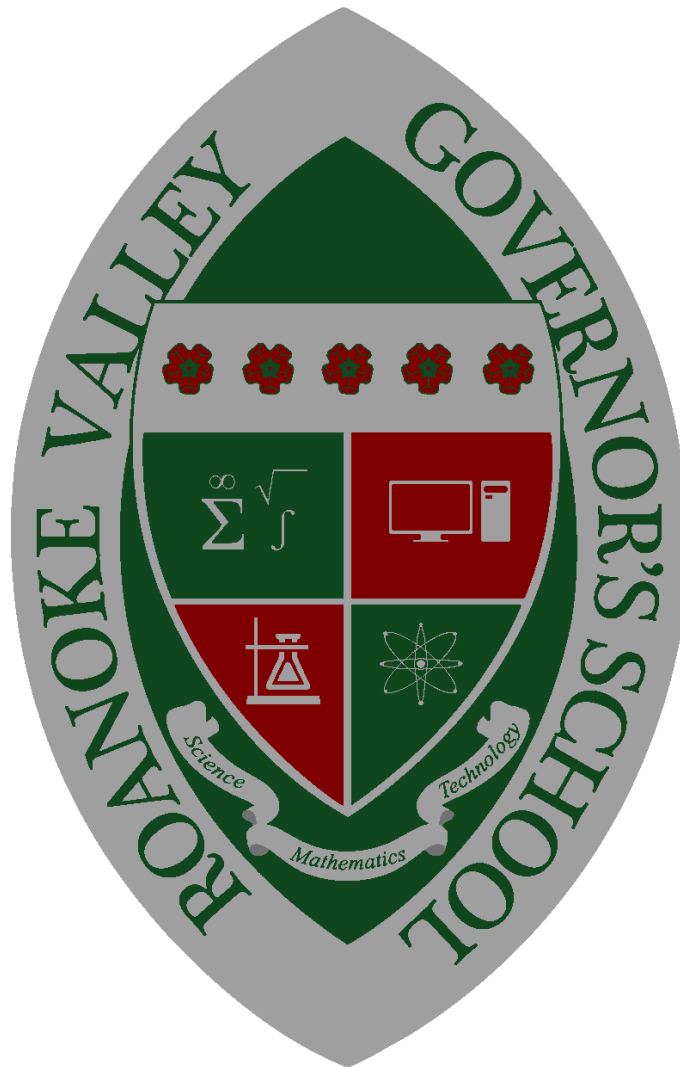


The Roanoke Valley Governor's School For Science and Technology 2022 Student Project Forum



The Roanoke Valley Governor's School for Science and Technology is supported by the Virginia Department of Education and the public school divisions of the Roanoke Valley. The RVGS Community is grateful for the support and financial commitment from our seven participating school districts:

Bedford County, Botetourt County, Craig County, Franklin County, Roanoke City, Roanoke County, Salem City

THE ROANOKE VALLEY GOVERNOR'S SCHOOL FACULTY AND STAFF

Office/Administrative Staff

Mark Levy, Director; Kathy Sebolt, Director of School Counseling; Paula Buch, School Secretary

Mathematics Faculty

Melissa Fisher (Chair), Matthew Browning, Doug Divers, Laura Roark, Brandon Taylor, Don Wages

Science Faculty

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

Adjunct Faculty/Intersession Support

Fred Hoffman

The faculty and staff of the Roanoke Valley Governor's School wish to thank those who have supported the student research effort during this academic year. In particular, we wish to acknowledge the generous support and assistance provided by:

Parents

Roanoke Valley Governor's School Foundation

Annual Appeal Committee

Governor's School Alumni

Project Mentors from Local Businesses, Industries, and Colleges

Project Forum Judges

Regional Board Members and Superintendents of our Seven School Districts:

District	Regional Board Member	Superintendent
Bedford County	Susan Mele	Mark Bergin
Botetourt County	Anna Weddle	Jonathan Ross
Craig County	Trace Bellassai	Jeanette Warwick
Franklin County	Julie Nix	Bernice Cobbs
Roanoke City	Mark Cathey	Verletta White
Roanoke County	Mike Wray	Ken Nicely
Salem City	Nancy Bradley	Curtis Hicks

2022 ANNUAL APPEAL SPONSORS (as of 1/24/2022)

Rhodium Sponsors (\$2,500+)

J. Spencer and Joy Frantz Donor
Advised Fund of Community
Foundation Serving Western
Virginia

Platinum Sponsors (\$1,000+)

Morrill Family
Preud'homme Family
Rigatti Family
Ryan Hurt
Silva Family
Sofi Family
Stevens Family
Tershak Family
Google

Gold Sponsors (\$500+)

Baka-Collins Family
Boxley Family
Bubar Family
Robert and Sherry Frantz
Shravan Gaddam
Hunter Family
Karri Family
Dr. and Mrs. Kauffman Donor
Advised Fund
Nathan and Angela Kerr Family
Reddan Family
Scarlatescu Family
Seven Stones Consulting, LLC
Zheng Family

Silver Sponsors (Up to \$500)

Doug and Shannon Anderson
Family
Bailey Family
Barker Family
Barrow Family
Michael Bartgis
Bary Family
Batty Family
Chuck and Sharon Beasley Family
James and Jamie Beasley Family
Alan and Kristi Berry Family
Jennifer and Chris Berry Family
Betty Bunch
Cady Family
Campbell Family
Ashley Carpenter
Carvalho Family
Chapman Family
Chen Family
Clements Family
Comer Family
Cross Family
Crumpacker Family
Cumins Family
Darnell Family
Davis Family
Day Family
Dorathy Family
Drewry Family
Duncan Family
Dye Family
Ericsson Family
Farmer Family
Faulkner Family
Feldmann Family

Silver Sponsors (Up to \$500)

Continued

Flippen Family
Fraticegli Family
Garri Family
Gergely Family
Grant Family
Han Family
Harig Family
Harmon Family
Meagan Harrison
Henderson Family
Hughes-Coles Family
Jackson Family
Jamison Family
Jarrett Family
Se Jeong
Joyce Family
Kepley Family in honor of Jack,
Andrew and Gretchen
Kuehl Family
LaConte Family
LaFlam Family
Lampros-Durrill Family
Lauer Family
Little Family
Louvet Family
Luci Family
Keshav Mallidi
Mayhue Family
McGinnis Family
Meidlinger Family
Miller Family
Mizuba Family
Olson Family
Paige Family
Pan Family

