Wages

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

Teacher sponsor: Mr. Don Wages

BEHAVIORAL AND SOCIAL SCIENCES

BS 1 Episodic Future Thinking and Climate Conscientiousness

Margaret (Maggie) Jarrett, Patrick Henry High School

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BS 2 The Effect of Short-Form Video on Academic Procrastination

Anissa-Rosa Morfa, William Fleming High School

Teacher sponsor: Mrs. Melissa Fisher

BS 3 Effects of Creativity on Stress and Mood

Phoenix O'Dell, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

BS 4 How Does Bilingualism Impact One's Empathy and Emotional Intelligence?

Irene (Ren) Combs-Cannaday, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

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

Teacher sponsor: Mrs. Melissa Fisher

BS 6 An Analysis of Distress Tolerance by Gender and Critical Thinking Skill Level

Priya Patel, Glenvar High School

Teacher sponsor: Mrs. Melissa Fisher

BS 7 Exploring the Use of LiDAR Technology to Analyze Footage in Audiovisual Surgical Training Simulations

Frances Livingston, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

BS 8 How Do Sleep and Gender Influence Recognition of Emotions and Faces?

Ian Costen, Franklin County High School

Teacher sponsor: Mrs. Melissa Fisher

BS 9 How Does Language Impact Cognitive Inhibition and Cognitive Flexibility

Tammy Phung, William Fleming High School

Teacher sponsor: Mrs. Melissa Fisher

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

Charlotte Anstey, Patrick Henry High School

Brinna Seidel, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

BIOMEDICAL AND HEALTH SCIENCES

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

Teacher sponsor: Mr. Brandon Taylor

BH 2 A Comparison of Crustacean and Fungal Derived Chitosan Pads and Gauze

Cara Wardell, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

BH 3 The Relationship between PER3 polymorphisms and Sleep Phenotype

Jaiden Dann, Lord Botetourt High School

Elodie McClintic, Franklin County High School

Teacher sponsor: Ms. Cindy Bohland

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

Teacher sponsor: Mr. Brandon Taylor

BH 5 The Effect of Quinine on Melanoma Cancer Cells

Lydia Goad, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

BH 6 The Effect of Manuka Honey on Pancreatic Adenocarcinoma Cells

Hannah Hertz, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

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

Teacher sponsor: Ms. Cindy Bohland

CELLULAR AND MOLECULAR BIOLOGY

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

Teacher sponsor: Ms. Cindy Bohland

CM 2 Cloning and Cell Localization of Geraniol Synthase from *Vaccinium* sect. *Cyanococcus*

Heidi Wienke, William Byrd High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Ms. Cindy Bohland

CM 4 The Impact of PI3KB Inhibition on Melanoma

Mirabel Makked, Salem High School

Claire Rawlins, Salem High School

Teacher sponsor: Ms. Cindy Bohland

CM 5 The Effect of Adrenergic Stimulation on Mitochondrial Bioenergetics in C2C12 Myotubes

Kathryn Ha, Salem High School

Teacher sponsor: Mrs. Melissa Fisher

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

Archit Arora, Staunton River High School

Teacher sponsor: Ms. Cindy Bohland

CM 7 The Regenerative Effects of Melatonin on Fibroblasts

William Xiao, Northside High School

Teacher sponsor: Ms. Cindy Bohland

COMPUTATIONAL BIOLOGY A

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

Dorothy Myers, Salem High School

Teacher sponsor: Mr. Mark Levy

CB-A 2 Deep Learning Drug Repurposing Tool

Ayush Pinnamaraju, Cave Spring High School

Caleb Wang, Hidden Valley High School

Teacher sponsor: Mr. Mark Levy

CB-A 3 Phylogenetic Analysis of Bacterial Meningitis

Citlalli Garcia-Quiroz, Patrick Henry High School

Teacher sponsor: Mr. Mark Levy

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

Emma Baldwin, Salem High School

Teacher sponsor: Mr. Mark Levy

CB-A 5 Differential Expression Analysis in Alzheimer's Disease to Validity of Mouse Models

