

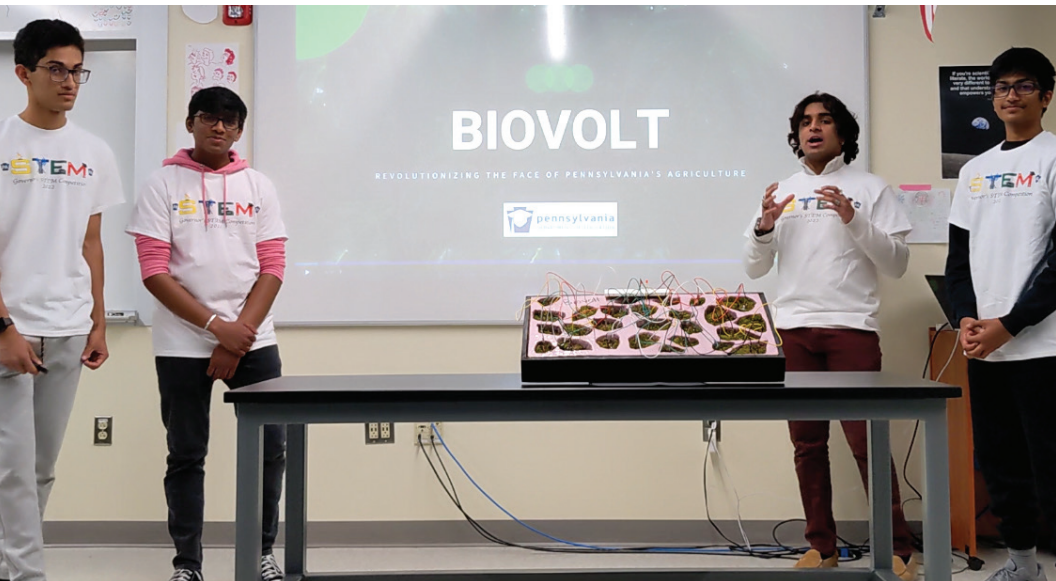
The Governor's STEM Competition 2023



April 2023



The Governor's STEM Competition 2022 Division 1 Grand Champions – Bishop Shanahan High School
Team Members: Catherine Flick, Gabriel Nichols, Brendan Pappas,
Evelyn Snyder, and James Spaulding



The Governor's STEM Competition 2022 Division 2 Grand Champions – Downtown STEM Academy
Team Members: Ayush Karkare, Sidanth Menon, Aneesh Raparla, and Hitaesh Saravanasajan

The Pennsylvania Department of Education (PDE) defines STEM (science, technology, engineering, and math) as an integrated, interdisciplinary, and student-centered approach to learning that encourages curiosity, creativity, artistic expression, collaboration, computational thinking, communication, problem solving, critical thinking, and design thinking.

The top placing teams from last year's 2022 Governor's STEM Competition were:

Division 1

- Grand Champion: Bishop Shanahan High School
- 1st Runner Up: Fox Chapel Area High School
- 2nd Runner Up: Conestoga High School
- 3rd Runner Up: Wyoming Area Secondary Center

Division 2

- Grand Champion: Downingtown STEM Academy
- 1st Runner Up: Haverford High School
- 2nd Runner Up: The Technical College High School at Pennock's Bridge
- 3rd Runner Up: Lower Dauphin High School

The following teams received the environmental impact awards:

Division 1

- Medical - Fox Chapel Area High School
- Sustainability - Wilson High School
- Survivability - Bishop Shanahan High School

Division 2

- Medical - Haverford High School
- Sustainability - Downingtown Area STEM
- Survivability - Fort LeBoeuf High School

The Governor's STEM Competition 2023

The Governor's STEM Competition challenges student teams from across the state to research, design, and present a device or project.

Teams were required to partner with a member of their local community, business, or educational entity to develop a solution to a real problem rooted in the commonwealth. This helps create an authentic experience for the students and provides opportunities for them to learn more about career pathways and employment possibilities based in STEM.

The competition was open to students in grades 9 through 12 who attend a public, charter, or private school, a career and technical education center, or a student being homeschooled in Pennsylvania.