Silver Sponsors (Up to \$500)

Continued

Patel Family
Pentecost Family
Perry Family
Pham Family
Plunkett Family
Qiu Family
Roanoke Valley Orthodontics
Roberts Family
Sageer Family
Schweitzer Family
Seidel Family
Silverglate Family
Simmons Insurance Agency
Siv Family
David and Christine Smith Family
Joseph and Jennifer Smith Family
Snyder Family
Spine and Orthopedic Rehab of VA
Stelter Family
Stewart Family
Sung Family
Sykes Family
Chip and Karen Thomas
James and Amy Thompson Family
Michael and Jill Thompson Family
Tiwari Family
Vokus Family
Wattie-Shear Family
Wei Family
Weiss Family
Wilson Family
Wood Family
Wyatt Family
Yakob Family

RVGS Students

Mariam Abdelmalak, AS-C 4
Laila Alam, MI-A 4
Sydney Anderson, AS-A 2
Evelyn Anderson, BS 4
John Aziz, MI-B 6
Ann Foust Bailey, BS 2
Russell (McLure) Bailey, MI-A 5
Carter Baka-Collins, SS-A 2
Sharmila Balaji, PS-A 1
Bailey Barker, MI-C 4
Helen Barrow, AS-A 8
Maddox Bary, PS-A 2
Sanchit Baskota, AS-B 8
Sachita Baskota, AS-A 6
Emma Batty, CEM 2
Riley Beasley, AS-A 1
James (Ford) Beasley, EM-A 2
Joseph Beasley, EE 6
Bass Beasley, Jr., EM-C 8
Robert Berry, EM-B 3
Kaeli Berry, PS-C 7
Divya Bharati, MI-B 2
Makayla Biller, PS-C 4
Benjamin Blevins, AS-B 3
Grace Bowman, PS-C 8
Sallie Boxley, PS-A 8
Trinity Breedlove, EM-A 9
Madison Brown, CEM 7
Ella Bryant, CM 4
Daniel (Jackson) Bubar, AS-B 4
William (Alex) Burnette, PS-A 6
Sean Cady, PS-A 2
Seth Caldwell, AS-C 5
Jefferson (Aidan) Callis, PS-B 4
Seijin Campbell, AS-C 1
Paulo Carey, EM-B 4
Alicia Carvalho, CM 2
Parker Chapman, EM-A 7
Catherine Chen, CB 8
John (J.B.) Clements, MI-B 6
Shane Cockram, EM-A 6
Katie Coles, PS-B 8
Ren Combs-Cannaday, AS-A 2
Charlie Comer, PS-A 5
Ryan (Davis) Cooper, EM-C 6
Titus Counihan, EM-B 6
Samuel Crawford, EM-A 10
Katherine Cross, PS-C 2
Katelyn Crumpacker, PS-A 3
Esly Cruz-Nolasco, PS-B 3
Roxanne Culley, EM-A 9
David (Chase) Cumins, EM-B 10
Kalob Daniels, MI-A 1
Tristen (Jack) David, EM-B 2
Remilekun (Remi) Davies, AS-B 2
Natalie Davis, CB 3
Haley Day, MI-B 7
Mitchell Deese, PS-B 6
Chloe DeKorse, EM-B 9
Mieko DeKorse, CEM 5
Bakari Deskins, EM-A 5
Reesa Devers, CEM 4
Lillian Dorathy, BS 7
Claire Dozier, CM 5
Sara Drewry, BH 1
Emily Duncan, MI-C 2
Sydnee Durham, EE 9
Benjamin Dye, CEM 9
Zachary Easter, PS-A 4
Zane Ellis, SS-B 1
Jack Ericsson, PS-C 5
Alexander (Lex) Farmer, PS-B 1
Nate Faulkner, CEM 6
Kathryn (Kate) Feldmann, EE 4
Canaan (Cane) Fetzer, PS-B 5
Austin Frantz, PS-A 4
Josephine (Josie) Fraticelli, PS-C 6
Taylor Frazier, BS 3
Anna Frittman, CM 5
Arden Gardner, PS-B 6
Keely Garri, PS-C 3
Erica Gergely, MI-C 1
Diol Glele, AS-B 4
Caroline Grant, BH 3
Coleman Grindstaff, ES 1
Su Gursoy, MI-C 3
Anna Halsdorf, AS-C 3
Daniel Han, SS-B 6
Grace Harig, EE 5
Troy (Andrew) Harmon, SS-B 3
Emiley Harris, CEM 1
Brenden Hartung, MI-A 7
William Henderson, AS-A 3
Aaron Henion, SS-A 1
Andres Hernandez, EM-C 6
Clara Higgins, ES 2
Holly Hinchy, BS 6
Thomas (TJ) Hinson, EM-B 2
Georgia Honts, CEM 3
Ava Hughes, AS-A 1
Abigail Hunter, MI-A 6
Merryn Isbell, EE 3
Ruby Isbell, EE 9
Jacob Jackson, CEM 8
Lillian (Libby) Jamison, EE 3
Margaret (Maggie) Jarrett, PS-C 1
Thomas (Trey) Joyce, III, PS-B 7
Grace Kahoun, MI-A 3
Abhinav (Abhi) Karri, AS-C 6
Griffin Kauffman, EM-A 3
Margaret Kauffman, ES 9
Vineel Kavuru, EE 8
Spencer Kearns, PS-A 7
Garrett Kelly, EM-B 10
Tristan Kerr, EM-C 3
Riley Kerr, SS-B 4
Micah Keyser-Rothgery, SS-B 3
Momin Khan, AS-A 5
Emily Kiser, AS-B 3
Cole Konstance, BH 4
Faith Kuehl, EM-B 9
Alex Kurtz, EM-B 4
Dominic LaConte, PS-A 8
Margaret Laflam, EE 8
Barbara (Ayla) Lampros, BH 2
Kiersten Lauer, MI-B 4
Juhee Lee, AS-C 4
Cynthia Lin, ES 8
Eleanor Little, CM 3
Nicholas Louvet, EM-A 4
Keaton Lucas, EM-C 7
Oliver Luci, ES 7
Lucas Mann, CB 2
Alexander Martin, EM-B 10
Marissa Martin, CB 2
Liam May, CB 7
Adison Mayhue, PS-C 3
Aidan Mayhue, CB 6
Elliott (Ellie) McClung, EM-C 7
Kira McGinnis, EE 5
Ayden McNulty, MI-C 5
Conlan McNulty, MI-B 5
Cameron McPhee, MI-B 2
Riley McReynolds, EM-B 5
Charles Meidlinger, SS-B 2
Andrew Michie, MI-C 4
Mihir Miller, EM-A 8
Zoie Mills, EM-B 5
Hannah Mizuba, MI-C 1
Courtney Monard, EE 1
Luke Moon, EM-C 9
Forrest Moorman, EM-A 7
Nathalie Moreno, AS-A 5
Nikolai Morgiewicz, EM-C 4
Jeremiah Morgiewicz, EE 7
Declan Morrill, EM-A 2
Savannah (Paige) Netting, PS-A 3
Lacey Ngo, BH 7
Vy Nguyen, BS 8
Henry Nguyen, MI-A 2
Jeremiah (Chase) Noel, AS-A 3
Autumn O'Connor, AS-C 3

