



*Joint  
Science and  
Technology  
Institute*

**VIRTUAL**

*July 10 - 23*



*Yearbook*



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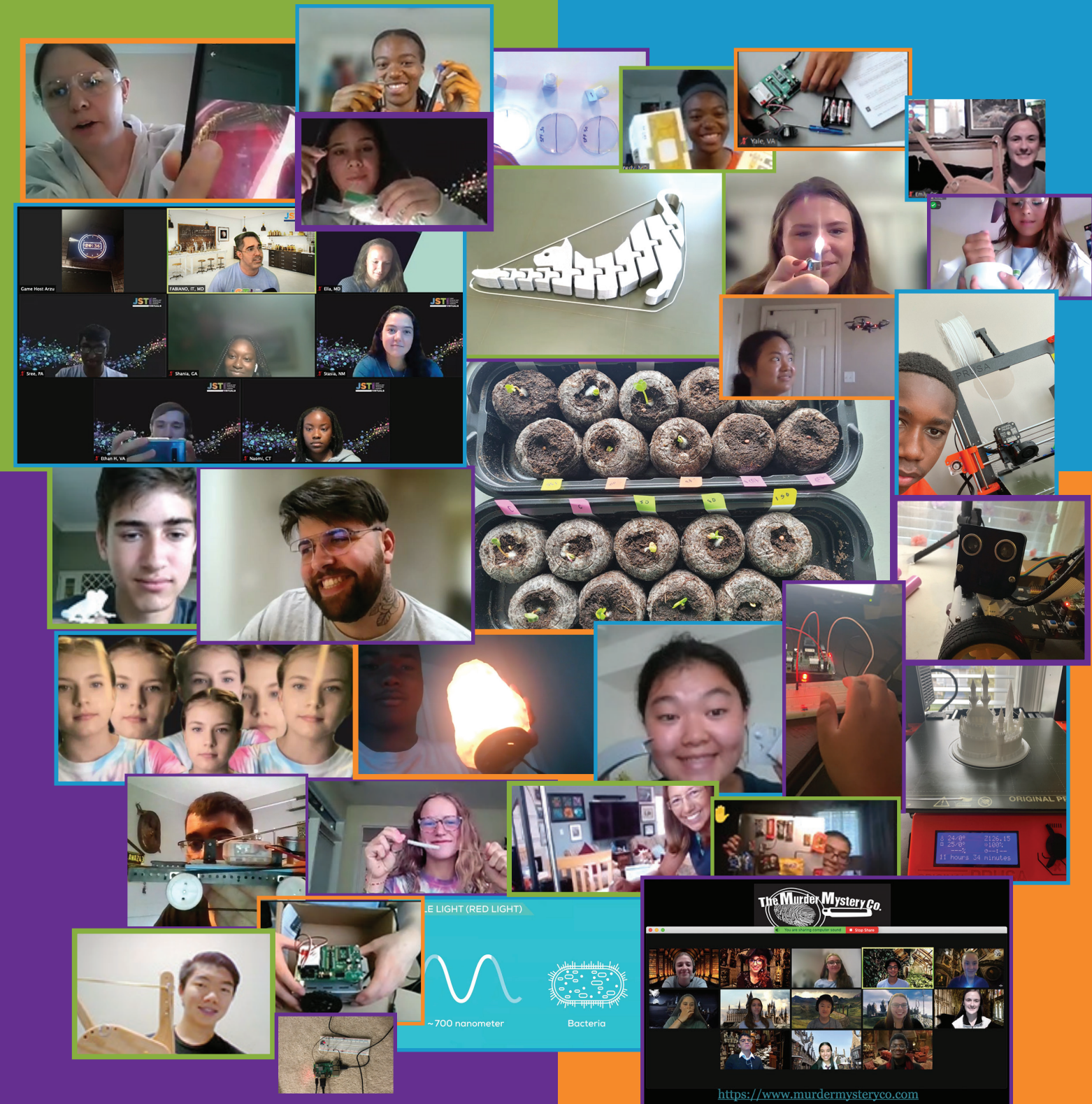
## JSTI at a glance

- 87 high school students

- 49 middle school students

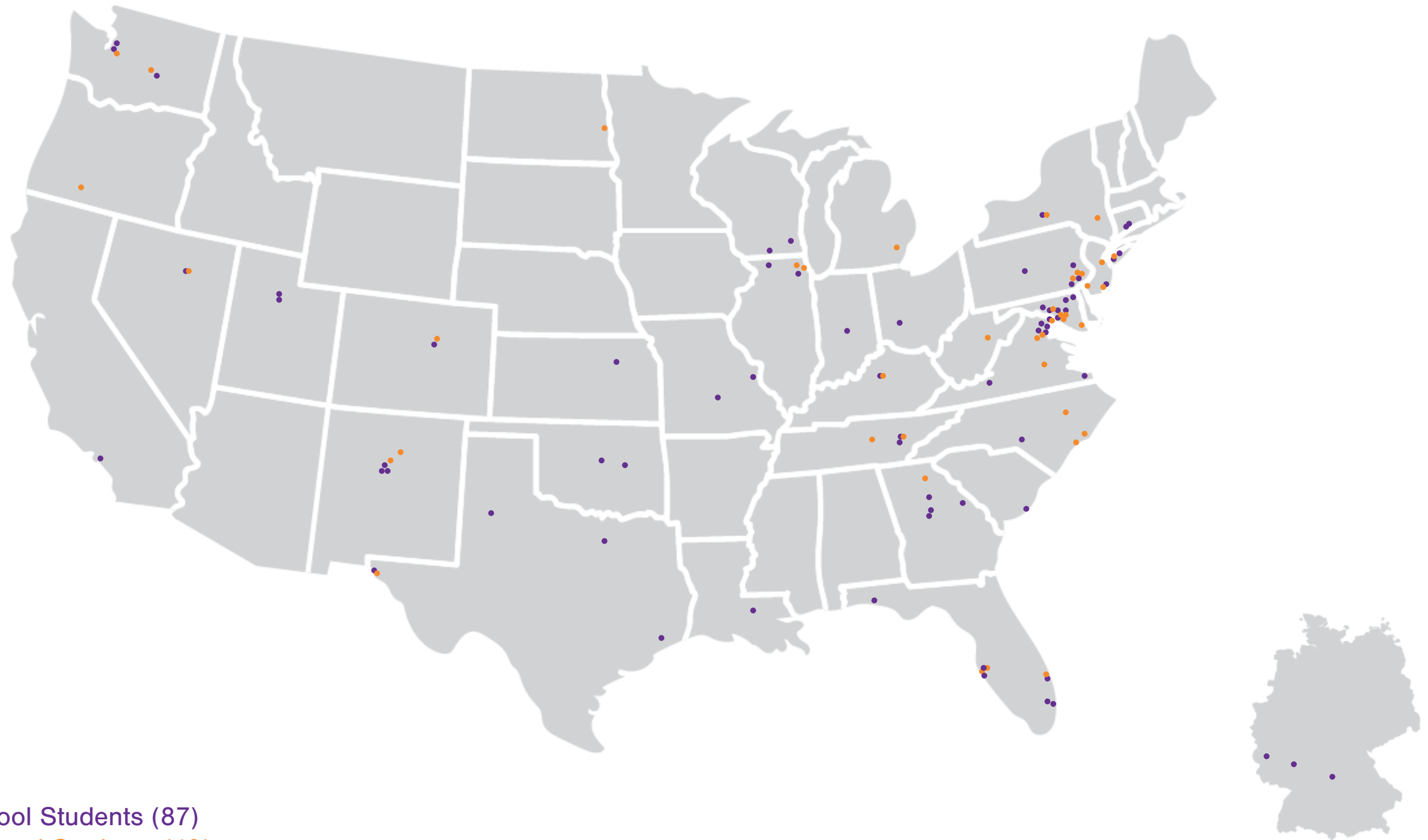
- Spread out over 6 time zones

- 8th year of JSTI and the first virtual cohort





# Location Map



High School Students (87)  
Middle School Students (49)

# High School Students

***“JSTI’s program to learn hands-on engineering from the National Laboratories’ experienced mentors has truly opened my eyes to the infinite opportunities there are for me in STEM.”  
–Olivia Heng***



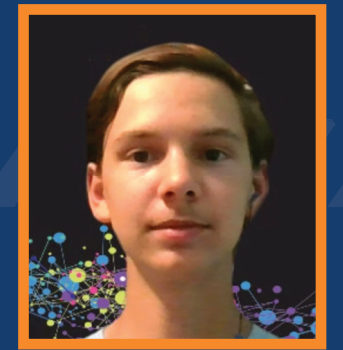
**Amrita Anand**  
State College Area  
High School  
State College, PA



**Ethan Barry**  
Grassfield High School  
Chesapeake, VA



**Shon Barthell**  
American Senior  
High School  
Hialeah, FL



**Jason Bertrand**  
East Mountain High School  
Edgewood, NM



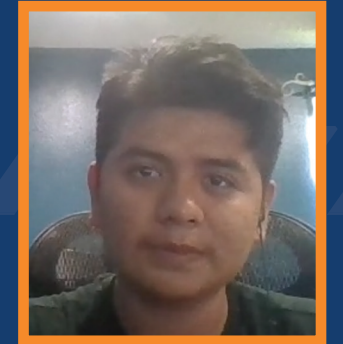
**Ethan Bishop**  
Northwest High School  
Boyds, MD



**Alexandra Cabrales**  
Maywood Center for  
Enriched Studies  
Indianapolis, IN



**Kylie Caprini**  
Wheaton Warrenville South  
High School  
Glen Ellyn, IL



**Martin Capula Vaquero**  
SCF Collegiate School  
Bradenton, FL



**Bridgette Carven**  
C. Milton Wright  
High School  
Churchville, MD



**Ethan Chau**  
Fox Senior High School  
St. Louis, MO



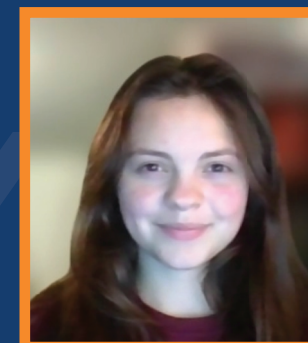
**Olivia Chen**  
Lubbock High School  
Lubbock, TX



**Shelby Copeland**  
Sandia High School  
Albuquerque, NM



**Spence Cox**  
Academic Magnet  
High School  
Charleston, SC



**Delana Creech**  
Ansbach Middle  
High School  
Gebtsattel, Germany

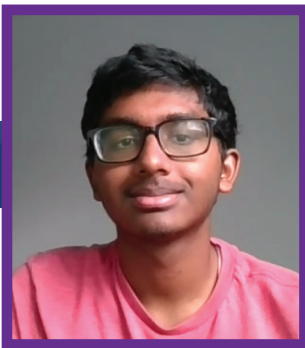


**Elena De Santo**  
La Cueva High School  
Albuquerque, NM



**Ivy Delay**  
Royal High School  
Royal City, WA

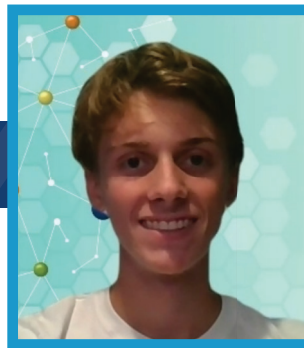




**Harsha Dharmaraj**  
Northview High School  
Johns Creek, GA



**Cameron Dickens**  
John Hardin High School  
Elizabethtown, KY



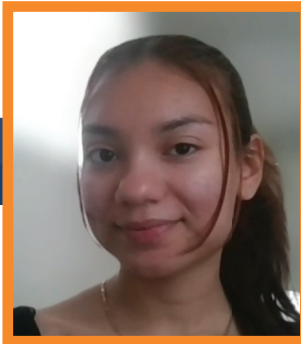
**Evan Diefenbeck**  
Avon Grove High School  
Landenberg, PA



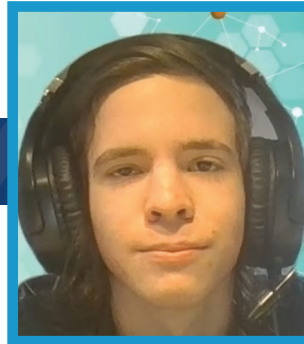
**Faith England**  
Vero Beach High School  
Fort Pierce, FL



**Janice Enwefa**  
Chapin High School  
El Paso, TX



**Emily Escalera**  
Martha Ellen Stilwell  
School of the Arts  
Rex, GA



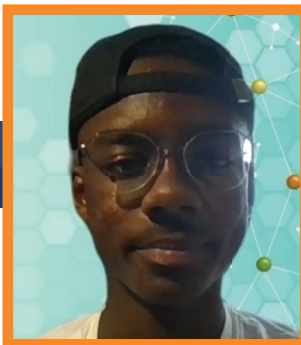
**John Field**  
The ASK Academy  
Albuquerque, NM



**Niya Fields**  
Spangdahlem High School  
Spangdahlem, Germany



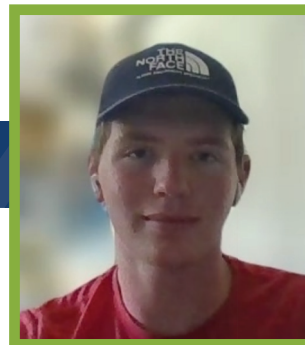
**Naomi Ford**  
Trumbull High School  
Trumbull, CT



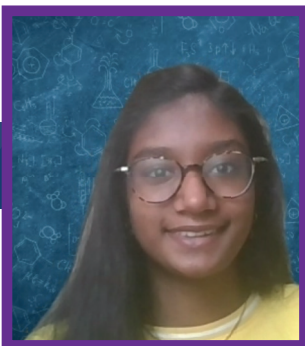
**Darryl France**  
Park School of Baltimore  
Nottingham, MD



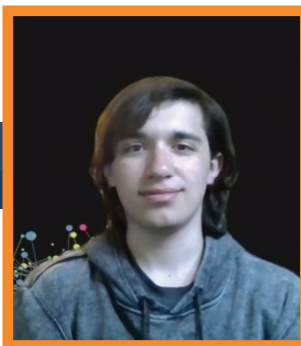
**Alma Francois-Pijuan**  
School of the Future  
New York City, NY



**Beccan Gruenberg**  
STEM School  
Highlands Ranch  
Highlands Ranch, CO



**Pragnya Gudipati**  
Juanita High School  
Kirkland, WA



**Ethan Hall**  
Hampton Roads Academy  
Newport, VA



**Lauren Hall**  
Albuquerque High School  
Albuquerque, NM



**Olivia Heng**  
Ocean City High School  
Ocean City NJ



**Bryannah Hernandez**  
Maywood Center for  
Enriched Studies  
Huntington Park, CA



**Sarah Hilburgh**  
Waynesville High School  
Ft. Leonard Wood, MO



**Brooke Hollander**  
Melvin J. Berman  
Hebrew Academy  
Silver Spring, MD



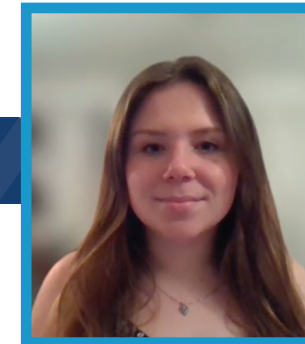
**Casey Hsieh**  
Mukwonago High School  
Mukwonago, WI



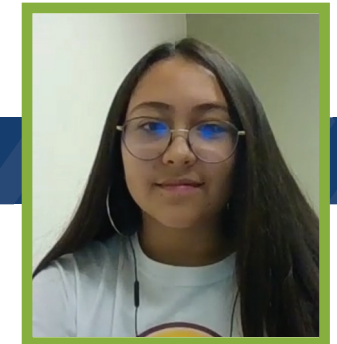
**Anastasia Jauriqui**  
Cibola High School  
Albuquerque, NM



**Candace Johnson**  
Andy Dekaney High School  
Houston, TX



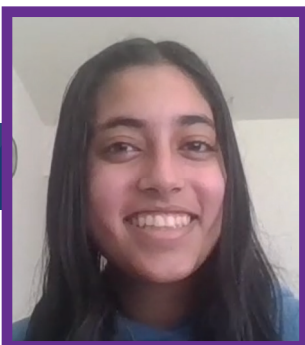
**Katie Jones**  
Heritage High School  
Maryville, TN



