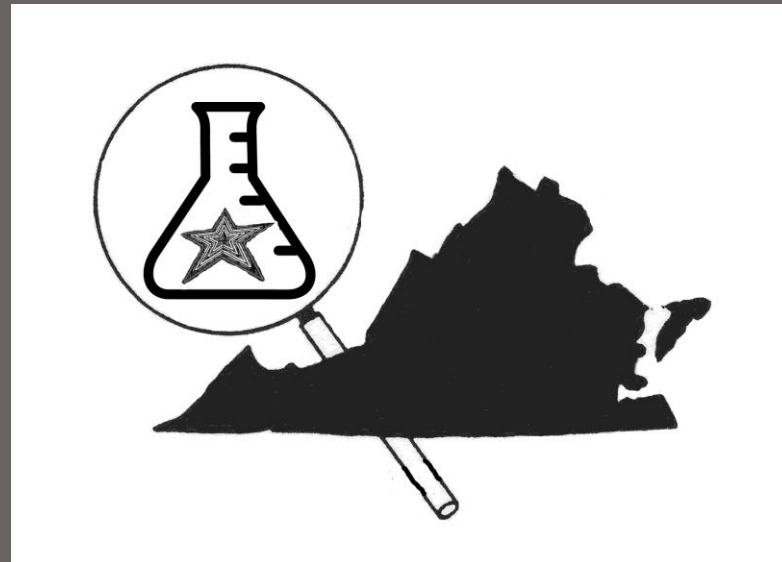


Western Virginia Regional Science Fair Awards



2022

Acknowledgements and Thanks

Participating School Districts and Schools

Roanoke City Public Schools

Roanoke County Public Schools

Roanoke Valley Governor's School

Western Virginia Regional Science and Engineering Fair Host

Virginia Western Community College, Dr. Heather Butler

Regional Fair Planning Committee

Erin Barnett

Roanoke County Public Schools

Tom Fitzpatrick

Roanoke City Public Schools

Mark Levy

Roanoke Valley Governor's School

Acknowledgements and Thanks

Special Thanks

The judges for sharing their time and expertise

The organizations that provided special awards

The students and teachers for working through such difficult conditions this year!

Sponsorships

Fair Sponsor:

AEP Foundation

Additional Sponsors:

RVGS Foundation

Leidos Inc.

Affiliated Fairs

Virginia State Science and Engineering Fair

Hosted by Old Dominion University - April 9

VSSEF will be hosted virtually this year, following ISEF virtual guidelines

Category Award 1st place projects advance to VSSEF (some 2nd place projects may advance if space is available)

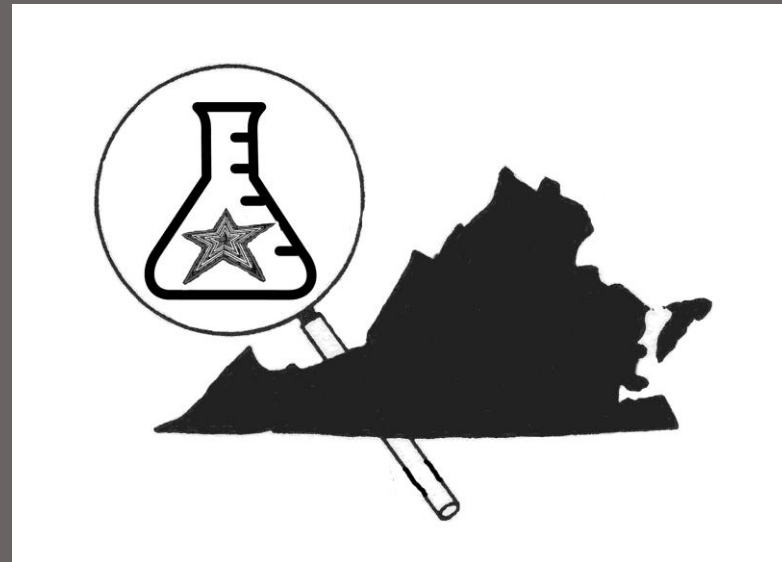
Regeneron International Science and Engineering Fair

ISEF will be held in a hybrid format this year (in-person and online options)

Three Grand Award projects are selected to advance to ISEF

Students advancing to other fairs will receive further information from Mr. Levy. Additional details on the last page of this document.