There was no regional qualifying competition this school year. There was one competition (the state competition) held in April 2023.

- Division 1: Those who have a majority of team members who have competed in the STATE COMPETITION in the last 5 years
- Division 2: Those who have a majority of team members who have NOT competed in the STATE COMPETITION in the last 5 years

Identical awards were presented in each division.

	Division 1 (Returning Team)
	Division 2 (New Team)

Teams Participating in the Governor's STEM Competition 2023

IU	School Name	School District Name	Advisor	Secondary Advisor
1	Bethlehem-Center High School	Bethlehem Center School District	Dawn Logan	
1	Canon-McMillan High School	Canon-McMillan School District	Cyndy Carroll	
1	Ringgold High School	Ringgold School District	Mandy Lutska	
1	Ringgold High School	Ringgold School District	Matthew Egizio	
3	Fox Chapel Area High School	Fox Chapel Area School District	Lisa Gibson	
3	Highlands High School	Highlands School District	Catherine Stack	
3	Mon Valley School	Allegheny Intermediate Unit	Beth Whitney	Robert DeFillippo
3	South Fayette High School	South Fayette Township School District	James Hausman III	
3	South Park High School	South Park School District	Eric Wisler	
4	Neshannock Jr./Sr. High School	Neshannock Township School District	Gregg Micsky	
6	Clarion-Limestone Area High School	Clarion-Limestone Area School District	Jessica Craig	
6	Venango Catholic High School	Venango Region Catholic Schools	Jessie Pyle	
7	Derry Area High School	Derry Area School District	Jennifer Welty	
8	Central Cambria High School	Central Cambria School District	Brandon Manack	Heather Niebauer
8	Chestnut Ridge High School	Chestnut Ridge School District	Keith Fleegle	
8	Hollidaysburg Area Senior High School	Hollidaysburg Area School District	Benjamin Fogle	
9	Coudersport Jr./Sr. High School	Coudersport Area School District	Laura Bryant	

	IU	School Name	School District Name	Advisor	Secondary Advisor
	10	Central Mountain High School	Keystone Central School District	Marcie Walizer	
	11	Southern Huntingdon County High School	Southern Huntingdon County School District	Nicolee Christophel	
	12	Waynesboro Area High School	Waynesboro Area School District	Stacey Sawicki	
	12	York County School of Technology	York County School of Technology	Robert Sealover	
	13	Fairland at the Central Education Center	Lancaster-Lebanon IU13	Derick Tilburg	Andrea Fellows
	13	Solanco High School	Solanco School District	Caley Roark	
	14	Boyertown Area High School	Boyertown Area School District	Joshua Pennington	
	14	Exeter Township Senior High	Exeter Township School District	Zach Potter	
	14	Oley Valley High School	Oley Valley School District	Jenn Hoffman	Angela Marino
	14	Reading Senior High School	Reading School District	Joseph S. Andrieux	
	14	Wilson High School	Wilson School District	Beth Levan	
	14	Wyomissing Area Jr./Sr. High School	Wyomissing Area School District	Dr. Brian Liskey	
	15	Carlisle High School	Carlisle Area School District	Matthew Freeman	
	15	Lower Dauphin High School	Lower Dauphin School District	Elizabeth Kirman	
	15	Shippensburg Area High School	Shippensburg Area School District	Myllinda Fowler	
	15	The Pennsylvania Cyber Charter School	The Pennsylvania Cyber Charter School	Thomas Brambley	Jolene Frazell
	16	Berwick Area High School	Berwick Area School District	Todd Gunther	
	16	Berwick Area High School	Berwick Area School District	Matt Shrader	
	16	Mid-West High School	Mid-West School District	Matthew Dietz	Kathy Shellenberger
	16	Shamokin Area Middle-High School	Shamokin Area School District	Laura Suchanick	