Phoenix O'Dell, AS-C 2
Caroline O'Keeffe, EM-C 5
Christina Okenquist, CM 4
Isaac Olson, MI-A 2
Meribel Pan, PS-A 1
Maggie Parkhurst, CB 1
Dhruvi Patel, ES 6
Autumn Patterson, PS-B 3
Maura Pentecost, AS-C 7
Seth Perry, EM-A 10
Falan Peters, EM-A 4
Savannah Peters, EM-A 5
Natalie Pham, ES 4
Tai Phan, EM-A 1
Annika Plunkett, AS-B 5
Emma Pope, EM-A 4
Guillaume Preud'homme, PS-B 4
Cole Price, AS-A 7
JP Prusakowski, EM-B 3
Ryan Prusakowski, MI-A 5
Rebecca Qiu, CB 4
Meera Raichura, MI-B 1
Carson Ray, SS-B 5
Kane Reczek, MI-A 1
Frances Reddan, MI-B 3
Diya Reddy, MI-B 1
Reese Redford, BH 2
Caroline Reichardt, PS-C 1
Olivia Reichardt, MI-A 6
Cora Reid, MI-C 6
Kensington Reynolds, AS-A 8
Seth Richards, PS-B 7
Reese Robers, BH 8
Maximillian Roberson, EM-C 8
Penelope Roberts, EE 4
Ainsley Robertson, EE 2
Joshua Ruppel, BS 1
Hana Sageer, AS-B 6
Andrew Sakamoto, SS-A 4
Natalie Saville, CM 1
Nicole Scarlatescu, AS-B 6
Matthew Scarlatescu, SS-A 4
Sophia Schumaecker, PS-C 2
James (Ben) Schweitzer, AS-B 8
Emma Seidel, AS-B 7
Erica Blake Sellars, EM-A 8
Gene Seo, AS-B 1
Evan Shifflett, EM-C 4
Zoe Silva, SS-A 6
Parker Sisk, PS-A 6
Brett Smith, PS-C 7
Penelope Smith, BH 6
Cameron Snyder, BH 6

Nathan Sprouse, CEM 10
Sarah Grace Stanley, EM-B 8
Cole Stelter, ES 3
William (Maxwell) Stevens, ES 5
Durbin Stevens, EM-C 3
Jacob Stewart, MI-A 7
Alexios (Lex) Stratton, EM-B 6
Ethan Su, EM-B 1
Luke Sumner, EM-C 1
Laon Sung, AS-C 1
Krischal Sutar, EM-B 2
Noah Svirsky, AS-B 1
Raimee Sykes, MI-A 4
Tobias (Toby) Tate , EM-C 10
Erika Terry, EM-C 1
Elisabeth Tershak, EM-C 5
Emma Thielecke, MI-A 3
Luke Thompson, AS-C 2
Heidi Thompson, SS-A 6
Himangi Tiwari, AS-A 6
Riley VanAken, EM-B 7
Tyler VanDyke, EM-A 6
Raghav Vasudeva, AS-A 4
James Voight, EM-B 1
Sydney Vokus, EM-C 2
Cara Wardell, PS-B 8
Silvia Wardell, SS-A 5
Jordan Wattie-Shear, MI-B 3
Claire Wei, BH 5
Brayden Whitlow, CB 5
Timothy Wilson, CB 5
Darryl Wilson, III, SS-A 3
Riley Wood, EM-A 1
Shaykalia Wright, AS-B 2
Abby Wyatt, PS-B 2
Griffin Yakob, EE 1
Michelle Zheng, BS 5

ANIMAL SCIENCES A



AS-A 1 The Effect of *Griffonia simplicifolia* on the Heart Rate of *Daphnia magna*

Riley Beasley, Patrick Henry High School

Ava Hughes, Patrick Henry High School

Teacher sponsor: Mr. Don Wages

AS-A 2 The Effect of Melatonin on the Heart Rate of *Daphnia magna*

Sydney Anderson, Patrick Henry High School

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

Teacher sponsor: Mr. Don Wages

AS-A 3 The Effect of Albuterol Sulfate on the Heart Rate of *Daphnia magna*

William Henderson, Franklin County High School

Jeremiah (Chase) Noel, Franklin County High School

Teacher sponsor: Mr. Don Wages

AS-A 4 Effect of Chlorpyrifos, Dicofol, Glyphosate, and 2,4-Dichlorophenoxyacetic acid on *D. rerio* development and gene expression

Raghav Vasudeva, Hidden Valley High School

Teacher sponsor: Ms. Cindy Bohland

AS-A 5 The Effect of *Camellia sinensis* on the Heart Rate of *Daphnia Magna*

Momin Khan, Patrick Henry High School

Nathalie Moreno, William Fleming High School

Teacher sponsor: Mr. Don Wages

AS-A 6 The Effect of Zinc on the Heart Rate of *Daphnia Magna*

Sachita Baskota, Patrick Henry High School

Himangi Tiwari, Patrick Henry High School

Teacher sponsor: Mr. Don Wages

AS-A 7 Effect of Anxiolytics on the Growth and Development of *Danio rerio* Embryos

Cole Price, Staunton River High School

Teacher sponsor: Mrs. Joanne Villers

AS-A 8 The Effect of *Lavandula Angustifolia* on the Heart Rate of *Daphnia Magna*

Helen Barrow, Cave Spring High School

Kensington Reynolds, Cave Spring High School

Teacher sponsor: Mr. Don Wages

ANIMAL SCIENCES B



AS-B 1 The Effect of *Crataegus oxyacantha* on the Heart Rate of *Daphnia magna*

Gene Seo, Northside High School
Noah Svirsky, Cave Spring High School
Teacher sponsor: Mr. Don Wages