Special Awards



American Meteorological Society Award

- ES2 The Development of an Interactive Green-Space Planning Tool for Mitigating Heat Islands in Lynchburg, VA
 Cynthia Lin
 RVGS/Franklin County High School
 Teacher Sponsor: Joanne Villers

ASM Materials Education Foundation

- MS5 Synthetic Clarinet Reeds
 Nathan Sprouse
 RVGS/Cave Spring High School
 Teacher Sponsor: Steve Smith

Association for Woman Geoscientists

- ES4 The Effect of Olivine Sand on Carbon Capture
 Natalie Pham
 RVGS/William Fleming High School
 Teacher Sponsor: Joanne Villers

NASA Earth System Science Award

ES4 The Effect of Olivine Sand on Carbon Capture
Natalie Pham
RVGS/William Fleming High School
Teacher Sponsor: Joanne Villers

National Oceanic and Atmospheric Administration (NOAA) Award

ES1 The Effect of Soil Plasticity and Optimum Moisture Content On Unconfined Strength
Andrew Becher
Glenvar High School
Teacher Sponsor: Charlie Filer

Yale Science and Engineering Award

CP3 Effects of Sodium and Potassium Compounds on Explosive Force
Georgia Honts
RVGS/James River High School
Teacher Sponsor: Steve Smith

Ricoh Sustainable Development Award

EE3 Using Food Waste to Produce Starch-Based Bioplastics
Emma Batty
RVGS/Patrick Henry High School
Teacher Sponsor: Joanne Villers

Society for In Vitro Biology

CM3 Circadian Rhythmicity of Cellular Healing
Eleanor Little
RVGS/Patrick Henry High School
Teacher Sponsor: Cynthia Bohland

Regeneron Biomedical Science Award

CM6 A Precision Medicine Approach: In silico Analysis of a Novel Anti-Tumor Peptide
as a Future Targeted Therapy
Rebecca Qiu
RVGS/William Byrd High School
Teacher Sponsor: Mark Levy

Alfred D. Blease Award, Sponsored by VWCC

PS6 Transient Genetic Transformation of *Cuscuta campestris* Using Arginine-functionalized Nanohydroxyapatites as a Plasmid Delivery Vector

Sophia Schumaecker, Katherine Cross

RVGS/Cave Spring HS, RVGS/Lord Botetourt HS

Teacher Sponsor: Steve Smith

Virginia Lakes and Watershed Association Award

EE4 The Effect of *Lemna minor* on Arsenic Concentration in a Hydroponic System

Margaret Laflam, Vineel Kavuru

RVGS/Hidden Valley High School

Teacher Sponsor: Joanne Villers

Mu Alpha Theta Award

SS1 OmniNet: Brain-Based General AI Solutions for Robust Multi-Task Learning

Carson Ray

RVGS/Cave Spring High School

Teacher Sponsor: Douglas Divers

Office of Naval Research Award

- CM6 A Precision Medicine Approach: In silico Analysis of a Novel Anti-Tumor Peptide
as a Future Targeted Therapy
Rebecca Qiu
RVGS/William Byrd High School
Teacher Sponsor: Mark Levy
- BH2 A Novel Glioblastoma Prognostic Assay Using Droplet Digital Polymerase Chain
Reaction
Caroline Grant
RVGS/Hidden Valley High School
Teacher Sponsor: Brandon Taylor
- AS2 Col4: An Indicator of Vascular Formation and Pericyte Recruitment
Abhi Karri
RVGS/Hidden Valley High School
Teacher Sponsor: Brandon Taylor

Western Virginia Water Authority Awards

1st ES3 The Effect of Bioprinted Chlorella-based Filtration Systems on Nitrate Concentration in Water
Dhruvi Patel
RVGS/Glenvar High School Teacher Sponsor: Steve Smith