	IU	School Name	School District Name	Advisor	Secondary Advisor
	18	Wilkes-Barre Area STEM Academy	Wilkes-Barre Area School District	Keith Eberts	Michael Shimko
	18	Wyoming Area Secondary Center	Wyoming Area School District	Trudy Chapple McAndrew	
	19	Forest City Regional High School	Forest City Regional School District	William Graziano	
	19	Valley View High School	Valley View School District	Brandon Dodson	
	20	Delaware Valley High School	Delaware Valley School District	Robert Curtis	
	20	East Stroudsburg High School North	East Stroudsburg Area School District	Jacqueline Edelbaum	Katherine Nute
	21	Parkland High School	Parkland School District	David Wacker	
	21	Whitehall High School	Whitehall-Coplay School District	Justin Boardl	
	22	Council Rock High School South	Council Rock School District	Jhon Lyzinski	
	22	Pennridge High School	Pennridge School District	Melissa O'Brien	Jim Rutkowski
	23	Hatboro-Horsham High School	Hatboro-Horsham School District	Derek Fromal	
	23	Lower Moreland High School	Lower Moreland Township School District	Nick Solomon	
	23	Merion Mercy Academy	Merion Mercy Academy	Benjamin York	
	23	Pottstown High School	Pottstown School District	Andrew Bachman	
	23	Spring-Ford Area Senior High School	Spring-Ford Area School District	Gabrielle Procario	
	24	Bishop Shanahan High School	Archdiocese of Philadelphia	Dr. John Janasik	Mark Mykytiuch
	24	Conestoga High School	Tredyffrin Easttown School District	Edward Sharick	
	24	Downingtown STEM Academy	Downingtown Area School District	Eric Brown	
	24	Renaissance Academy Charter School	Renaissance Academy Charter School	Raphael Molina	Molly Holden
	25	Garnet Valley High School	Garnet Valley School District	Paul Kazanjian	

	IU	School Name	School District Name	Advisor	Secondary Advisor
	25	Marple Newtown High School	Marple Newtown School District	Caitlin Kohout	
	25	Penn Wood High School	William Penn School District	Benny Joseph	Susan Norton
	26	Philadelphia Academy Charter High School	Philadelphia Academy Charter Schools	Robert Mottershead	Megan Simmons
	29	Blue Mountain High School	Blue Mountain School District	Randy Metzger	
	29	North Schuylkill Jr./Sr. High School	North Schuylkill School District	Gene Lapointe	

	Division 1 (Returning Team)
	Division 2 (New Team)

Project Descriptions



IU1

Bethlehem-Center High School

The purpose of a Hydroelectric Utility Generator (HUG) is to promote sustainable energy through household water consumption. We hope that while it will not replace the entire electrical system, it can create a source of renewable energy to, for example, charge your phone while you take a shower.

Canon-McMillan High School

Winter often brings dangerous driving conditions for our fellow Pennsylvanians. We created a working road model that would use electricity sent via the rebar in the asphalt, which could be generated with photovoltaic cells, or wind from the passing vehicles. We believe that heating roads in icy/snowy conditions will make Pennsylvania's roads safer for travel.

Ringold High School

This project is an "elevated greenhouse" that can take in excess carbon dioxide to grow crops for the less fortunate. Ideally this "elevated greenhouse" can be placed over smokestacks, fireplaces, and many more producers of carbon dioxide.

Ringold High School

To continue the advancement of drug production, our project uses a new method of collecting snake venom to be used in medicine to treat diseases. Our project provides a safer and more efficient way of collecting venom which protects the snake and the handler by essentially creating a "hands free" project to collect the toxin.

IU3



Fox Chapel Area High School

The Turbo is a device that addresses the needs of communities that experience contaminated water. The Turbo is able to check for: turbidity; informs the public on their quality of water; and allows for communities to keep one another safe by providing an easy method of reporting water contamination.

Highlands High School

Does your pizza recycle water? Ours does. Our Simply Sustainable collection system efficiently collects and filters rainwater while simultaneously growing delicious pizza ingredients on top. Our innovation is practical, mobile, and autonomous, making it the perfect tool for Pennsylvanian community gardens without access to clean water.