AS-B 2 The Effect of *Lobelia inflata* on the Heart Rate of *Daphnia magna*

Remilekun (Remi) Davies, William Fleming High School
Shaykalia Wright, William Fleming High School
Teacher sponsor: Mr. Don Wages

AS-B 3 Effects of Perfluorooctanoic Acid on Development and Gene Expression of *Danio rerio* Embryos

Benjamin Blevins, Staunton River High School
Emily Kiser, Staunton River High School
Teacher sponsor: Ms. Cindy Bohland

AS-B 4 The Effects of L-Arginine on the Heart Rate of *Daphnia Magna*

Daniel (Jackson) Bubar, Patrick Henry High School
Diol Glele, Patrick Henry High School
Teacher sponsor: Mr. Don Wages

AS-B 5 The Effect of Exposure to the Pyrethroid Bifenthrin on the Behavior and Development of *Caenorhabditis elegans*

Annika Plunkett, Patrick Henry High School
Teacher sponsor: Mrs. Joanne Villers

AS-B 6 The Effect of *Digitalis Purpurea* on the Heart Rate of *Daphnia magna*

Hana Sageer, Hidden Valley High School
Nicole Scarlatescu, Hidden Valley High School
Teacher sponsor: Mr. Don Wages

AS-B 7 The Effect of Beta-carotene on Eye Pigmentation and Eyesight in *Drosophila*

Emma Seidel, Patrick Henry High School
Teacher sponsor: Ms. Cindy Bohland

AS-B 8 The Effect of *Scutellaria lateriflora* on the Heart Rate of *Daphnia Magna*

Sanchit Baskota, William Fleming High School
James (Ben) Schweitzer, Patrick Henry High School
Teacher sponsor: Mr. Don Wages

ANIMAL SCIENCES C



AS-C 1 The Effect of *Capsicum annuum* on the Heart Rate of *Daphnia Magna*

Seijin Campbell, Franklin County High School

Laon Sung, Franklin County High School

Teacher sponsor: Mr. Don Wages

AS-C 2 The Effect of *Holothuroidea* on the Heart Rate of *Daphnia Magna*

Phoenix O'Dell, Patrick Henry High School

Luke Thompson, Patrick Henry High School

Teacher sponsor: Mr. Don Wages

AS-C 3 Variations in Learning Ability in Different *C. elegans* Mutants

Anna Halsdorf, Patrick Henry High School

Autumn O'Connor, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

AS-C 4 The Effect of Tartaric Acid on the Heart Rate of *Daphnia magna*

Mariam Abdelmalak, Salem High School

Juhee Lee, Franklin County High School

Teacher sponsor: Mr. Don Wages

AS-C 5 The Effect of *Centella asiatica* on the Heart Rate of *Daphnia magna*

Seth Caldwell, Franklin County High School

Teacher sponsor: Mr. Don Wages

AS-C 6 Col4: An Indicator of Vascular Formation and Pericyte Recruitment

Abhinav (Abhi) Karri, Hidden Valley High School

Teacher sponsor: Mr. Brandon Taylor

AS-C 7 The Effect of *Beta vulgaris rubra* on the Heart Rate of *Daphnia magna*

Maura Pentecost, Staunton River High School

Teacher sponsor: Mr. Don Wages

BEHAVIORAL AND SOCIAL SCIENCES



BS 1 Examining the Relationship Between Implicit Gender Bias and Gender Bias Detection

Joshua Ruppel, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

BS 2 The Effect of Screen Time on Mood

Ann Foust Bailey, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

BS 3 An Analysis of Adolescents' Social Emotional Wellbeing and School Performance During COVID-19
Virtual Education Transitions

Taylor Frazier, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

BS 4 Episodic Future Thinking: How Long Does it Take for Consequences to Mean Something?

Evelyn Anderson, Cave Spring High School

Teacher sponsor: Mrs. Melissa Fisher

BS 5 Examining Delay Discounting in Individuals Recovering from Substance Addiction

Michelle Zheng, Cave Spring High School

Teacher sponsor: Mrs. Melissa Fisher

BS 6 Examining the Relationship Between Social Media Use and Body Perception

Holly Hinchy, Cave Spring High School

Teacher sponsor: Mrs. Melissa Fisher

BS 7 An Analysis of the 2017 Annual Parole Survey

Lillian Dorathy, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

BS 8 The Effect of Episodic Future Thinking on Glycemic Variability in Prediabetes

Vy Nguyen, William Fleming High School

Teacher sponsor: Mrs. Melissa Fisher

BIOMEDICAL AND HEALTH SCIENCES



BH 1 Mechanistic Insight into Adenoviral Perturbation of Intercellular Communication

Sara Drewry, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

BH 2 The Effect of Manzanamine A on the Growth of Small Cell Lung Carcinoma

Barbara (Ayla) Lampros, Salem High School

Reese Redford, Salem High School

Teacher sponsor: Ms. Cindy Bohland

BH 3 A Novel Glioblastoma Prognostic Assay Using Droplet Digital Polymerase Chain Reaction

Caroline Grant, Hidden Valley High School

Teacher sponsor: Mr. Brandon Taylor

BH 4 Investigating Levodopa, Lithium, and Bumetanide as Possible Treatments for Alzheimer's Disease using a *Drosophila melanogaster* model

Cole Konstance, Hidden Valley High School

Teacher sponsor: Ms. Cindy Bohland

BH 5 Collagen XIX Point Mutation Leads to Inhibitory Synapse Formation Defects and Schizophrenia-Related Behaviors in Mice

Claire Wei, Cave Spring High School

Teacher sponsor: Mr. Mark Levy

BH 6 Investigating Vascular Abnormalities in the Placenta Due to Preeclampsia

Penelope Smith, Patrick Henry High School

Cameron Snyder, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

BH 7 Assessment of Transplant Liver Viability Using Raman Spectroscopy and Exosome Analysis

Lacey Ngo, William Fleming High School

Teacher sponsor: Mr. Brandon Taylor

BH 8 Measuring the Thermic Effect of Food in Metabolic Studies

Reese Robers, Patrick Henry High School

Teacher sponsor: Mrs. Melissa Fisher

CELLULAR AND MOLECULAR BIOLOGY



CM 1 Investigating the Effects of Gold Nanoparticles on Neonatal Human Dermal Fibroblast Proliferation and Type 1 Collagen Gene Expression