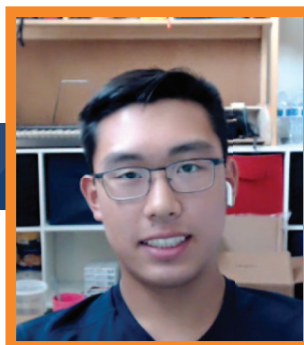
**Eliana Kai Juarez**  
V. Sue Cleveland  
High School  
Rio Rancho, NM

***“Although different from usual, JSTI did a great job with using the virtual set-up to allow students to complete similar tasks as they would in normal operations. I had a wonderful, and educational experience”.***  
***–Sarah Hilburgh***





**Sonika Khosla**  
Manhattan High School  
Manhattan, KS



**Yale Kim**  
Patriot High School  
Bristow, VA



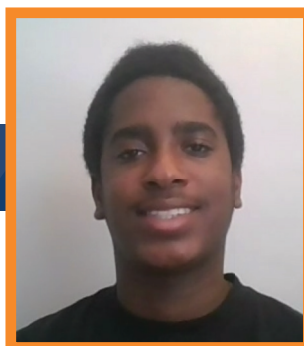
**Namrata Kondala**  
Flower Mound High School  
Flower Mound, TX



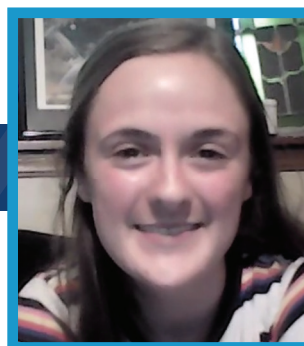
**Noor Maghaydah**  
Lansing High School  
Ithaca, NY



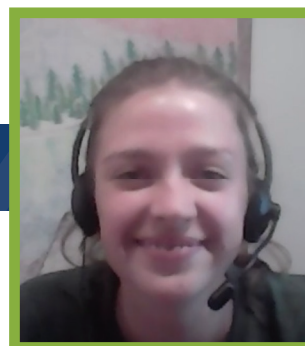
**Kayla Magruder**  
Eleanor Roosevelt  
High School  
Bowie, MD



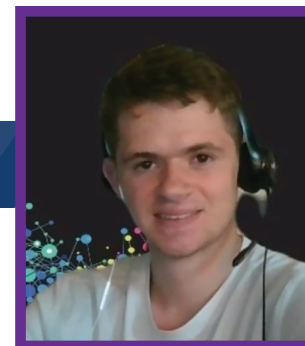
**Miles Magruder**  
Bowie High School  
Bowie, MD



**Emily Mcdowell**  
Butner Public School  
Okemah, OK



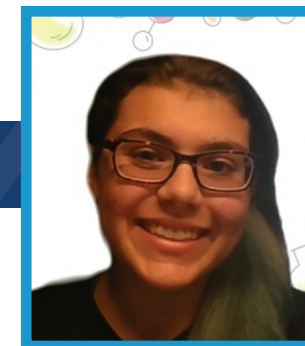
**Lauren Mcdowell**  
Butner Public School  
Okemah, OK



**James McFarland**  
Niceville Senior High School  
Niceville, FL



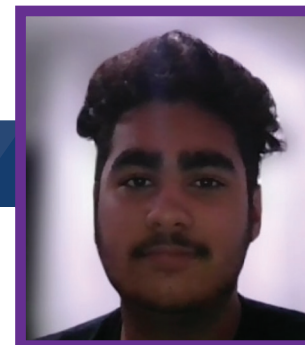
**Addison Melendez**  
Carlin Combined School  
Carlin, NV



**Nicolette Miceli**  
State College of Florida  
Collegiate School  
Parrish, FL



**Nadia Mokhtarzada Blake**  
School Without Walls  
High School  
Washington, D.C.



**Jordan Molina**  
American Senior  
High School  
Pembroke Pines, FL



**Olivia Morrow**  
Spangdahlem High School  
Spangdahlem, Germany



**Glenn Ochsner**  
Bellbrook High School  
Bellbrook, OH



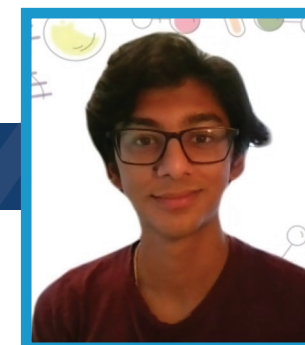
**Andrew Ockey**  
Jordan High School  
Taylorsville, UT



**Justin Otelo**  
McKinley Senior  
High School  
Baton Rouge, LA



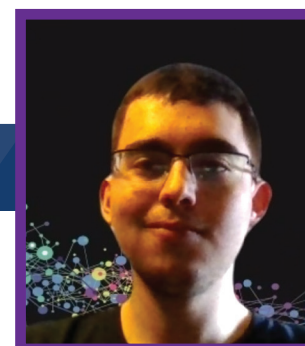
**Kaden Parkin**  
Jordan High School  
Sandy, UT



**Sourish Pasula**  
Oklahoma School of Science  
and Mathematics  
Edmond, OK



**Misha Patel**  
Trumbull High School  
Trumbull, CT



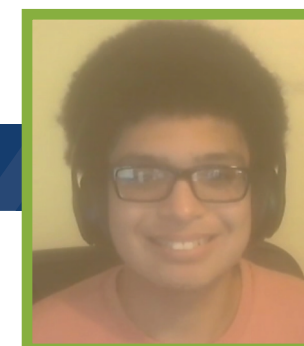
**Justin Peltz**  
Sandia High School  
Albuquerque, NM



**Elizabeth Pennington**  
Elkton High School  
Elkton, MD



**Andrew Quinonez**  
Hayfield Secondary School  
Alexandria, VA



**Skyler Rapp**  
Woodbridge Senior  
High School  
Woodbridge, VA

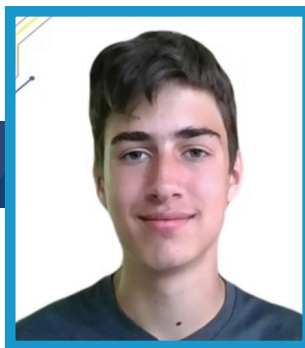




**Galilea Rodriguez**  
Harmony Science Academy  
El Paso, TX



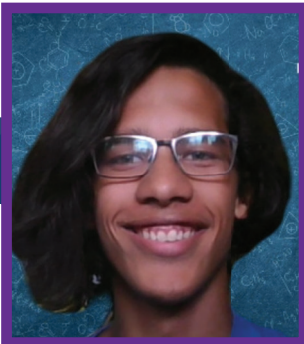
**Gavin Rodriguez**  
Harmony Science Academy  
El Paso, TX



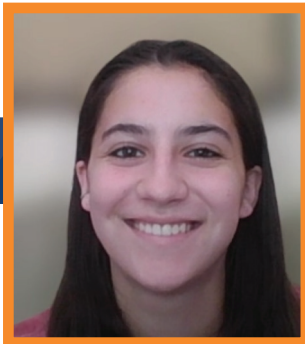
**Isaiah Rohrs**  
Purdue Polytechnic  
High School North  
Indianapolis, IN



**Evelyn Rueda**  
Andress High School  
Wiesbaden, Germany



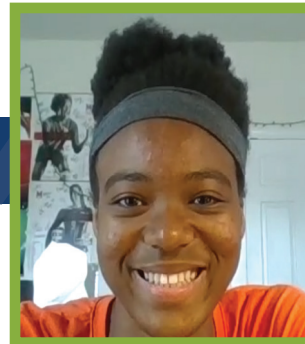
**Christian Sannutti**  
Pinecrest High School  
West End, NC



**Sofia Schnerr**  
West Chester East  
High School  
West Chester, PA



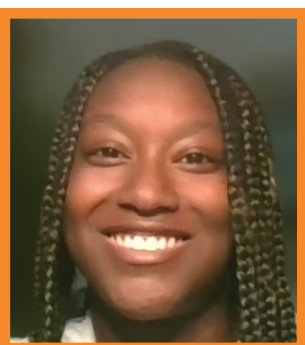
**Samuel Schwartz**  
Lawrence Woodmeir  
High School  
Valley Stream, NY



**Kennedy Shepherd**  
Clarksburg High School  
Clarksburg, MD



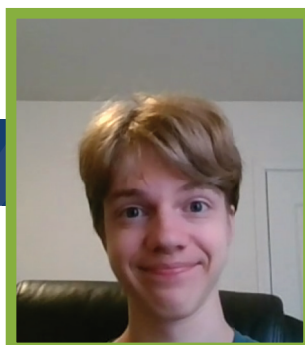
**Yu De Shih**  
Lubbock High School  
El Paso, TX



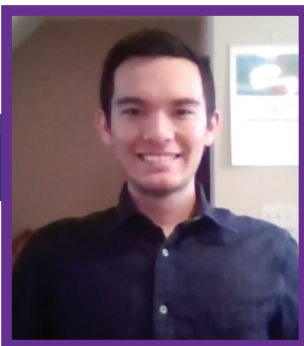
**Shania Swann**  
Martha Ellen Stilwell  
School of the Arts  
Jonesboro, GA



**Aliyah Taylor**  
Martha Ellen Stilwell  
School of the Arts  
Jonesboro, GA



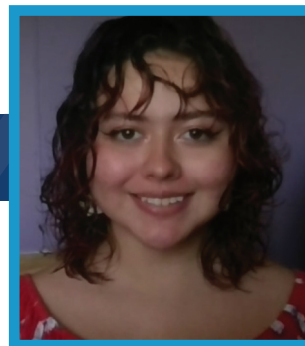
**Adam Tedesco**  
Volcano Vista high school  
Albuquerque, NM



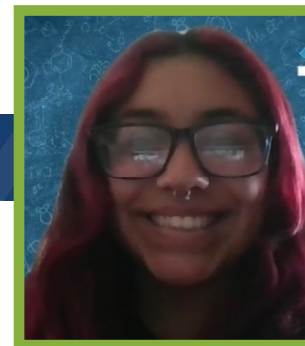
**Ryuto Thew**  
Auburn High School  
Machesney Park, IL



**Aison Tran**  
Freedom High School  
Chantilly, VA



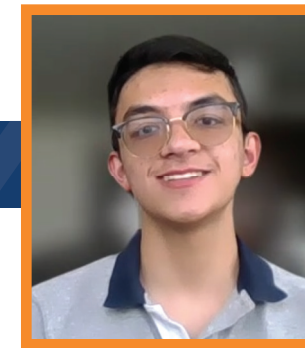
**Valeria Valles**  
Riverside High School  
El Paso, TX



**Ruby Vasquez**  
Riverside High School  
El Paso, TX



**Sidney Vass**  
Gibbs High School  
Knoxville, TN



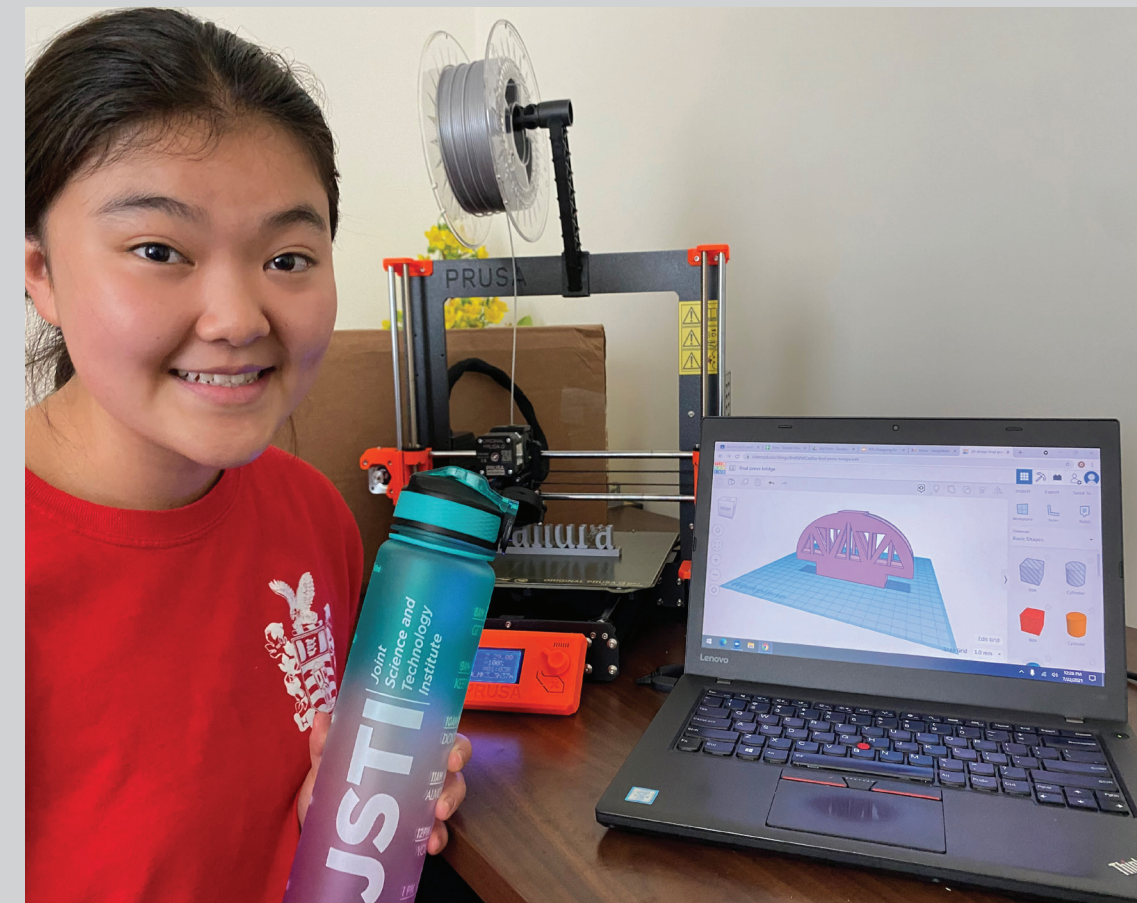
**Vincent Vest**  
Forest Park High School  
Woodbridge, VA