Mon Valley School

A smart watch alerts a student when their body is showing signs of stress and suggests an intervention for them to use to return to calm. The watch will also notify the teacher in the room that the student is beginning to experience signs of stress.

South Fayette High School

Smart Stride uses artificial intelligence (AI) and machine learning to anticipate and prevent foot drop in users with multiple sclerosis. Smart Stride's AI analyzes a variety of stimuli such as heart rate, humidity, and temperature to accurately predict and prevent foot drop. When a potential risk is detected, Smart Stride delivers an electrical stimulus to the peroneal nerve to correct the dropped foot, preventing the fall and potential injury.

South Park High School

The PDCPI (Portable DC Power Inverter) allows contractors to work in the field without using a generator. Day-to-day generators are inconvenient due to their dependence on fossil fuels, which release harmful chemicals into the atmosphere and are too heavy to easily maneuver around a job site. Our battery-powered inverter solves all of these problems while having the capability to run heavy equipment that standard batteries cannot power.

IU4



Midwestern Intermediate Unit IV
Making a Difference in Education

Neshannock Jr/Sr High School

The MZM Bot is a robot kit that is designed to help both students and teachers across Pennsylvania's schools. For students, it is a learning tool to help students learn about autonomous vehicles and engineering through design and programming. Once the students complete the robot, the MZM Bot is a tool for teachers to transport papers to and from their classroom without having to leave the classroom. The MZM Bot utilizes a lidar unit to help navigate school hallways autonomously.

IU6



Clarion-Limestone Area High School

A "Community of Opportunity" utilizes Hydrothermal Oxidation to lower the cost of living in low income and poverty stricken communities. This method uses 3D printed homes and the idea of Hydrothermal Oxidation to decrease electric and sewage costs in the community while generating 50 mega watts of electricity each day from this process. Both of these ideas combined decrease the cost of living for communities that cannot afford the basic necessities of life and allow them to live comfortably in a home equipped with the basic needs essential for survival.

Venango Catholic High School

Our team designed a roadside trash collector. The operator can easily push the machine along a roadway and it will pick up trash and deposit it into a connected garbage bag.

IU7

Derry Area High School

The TopperDropper focuses on the promotion of sustainable resource usage while maintaining a positive relationship with food in school-aged children and beyond. A new kind of salad-bar container makes the distribution of salad food more sanitary with equal, appropriate portions. The product is dishwasher safe and is sanitized by using ultraviolet lights after each use. It allows food to be dispensed in a sanitary manner, preventing allergens and cross-contamination. It also reduces the amount of food wasted because each portion is based on the recommendation for the given demographic, varying from elementary-aged children to full-grown adults.



IU8

Central Cambria High School

The Wavecatcher is a long, tube-like device split into buoy segments and a power conversion module designed to float on top of bodies of water. As waves, both naturally or wake-generated, occur, the kinetic energy causes segments to oscillate, pulling a bike chain wrapped around a sprocket to generate green electricity. The device both recycles energy spent by commercial water traffic and converts natural water movements into electricity.



Chestnut Ridge High School

The hand sanitizer and rag holder is the perfect addition to any gym or fitness center. With a sleek and durable design, it can be easily mounted on any piece of equipment to provide a convenient and accessible place for gym-goers to sanitize and clean their equipment.

Hollidaysburg Area Senior High School

Tiger Trash is a smart garbage can that is focused on trash collection for rural, suburban, and urban townships and municipalities. An ultrasonic sensor will send a signal when the trash can is full in order to prevent excess littering. It would help waste management companies manage effective garbage collection, their routing, and help in reducing carbon emissions.

IU9

Coudersport JR/SR High School

The AnimalTrac app was created to send a notification to drivers warning them about deer, other wildlife activity, and general obstructions on and around our roadways, in the hope to help lower the chances of animal-related accidents. The app will work by using a Geofence to help notify people in a general area by displaying alerts that are sent by drivers who have spotted animals or obstructions in a specific location.



IU10



Central Mountain High School

The project is designed to get rid of the infestation of spongy moths in Central Pennsylvania. It uses ultraviolet light to spread pheromones that attract the moths, then an electrical box around the trap is what kills the moths.