Natalie Saville, William Fleming High School

Teacher sponsor: Ms. Cindy Bohland

CM 2 Novel Peptide Drug Limits Vascular Smooth Muscle Cell Proliferation in Disease Models

Alicia Carvalho, Cave Spring High School

Teacher sponsor: Mr. Brandon Taylor

CM 3 Circadian Rhythmicity of Cellular Healing

Eleanor Little, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

CM 4 The Effect of RNA Interference on the Apoptosis of Small Cell Lung Carcinoma

Ella Bryant, Northside High School

Christina Okenquist, Northside High School

Teacher sponsor: Ms. Cindy Bohland

CM 5 Is it Tuna? A Comparison of DNA Degradation in Various Thunnini Preparations

Claire Dozier, Lord Botetourt High School

Anna Frittman, Lord Botetourt High School

Teacher sponsor: Ms. Cindy Bohland

CHEMISTRY/ENERGY/MATERIALS SCIENCE



CEM 1 Removal of Heavy Metal Ions by Hydrogels

Emiley Harris, Staunton River High School

Teacher sponsor: Mr. Steve Smith

CEM 2 Using Food Waste to Produce Starch-based Bioplastics

Emma Batty, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

CEM 3 The Effect of Various Sodium and Potassium Compounds on Explosive Force

Georgia Honts, James River High School

Teacher sponsor: Mr. Steve Smith

CEM 4 Bioethanol From Lignocellulosic Plant Waste

Reesa Devers, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith

CEM 5 The Effects of Different Municipal Waste Materials for Ethanol Production

Mieko DeKorsey, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

CEM 6 Testing the Effects of Nanoparticles on the Bioluminescence Intensity of *Vibrio fischeri*

Nate Faulkner, Cave Spring High School

Teacher sponsor: Mr. Steve Smith

CEM 7 An Analysis of Water Maser Observations Using Next-Generation VLA

Madison Brown, Franklin County High School

Teacher sponsor: Mr. Brandon Taylor

CEM 8 The Adsorbent Effect of Iron (III) Oxide Nanoparticles on Various Ions

Jacob Jackson, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith

CEM 9 The Effect of Different Organic Dyes On the Power Output of Dye-Sensitized Solar Cells

Benjamin Dye, Franklin County High School

Teacher sponsor: Mr. Steve Smith

CEM 10 Synthetic clarinet reeds

Nathan Sprouse, Cave Spring High School

Teacher sponsor: Mr. Steve Smith

COMPUTATIONAL BIOLOGY



CB 1 Analysis of Differential Gene Expression in Blood Samples to Predict Alzheimer's Disease

Maggie Parkhurst, William Byrd High School

Teacher sponsor: Mr. Mark Levy

CB 2 Differential Expression of Genes in Fast and Slow Twitch Muscle Fibers

Lucas Mann, Franklin County High School

Marissa Martin, Northside High School

Teacher sponsor: Mr. Mark Levy

CB 3 Differential Expression of Genes in Preeclampsia and Preterm Birth

Natalie Davis, Franklin County High School

Teacher sponsor: Mr. Mark Levy

CB 4 Examining the Mechanism of PI3K Isoform-Selective Inhibitors for Novel Glioblastoma and Related Cancer Treatments via 3D In-Silico Modeling

Rebecca Qiu, William Byrd High School

Teacher sponsor: Mr. Mark Levy

CB 5 Developing a Program to Identify Targets for RNA Interference while Minimizing Off-Target Effects

Brayden Whitlow, Franklin County High School

Timothy Wilson, James River High School

Teacher sponsor: Mr. Mark Levy

CB 6 Comparing Autism Spectrum Disorder and Borderline Personality Disorder Through Genetic and Epigenetic Factors

Aidan Mayhue, Lord Botetourt High School

Teacher sponsor: Mr. Mark Levy

CB 7 α -gal Syndrome and Identifying Potential Sources of Endogenous α -gal in Tick Genomes

Liam May, Franklin County High School

Teacher sponsor: Mr. Mark Levy

CB 8 Using Differential Gene Expression to Diagnose Stages of Alcoholic Liver Disease

Catherine Chen, Cave Spring High School

Teacher sponsor: Mr. Mark Levy

EARTH AND ENVIRONMENTAL SCIENCES



ES 1 Investigating the Bioethanol Yield of Various Photosynthetic Organisms

Coleman Grindstaff, Franklin County High School

Teacher sponsor: Mr. Steve Smith

ES 2 The Effect of Climate Change Temperatures on *Triticum aestivum* and *Raphanus sativus*

Clara Higgins, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

ES 3 The Effect of Nanoparticle Composition on the Filtration of Heavy Metal Ions from Water

Cole Stelter, Lord Botetourt High School

Teacher sponsor: Mr. Steve Smith

ES 4 The Effect of Olivine Sand on Carbon Capture

Natalie Pham, William Fleming High School

Teacher sponsor: Mrs. Joanne Villers

ES 5 A Comparison of Surface Water Quality Upstream and Downstream of Blacksburg Country Club

William (Maxwell) Stevens, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

ES 6 The Effect of Bioprinted *Chlorella*-based Filtration Systems on Nitrate Concentration in Water

Dhruvi Patel, Glenvar High School

Teacher sponsor: Mr. Steve Smith

ES 7 The Effect of Plastic-Degrading Organisms on Plastics in a Semi-Aquatic Environment

Oliver Luci, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith

ES 8 The Development of an Interactive Urban Planning Tool for Mitigating Heat Islands in Lynchburg, VA

Cynthia Lin, Franklin County High School

Teacher sponsor: Mrs. Joanne Villers

ES 9 The Effect of Various Dyes on the Efficiency of Indium Tin Oxide Solar Cells

Margaret Kauffman, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith

ENGINEERING MECHANICS A



EM-A 1 Using a Robotic Arm to Move and Pour a Beaker

Tai Phan, Northside High School

Riley Wood, Franklin County High School

Teacher sponsor: Mr. Connor Wade

EM-A 2 Walk-Safe Cane 2.0

James (Ford) Beasley, Patrick Henry High School

Declan Morrill, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-A 3 Autonomous Vehicle Seat Presence Sensors