**Charles Wang**  
Walter Johnson High School  
Rockville, MD

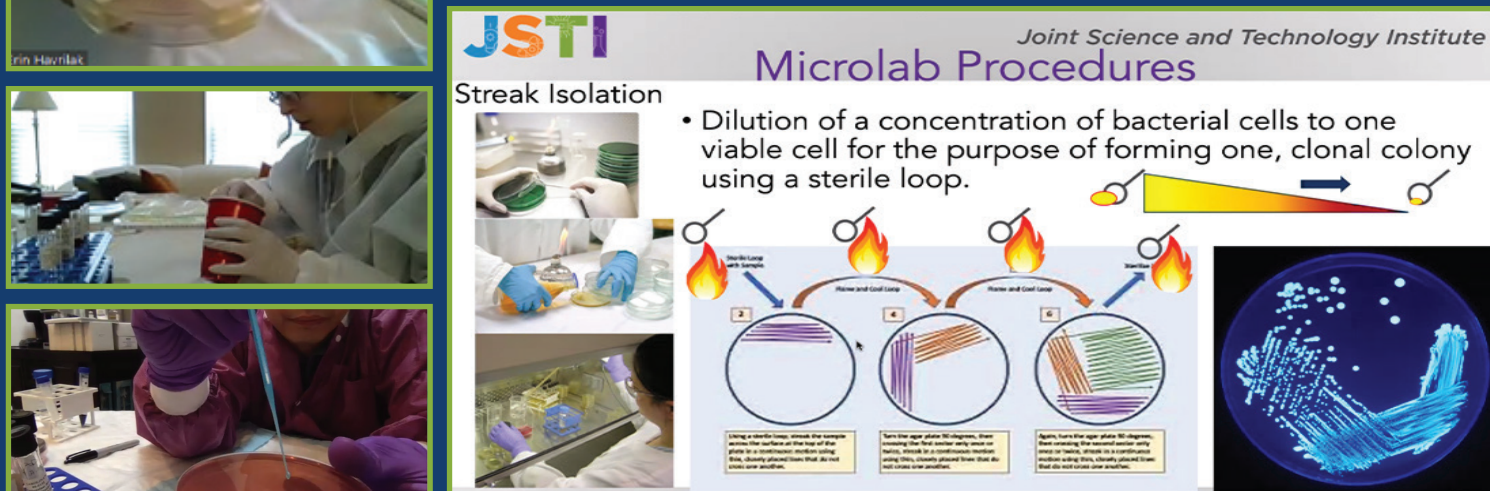
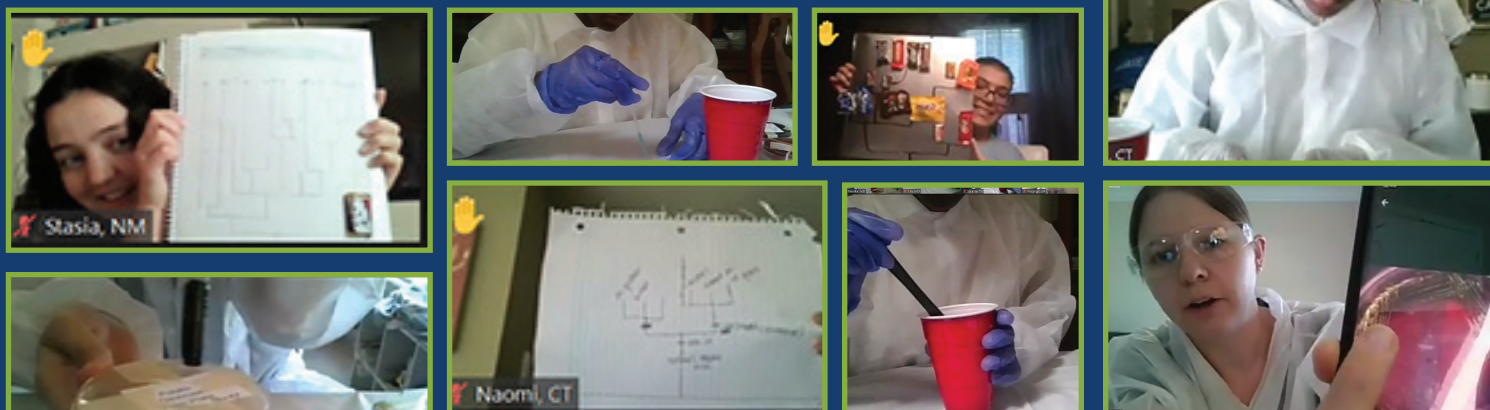
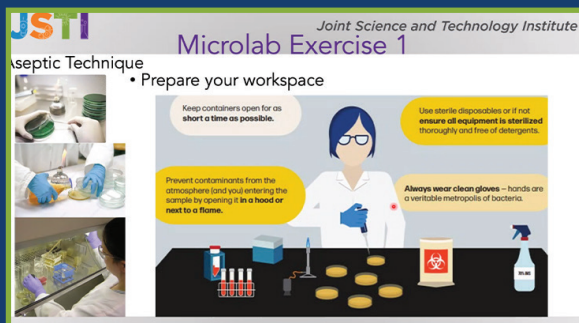


**Sreenidhi Yaratha**  
North Penn High School  
Colmar, PA





# Physiological and Genomic Characterization of Bacterial Extremophiles from Cave Environments



## HIGH SCHOOL



# Physiological and Genomic Characterization of Bacterial Extremophiles from Cave Environments

Bacteria are found in nearly every environmental niche and have co-evolved with all animals and plants that ever existed. While significant evidence implicates bacteria's direct impact on climate, ecosystems, and animal/plant health, we have only begun to reveal the immense diversity comprised solely of these "simple" organisms. To continue the quest of discovering potentially novel and ecologically relevant bacterial species, this project investigates the microbial diversity present in subsurface cave systems, where, despite the limited availability of nutrients commonly found in terrestrial soils, microbial life continues to thrive. Herein, our team employs classical microbiological techniques with genomic sequencing and bioinformatics tools to physiologically and genomically characterize potentially novel extremophile bacterial isolates from two cave systems in the United States. This unique project centers on real-time, hands-on techniques to deliver the genuine experience of hypothesis-driven, scientific research to our students.

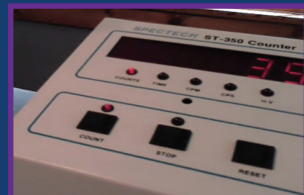
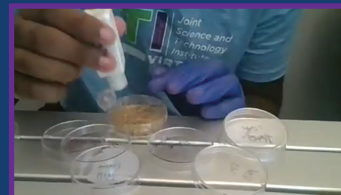
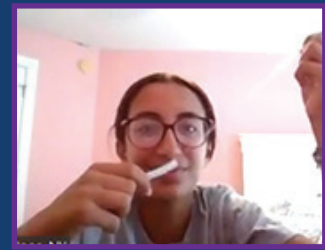
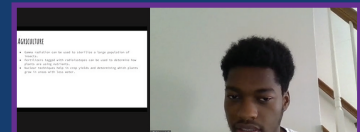
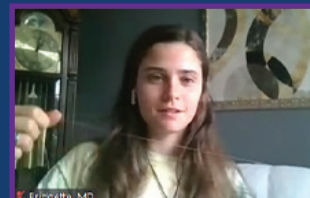
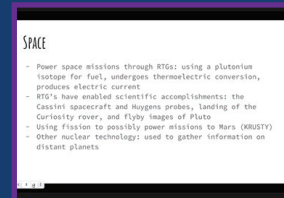
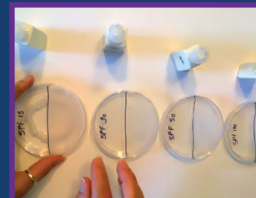
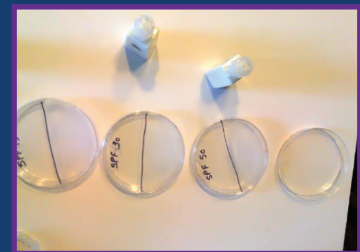
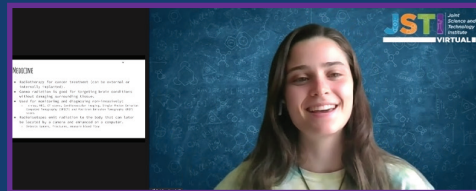
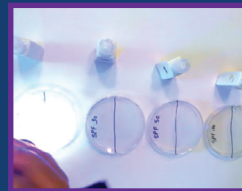
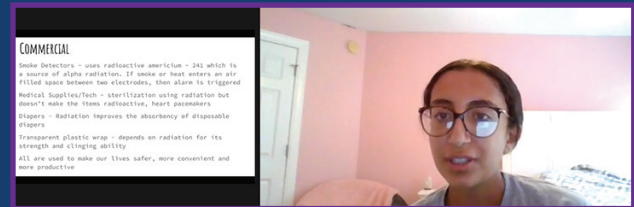
**Mentors:** <sup>a</sup>Michaeline Albright, <sup>b</sup>Andrew Bartlow, <sup>b</sup>Karen Davenport, <sup>b</sup>Armand Dichosa, Priya Dighe, <sup>b</sup>Blake Hovde, <sup>c</sup>Shannon Johnson, Julia Kelliher, <sup>b</sup>Anand Kumar, <sup>b</sup>Earl Middlebrook, and <sup>b</sup>Migun Shakya

**Affiliations:** <sup>a</sup>B-11: Bioenergy and Biome Sciences; <sup>b</sup>B-10: Biosecurity and Public Health; <sup>c</sup>A-2: Intelligence and Systems Analysis  
Los Alamos National Laboratory

**Team Members:** Naomi Ford, Pragnya Gudipati, Brooke Hollander, Anastasia Jauriqui, Nicolette Miceli, Nadia Mokhtarzada Blake, Elizabeth Pennington, Sofia Schnerr, Shania Swann, Valeria Valles



## Radiation Biology



## Radiation Biology

The use of ionizing radiation in many industrial, military, and medical devices requires the study of the effects of these types of radiation on living things in order to set limits on exposure and develop protective devices and practices. The objective of this project is to familiarize the students with different types of radiation and their sources, view the results of radiation exposure through experimentation with eukaryotic organisms including yeast and plants, and explore methods of detecting, assessing, and treating radiation exposure that are being developed at ORNL and other facilities.


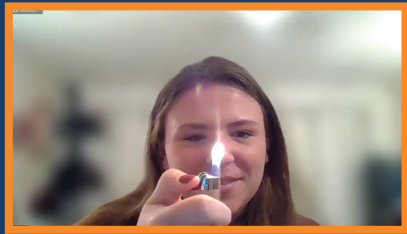
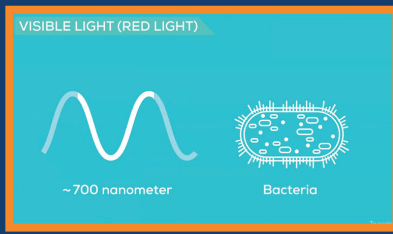
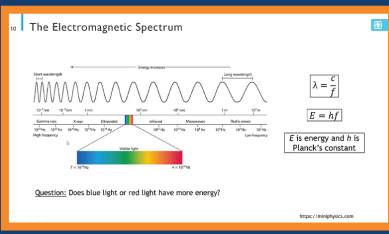
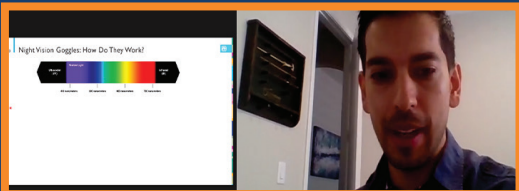


**Mentors:** <sup>a</sup>Betsy Ellis, <sup>a</sup>Adayabalam Balajee, <sup>a</sup>Wayne Baxter, <sup>b</sup>Bridget Kennedy


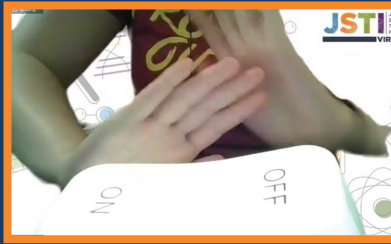
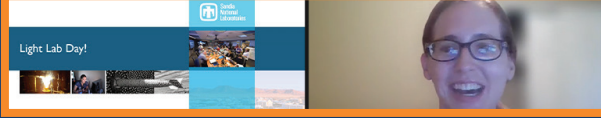

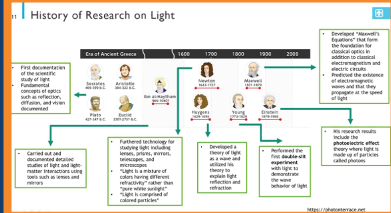

**Affiliations:** <sup>a</sup>Oak Ridge Institute for Science and Education; <sup>b</sup>Science in Motion at Clarion University of PA






**Team Members:** Amrita Anand, Ethan Bishop, Bridgette Carven, Ivy Delay, Namrata Kondala, Noor Maghaydah, Miles Magruder, Lauren Mcdowell, Addison Melendez



# Quantum Computing and Technology







HIGH SCHOOL



# Quantum Computing and Technology

The strangeness of quantum physics is being harnessed to revolutionize computing as we know it. In this project, you will get a primer on the fundamentals of computing, learn hands-on the oftentimes perplexing phenomena of quantum physics, and apply those phenomena to solve computing problems in new ways. Students will gain experience creating circuits on a real-world quantum computer and hear from a team of mentors what it's like to have a career at the forefront of quantum technology.

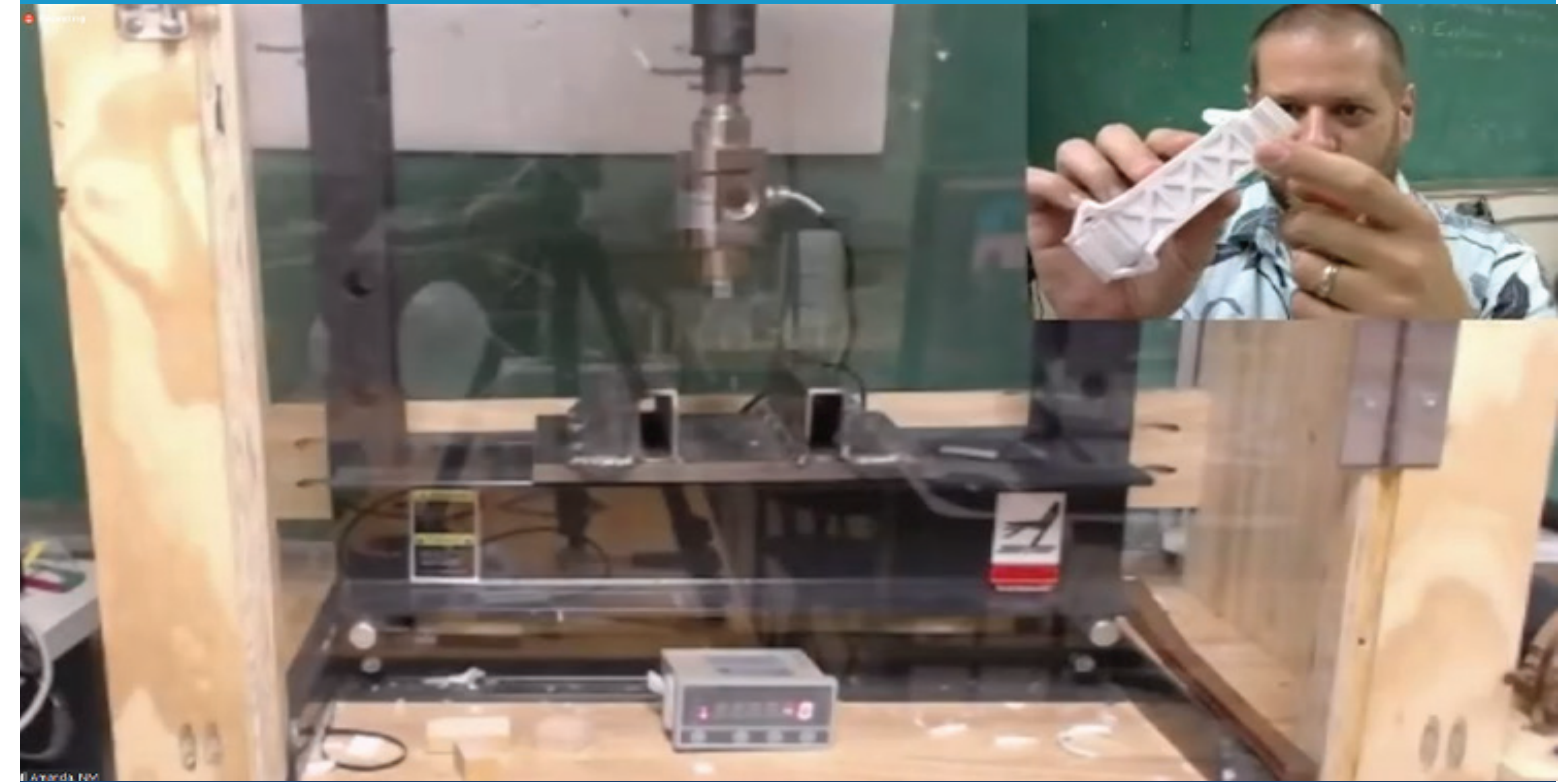
**Mentors:** <sup>a</sup>Megan Ivory, <sup>a</sup>Mohan Sarovar, <sup>a</sup>Roger Ding, Lisa Hackett, Daniel Dominguez, Ashlyn Burch, <sup>a</sup>Bethany Little, <sup>a</sup>Will Kindle, <sup>b</sup>Mekena Metcalf

**Affiliations:** <sup>a</sup>Sandia National Laboratory; <sup>b</sup>Lawrence Berkeley National Laboratory

**Team Members:** Ethan Barry, Cameron Dickens, Janice Enwefa, Emily Escalera, Ethan Hall, Katie Jones, Glenn Ochsner, Sourish Pasula, Galilea Rodriguez, Charles Wang



## Designing for Strength: Making the Most of Your 3D prints



## Designing for Strength: Making the Most of Your 3D prints

Finite deposition modeling (FDM) 3D printing has become incredibly popular due to the expiration of key patents governing the technology. A cheap FDM printer has gone from \$20k to \$200 in less than two decades, quickly leading to the proliferation of FDM 3D printers among hobbyists and engineers alike. While FDM 3D printing has many advantages over more traditional manufacturing techniques, it tends to result in weaker parts than parts made by machining processes. In this project, we will learn how to design and print parts for strength, and along the way you will use a 3D printer and learn the basics of computer aided design. We will strength tests parts using a hydraulic press and force gauge and analyze the resulting data. Finally, we will write a report on the practices that result in the strongest 3D printed parts, applying statistical analysis to understand the significance our results.