IU11



Southern Huntingdon County High School

Colifree is a rapid test kit that detects if coliform is present in a body of water.

IU12



Waynesboro Area Senior High School

Emolument is a free, computer-based program that analyzes multiple pieces of stock data and outputs the best performing stocks by name and number. The higher the number, the better the investment. The goal is to make investing simple for those who have no financial background and little money to save, so they can invest on their own and not need assistance from the state once they retire.

York County School of Technology

Our group decided to focus on the homeless population of Pennsylvania. We created a portable shelter that can be distributed to those turned away from a shelter due to a lack of space, beds, supplies, etc.

IU13



Fairland at the Central Education Center

Our team brainstormed innovative ideas to help address the shortage of commercial truck parking and amenities along major interstate corridors in Pennsylvania. Trucks parking on highway shoulders and ramps is common during overnight hours because the federal government has mandated timed breaks and presents a significant safety issue. The students developed an application (app) that makes finding truck parking/amenities easier which helps truck drivers across the state.

Solanco High School

The Bat Defender is a self-powered device intended to be placed near highways to prevent bats from feeding near these dangerous areas.

Boyertown Area High School

Our project, to aide in the innovation for the commonwealth, is the development of local radiation sensors. These are sensors that work to search for the presence of heavily radioactive materials to prevent small scale nuclear terror attacks.

Exeter Township Senior High

Our team partnered with the US Army Corps of Engineers and the Blue Marsh Lake Recreation Area to help combat the impacts of harmful algal blooms (HABs) on Blue Marsh Lake. The team developed an ROV to assist the park rangers at Blue Marsh Lake in the water quality testing procedure that is part of their HABs management plan. The ROV is capable of being controlled remotely and can collect samples at different depths from the swim beach of the lake to be tested for harmful toxins, as well as be used to collect samples in remote areas of the lake.

Oley Valley High School

A gardening tool to decrease the number of required tools for each step of gardening. Our tool is size adjustable for making different sized holes in the ground while piercing through any landscaping fabric.

Reading Senior High School

The Team's project is based on a new fictional/oval-shaped action character named Atom, that brings joy to young elementary school students while teaching them how to plant vegetation and or flowers. Atom is produced using a 3D printer to absorb water and allow sunlight to encourage growth inside its container. With soil and other fertilizers inside, students can watch it grow while protecting it from the harsh environment.

Wilson High School

Using LED lights attached to a metal frame, our team created an extension for the stop sign on the side of a school bus that aims to get the attention of distracted drivers before they fail to stop when a bus is loading or unloading students. The LED lights can be coded to flash more intensely when a moving vehicle is detected within the range of the school bus. The goal of our project is to help keep students safe and prevent unfortunate injuries or deaths.

Wyomissing Area Jr./Sr. High School

The Team created a full-scale feasibility study on using solar energy to power our school district. By analyzing many different types of solar technologies, and with the assistance of GreenWorks Energy Group, we evaluated how our school could convert to solar energy and stop the burning of oil and natural gas for our electricity.

IU15



Carlisle High School

Our project focuses on small stream cleanup. The prototype uses compressed air to create a bubble barrier along with stream current to catch trash/debris and direct it to a collection bin on the bank.

Lower Dauphin High School

VenDonation is a food vending machine hub that works flawlessly with the VendConnect app. Developed to address food insecurity in Pennsylvania, enDonation is a machine that allows for food sharing within the community 24 hours per day, 7 days per week, and 365 days per year. The machines look like an Amazon Hub locker but are so much more when partnered with the VendConnect app. The VendConnect app bridges the gap between VenDonation machines and the community. Think of VendConnect like Instacart or DoorDash but connect people living in food insecurity areas.

Shippensburg Area High School

This team has devoted itself to improving Pennsylvania's renewable energy via hydroelectric dams that don't harm the environment. Dams create a build-up of silt that can harm the area around the river and the wildlife in it. The main concern are the toxic minerals (nitrogen and phosphorus) that build up within the silt. Our solution is an underwater robot that can travel in waterways around dams and scoop up and remove silt from the surface.