2nd EE4 The Effect of *Lemna minor* on Arsenic Concentration in a Hydroponic System
Margaret Laflam, Vineel Kavuru
RVGS/Hidden Valley High School Teacher Sponsor: Joanne Villers

American Psychological Association Award

BS4 An Analysis of Adolescents' Social Emotional Wellbeing and School Performance During COVID-19
Virtual Education Transitions
Taylor Frazier
RVGS/Patrick Henry High School
Teacher Sponsor: Melissa Fisher

National Geographic Cultivating Empathy for the Earth

ES3 The Effect of Bioprinted Chlorella-based Filtration Systems on Nitrate Concentration in Water
Dhruvi Patel
RVGS/Glenvar High School
Teacher Sponsor: Steve Smith

U.S. Air Force Award

BS4 An Analysis of Adolescents' Social Emotional Wellbeing and School Performance During COVID-19

Virtual Education Transitions

Taylor Frazier

RVGS/Patrick Henry High School

Teacher Sponsor: Melissa Fisher

CP7 An Analysis of Water Maser Observations Using Next-Generation VLA

Madison Brown

RVGS/Franklin County High School

Teacher Sponsor: Brandon Taylor

EM9 The Rotating Weekly Pill Dispenser 2.0

Sydney Vokus

RVGS/Lord Botetourt High School

Teacher Sponsor: Drew Hurst

American Water Works Association Awards

1st ES3 The Effect of Bioprinted Chlorella-based Filtration Systems on Nitrate Concentration in Water
Dhruvi Patel
RVGS/Glenvar High School
Teacher Sponsor: Steve Smith

2nd EE4 The Effect of *Lemna minor* on Arsenic Concentration in a Hydroponic System
Margaret Laflam, Vineel Kavuru
RVGS/Hidden Valley High School
Teacher Sponsor: Joanne Villers

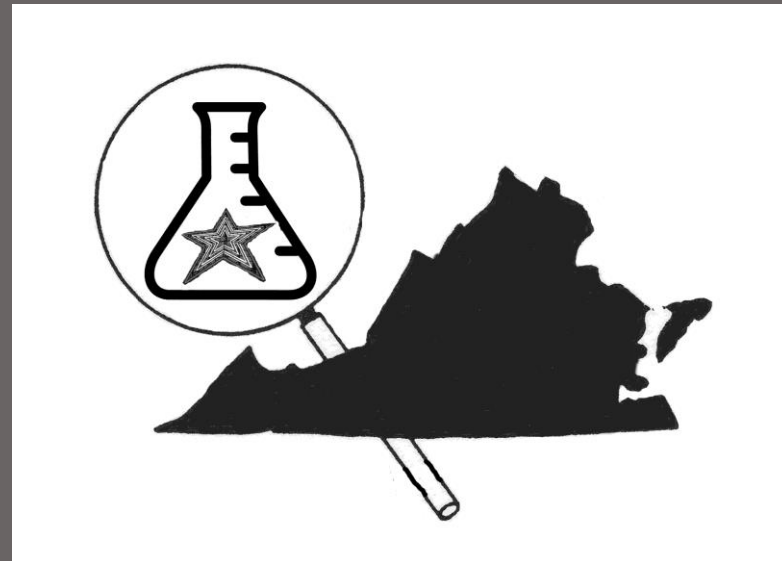
Virginia Water Environment Association/ Junior Stockholm Water Prize

ES3 The Effect of Bioprinted Chlorella-based Filtration Systems on Nitrate Concentration in Water
Dhruvi Patel
RVGS/Glenvar High School
Teacher Sponsor: Steve Smith

Virginia Western Community Scholarship (30 Credits)

- CM6 A Precision Medicine Approach: In silico Analysis of a Novel Anti-Tumor Peptide as a Future Targeted Therapy
Rebecca Qiu
RVGS/William Byrd High School
Teacher Sponsor: Mark Levy
- BH2 A Novel Glioblastoma Prognostic Assay Using Droplet Digital Polymerase Chain Reaction
Caroline Grant
RVGS/Hidden Valley High School
Teacher Sponsor: Brandon Taylor