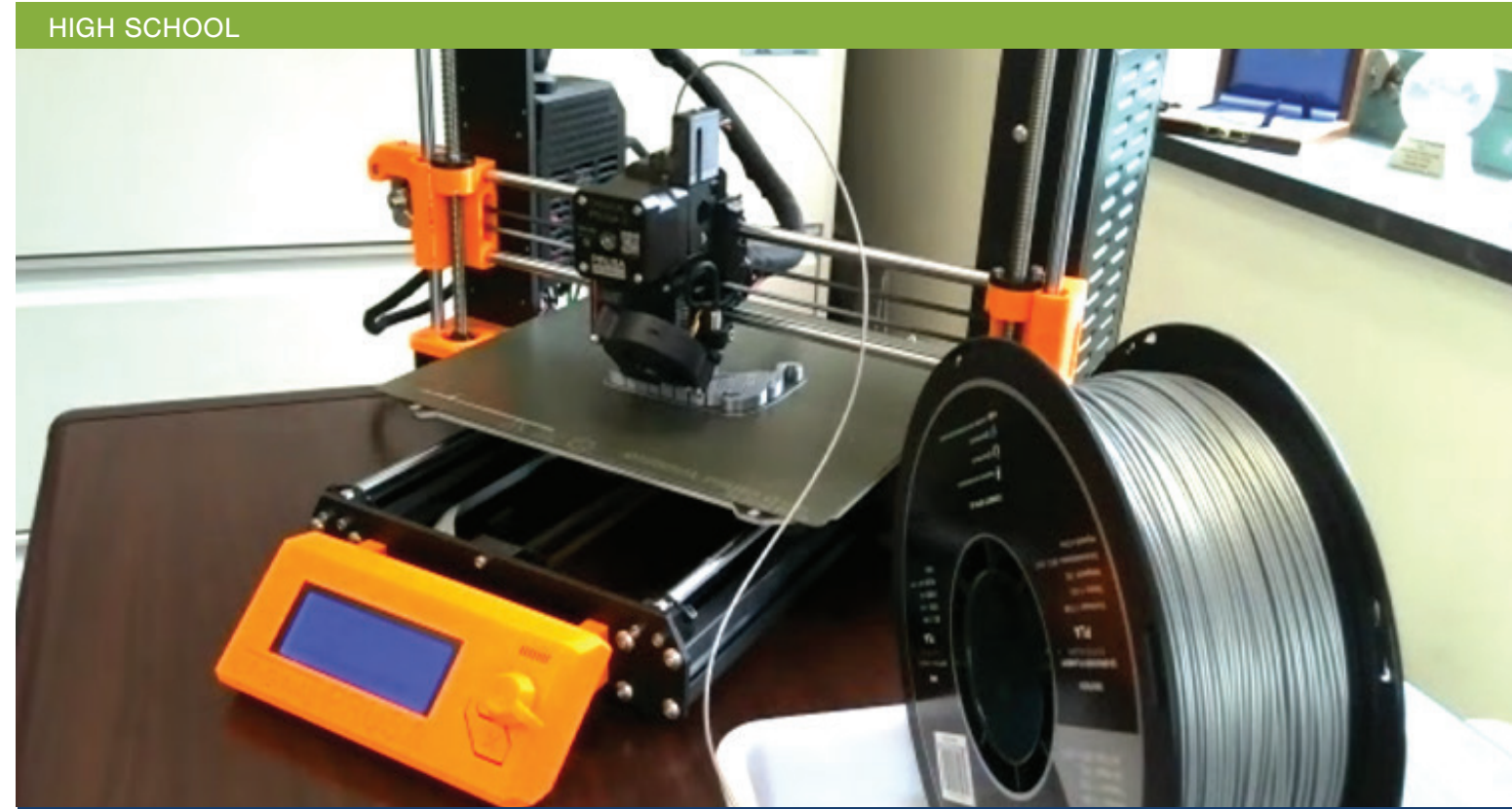
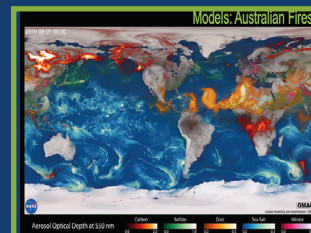
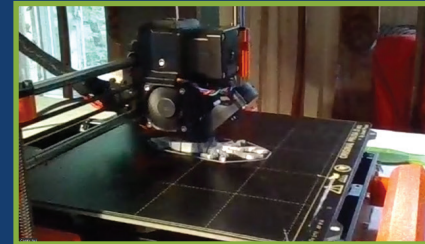
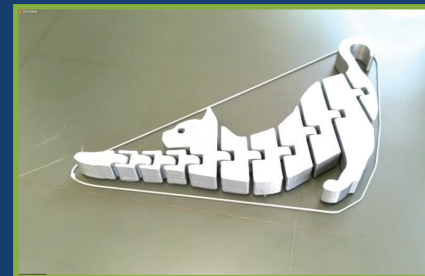
**Mentors:** Jacob Yoder, Remington Bullis, Conrad Farnsworth, Amanda Farnsworth

**Affiliations:** Los Alamos National Laboratory

**Team Members:** Jason Bertrand, Kylie Caprini, John Field, Alma François-Pijuan, Olivia Heng, Sarah Hilburgh, James McFarland, Jordan Molina, Justin Otelo, Isaiah Rohrs



## Design for Additive Manufacturing

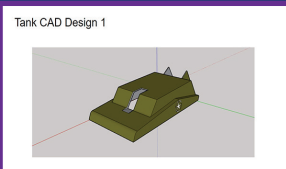

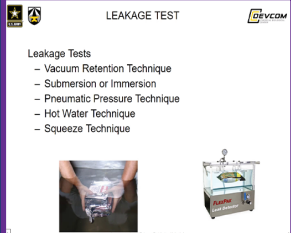
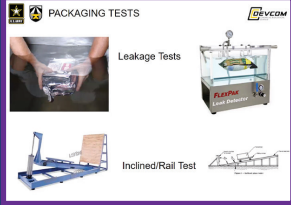


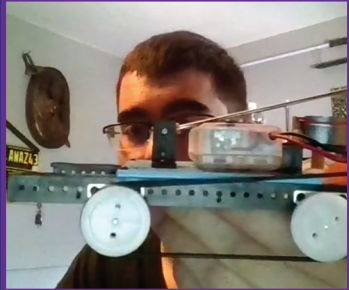
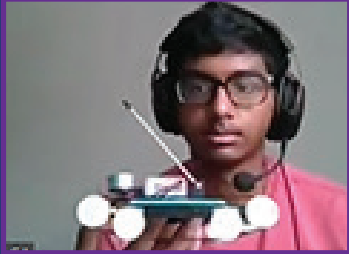


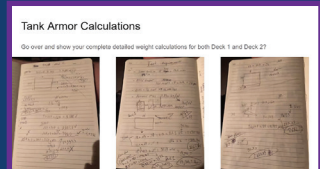


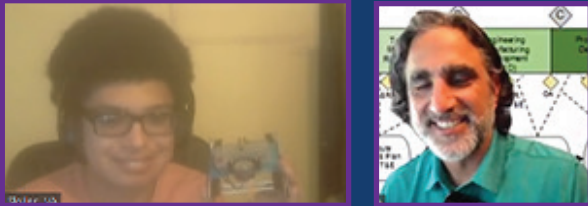

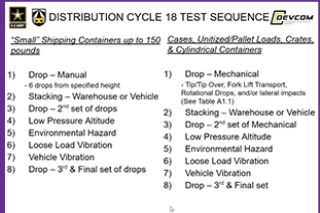
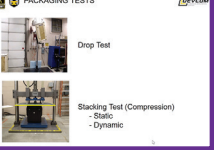

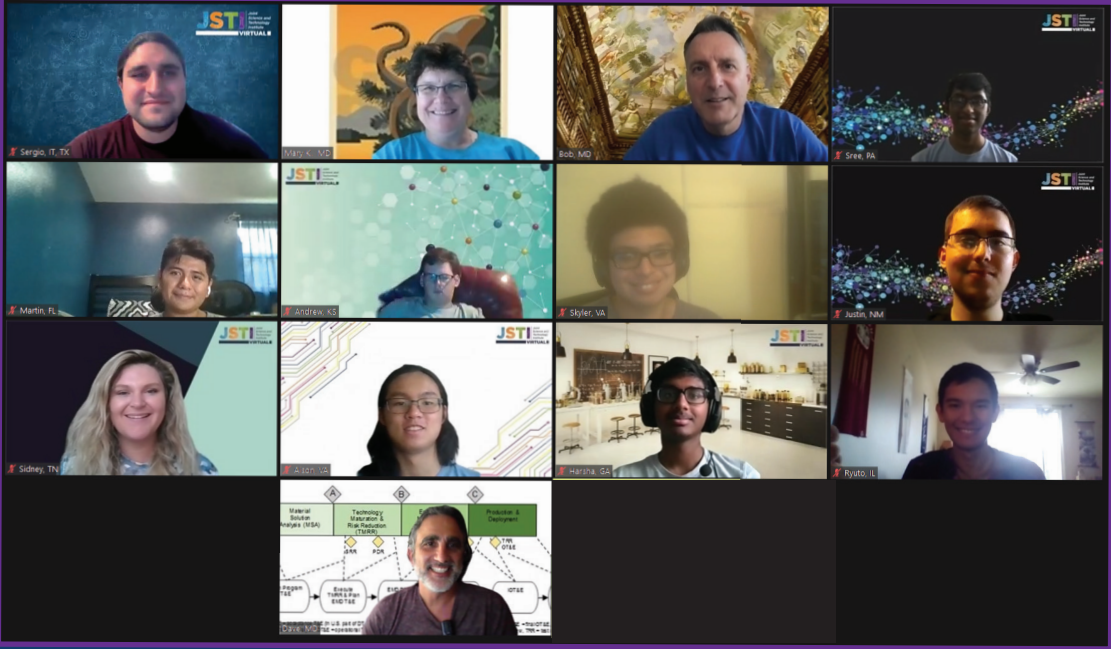
## Design for Additive Manufacturing

<b>Mentor:</b>	Michael Geuy
<b>Affiliations:</b>	PhD Student - Mechanical Engineering/Additive Manufacturing and Design Pennsylvania State University
<b>Team Members:</b>	Ethan Chau, Evan Diefenbeck, Casey Hsieh, Thomas Kebede, Kaden Parkin, Misha Patel, Christian Sannutti, Samuel Schwartz, Ruby Vasquez



# Electronic and Military Packaging







# Electronic and Military Packaging

Students will design, build and test a unique electronic item and their packaging skill against the rugged military environment. Working with engineers and specialists from Advance Design & Manufacturing, the students will also use an open source CAD program and other rapid prototyping technologies to analyze, design and model an ancillary item for their project. Students will learn about military specifications for packaging materials to protect their parts, and test their packaged part against the extreme conditions and situational environment encountered by military to ensure a successful delivery.

**Mentors:** Dave Vincitore and Robert Pazada

**Affiliations:** Aberdeen Proving Ground

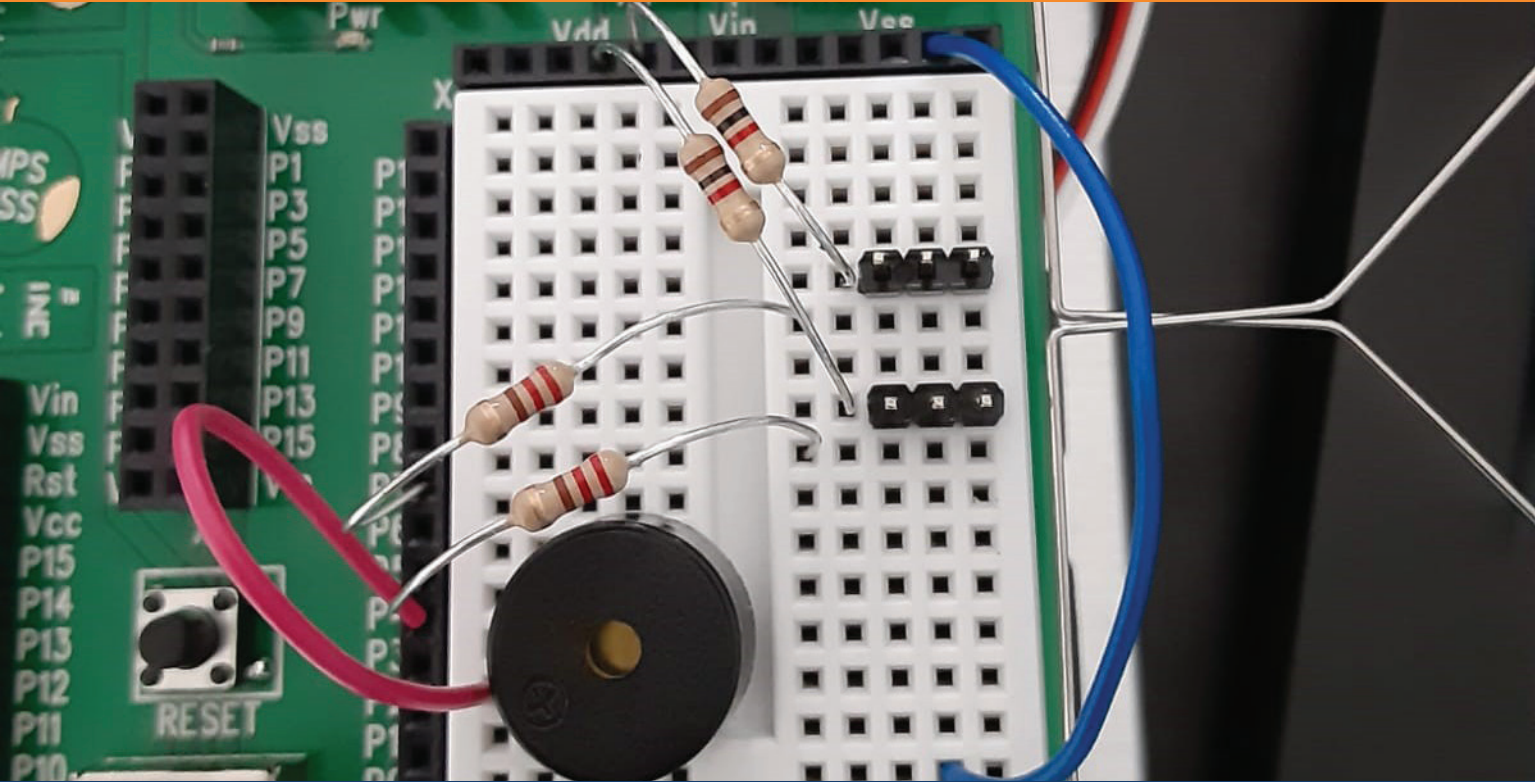
**Team Members:** Martin Capula Vaquero, Harsha Dharmaraj, Andrew Ockey, Justin Peltz, Skyler Rapp, Ryuto Thew, Aison Tran, Sidney Vass, Sreenidhi Yaratha



# Expanded Robotics



HIGH SCHOOL



# Expanded Robotics

The field of robotics is growing by leaps and bounds: from movie props to performing delicate surgeries. As an introduction to robotics and applied engineering, students will explore the gambit of emerging trends and future applications in the industry including traditional uses like welding and high speed sortation through to drones and humanoids. Students will then get hands on by designing, building, and programming robots. Students will be introduced to the PBASIC coding language through student built robots and Python through a shared drone by creating flight patterns and controls. Basic engineering principles from mechanical design and assembly to algorithms and coding will be introduced.