The Pennsylvania Cyber Charter School

Pennsylvania has one of the highest rates of deer/vehicle collisions in the country. Students at PA Cyber have created a device to deter deer from the roadway using ultrasonic frequencies with the hopes of saving Pennsylvanians millions of dollars and eliminating any unnecessary loss of life.

IU16



Berwick Area Senior High School

Wastewater treatment systems and their individual pumping stations are vital to protect our environment. Their operation is vulnerable to storm-caused electrical outages, leading to the risk of sewage overflows. Our project is to design a system to automatically drain down a network of pumping stations efficiently when a storm warning is given.

Berwick Area Senior High School

Our Team worked closely with Martz Technologies and the Berwick Area Joint Sewer Authority to develop plans to implement a water wheel power generator to net meter electricity for the wastewater treatment plant. We created a model water wheel to do a feasibility study to measure possible efficiency and power generated by the outflow of

treated water being returned to the Susquehanna River using a water wheel geared with an electric generator.

Mid-West High School

Pennsylvania's winter weather is a challenge. Our BEST system automatically distributes a brine solution onto the roadways when dangerous conditions exist. Our system will save both money and lives.

Shamokin Area Middle High School

To bridge the gap between the community and youth, an electronic bulletin board powered by Raspberry Pi will be created to display community events, initiatives, and announcements in the school's main lobby. A partnership with numerous community organizations, along with the Environmental Protection Agency and the Rebuilding Our Community initiative, will provide the means for communication between youth and the community.

IU18



Wilkes-Barre Area STEM Academy

Our team created a mobile digital wildlife filming station which can be deployed in almost any wildlife location including high in tree-tops, in caves, in open fields and deep forests. After initial installation, all data can be collected without disturbing the wildlife and without the need of Wi-Fi signals.

Wyoming Area Secondary Center

Solar Quest is a solar-powered GPS system to provide directions to hikers through Navit which will ultimately lessen the total amount of people who lose their way when hiking. This device does not need the internet to run and utilizes renewable energy, allowing its use anytime and anywhere.

IU19



Forest City Regional High School

The Helping Hands project was created with the intent of providing assistance for those with limited hand use while using eating utensils. While other solutions exist, team members sought to create a device that would be economical and easily adaptable, making it possible for users to fit the device to a variety of eating utensils.

Valley View High School

Our device will allow first responders to assess the status of multiple classrooms quickly and efficiently during an active shooter or other emergency. The device allows teachers to set the status of their room as either occupied/unoccupied, secure/unsecure and injuries/no injuries. This status is relayed immediately to a central control panel that will illuminate accordingly to provide information to anyone viewing the control panel.

IU20



Delaware Valley High School

Our team designed and developed a prototype of an advanced home security system that will automatically secure points of entry into the home from intruders. The system will close doors and windows if movement is detected within a certain distance of the home.

East Stroudsburg High School North

The team created an independent drinking device for a student with cerebral palsy (CP). His CP is equivalent to someone with quadriplegia and the drinking device uses his head to activate a servo to spin a straw towards him and then retreat after five seconds.

IU21

Parkland High School

The Root Rescuer is a device used to implement a new planting process to aid in the strengthening of the crops' root structure. Using Biochar, a charcoal-like material that is produced from plant materials such as grass, agricultural, and forest residues that are decomposed at high temperatures, roots will be more stable and efficient in the defense against Pennsylvania weather.



Whitehall High School

Our project is a Pennsylvanian-specific, volunteer-based, phone application titled camPAign. It would allow users to post requests for local volunteer work such as: moving furniture, doing yard work, helping with car troubles, and more. The "app" would also act as a platform for established Pennsylvania volunteer organizations to attract more volunteers and provide a platform to engage new or younger generations of volunteers.

IU22

Council Rock High School South

Our project fills the void of a lack of STEM programs, especially for adolescents and those in lower socio-economic circumstances, by providing access to STEM-related opportunities, at no cost, through an online format: STEM Enrichment of Pennsylvania (stemepa.com). We partnered with the Northampton Library for a small physical component of our project and to be able to interact with their established audience.