William (Alex) Burnette, Hidden Valley High School

Parker Sisk, Hidden Valley High School

Teacher sponsor: Mr. Mark Levy

CB-A 6 Automatic Mutation Locator via Transcriptome Analysis

Michael (Brenden) Hartung, Northside High School

Teacher sponsor: Mr. Mark Levy

COMPUTATIONAL BIOLOGY B

CB-B 1 A Bioinformatics Study of the Immunosuppressive Abilities of Animal Coronaviruses

Nathan Preston, Lord Botetourt High School

Teacher sponsor: Mr. Mark Levy

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

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CB-B 3 A Comparison Study of Human Endogenous Retrovirus DNA and Active Retrovirus RNA

Frances Reddan, Patrick Henry High School

Teacher sponsor: Mr. Mark Levy

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

Rishika Sethumadhavan, Cave Spring High School

Teacher sponsor: Mr. Mark Levy

CB-B 5 Bioinformatics Study to Determine Biomarkers for Preeclampsia

Keely Garri, Franklin County High School

Teacher sponsor: Mr. Mark Levy

CB-B 6 Exploration of the Mutation Progression of Mpox

Kaleb Humerickhouse, Cave Spring High School

Teacher sponsor: Mr. Mark Levy

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

Aman Mengistu, Cave Spring High School

Teacher sponsor: Mr. Mark Levy

EARTH AND ENVIRONMENTAL SCIENCES A

ES-A 1 The Effects of Sunblock and Sunscreen on *Chlorella* Growth and Water Quality

Kinsley Milko, Lord Botetourt High School

Teacher sponsor: Mrs. Joanne Villers

ES-A 2 The Effect of Magnesium Sulfate on the Growth of *Chlorella*

Laine Clements, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

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

Claire Ricketts, Cave Spring High School

Teacher sponsor: Mrs. Joanne Villers

ES-A 4 The Effect of High Stress Temperatures on *Brassica rapa*

Emily Dewire, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

ES-A 5 The Effect of Copper (II) Sulfate on Growth and Development of *Danio rerio*

Julia Batty, Patrick Henry High School

Maya Olson, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

ES-A 6 Urban Edge Effects Impact on Soil Microbial Diversity and pH

Mitchell Blankenship, William Fleming High School

Adam Doner, William Fleming High School

Teacher sponsor: Mrs. Joanne Villers

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

Teacher sponsor: Mrs. Joanne Villers

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

Teacher sponsor: Mr. Mark Levy

ES-A 9 Using *E. coli* as a Water Health Indicator to Determine the Effects of a Population and its Respective Demographics on Water Quality

Jefferson (Aidan) Callis, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

ES-A 10 The Best Method of Filtering Fluoride Out of Water Using Plants

Claire Grindo, Liberty High School

Teacher sponsor: Ms. Cindy Bohland

EARTH AND ENVIRONMENTAL SCIENCES B

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

Ella Dickerson, Lord Botetourt High School

Teacher sponsor: Mrs. Joanne Villers

ES-B 2 The Effect of Farming Method on the Microbial Diversity of Soil

Jack Le Roy, Floyd County High School

Helena Longstreth, Franklin County High School

Teacher sponsor: Mrs. Joanne Villers

ES-B 3 The Effect of Light Pollution on the Change in the Population of *Tachypleus tridentatus*

Daniel Owen-O'Quill, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

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

Riley Beasley, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

ES-B 5 The Biosorption of Iron and Copper Ions in Aqueous Solutions by *Chlorella vulgaris*

Rhiannon Stowe, Lord Botetourt High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Brett Smith, Lord Botetourt High School

Teacher sponsor: Ms. Cindy Bohland

ES-B 7 The Impact of Road Type and Distance from Roadway on Invasive Species Prevalence