Griffin Kauffman, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

EM-A 4 Using a Robotic Arm to Scoop, Transport and Stir a Substance

Nicholas Louvet, Glenvar High School

Falan Peters, Lord Botetourt High School

Emma Pope, Glenvar High School

Teacher sponsor: Mr. Connor Wade

EM-A 5 HitchMaster

Bakari Deskins, Franklin County High School

Savannah Peters, Franklin County High School

Teacher sponsor: Mr. Drew Hurst

EM-A 6 Using a Robotic Arm to Stack Cups

Shane Cockram, Franklin County High School

Tyler VanDyke, Craig County High School

Teacher sponsor: Mr. Connor Wade

EM-A 7 Robotic Arm Using a Writing Utensil

Parker Chapman, Franklin County High School

Forrest Moorman, Franklin County High School

Teacher sponsor: Mr. Connor Wade

EM-A 8 Motorized Fruit Slicer

Mihir Miller, Salem High School

Erica Blake Sellars, Franklin County High School

Teacher sponsor: Mr. Drew Hurst

EM-A 9 Pet Food Dispenser

Trinity Breedlove, Patrick Henry High School

Roxanne Culley, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-A 10 Robotic Arm to Move Objects in 360° Plane

Samuel Crawford, Patrick Henry High School

Seth Perry, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

ENGINEERING MECHANICS B



EM-B 1 Tennis Ball Collector

Ethan Su, Hidden Valley High School

James Voight, James River High School

Teacher sponsor: Mr. Drew Hurst

EM-B 2 The Use of Robotics to Produce Tea

Tristen (Jack) David, Franklin County High School

Thomas (TJ) Hinson, Salem High School

Krischal Sutar, William Fleming High School

Teacher sponsor: Mr. Connor Wade

EM-B 3 Cabinet Sensor with Phone Alert

Robert Berry, Patrick Henry High School

John Paul (JP) Prusakowski, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-B 4 Basic Electric Automatic Notching System

Paulo Carey, Franklin County High School

Alex Kurtz, Franklin County High School

Teacher sponsor: Mr. Connor Wade

EM-B 5 Remote Exoskeleton Hand

Riley McReynolds, William Fleming High School

Zoie Mills, William Fleming High School

Teacher sponsor: Mr. Drew Hurst

EM-B 6 Robotic Arm Bottle Cap Opener

Titus Counihan, Patrick Henry High School

Alexios (Lex) Stratton, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-B 7 Remote Control Car

Riley VanAken, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-B 8 Remote Controlled Lockbox

Sarah Grace Stanley, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-B 9 Selective Robotic Arm

Chloe DeKorsey, Patrick Henry High School

Faith Kuehl, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-B 10 The Supper Stirrer

David (Chase) Cumins, Patrick Henry High School

Garrett Kelly, Patrick Henry High School

Alexander Martin, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

ENGINEERING MECHANICS C



EM-C 1 Coin Counter and Sorter

Luke Sumner, Franklin County High School

Erika Terry, Staunton River High School

Teacher sponsor: Mr. Connor Wade

EM-C 2 The Rotating Weekly Pill Dispenser 2.0

Sydney Vokus, Lord Botetourt High School

Teacher sponsor: Mr. Drew Hurst

EM-C 3 Sunlight Tracking Device

Tristan Kerr, Patrick Henry High School

Christopher (Durbin) Stevens, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EM-C 4 Robotic Arm with Electromagnet

Nikolai Morgiewicz, Patrick Henry High School

Evan Shifflett, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-C 5 Robotic Arm to Open a Jar

Caroline O'Keeffe, Patrick Henry High School

Elisabeth Tershak, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-C 6 Soil Moisture and Temperature Probe

Ryan (Davis) Cooper, Lord Botetourt High School

Andres Hernandez, Lord Botetourt High School

Teacher sponsor: Mr. Drew Hurst

EM-C 7 Spork Bot

Keaton Lucas, Lord Botetourt High School

Elliott (Ellie) McClung, Lord Botetourt High School

Teacher sponsor: Mr. Connor Wade

EM-C 8 The Use of a Robotic Arm to Putt a Ball

Charles (Bass) Beasley, Jr., Patrick Henry High School

Maximillian Roberson, Patrick Henry High School

Teacher sponsor: Mr. Connor Wade

EM-C 9 Remote Control Car with Arduino
Luke Moon, Patrick Henry High School
Teacher sponsor: Mr. Drew Hurst

EM-C 10 Modular Midi Controller for DAW
Tobias (Toby) Tate, Patrick Henry High School
Teacher sponsor: Mr. Drew Hurst

ENVIRONMENTAL ENGINEERING



EE 1 The Effect of Macronutrients on the Ability of *Bacillus subtilis* to Degrade Petroleum Hydrocarbons

Courtney Monard, Hidden Valley High School

Griffin Yakob, William Byrd High School

Teacher sponsor: Mrs. Joanne Villers

EE 2 The Application of Interpolymer Complex Hydrogels in the Removal of Heavy Metals from Aqueous Solutions

Ainsley Robertson, Cave Spring High School

Teacher sponsor: Mrs. Joanne Villers

EE 3 Nutrient Deficiency Notification Pot System

Merryn Isbell, Patrick Henry High School

Lillian (Libby) Jamison, Patrick Henry High School

Teacher sponsor: Mr. Drew Hurst

EE 4 The Effect of *Aspergillus niger* and *Aspergillus brasiliensis* on the Decomposition Rate of Low-Density Polythene Plastic

Kathryn (Kate) Feldmann, Patrick Henry High School

Penelope Roberts, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

EE 5 The Effect of Filamentous vs. Unicellular Algae on the Removal of Microplastics from Water

Grace Harig, Patrick Henry High School

Kira McGinnis, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

EE 6 A Comparison of Biodegradable Substitutes for Plastic Microbeads in Facial Scrubs

Joseph Beasley, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

EE 7 The Effect of Different Berry Extracts on the Efficiency of a Dye-sensitized Solar Cell

Jeremiah Morgiewicz, Patrick Henry High School

Teacher sponsor: Mr. Steve Smith

EE 8 The Effect of *Lemna minor* on Arsenic Concentration in a Hydroponic System

Vineel Kavuru, Hidden Valley High School

Margaret Laflam, Hidden Valley High School

Teacher sponsor: Mrs. Joanne Villers

EE 9 The Effect of Olivine Content on the Permeability of Concrete

Sydnee Durham, Patrick Henry High School

Ruby Isbell, Patrick Henry High School

Teacher sponsor: Mrs. Joanne Villers

MICROBIOLOGY A



MI-A 1 The Effect of Essential Oil of *Origanum vulgare* on Gram-positive and Gram-negative Bacteria