Pennridge High School

The Pennridge Nerd Squad developed a pollinator drone to address the decline in honeybee and pollinator populations in Pennsylvania. This 3-D printed drone can help pollinate crops and native plant species to support the farming industry and the environment.

IU23

Hatboro-Horsham High School

Harness the power of the sun to charge your phone/iPad. The team created a prototype that could become part of outdoor furniture to transform these common park items into renewable energy stations that could charge our most used personal devices.

Lower Moreland High School

Our project, CUSTARD, solves current issues in pothole reporting. A vehicle-mounted ultrasonic sensor automatically tracks the depth and locations of potholes.

Merion Mercy Academy

Our Team identified the chemicals in landfills and our idea was to create a machine that goes into landfills that will have a magnet that will separate the aluminum out from the rest of the waste. Then we can reuse the trash trucks or other big trucks that can bring the recycled aluminum to sites that will reuse the material. We decided to focus on aluminum because it is 100 percent recyclable.

Pottstown High School

The Walkabout Cane and Crutch Adaptor increases mobility of people using assistive walking devices by turning a cane into a "third foot." The Walkabout's increased surface area, reduced cane angle slippage, and biomimicry of foot action allows users to get back to activities they used to do such as walk on beaches, uneven or soft terrain, or kick a ball with children.

Spring-Ford Area Senior High School

AMPS - Pennsylvania has over 83,000 miles of waterways and over 4,000 ponds. Algae can ruin water content and create dead zones in these naturally significant water sources. Our design project is an effective and inexpensive product to detect and monitor algae growth to limit toxic zones, so that the algae can be remediated.

IU24



Bishop Shanahan High School

DAVID is the Digitally Automated Vehicular Intersection Detector which is designed to help stopped drivers at a 3-way T-intersection know if a vehicle is approaching from the right or left. It is suited for use when it is difficult to see oncoming traffic because of man-made or naturally occurring blind spots. This applies to roads with sharp turns, hills, and overgrown foliage – all common occurrences on the Pennsylvania landscape.

Conestoga High School

Project Pb: Given the prevalence of lead in water and the lack of a reliable solution, our device autonomously and periodically gathers samples of water from household pipes and tests them for lead concentration.

Downingtown STEM Academy

Biovolt V2 is a biophotovoltaic cell: a plant-based battery designed to be used by Pennsylvania farmers as a source of renewable energy. The device generates power without taking up space on the surface by utilizing the interaction between a plant's natural processes of photosynthesis and bacterial activity. This updated model has a modular design, environmentally friendly materials, and uses series and parallel combination wiring to increase the efficiency of the device.

Renaissance Academy Charter School

We will study the effect of blue, red and white light on a particular strain of plants growing on microgravity (simulated by a clinostat). If a particular light wavelength differentially stimulates growth, we will propose it and the *pgm-1* genetic background as ideal to cultivate plants in future space colonies, under microgravity conditions.

IU25



Garnet Valley High School

Our project is a device that extends the life span of fruits and vegetables by removing a core hormone from the ripening process called ethylene. Our device aims to make it easier for Pennsylvanian consumers to eat healthy while not wasting food. This device also will save Pennsylvanians money since they can buy produce without wasting it.

Marple Newtown High School

This year, our team is tackling roadway deaths due to unfavorable weather conditions with semi-permeable roadways. These roadways could be made of porous asphalt, allowing water to pass through instead of resting on the surface and increasing the risk of a crash. Semi-permeable roadways have the added benefit of decreasing the number of potholes, as the materials have room to accompany the expansion of water as it turns to ice, making the roadways safer for all Pennsylvanians.

Penn Wood High School

Potholes have plagued the streets of Pennsylvania. With Pothole Protection, a sustainable, environmentally friendly, and efficient solution, could be made to give all Pennsylvania riders a smoother driving experience.

IU26

Philadelphia Academy Charter High School

Granny's Garden project was selected to protect against food scarcity and food deserts. A table-top aquaponic project would permit people, like your grandmother, to have access to herbs, fruits, and vegetables throughout the year. This project will have both small tropical fish and small shrimp as the nutrient producers for the plants. Easy access to fresh herbs, fruits, and vegetables is the right of all people.