**Mentor:** Harrison Hughes

**Affiliations:** Georgia Tech Research Institute

**Team Members:** Shon Barthell, Olivia Chen, Elena De Santo, Faith England, Darryl France, Youngwoo Kim, Kayla Magruder, Adam Tedesco, Vincent Vest



# It's a Small World: Harnessing the Potential of Bacteria to Benefit Us All Through Biotechnology

**Compound Microscope vs. the Foldscope**

**Compound scope:**

- Eyepiece with a magnification of 10X
- Stage holds the slide in place
- Coarse and fine focus knobs to move stage up and down
  - Brings sample into focus
- 3-4 lenses
  - Usually 4X, 10X, 40X, sometimes 100X
  - So magnification can reach 10X \* 100X = 1000X
- Illuminator under stage provides light for sample

**How it Works:**

1. This is the "back" of the completed Foldscope
2. Place a prepared slide (we will discuss more about this tomorrow, but there are instructions in the instruction manual) into the slots of the "sample stage"
3. Clip the magnetic "coupler" to the lens to hold the slide in place and make the image clearer

**Compound Microscope vs. the Foldscope**

**Foldscope:**

- No eyepiece - just your eye!
- Sample stage holds the slide in place
- Focus using slides left and right
  - Brings sample into focus
- 1 lens
  - Magnification of 100X
  - Can resolve up to 2 micrometers - the size of bacterial
- "Illuminator" is whatever light source you have in your room
  - Lens stage holds the lens in place as you move the sample
  - Focusing guide is the "body" that serves as the skeleton for all the moving pieces

## It's a Small World: Harnessing the Potential of Bacteria to Benefit Us All Through Biotechnology

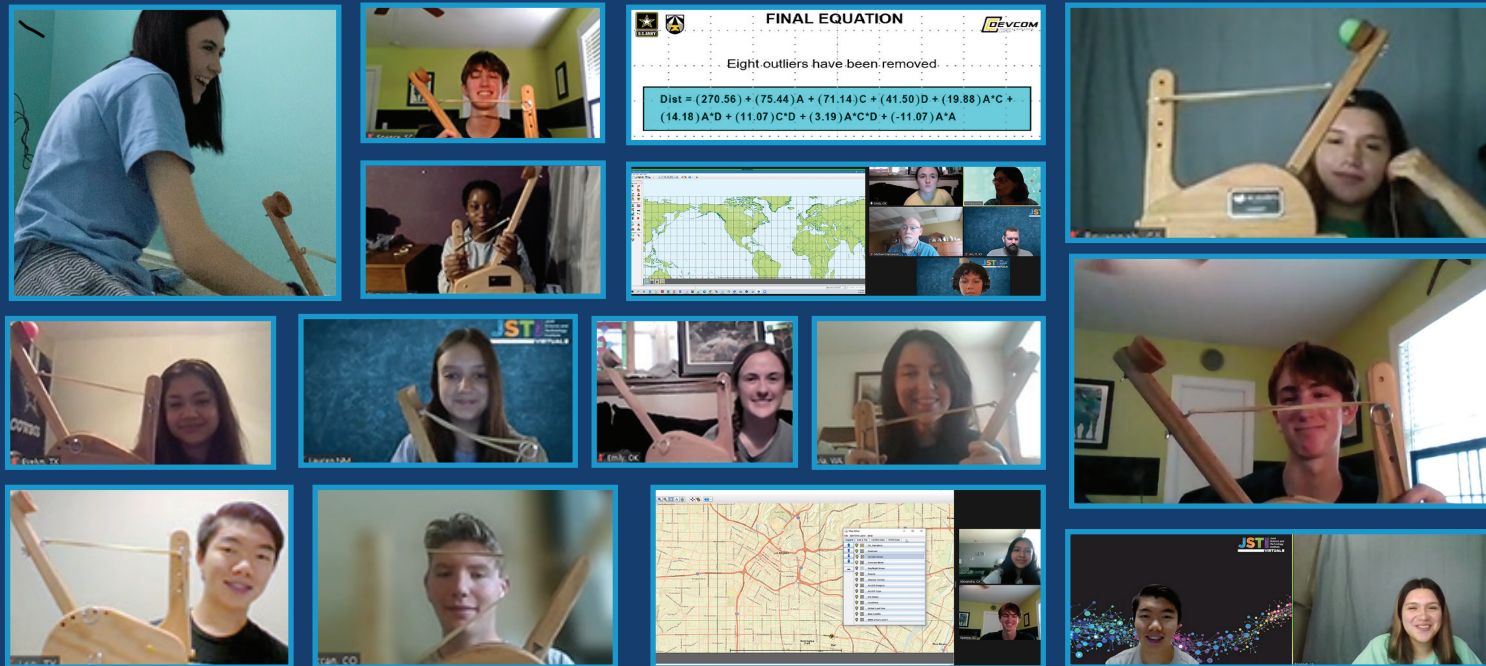
The study of bacteria (microbiology) is a broad field that includes understanding how microorganisms can benefit us, as well as cause us harm through infection. An area where bacteria continue to make important contributions is in biotechnology. For this, processes performed by bacteria, such as cell division, DNA replication and transcription are harnessed to generate new and useful molecules. For example, bacteria can be engineered to produce new drugs used in human medicine and enzymes for industrial processes. In addition to yielding new products that benefit society, biotechnology promises to offer a wide range of career opportunities well into the future. For this program, we will use both on-line activities, as well as hands-on exercises to demonstrate fundamental principles of biotechnology. Beginning with the basics of working with bacteria, we will also explore how the shapes of molecules of life, i.e., DNA and protein, contribute to their function. Next, we will demonstrate how these molecules can be altered, including through the use of PCR and CRISPR, to yield new functions. Since communication is vital to the activity of scientists, we will also emphasize the use of creative ways to share the results of our activities.

**Mentors:** Greg Phillips, Rachael Hart, Sarah DeWolf, Maia Lawson

**Affiliations:** Iowa State University

**Team Members:** Shelby Copeland, Delana Creech, Niyia Fields, Eliana Juarez, Sonika Khosla, Andrew Quinonez, Gavin Rodriguez, Kennedy Shepherd, Aliyah Taylor





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## High School Staff



**Fabiano De Souza**  
Rockville, MD



**Sergio Estrada**  
El Paso, TX



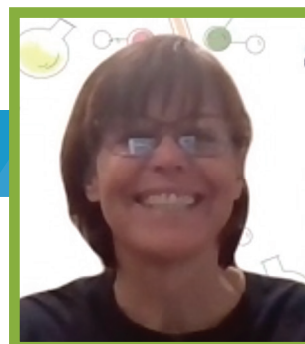
**Erin Havrilak**  
Lenoir City, TN



**Arlene Huber**  
Rio Rancho, NM



**Barbara Mosley**  
Knoxville, TN



**Terri Reeves**  
Somerville, TN



**Edward Rychwalski**  
Abingdon, MD

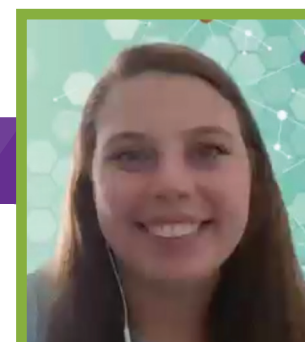


**Jim Taylor**  
Manchester, KY



**Hayley Young**  
Knoxville, TN

## JSTI High School Alumni



**Summer Cook**  
Port Orange, FL



**Melissa Garnes**  
Auburn, AL



**Anna Hilburgh**  
Fort Leonard Wood, MO



**Samantha Wood**  
Lincoln, NE

## ORISE Staff



**Jennifer Tyrell**  
Senior Project Manager



**Kayla Canario**  
Project Manager



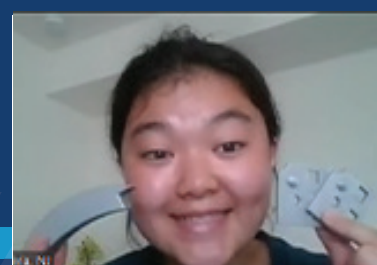
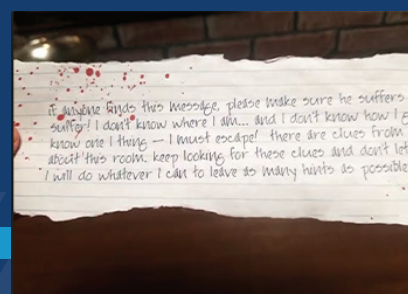
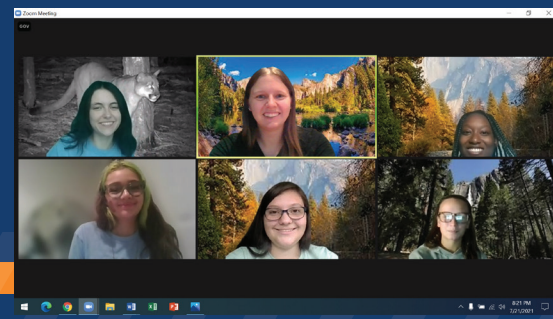
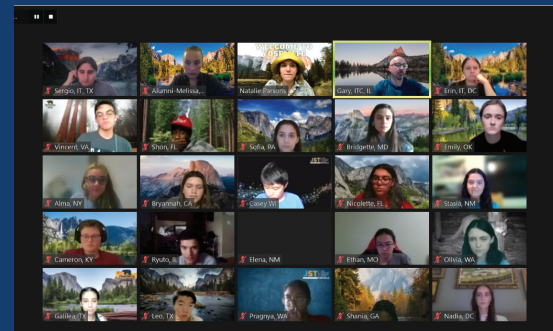
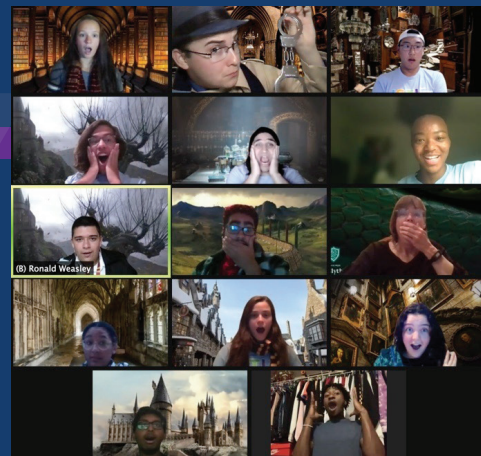
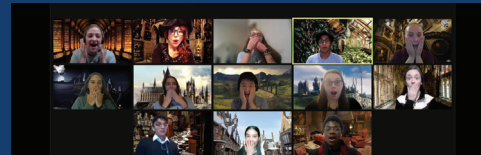
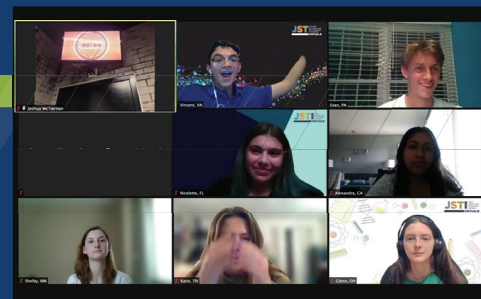
**Karen Brummett**  
Program Specialist



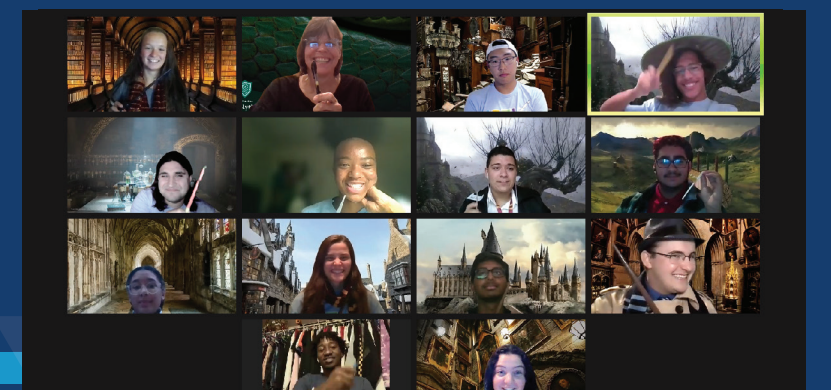
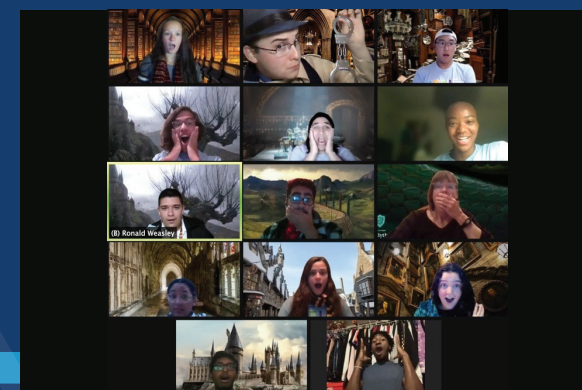
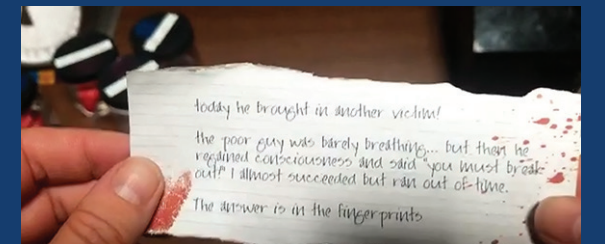
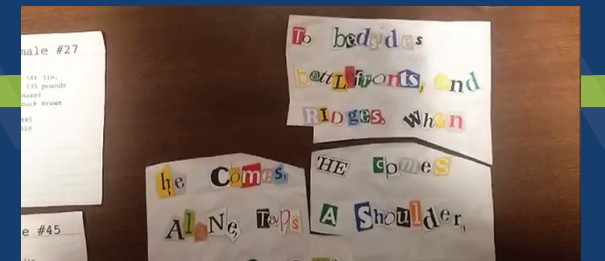
**Gary Cipinko**  
Instructional  
Technology Coordinator



# Activities



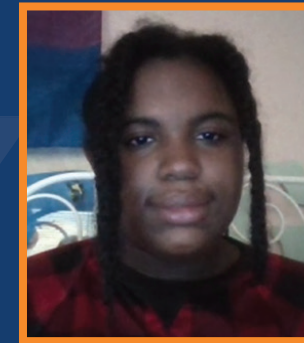
# Activities





# Middle School Students

***“I love doing something new and innovative. I love being able to invent and use trial and error to fix my mistakes. I enjoy coding the Pi and see my code actually work.”***  
***-Lydia Denton***



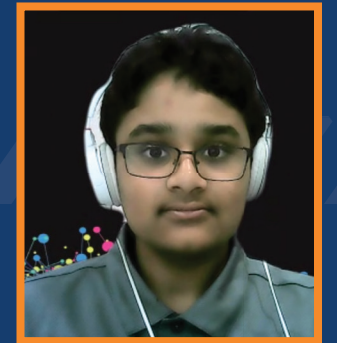
**Gloria Amado**  
Swiftcreek Middle School  
Midlothian, VA



**William Avalos**  
Tygarts Valle  
Middle School  
Mill Creek, WV



**Kylie Babas**  
State College Of Florida  
Collegiate School  
Bradenton, FL



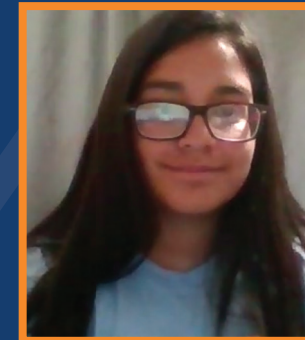
**Rohit Balaji**  
Lionville Middle School  
Downingtown, PA



**Noah Benoit-Jean**  
Keith Valley Middle School  
Horsham, PA



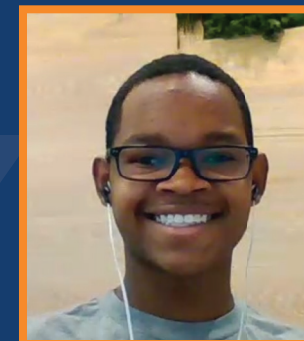
**Adithya Bhaskar**  
Bennett Middle School  
Salisbury, MD