Kalob Daniels, Lord Botetourt High School

Kane Reczek, Lord Botetourt High School

Teacher sponsor: Ms. Laura Roark

MI-A 2 The Effect of Wasabi Concentrations on Growth of *E. coli* K12

Henry Nguyen, Patrick Henry High School

Isaac Olson, Patrick Henry High School

Teacher sponsor: Ms. Laura Roark

MI-A 3 The Use of a Fluorescent pH-Biosensor to Image Yeast Organelles

Grace Kahoun, Patrick Henry High School

Emma Thielecke, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

MI-A 4 A Comparison of Cinnamon Bark and Cinnamon Leaf Essential Oils on the Growth of *Escherichia coli*

Laila Alam, Lord Botetourt High School

Raimee Sykes, Lord Botetourt High School

Teacher sponsor: Ms. Laura Roark

MI-A 5 The Antibacterial Effects of Copper on *Bacillus subtilis*

Russell (McLure) Bailey, Patrick Henry High School

Ryan Prusakowski, Patrick Henry High School

Teacher sponsor: Ms. Laura Roark

MI-A 6 The Effect of Rotenone, Paraquat, and Malathion on Movement and Neuron Degeneration

Associated with Parkinson's Disease in *Caenorhabditis elegans*

Abigail Hunter, Patrick Henry High School

Olivia Reichardt, Patrick Henry High School

Teacher sponsor: Mr. Brandon Taylor

MI-A 7 The Inhibitory Effects of *Allium cepa* on the Growth of *Escherichia coli* K-12

Michael (Brenden) Hartung, Northside High School

Jacob Stewart, Hidden Valley High School

Teacher sponsor: Ms. Laura Roark

MICROBIOLOGY B



MI-B 1 The Effect of Pomegranate Juice vs. Cranberry Juice on *Staphylococcus epidermidis*

Meera Raichura, William Byrd High School

Diya Reddy, Cave Spring High School

Teacher sponsor: Ms. Laura Roark

MI-B 2 The Synergistic Antibacterial Effect of Frankincense Oil and Myrrh Oil on *E. coli k12*

Divya Bharati, William Fleming High School

Cameron McPhee, William Fleming High School

Teacher sponsor: Ms. Laura Roark

MI-B 3 A Comparison of Antibacterial Effect of Aloe Vera on *E. coli* and *S. epidermidis*

Frances Reddan, Patrick Henry High School

Jordan Wattie-Shear, Patrick Henry High School

Teacher sponsor: Ms. Laura Roark

MI-B 4 Antimicrobial Efficacy of Sodium Fluoride, Zinc Chloride, and Cetylpyridinium Chloride on *Neisseria subflava*

Kiersten Lauer, Northside High School

Teacher sponsor: Mr. Steve Smith

MI-B 5 The Antibacterial Effect of *Thymus capitatus* Essential Oil on *Escherichia coli*

Conlan McNulty, William Fleming High School

Teacher sponsor: Ms. Laura Roark

MI-B 6 A Comparison of Oregano Essential Oil and its Main Component Carvacrol on the Growth of *Staphylococcus Epidermidis*

John Aziz, Patrick Henry High School

John (J.B.) Clements, Patrick Henry High School

Teacher sponsor: Ms. Laura Roark

MI-B 7 The Effect of Environmental Factors on Beta-Carotene Production in Genetically Engineered Yeast

Haley Day, William Byrd High School

Teacher sponsor: Ms. Cindy Bohland

MICROBIOLOGY C



MI-C 1 The Inhibitory Effect of *Allium sativum* on *Escherichia coli* K12

Erica Gergely, Lord Botetourt High School

Hannah Mizuba, Lord Botetourt High School

Teacher sponsor: Ms. Laura Roark

MI-C 2 The Effect of Lemongrass Essential Oil on the Growth of *Escherichia coli* K-12 versus *Bacillus cereus*

Emily Duncan, Lord Botetourt High School

Teacher sponsor: Ms. Laura Roark

MI-C 3 The Inhibiting Effect of Turkish and American Propolis on *Bacillus subtilis*

Su Gursoy, William Fleming High School

Teacher sponsor: Ms. Laura Roark

MI-C 4 The Effect of Different Apple Parts on the Inhibition of *Escherichia coli* K-12

Bailey Barker, Patrick Henry High School

Andrew Michie, Patrick Henry High School

Teacher sponsor: Ms. Laura Roark

MI-C 5 Investigating the Use of Metal Nanoparticles to Create Antimicrobial Bioplastic

Ayden McNulty, William Fleming High School

Teacher sponsor: Mr. Steve Smith

MI-C 6 The Effect of Rosemary on the Growth of *S. epidermidis*

Cora Reid, Staunton River High School

Teacher sponsor: Ms. Laura Roark

PLANT SCIENCES A



PS-A 1 The Allelopathic Effect of Butternut Squash on Germination and Growth of Morning Glory and Sweet Corn

Sharmila Balaji, Cave Spring High School

Meribel Pan, Hidden Valley High School

Teacher sponsor: Mr. Matthew Browning

PS-A 2 The Allelopathic Effect of Juglone on Germination and Growth of Milk Thistle Seeds

Maddox Bary, Glenvar High School

Sean Cady, Craig County High School

Teacher sponsor: Mr. Matthew Browning

PS-A 3 The Effect of Salinity on DNA Methylation in *Arabidopsis*

Mary (Katelyn) Crumpacker, Salem High School

Savannah (Paige) Netting, Salem High School

Teacher sponsor: Ms. Cindy Bohland

PS-A 4 The Allelopathic Effect of Different Pine Trees on The Germination & Growth of Sunflower

Zachary Easter, Salem High School

Austin Frantz, Salem High School

Teacher sponsor: Mr. Matthew Browning

PS-A 5 Effects of Cobalt-60 Radiation and Salinity on the Growth of *Raphanus sativus*

Charlie Comer, Franklin County High School

Teacher sponsor: Mrs. Joanne Villers

PS-A 6 The Allelopathic Effect of Wheat on Germination and Growth of White Clover

William (Alex) Burnette, Hidden Valley High School

Parker Sisk, Hidden Valley High School

Teacher sponsor: Mr. Matthew Browning

PS-A 7 Hydroponic and Atmospheric Exposure of Cladosporium Volatiles on *Raphanus sativus*