IU29



Blue Mountain High School

The team has been working at designing a low cost but effective concussion sensor to implement on athletes' helmets or integrate into their gear which would indicate the possibility of a concussion from impacts received during a sporting event. This was primarily designed for high school athletics where concussions seem to be prevalent. The sensor would be app driven and data would be viewable via a tablet or phone-based app which would indicate when concussion thresholds are met. There are some products out on the market, but they wanted to do it in a cost-effective manner to flood the market.

North Schuylkill Jr/Sr High School

As flooding is the most common natural disaster in Pennsylvania, our team has decided to develop WAFRS (Wireless Automated Flood Recognition System). This system provides the ability to have real-time monitoring of road water levels to allow for a faster response to flooding roads.

We would like to thank the following for their commitment to The Governor's STEM Competition 2023:

We wish to thank the many individuals at the intermediate units across the commonwealth for their support of The Governor's STEM Competition and to all the students, advisors, and teams who met the challenge of this year's virtual edition.

Special thanks to:



Richard Askey, President of PSEA,
and Partner for teacher recognition



Partner for student recognition



Many thanks to our judges who took time out of their daily schedules to participate:

Dr. Eva Allen	Tom Esposito	Jason Reisinger
Ryan Allen	Sara Frey	Lori Rodgers
Brittany Anderson	Jeremy Gaborin	Erica Ryu
Mary Barnette	Kenneth Gabel	Kendy Schiffert
Samantha Beebe	James Gates	Sandy Shacklady-White
Sarah Brambley	Judith Hawthorn	Steven Sheirer
Jared Campbell	Heather Heimer	Glenn Singer
Casey Cappello	Rich Mackrell	Gina Spicknall-Cook
Fred Cherny	Diane McGaffic	Craig Stonaha
Kim Cole	Charles Mohler	Daniel Tomaso
Sarah D'Urzo	Ethan Pan	Brian Varnecky
Avni Dyer	Meredith Penner	Jamal Wakeem
	Judd Pittman	

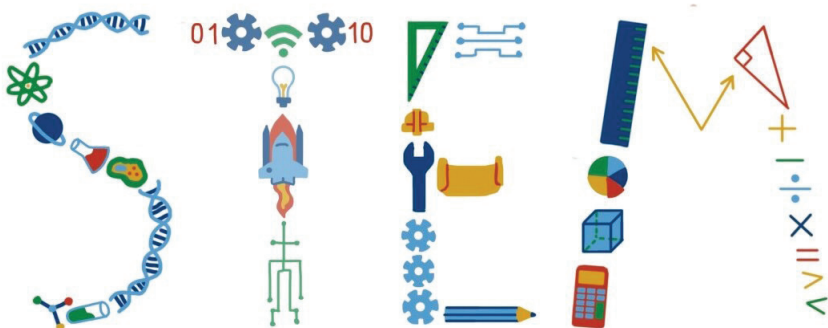
Penn State Harrisburg Category Judges:

Reuben Asempapa	Ola Rashwan
Jesse Middaugh	R. Tyler Richardson

The Pennsylvania Department of Education Designated Planning Team:

Angela Kirby PaTTAN Central Director	Corey Dickey
Sergio Anaya	Melissa Howell
Lauren Beal	Michael Onofrey
Nicole Bond	Tara Russo
Chris Cherny	PaTTAN Tech Team

2023 GOVERNOR'S



COMPETITION

Cover Logos designed by:

Esther Forker (front cover), Forest Area School District, School District, led by Michelle Mazur.

Kayden Dructor (inside back cover), Wyoming Area Secondary Center, led by Kayla Collura.

Gabriella Araujo (back cover), Forest Area School District, led by Michelle Mazur.



The Governor's STEM Competition 2023

Josh Shapiro, Governor

Dr. Khalid N. Mumin, Acting Secretary, Department of Education

David Volkman, Special Advisor to the Secretary



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