Category Awards



Animal Sciences

3rd Place

AS5 The Effect of *Capsicum annuum* on the Heart Rate of
Daphnia magna

Laon Sung, Seijin Campbell
RVGS/Franklin County High School
Teacher Sponsor: Donald Wages

2nd Place

AS8 Effect of Caffeine and *Mucuna pruriens* on Regeneration of *Dugesia tigrina*

Shreya Madan
Hidden Valley High School
Teacher Sponsor: Sandra Reedy

1st Place

AS2 Col4: An Indicator of Vascular Formation and Pericyte Recruitment

Abhi Karri
RVGS/Hidden Valley High School
Teacher Sponsor: Brandon Taylor

Biomedical and Health Sciences

3rd Place BH5 Measuring the Thermic Effect of Food in Metabolic Studies

Reese Robers

RVGS/Patrick Henry High School

Teacher Sponsor: Melissa Fisher

2nd Place BH3 The Effect of RNA Interference on the Apoptosis of Small Cell Lung Carcinoma

Ella Bryant, Christina Okenquist

RVGS/Northside High School

Teacher Sponsor: Cynthia Bohland

1st Place BH2 A Novel Glioblastoma Prognostic Assay Using Droplet Digital Polymerase Chain Reaction

Caroline Grant

RVGS/Hidden Valley High School

Teacher Sponsor: Brandon Taylor

Behavioral and Social Science

3rd Place BS3 The Impact of Age and Generosity in Relation to COVID-19 Risk Perceptions and Behaviors
Rachel Baffoe-Bonnie
Cave Spring High School
Teacher Sponsor: Margaret Taylor

2nd Place BS2 Examining Delay Discounting in Individuals Recovering from Substance Addiction
Michelle Zheng
RVGS/Cave Spring High School
Teacher Sponsor: Melissa Fisher

1st Place BS4 An Analysis of Adolescents' Social Emotional Wellbeing and School Performance
During COVID-19 Virtual Education Transitions
Taylor Frazier
RVGS/Patrick Henry High School
Teacher Sponsor: Melissa Fisher

Cellular & Molecular Biology / Computational Biology

- 3rd Place (tie) CM1 Novel Peptide Drug Limitation of Vascular Smooth Muscle Cell Proliferation in Neointima Formation
Alicia Carvalho
RVGS/Cave Spring High School
Teacher Sponsor: Brandon Taylor
- CM5 Analysis of Differential Gene Expression in Blood Samples to Predict Alzheimer's Disease
Maggie Parkhurst
RVGS/William Byrd High School
Teacher Sponsor: Mark Levy
- 2nd Place CM3 Circadian Rhythmicity of Cellular Healing
Eleanor Little
RVGS/Patrick Henry High School
Teacher Sponsor: Cynthia Bohland
- 1st Place CM6 A Precision Medicine Approach: In silico Analysis of a Novel Anti-Tumor Peptide as a Future Targeted Therapy
Rebecca Qiu
RVGS/William Byrd High School
Teacher Sponsor: Mark Levy

Chemistry / Physics

3rd Place CP8 The effect of parachute shape on velocity

Noah Harris

William Fleming High School

Teacher Sponsor: Chris Barnes

2nd Place CP2 Determination of Optimal Voltage in the Production of Hydrogen Gas Through the Electrolysis of Water

Elliott Gaines, Dexter Gaines, Wyatte Bailey

William Byrd High School

Teacher Sponsor: Melissa Carr

1st Place CP3 Effects of Sodium and Potassium Compounds on Explosive Force

Georgia Honts

RVGS/James River High School

Teacher Sponsor: Steve Smith

(tie)