**Rosario Bujanda**  
Royal Intermediate School  
Royal city, WA



**Chance Butler**  
White Oak Middle School  
Silver Spring, MD



**Keyon Cannon**  
Potomac Middle School  
Woodbridge, VA



**Kendall Carr**  
Potomac Middle School  
Woodbridge, VA



**Noah Coleman**  
Woodbridge Middle School  
Woodbridge, VA



**Sabrina Cordero**  
Harmony Science Academy  
El Paso, TX



**Lydia Denton**  
Sallie B Howard School of  
the Arts and Science  
Wilson, NC



**Bailey Dickens**  
Bluegrass Middle School  
Elizabethtown, KY

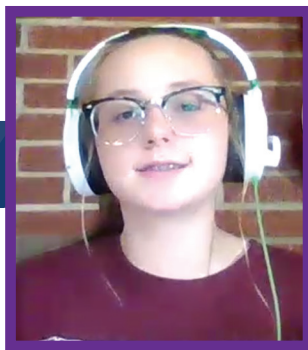


**Charlotte Ellis**  
Virginia Virtual Academy  
Bristow, VA

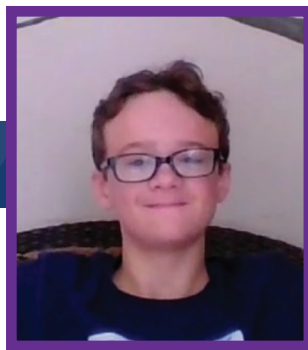


**Jocelyn Ellis**  
Virginia Virtual Academy  
Bristow, VA





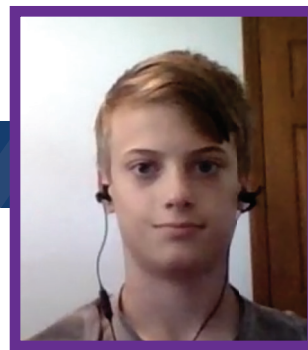
**Olivia Flaminio**  
White County Middle School  
Sparta, TN



**William Giles**  
Lumpkin County  
School System  
Dahlonega, GA



**Lawrence Graley**  
Chiloquin Jr/Sr High School  
Chiloquin, OR



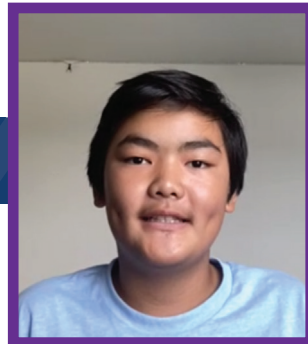
**Michael Grimalovsky**  
Colonia Middle School  
Colonia, NJ



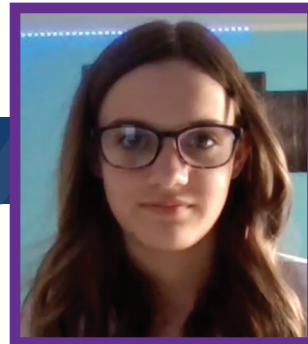
**Hamsini Gudipati**  
International Community School  
Kirkland, MD



**Divonna Hankins**  
State College Of Florida  
Collegiate School  
Bradenton, FL



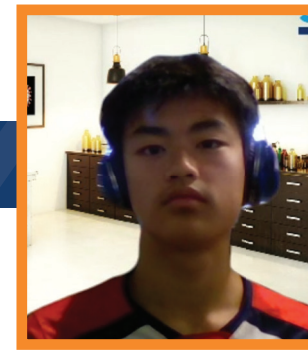
**Joseph Heng**  
Ocean City  
Intermediate School  
Ocean City, NJ



**Katelyn Jeffries**  
Carlin Combined School  
Carlin, NV



**Ryan Kim**  
River Trails Middle School  
Prospect Heights, IL



**Lam Le**  
Discovery Middle School  
Fargo, ND



**Nicolai Libby-Gonzaga**  
Benjamin Tasker  
Middle School  
Bowie, MD



**Justin Little**  
Woodbridge Middle School  
Woodbridge, VA



**Suubi Lutu**  
From the Heart  
Christian School  
Camp Springs, MD



**Madison Madden**  
Broad Creek Middle School  
Swansboro, NC



**Jenna Maghaydah**  
Lansing Middle School  
Ithaca, NY



**Pankhuri Malayanil**  
Hallie Wells Middle School  
Clarksburg, MD



**Catherine Manley**  
West Valley Middle School  
Knoxville, TN



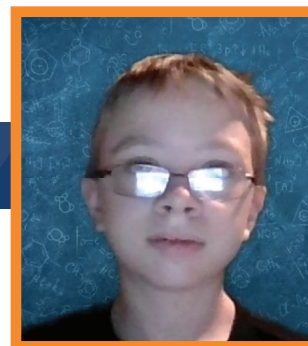
**Trinity McGruder**  
Agassiz IB World  
Chicago, IL



**Sofia Mokhtarzada Blake**  
School Without Walls at  
Francis Stevens  
Washington, D.C.



**Alexander Neff**  
The Epiphany School of  
Global Studies  
Havelock, NC



**Nolen Padgett**  
Lumpkin County  
Middle School  
Dahlonega, GA



**Nivedh Panicker**  
State College of Florida  
Collegiate School  
Parrish, FL



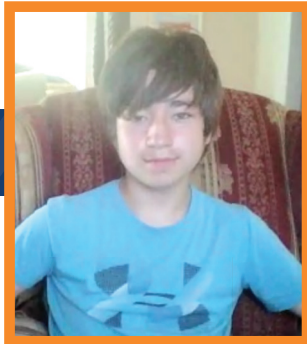
**Julia Perez**  
Santa Fe Indian School/  
Middle School  
Santa Fe, NM



**Kevin Radford**  
Talley Middle School  
Claymont, DE







**Alan Raitt**  
Bulkely Middle School  
Rhinebeck, NY



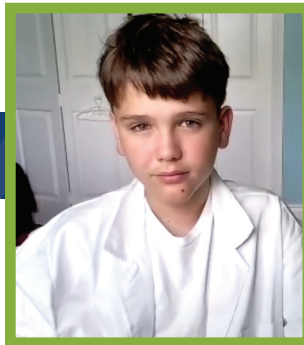
**Gwen Rodriguez**  
Harmony Science Academy  
El Paso, TX



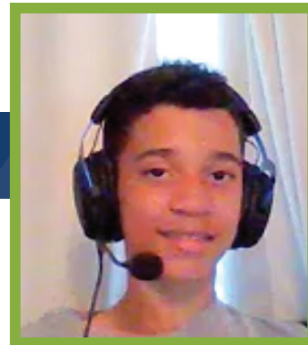
**Audrey Skipworth**  
Mother of Divine Grace  
Bonney Lake, WA



**Henry Stanley**  
Laredo Middle School  
Centennial, CO



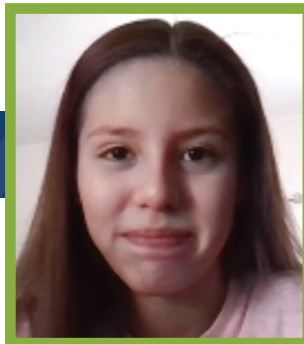
**William Stetson**  
Bak Middle School  
of the Arts  
Jupiter, FL



**Bryce Trotman**  
Norwood Fontbonne  
Academy  
Ambler, PA



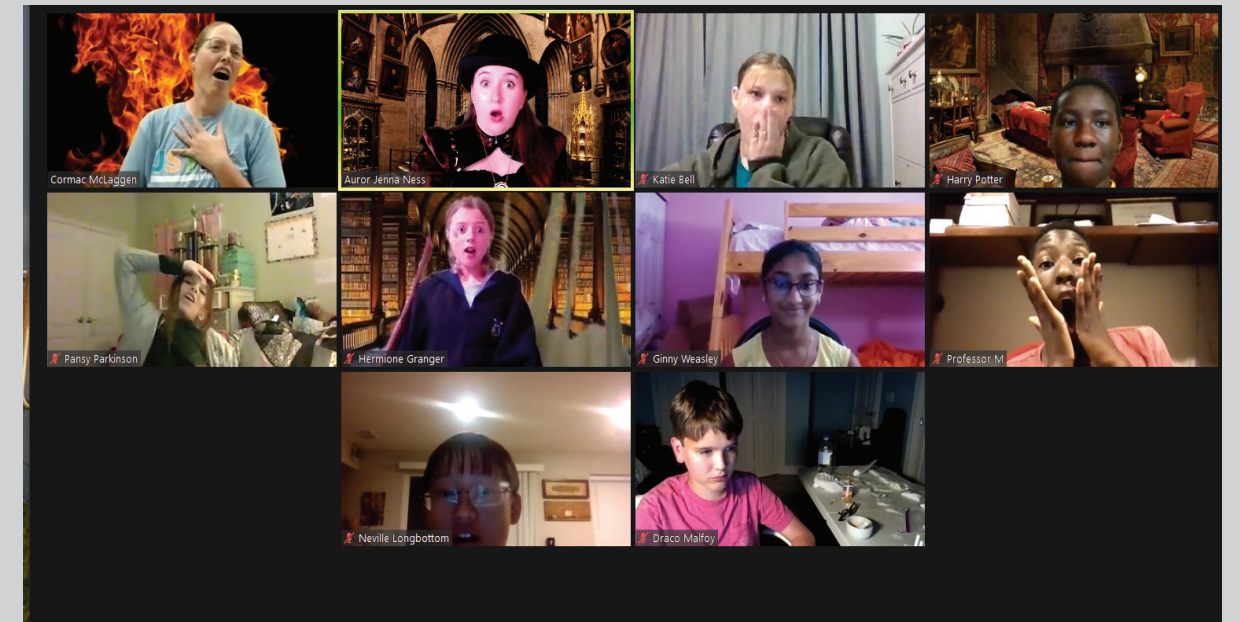
**Kyla Trujillo**  
Santa Fe Indian School  
San Felipe Pueblo, NM



**Shyla Trujillo**  
Santa Fe Indian School  
San Felipe Pueblo, NM



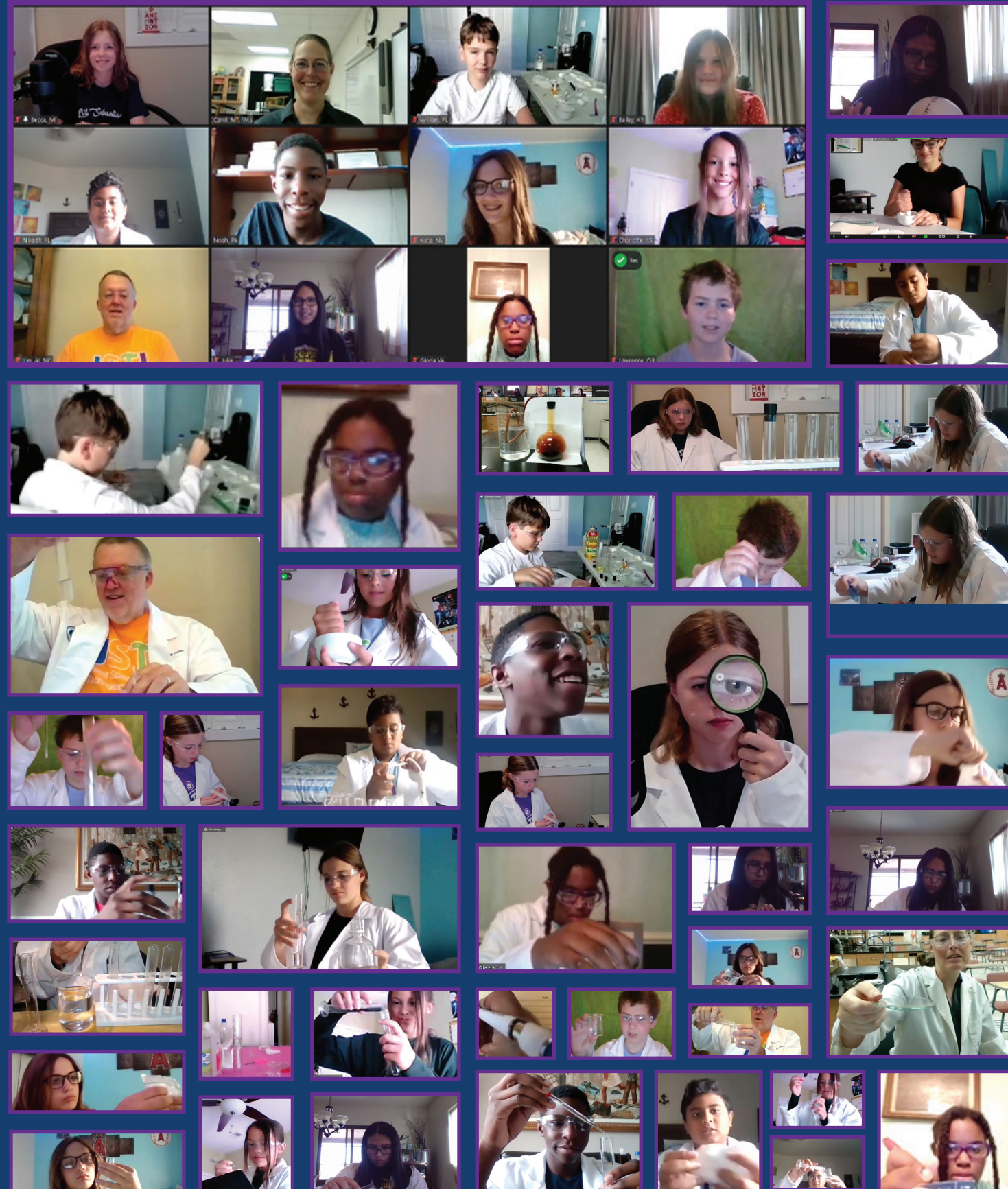
**Rebecca van Lent**  
Forsythe Middle School  
Ann Arbor, MI



***“One of the many things that makes JSTI amazing to me is that it is filled to the brim with hands on activities and that I can be sure to meet other children like me across the United States.”***  
***-William, FL***



## Forensics



## MIDDLE SCHOOL



## Forensics

Our forensic science adventure will start with learning and practicing the skills involved in analytical observation, identifying substances through chemical reactions, chromatography and computer data, taking and evaluating fingerprints and we will finish with a mystery that can only be solved by applying these new skills.