Alexander (Lex) Farmer, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

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

Teacher sponsor: Mrs. Joanne Villers

ES-B 9 Phytoremediation of Motor Oil Contamination by *Lemna minor*

Isabella (Izzy) Mather, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

ENGINEERING MECHANICS A

EM-A 1 Child Safety Cap Aid

Noah Svirsky, Cave Spring High School

Teacher sponsor: Mr. Drew Hurst

EM-A 2 Piano Man

Miya Morton, Hidden Valley High School

Roy Wainwright, Franklin County High School

Teacher sponsor: Mr. Connor Wade

EM-A 3 The Use of Natural Light in Residential Architecture for Enhanced Well Being

Katie Coles, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

EM-A 4 Employing Arduino and CAD Design in the Automated Tracking of Celestial Objects

Dylan (Dylan) De Meyts, Patrick Henry High School

Grady Stinson, Patrick Henry High School

Christopher Toner, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-A 5 Servo Gimbal Controlled Camera Mount for Drones

Jordan Wattie-Shear, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-A 6 Handwriting Robotic Arm 2.0

Jeanne-Eugenie Picard, Cave Spring High School

Teacher sponsor: Mr. Drew Hurst

EM-A 7 Motor Controlled Catapult

Joseline Hernandez-Marroquin, Patrick Henry High School

Kevin Ly, William Fleming High School

Kritesh Sutar, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-A 8 Bi-Loon

Guillaume Preud'homme, Patrick Henry High School

James (Ben) Schweitzer, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-A 9 Robot Extraction Hive Mind

Jamal Millner, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

ENGINEERING MECHANICS B

EM-B 1 Automatic Pill Dispenser

Jacob Stewart, Hidden Valley High School

Teacher sponsor: Mr. Drew Hurst

EM-B 2 Bluetooth Controlled RC Car

Lachlan Robrecht, Patrick Henry High School

Timothy Yemey, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-B 3 Mobile Storage Containment Unit

Isaiah Butler, Patrick Henry High School

Walker (Jackson) Farrar, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-B 4 Automatic Ultimate Frisbee Launcher

Samuel Dandridge, Patrick Henry High School

Anam Neopaney, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

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

Kaeli Berry, James River High School

Teacher sponsor: Mr. Brandon Taylor

EM-B 6 Electromagnet Crane

Hayston Chappell, Patrick Henry High School

Matthew Feldmann, Patrick Henry High School

Benjamin (Ben) Grindstaff, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-B 7 Automatic Liquid Dispenser

Holden Bryant, Franklin County High School

John (Will) Jones, Franklin County High School

Teacher sponsor: Mr. Connor Wade

EM-B 8 Human Sensing RC Car

Christian Chicas-Nolasco, William Fleming High School

Teacher sponsor: Mr. Drew Hurst

EM-B 9 Automated Plant Rotation and Watering System

Molly (Morgan) Fitzgerald, Patrick Henry High School

Evelyn (Eve) Foster, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

ENGINEERING MECHANICS C

EM-C 1 Crane with Color Detection

Eyad Al-Aromah, William Fleming High School
Craig (Isaac) Morris, Craig County High School
Teacher sponsor: Mr. Connor Wade

EM-C 2 Car controlled by hand movements

Samuel Glenn, Patrick Henry High School
James O'Keeffe, Patrick Henry High School
Teacher sponsor: Mr. Connor Wade

EM-C 3 Autonomous Following Box V2

Alpinveer (Alpin) Singh, Cave Spring High School
Teacher sponsor: Mr. Drew Hurst

EM-C 4 The "No Swim" Safety Clip

Isaac Olson, Patrick Henry High School
Ryan Prusakowski, Patrick Henry High School
Teacher sponsor: Mr. Drew Hurst

EM-C 5 The Foundation of New Technology with a Mechanical Network of Units

Tyler McCarren, Lord Botetourt High School
Teacher sponsor: Mr. Doug Divers

EM-C 6 Self-Stabilizing RC Car

Nathan Bulla, Cave Spring High School
Mann Patel, Glenvar High School
Teacher sponsor: Mr. Connor Wade

EM-C 7 A Helping Hand; an automated handwriting tool for assisting amputees.