CP7 An Analysis of Water Maser Observations Using Next-Generation VLA

Madison Brown

RVGS/Franklin County High School

Teacher Sponsor: Brandon Taylor

Environmental Engineering

3rd Place

EE6 Nutrient Deficiency Notification Potted Plant System

Merryn Isbell, Lillian Jamison

RVGS/Patrick Henry High School

Teacher Sponsor: Drew Hurst

2nd Place

EE3 Using Food Waste to Produce Starch-Based Bioplastics

Emma Batty

RVGS/Patrick Henry High School

Teacher Sponsor: Joanne Villers

1st Place

EE2 Sonic Fire Extinguisher

Charlie Horrell, Braydon Claud

Glenvar High School

Teacher Sponsor: Jennifer Crozier

Engineering Mechanics

- 3rd Place (tie) EM6 The HitchMaster
Savannah Peters, Bakari Deskins
RVGS/Franklin County High School Teacher Sponsor: Drew Hurst
- EM7 Modular Midi Controller for DAW
Toby Tate
RVGS/Patrick Henry High School Teacher Sponsor: Drew Hurst
- 2nd Place EM3 Tennis Ball Collector
Ethan Su, James Voight
RVGS/Hidden Valley HS, RVGS/James River HS Teacher Sponsor: Drew Hurst
- 1st Place (tie) EM9 The Rotating Weekly Pill Dispenser 2.0
Sydney Vokus
RVGS/Lord Botetourt High School Teacher Sponsor: Drew Hurst
- EM2 MVES Facilities Assistance Technology
Emiliano Gonzalez, Summer Smith, Lucy Pendleton
Burton Center for Arts and Technology Teacher Sponsor: Susheela Shanta

Earth & Environmental Sciences / Materials Science

3rd Place

ES6 Effect of Different Dyes on the Efficiency of Dye-Sensitized Solar Cells

Benjamin Dye

RVGS/Franklin County High School

Teacher Sponsor: Steve Smith

2nd Place

MS4 The Effect of Tension and Compression on Various Different Types of Wood

Miles Morton

Hidden Valley High School

Teacher Sponsor: Kristol Blankenship

1st Place

ES3 The Effect of Bioprinted Chlorella-based Filtration Systems on Nitrate Concentration in Water

Dhruvi Patel

RVGS/Glenvar High School

Teacher Sponsor: Steve Smith

Microbiology

- 3rd Place MI7 A Comparison of Cinnamon Bark and Cinnamon Leaf Essential Oils on the Growth of *Escherichia coli* k-12
Laila Alam, Raimee Sykes
RVGS/Lord Botetourt High School
Teacher Sponsor: Laura Roark
- 2nd Place MI1 The antibacterial effects of honey
Avery Flynn
Glenvar High School
Teacher Sponsor: Karen Hicks
- 1st Place
(tie) MI2 Investigating the Use of Metal Nanoparticles to Create Antimicrobial Bioplastic
Ayden McNulty
RVGS/William Fleming High School
Teacher Sponsor: Steve Smith
- MI4A Comparison of Oregano Essential Oil and its Main Component Carvacrol on the Growth of *Staphylococcus epidermidis*.
JB Clements, John Aziz
RVGS/Patrick Henry High School
Teacher Sponsor: Laura Roark

Plant Sciences

3rd Place

PS5 The Role of Arabidopsis AtUNC-93 on the Regulation of Abiotic Stress Tolerance

Seth Richards, Thomas Joyce

RVGS/Lord Botetourt HS, RVGS/Salem HS

Teacher Sponsor: Cynthia Bohland

2nd Place

PS1 The Synergistic Allelopathic Effect of *A. archangelica* and *F. oxysporum* on the Germination & Growth of on *S. lycopersicum*

Brett Smith, Kaeli Berry

RVGS/Lord Botetourt HS, RVGS/James River HS

Teacher Sponsor: Matthew Browning

1st Place

PS6 Transient Genetic Transformation of *Cuscuta campestris* Using Arginine-functionalized Nanohydroxyapatites as a Plasmid Delivery Vector