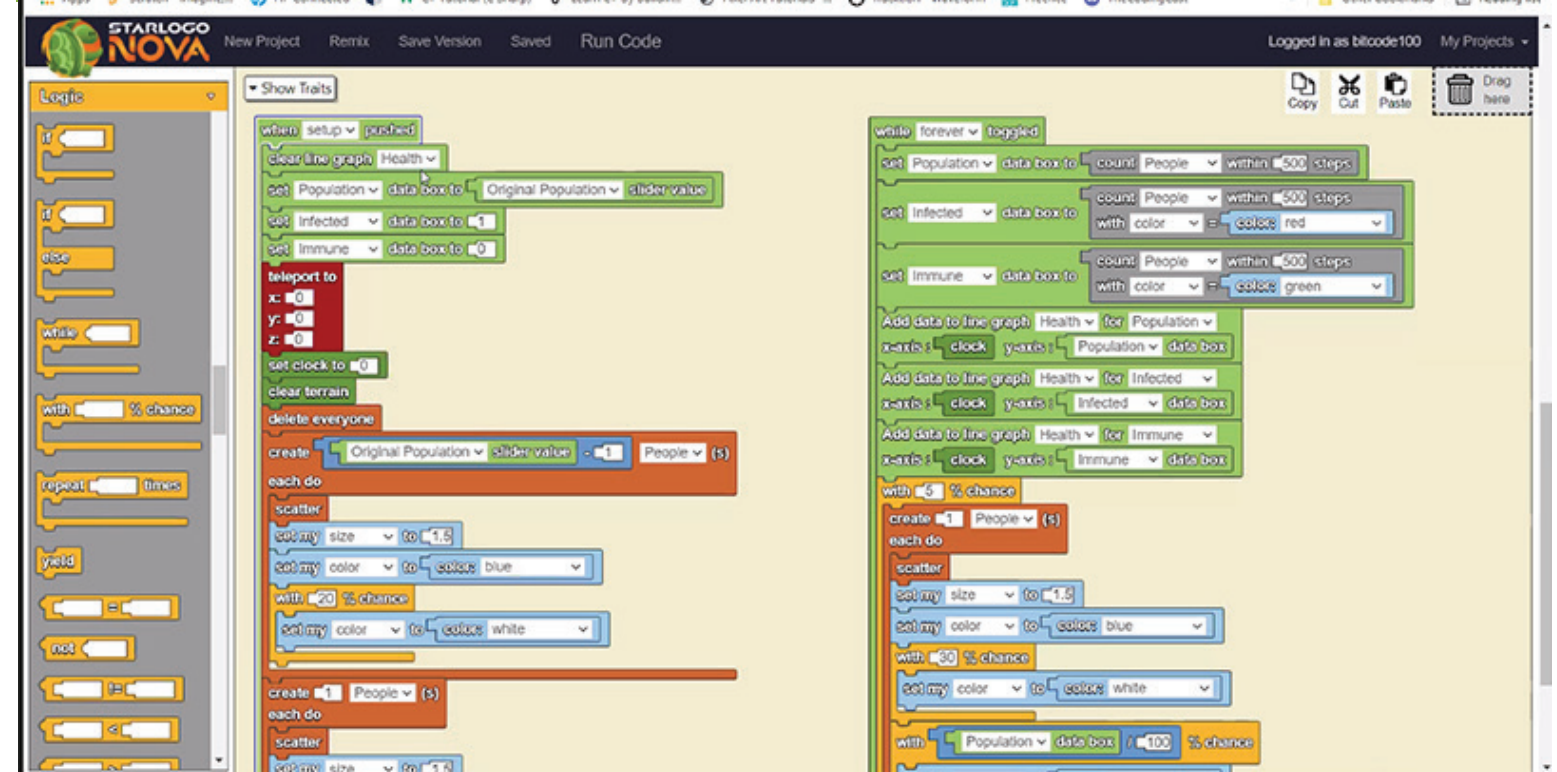
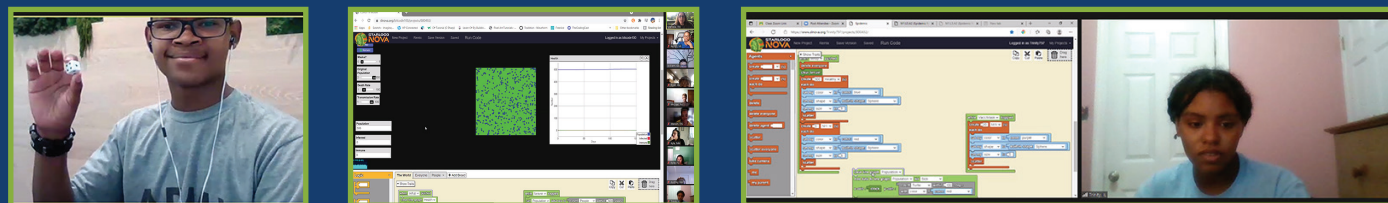
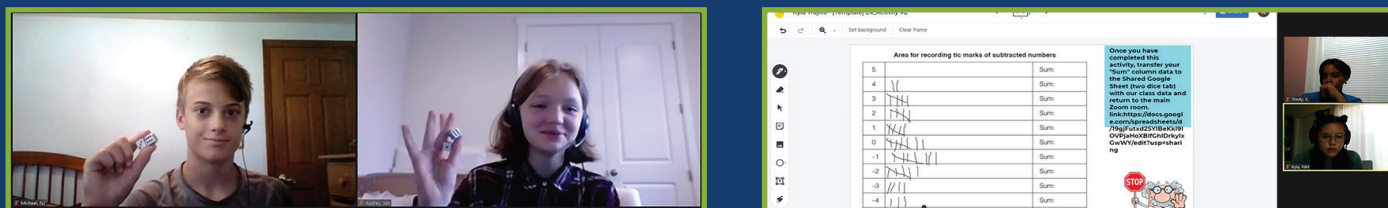
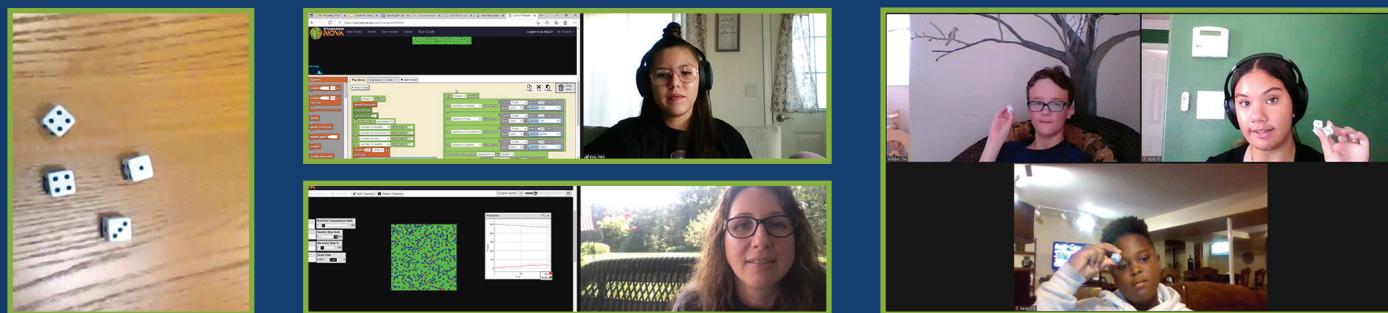
**Master Teacher:** Carol Ochsner

**Assistant Instructor:** Jim Davis

**Team Members:** Gloria Amado, Noah Benoit-Jean, Bailey Dickens, Charlotte Ellis, Lawrence Grale, Katelyn Jeffries, Nivedh Panicker, Julia Perez, William Stetson, Rebecca Van Lent



# Computer Science and Modeling



# Computer Science and Modeling

Student will participate in an integrated science and computer science project. Students will learn to utilize various lenses to examine problems and determine solutions, develop and use StarLogo Nova computer models that help answer questions through scientific inquiry, and use critical thinking to assess which ideas are reasonable and which are not.

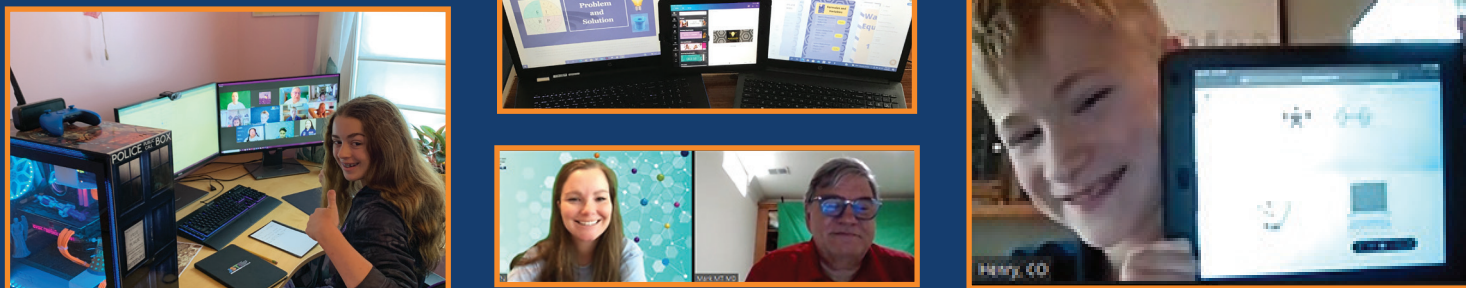
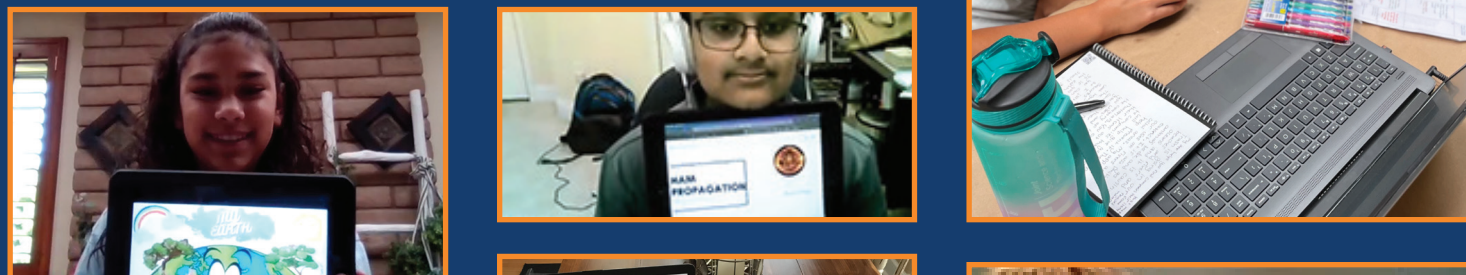
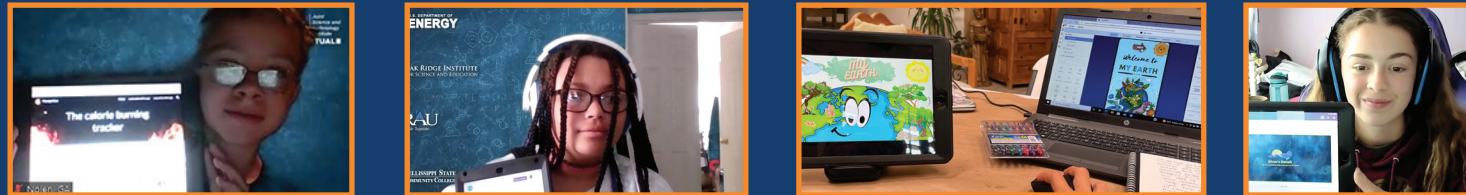
**Master Teacher:** Marcela St. Onge

**Assistant Instructor:** Manon Fleming

**Team Members:** Kylie Babas, Keyon Cannon, William Giles, Michael Grimalovsky, Ryan Kim, Trinty Mcgruder, Kevin Radford, Audrey Skipworth, Kyla Trujillo



## App Design



## App Design

The students will learn the basics of graphic design and web and app development using Canva, Google Sites, and Thunkable. They will then use this new skill set plus their entrepreneurial skills to create an app and service that will help solve a problem in their community.

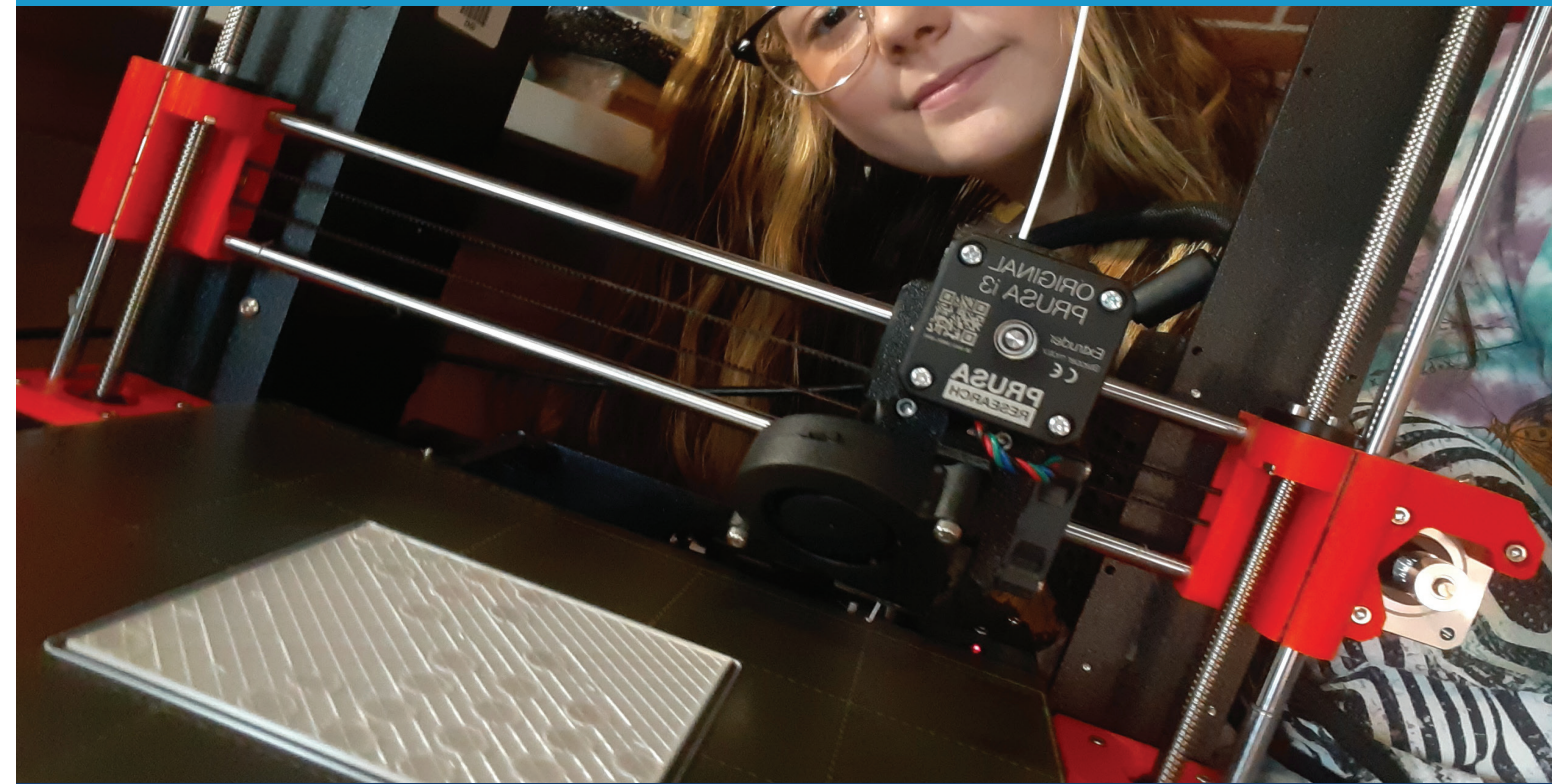
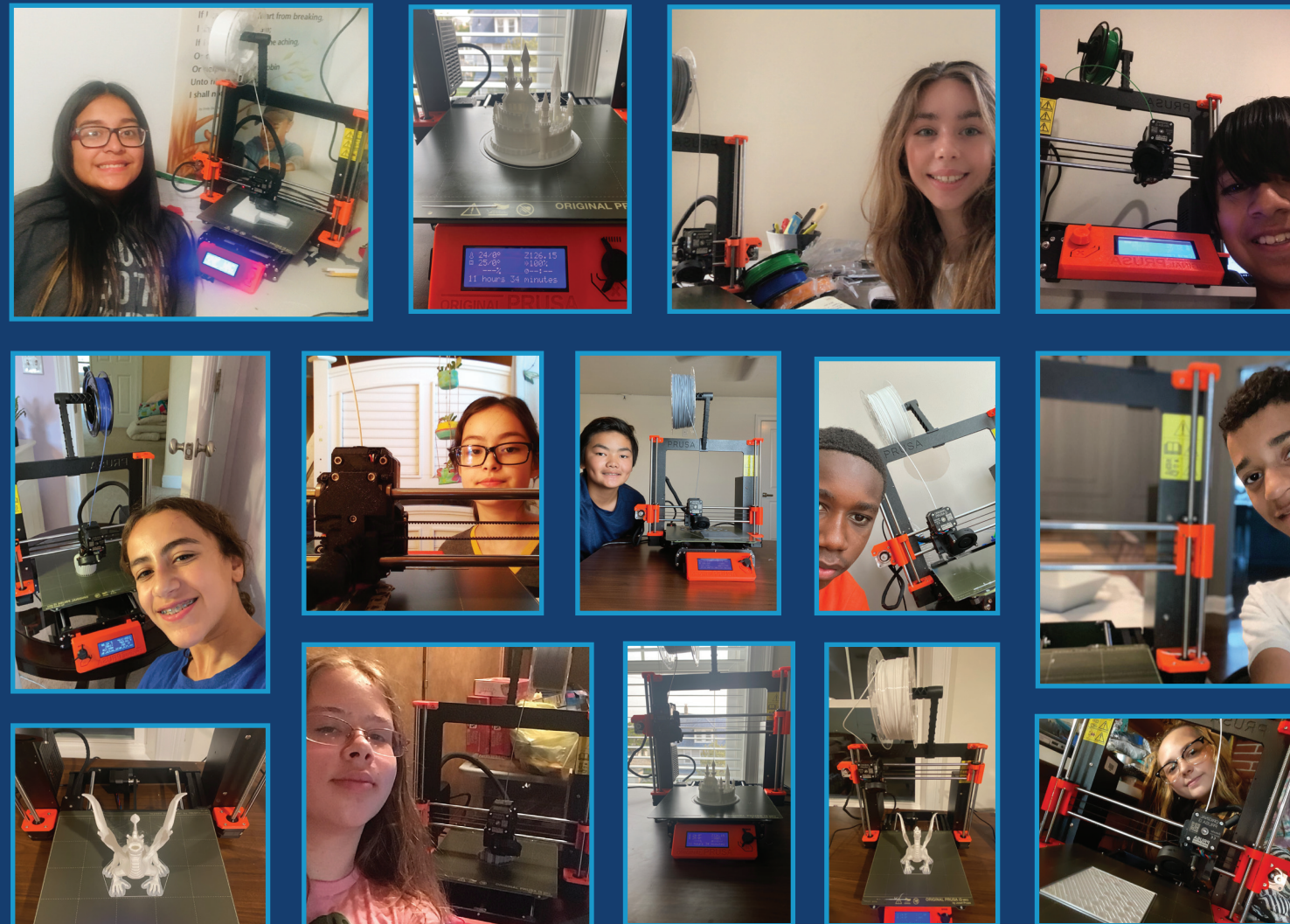
**Master Teacher:** Mark Rubin