Alexander (Alex) Key, Liberty High School
Arrington Short, Staunton River High School
Teacher sponsor: Mr. Connor Wade

EM-C 8 Manually Controlled Precision Drawing Tool

Sean Powell, Patrick Henry High School
Caroline Reichardt, Patrick Henry High School
Teacher sponsor: Mr. Connor Wade

ENGINEERING MECHANICS D

EM-D 1 Automatic Wire Straightener and Coiler

Sean Cady, Craig County High School

Teacher sponsor: Mr. Drew Hurst

EM-D 2 Soft Robotic Glove for Neuromuscular Recovery

William (Will) Henderson, Franklin County High School

Jeremiah (Chase) Noel, Franklin County High School

Teacher sponsor: Mr. Drew Hurst

EM-D 3 Mechanical Drawing Device Using XY Pulley System

Graham Dietrich, Lord Botetourt High School

Benjamin Ogle, Glenvar High School

Teacher sponsor: Mr. Connor Wade

EM-D 4 Handy Vehicle

Teacher sponsor: Mr. Drew Hurst

EM-D 5 Ping Pong Ball Launcher

Nathan Amos, Franklin County High School

Jay (Trey) Hipes, James River High School

Teacher sponsor: Mr. Connor Wade

EM-D 6 Automated Safety-Enhanced Paper Cutting Machine

Cora Reid, Staunton River High School

Teacher sponsor: Mr. Drew Hurst

EM-D 7 Bluetooth Controlled Marionette

Virginia (Ginny) Matthews, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

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

Seijin Campbell, Franklin County High School

Kalob Daniels, Lord Botetourt High School

Teacher sponsor: Mr. Drew Hurst

ENVIRONMENTAL ENGINEERING/ENERGY

EE 1 Deployable Aqua-Bacterial Analyzer

Zachary (Zach) Young, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

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

Josephine Eaton, Salem High School

Teacher sponsor: Ms. Cindy Bohland

EE 3 The Effect of Various Types of Clay on the Water Filtration Properties of Sodium Alginate Beads

Henry Fedak, Patrick Henry High School

Lawson Fralin, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Mrs. Joanne Villers

EE 5 A Comparison of the Emissions of E85 and Traditional Gasoline

John (JB) Clements, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

EE 6 The Effect of Different Organic Substrates on Volume of Gas Produced During Anaerobic Digestion

Darby Kerr, Patrick Henry High School

Charles Rucker, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

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

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

EE 8 Using Secondhand oils to Make Biofuel

Anders Plunkett, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

MATERIALS SCIENCE/CHEMISTRY

MS 1 Comparing the Structural Integrity of Corn, Wheat, and Potato Starch in Bioplastics.

Carter Biscotte, Salem High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

MS 3 Energy Efficiency of Transparent Wood

Naomi Fetzer, Cave Spring High School

Teacher sponsor: Mrs. Joanne Villers

MS 4 The effect of natural fibers on the tensile strength of chitin bioplastics

Aeryn Thompson, William Fleming High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Kylie Duke, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

MS 6 Strength in Sustainability: the Use of Recycled Plastics in Making Concrete

Lucy Atwood, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Maxton (Max) Mizuba, Lord Botetourt High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Preston Vaughn, Lord Botetourt High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

MS 9 The Effects of Iron Oxide and Zinc Oxide Nanoparticles on *E. coli*

Claire (Liz) Morris, Craig County High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Kensington Reynolds, Cave Spring High School

Teacher sponsor: Mr. Brandon Taylor

MICROBIOLOGY A

MI-A 1 The Synergistic Effect of Gentamicin and Ciprofloxacin on *S. marcescens*

James (Sam) Bullington, Patrick Henry High School

Alasdair Hackworth, William Fleming High School

Teacher sponsor: Mr. Matthew Browning

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

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Mr. Brandon Taylor

MI-A 4 The Effect of Home Remedies vs. Vancomycin on *B. cereus*

Rowan Poelzing, Patrick Henry High School

Austin White, Patrick Henry High School

Teacher sponsor: Mr. Matthew Browning

MI-A 5 The Effect of *A. sativum* and Ampicillin on *L. lactis*

Barrett Pace, James River High School

Riley Sides, Franklin County High School

Teacher sponsor: Mr. Matthew Browning

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

Teacher sponsor: Mr. Brandon Taylor

MI-A 7 The Effect of T2 Coliphage and Ampicillin on *E. coli B*

Strummer Giffin, Lord Botetourt High School

Jabe Le Roy, Floyd County High School

Teacher sponsor: Mr. Matthew Browning

MI-A 8 The Effect of Essential Oils on *Escherichia coli* and *Enterobacter aerogenes*