Sophia Schumaecker, Katherine Cross

RVGS/Cave Spring HS, RVGS/Lord Botetourt HS

Teacher Sponsor: Steve Smith

Systems Software

3rd Place

SS2 Use of Python In Encryption Testing For Cybersecurity

Carter Baka-Collins

RVGS/James River High School

Teacher Sponsor: Douglas Divers

2nd Place

SS3 Visualizing Exoplanetary Systems Using NASA Archive Data

Charles Meidlinger

RVGS/Patrick Henry High School

Teacher Sponsor: Douglas Divers

1st Place

SS1 OmniNet: Brain-Based General AI Solutions for Robust Multi-Task Learning

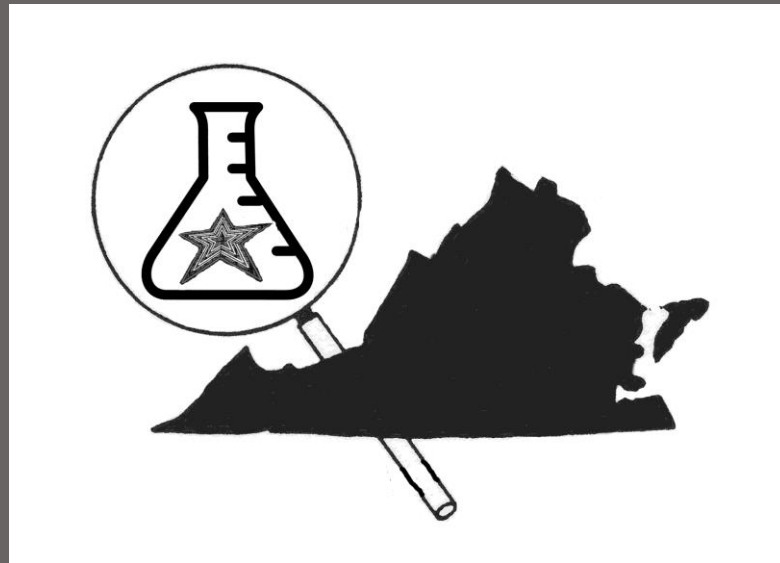
Carson Ray

RVGS/Cave Spring High School

Teacher Sponsor: Douglas Divers

Grand Awards & State Fair Advancement

Advancing students need to review information on final page of this document



Alternate Grand Award Winners

These projects may serve as an alternate to attend ISEF if one of the Grand Award projects isn't able to attend.

Dhruvi Patel

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

RVGS/Glenvar High School

Teacher Sponsor: Steve Smith

Sophia Schumaecker and Kathine Cross

Transient Genetic Transformation of *Cuscuta campestris* Using Arginine-functionalized Nanohydroxyapatites as a Plasmid Delivery Vector

RVGS/Cave Spring HS, RVGS/Lord Botetourt HS

Teacher Sponsor: Steve Smith

Taylor Frazier

BS4 An Analysis of Adolescents' Social Emotional Wellbeing and School Performance During COVID-19

Virtual Education Transitions

RVGS/Patrick Henry High School

Teacher Sponsor: Melissa Fisher

Grand Award Winners

These projects qualify for the International Science and Engineering Fair

Rebecca Qiu

A Precision Medicine Approach: In silico Analysis of a Novel Anti-Tumor Peptide as a Future Targeted Therapy

RVGS/William Byrd High School

Teacher Sponsor: Mark Levy

Caroline Grant

A Novel Glioblastoma Prognostic Assay Using Droplet Digital Polymerase Chain Reaction

RVGS/Hidden Valley High School

Teacher Sponsor: Brandon Taylor

Abhi Karri

Col4: An Indicator of Vascular Formation and Pericyte Recruitment

RVGS/Hidden Valley High School

Teacher Sponsor: Brandon Taylor

Virginia State Science and Engineering Fair (VSSEF advancement)

All 1st place projects are eligible to advance to VSSEF.

2nd place projects from *categories without a tie for 1st place* may also advance to VSSEF if space is available.

A full list of VSSEF advancing projects will be available in the future.

Congratulations to the Award Winners!

Awards and certificates will be distributed to students in school over the next two weeks. Some awards include a cash prize and require student action to receive the award – students are responsible for reading and acting on all directions provided with the awards documentation.

Projects advancing to VSSEF and/or ISEF: Contact Mr. Levy (mlevy@rvgs.k12.va.us) immediately to confirm if you can attend. Consult the “Affiliated Fairs” page near the beginning of this document for dates of these events. Additional information will be provided in the next few days via email.