Spencer Kearns, Staunton River High School

Teacher sponsor: Mr. Steve Smith

PS-A 8 The Allelopathic Effect of Kentucky Bluegrass on the Germination and Growth of Dandelions

Sallie Boxley, Patrick Henry High School

Dominic LaConte, Patrick Henry High School

Teacher sponsor: Mr. Matthew Browning

PLANT SCIENCES B



PS-B 1 The Allelopathic Effect of Juglone on the Germination and Growth of *C. sativus*
Alexander (Lex) Farmer, Patrick Henry High School
Teacher sponsor: Mr. Matthew Browning

PS-B 2 The Effect of Invasive Species on the Biodiversity of Plants and Soil Microbes
Abby Wyatt, Staunton River High School
Teacher sponsor: Mrs. Joanne Villers

PS-B 3 The Allelopathic Effect of Strawberries on the Germination & Growth of Tomatoes
Esly Cruz-Nolasco, William Fleming High School
Autumn Patterson, William Fleming High School
Teacher sponsor: Mr. Matthew Browning

PS-B 4 The Synergistic Allelopathic Effect of Capsaicin and Gibberellic Acid on the Germination & Growth of *B. oleracea*
Jefferson (Aidan) Callis, Patrick Henry High School
Guillaume Preud'homme, Patrick Henry High School
Teacher sponsor: Mr. Matthew Browning

PS-B 5 The Effect of Different Allelochemicals on Seed Germination
Canaan (Cane) Fetzer, Cave Spring High School
Teacher sponsor: Mr. Steve Smith

PS-B 6 The Allelopathic Effect of *C. juncea* on the Germination & Growth of *T. officinale*
Mitchell Deese, Salem High School
Arden Gardner, Franklin County High School
Teacher sponsor: Mr. Matthew Browning

PS-B 7 The Effect of AtUNC-93 Gene on Abiotic Stress Response in *Arabidopsis thaliana*
Thomas (Trey) Joyce, III, Salem High School
Seth Richards, Lord Botetourt High School
Teacher sponsor: Ms. Cindy Bohland

PS-B 8 The Allelopathic Effect of *E. cinerea* on the Germination & Growth of *A. schoenoprasum*
Katie Coles, Patrick Henry High School
Cara Wardell, Patrick Henry High School
Teacher sponsor: Mr. Matthew Browning

PLANT SCIENCES C



PS-C 1 The Allelopathic Effect of *L. angustifolia* Organs on the Germination & Growth of *S. halpense*

Margaret (Maggie) Jarrett, Patrick Henry High School

Caroline Reichardt, Patrick Henry High School

Teacher sponsor: Mr. Matthew Browning

PS-C 2 Transient Genetic Transformation of a Parasitic Plant Using Nanorods

Katherine Cross, Lord Botetourt High School

Sophia Schumaecker, Cave Spring High School

Teacher sponsor: Mr. Steve Smith

PS-C 3 The Allelopathic Effect of *E. globulus* on Germination & Growth of *L. perenne*

Keely Garri, Franklin County High School

Adison Mayhue, Lord Botetourt High School

Teacher sponsor: Mr. Matthew Browning

PS-C 4 The Allelopathic Effect of *S. oleracea* on the Germination & Growth of *R. sativus*

Makayla Biller, Patrick Henry High School

Teacher sponsor: Mr. Matthew Browning

PS-C 5 The Effect of Coal Ash on Arabidopsis Germination and Development

Jack Ericsson, Patrick Henry High School

Teacher sponsor: Ms. Cindy Bohland

PS-C 6 The Effect of Manuka Oil and Lemongrass Oil on the Germination of *Digitaria sanguinalis*, *Poa pratensis*, and *Festuca arundinacea*

Josephine (Josie) Fraticelli, Glenvar High School

Teacher sponsor: Mrs. Joanne Villers

PS-C 7 The Synergistic Allelopathic Effect of *A. archangelica* and *F. oxysporum* on the Germination & Growth of on *S. lycopersicum*

Kaeli Berry, James River High School

Brett Smith, Lord Botetourt High School

Teacher sponsor: Mr. Matthew Browning

PS-C 8 The Effect of Light Wavelength on Induced Mutations in *Saintpaulia ionantha*

Grace Bowman, Franklin County High School

Teacher sponsor: Mrs. Joanne Villers

SYSTEMS SOFTWARE A



SS-A 1 Demonstrating Machine Learning through the Recognition and Interpretation of Handwriting via Python

Aaron Henion, Cave Spring High School

Teacher sponsor: Mr. Doug Divers

SS-A 2 The Use of Python in Encryption Testing for Cybersecurity

Carter Baka-Collins, James River High School

Teacher sponsor: Mr. Doug Divers

SS-A 3 Scientific Calculator in Python

Darryl Wilson, III, William Fleming High School

Teacher sponsor: Mr. Doug Divers

SS-A 4 Evaluating the Effectiveness of Machine Learning Models for Classifying Handwritten Letters

Andrew Sakamoto, Hidden Valley High School

Matthew Scarlatescu, Hidden Valley High School

Teacher sponsor: Mr. Doug Divers

SS-A 5 Theatrical Performance Accuracy Tool

Silvia Wardell, Patrick Henry High School

Teacher sponsor: Mr. Doug Divers

SS-A 6 Mapping a Century of Major Earthquakes and Tsunamis with Python

Zoe Silva, Staunton River High School

Heidi Thompson, Cave Spring High School

Teacher sponsor: Mr. Doug Divers

SYSTEMS SOFTWARE B



SS-B 1 Creating an Image Search Engine in Python

Zane Ellis, Staunton River High School

Teacher sponsor: Mr. Doug Divers

SS-B 2 Visualizing Exoplanetary Systems Using NASA Archive Data

Charles Meidlinger, Patrick Henry High School

Teacher sponsor: Mr. Doug Divers

SS-B 3 COVID-19 Risk Map and Safety Data in Python

Troy (Andrew) Harmon, Patrick Henry High School

Micah Keyser-Rothgery, Patrick Henry High School

Teacher sponsor: Mr. Doug Divers

SS-B 4 Bias Detector

Riley Kerr, Patrick Henry High School

Teacher sponsor: Mr. Doug Divers

SS-B 5 OmniNet: A Brain-Based General AI System

Carson Ray, Cave Spring High School

Teacher sponsor: Mr. Doug Divers

SS-B 6 Using Trend Data and Scenario-Based Algorithms to Predict Population Change

Daniel Han, Cave Spring High School

Teacher sponsor: Mr. Doug Divers