Ana (Ana Maria) Rincon, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Mr. Matthew Browning

MICROBIOLOGY B

MI-B 1 Optimizing PET Plastic Degradation Through Engineered *E. coli* Expressing *I. sakaiensis* Gene
Samyak (Sam) Srivastava, Cave Spring High School
Teacher sponsor: Mr. Matthew Browning

MI-B 2 The Effect of Peppermint Oil and Doxycycline Hyclate on *S. epidermidis*
Sophia Rorrer, Franklin County High School
Jenna Shipp, Franklin County High School
Teacher sponsor: Mr. Matthew Browning

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
Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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
Teacher sponsor: Mr. Brandon Taylor

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
Teacher sponsor: Ms. Cindy Bohland

MI-B 6 The Effect of Ampicillin and Oregano Oil on *M. luteus*
Sullivan (Sully) Armstead, Patrick Henry High School
Jake Robertson, Patrick Henry High School
Teacher sponsor: Mr. Matthew Browning

MI-B 7 The Effect of Gentamicin and *L. scoparium* on the Growth of *P. fluorescens*
Brynne Wiegard, Patrick Henry High School
Teacher sponsor: Mr. Matthew Browning

MI-B 8 The Effect of Essential Oil on *Pseudomonas fluorescens* Biofilm
Caralyn (Carrie) Collins, Lord Botetourt High School
Teacher sponsor: Ms. Cindy Bohland

MICROBIOLOGY C

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

Benjamin King, Northside High School

Joshua (Josh) Manning, Staunton River High School

Teacher sponsor: Ms. Cindy Bohland

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

Lera Gibson, Franklin County High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

MI-C 3 The Antibacterial Effect of Copper Nanoparticles on *Escherichia coli* K12 and *Staphylococcus epidermidis*

Erica Gergely, Lord Botetourt High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

MI-C 4 The Effect of Diluted Ampicillin on the Growth of *E. coli*

Jack Lawrence, Salem High School

Dev Patel, Salem High School

Teacher sponsor: Mr. Matthew Browning

MI-C 5 Can Bacteriophages Solve Antibiotic Resistance?

Nolan Stokes, Patrick Henry High School

Claire Togo, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

MI-C 6 The Effect of Beta-Lactam and Natural Antibiotics on *R. rubrum*

Gabriel Rodriguez, William Fleming High School

Ahnyis Salisbury-Bonhomme, William Fleming High School

Teacher sponsor: Mr. Matthew Browning

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

Zara Bhowansingh, Hidden Valley High School

Teacher sponsor: Mr. Matthew Browning

MI-C 8 The Effect of Cranberry Juice and Ciprofloxacin on the Growth of *E. coli*

Skye Harbin, William Fleming High School

Reese Kuehl, Patrick Henry High School

Teacher sponsor: Mr. Matthew Browning

PLANT SCIENCES A

PS-A 1 The Allelopathic Effect of *Capsicum chinense* on the germination of *Pueraria montana var. lobata*

Anson Foster, Patrick Henry High School

Brantley Pruitt, Patrick Henry High School

Teacher sponsor: Mrs. Tracy Jenkins

PS-A 2 The Allelopathic Effect of *Zea mays* on the Germination of *Corchorus olitorius*

Riley Howell, Lord Botetourt High School

Ian Park, Lord Botetourt High School

Teacher sponsor: Mrs. Tracy Jenkins

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

Meera Raichura, William Byrd High School

Teacher sponsor: Ms. Cindy Bohland

PS-A 4 A Study of the Allelopathic Effect of *Persea americana* and *Beta vulgaris* Seeds

Aspen Cooper, Franklin County High School

Teacher sponsor: Mrs. Tracy Jenkins

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

Teacher sponsor: Mrs. Tracy Jenkins

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

Eslly Cruz-Nolasco, William Fleming High School

Teacher sponsor: Mrs. Joanne Villers

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

Teacher sponsor: Mrs. Tracy Jenkins

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

Teacher sponsor: Mrs. Tracy Jenkins

PLANT SCIENCES B

PS-B 1 A Study of the Allelopathic Effect of *Zea mays* on *Triticum aestivum* and *Oryza sativa*

Colt Guilliams, William Fleming High School

Maxwell Weiss, Patrick Henry High School

Teacher sponsor: Mrs. Tracy Jenkins

PS-B 2 The Allelopathic Effect of *Allium schoenoprasum* on the Germination of *Brassica oleracea*

Mattox Jalbert, Franklin County High School

Jayden Wainwright, Franklin County High School

Teacher sponsor: Mrs. Tracy Jenkins

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

Teacher sponsor: Mrs. Tracy Jenkins

PS-B 4 The Allelopathic Effect of *C. liberica var. Dewevrei* on the Germination of *M. sativa*

Devanshi Chaudhari, Patrick Henry High School

Jamileh (Jennah) Rasoul, Patrick Henry High School

Teacher sponsor: Mrs. Tracy Jenkins

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

Teacher sponsor: Ms. Cindy Bohland

PS-B 6 The Effect of Zinc Oxide Nanoparticle Foliar Spray on the Chlorophyll Content of *Vigna radiata* Leaves

Evanjali Wagley, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith and Mr. Steve Villers

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

Teacher sponsor: Mrs. Tracy Jenkins

PS-B 8 A Study of the Allelopathic Effect of *Allium sativum* on *Glycine max*

Ian Harrison, Patrick Henry High School

Teacher sponsor: Mrs. Tracy Jenkins

SYSTEMS SOFTWARE A

SS-A 1 Stock Price Predictor

Brodie Eanes, Franklin County High School
Sophie Tisdale, Franklin County High School
Teacher sponsor: Mr. Doug Divers

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
Teacher sponsor: Mr. Doug Divers

SS-A 3 Using Python to Generate Study Materials

Cameron McPhee, William Fleming High School
Teacher sponsor: Mr. Doug Divers

SS-A 4 Using Machine Learning to Detect AI-Generated Writing

Conlan McNulty, William Fleming High School
Teacher sponsor: Mr. Doug Divers

SS-A 5 Custom Emojis Using Facial Landmarks In Python

Ariana Markham, Northside High School
Teacher sponsor: Mr. Doug Divers

SS-A 6 Object Detection with Python

Nathan Cloutier, Franklin County High School
Aadesh Mittal, Cave Spring High School
Teacher sponsor: Mr. Doug Divers

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

Aryan Madan, Hidden Valley High School
Teacher sponsor: Mrs. Tracy Jenkins

SYSTEMS SOFTWARE B

SS-B 1 Utilizing Python to Create Meal Plans Based on All Available Ingredients

Gage Allran, Cave Spring High School

Anish Suryapeta, Cave Spring High School

Teacher sponsor: Mr. Doug Divers

SS-B 2 Multilingual Translation System: A Python-Based Solution for Cross-Cultural Communication

Sanchit Baskota, William Fleming High School

Divya Bharati, William Fleming High School

Autumn Patterson, William Fleming High School

Teacher sponsor: Mr. Doug Divers

SS-B 3 Economic Data Analysis in Python

Eli Peters, Franklin County High School

Teacher sponsor: Mr. Doug Divers

SS-B 4 Bias Detection System for Letters of Recommendation

Luke Thompson, Patrick Henry High School

Teacher sponsor: Mr. Doug Divers

SS-B 5 Mental Melody

Sharmila Balaji, Cave Spring High School

Teacher sponsor: Mr. Brandon Taylor

SS-B 6 Signature Authenticator

Elijah (Eli) Harl, Franklin County High School

Benjamin (Ben) Meyer, Cave Spring High School

Teacher sponsor: Mr. Doug Divers