**Assistant** Shannon Turner  
**Instructor:**

**Team** Rohit Balaji, Kendall Carr, Jocelyn Ellis, Divonna Hankins, Justin Little, Madison Madden,  
**Members:** Catherine Manley, Nolen Padgett, Gwen Rodriguez, Henry Stanley



## 3D Printing



## 3D Printing

During the first week of the course, students will learn basic 3D modeling skills, such as creating objects, aligning, scaling, rotating, and grouping. Students will then progress to computer aided designs (CAD) that integrate more complex functions of the CAD program (e.g., adjusting the XYZ axes, using calipers to determine real world scaling of models, converting 3D designs to .STL files, exporting files, etc.). As students gain confidence in their 3D modeling skills, they will be introduced to 3D printing using the objects from their own designs. Students will utilize a slicer program to prepare their .STL files for printing. As the course moves into the second week, the focus will shift to using their CAD and printing skills to create and 3D print a functional assistive tool or instrument for humans or animals with a disability. Student teams of two will gain empathy for others and will work together to research and identify assistive needs with their schools, homes, families, or communities to improve the daily life of another human, an animal, or even a plant. Students will each show off their newly acquired skills and will produce a short video documenting their experiences in the course and highlights of their project development and outcomes.

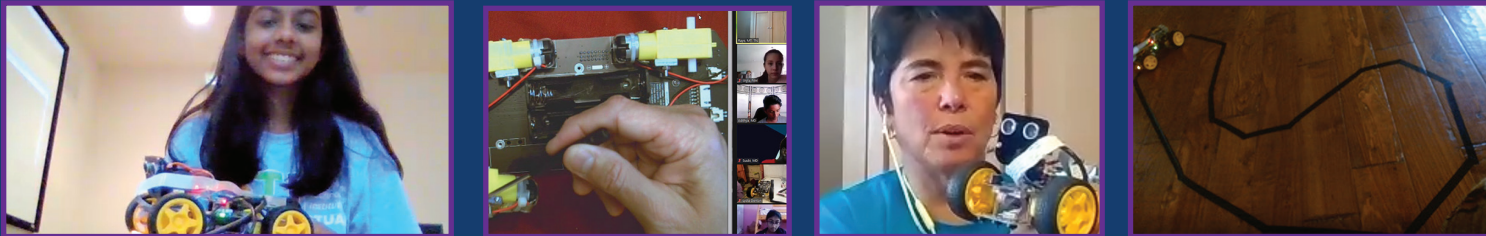
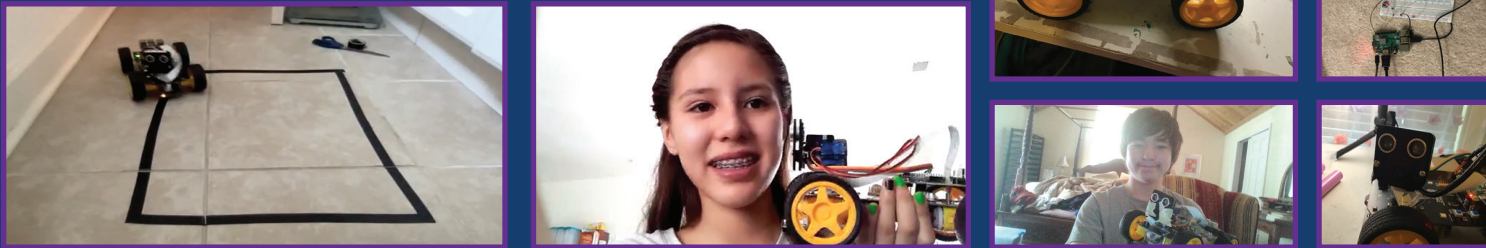
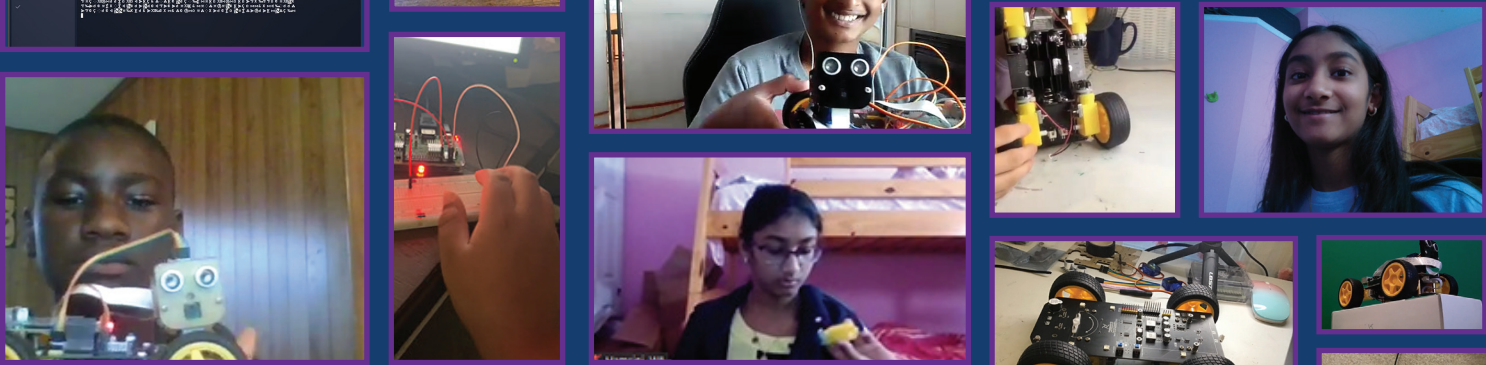
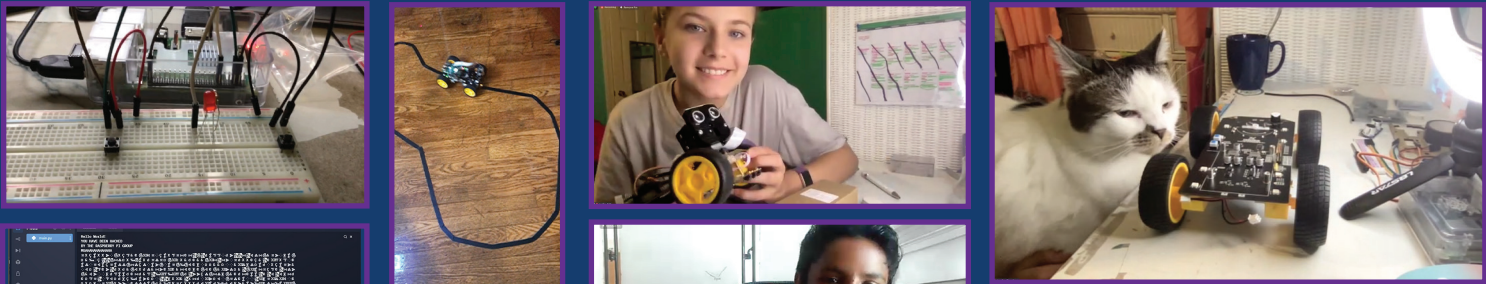
**Master Teacher:** Kristy Hutson

**Assistant Instructor:** Vincent Jodoin

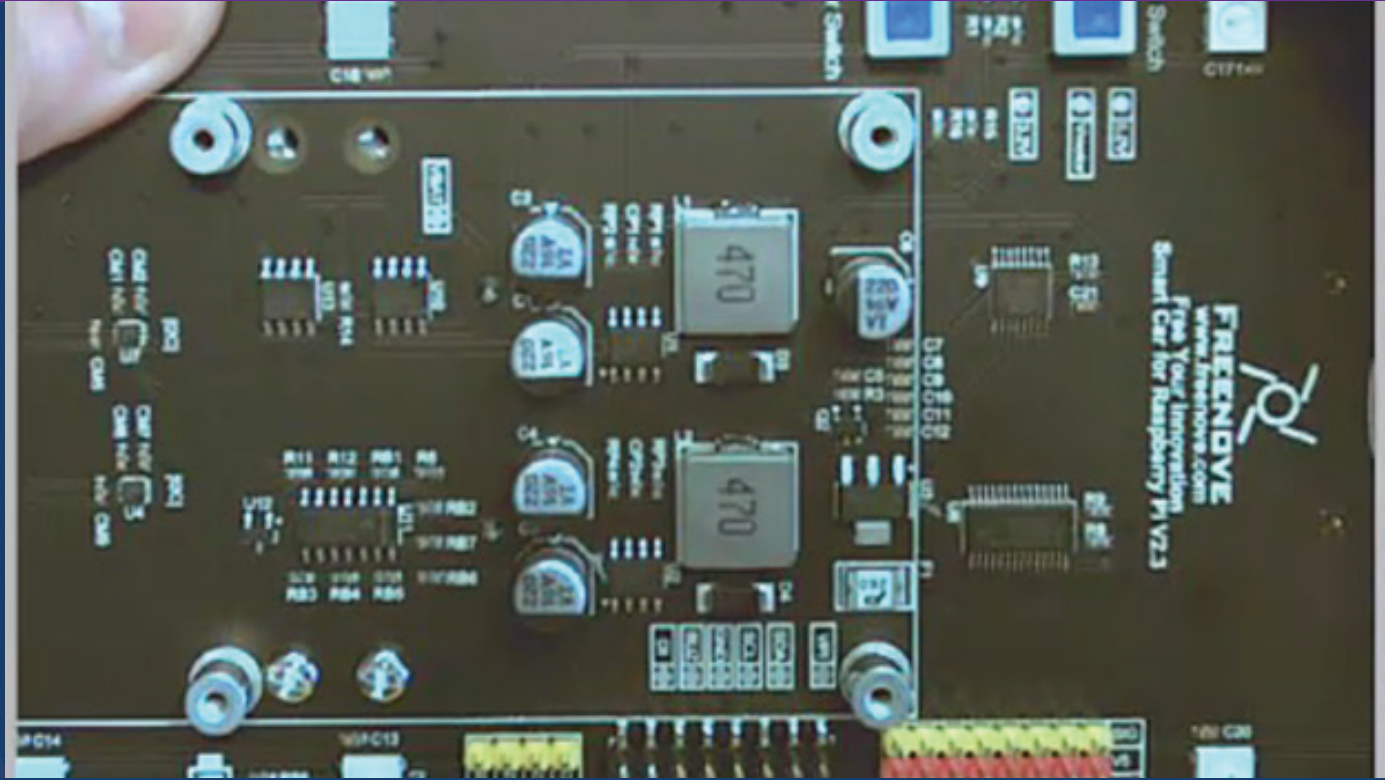
**Team Members:** William Avalos, Rosario Bujanda, Sabrina Cordero, Olivia Flaminio, Joseph Heng, Nicolai Libby-Gonzaga, Jenna Maghaydah, Sofia Mokhtarzada Blake, Alexander Neff, Bryce Trotman



## Raspberry Pi



## MIDDLE SCHOOL



## Raspberry Pi

In this course, students will connect a Raspberry Pi to a monitor, a standard keyboard, and mouse, to discover what it is capable of doing, and see that it can do everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to playing games. They can also use it for future tasks like making spreadsheets or word-processing. It can also be used as a data collection tool for science and to make customizable electronic gadgets. The students will use a breadboard, wiring, resistors, and LEDs to learn basic coding and electronic circuitry. They will build a smart car robot, controlled by a Raspberry Pi, that uses sensors to learn its capabilities with interacting with the outside world. Students will discuss cybersecurity and its impact to their world. And finally, they will be given an opportunity to discover more projects using their raspberry pi, including coding music with Sonic Pi.

**Master Teacher:** Raye Pedigo

**Assistant Instructor:** Neal Dexter

**Team Members:** Adithya Bhaskaran, Chance Butler, Noah Coleman, Lydia Denton, Hamsini Gudipati, Lam Le, Suubi Lutu, Pankhuri Malayanil, Alan Raitt, Shyla Trujillo



# Middle School Staff



**Jim Davis**  
Waynesville, NC



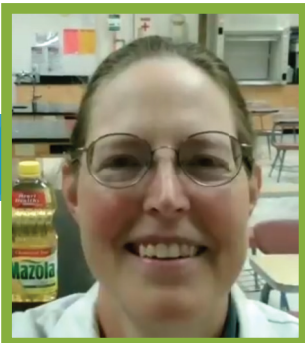
**Neal Dexter**  
Hixson, TN



**Kristy Hutson**  
Knoxville, TN



**Vincent Jodoin**  
Grand Island, NE



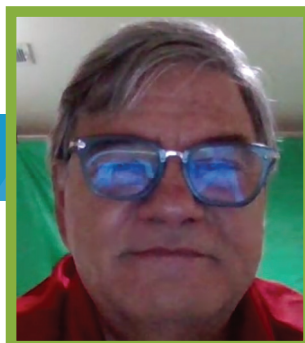
**Carol Ochsner**  
Monroe, WI



**Raye Pedigo**  
White Pine, TN



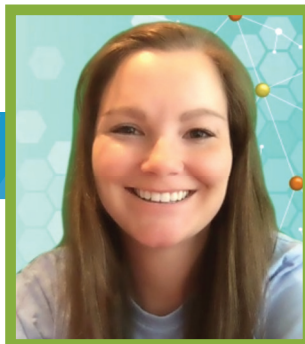
**Manon Fleming**  
Knoxville, TN



**Mark Rubin**  
Annapolis, MD



**Marcela St. Onge**  
Oakdale, TN



**Shannon Turner**  
Hendersonville, TN

# ORISE Staff



**Jennifer Tyrell**  
Senior Project Manger



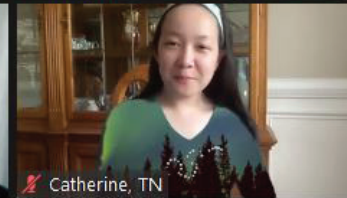
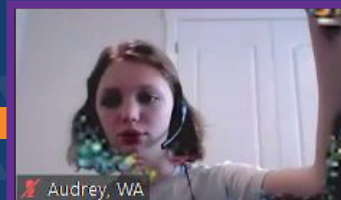
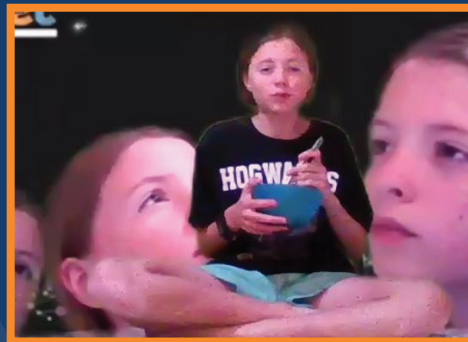
**Kayla Canario**  
Project Manager



**Karen Brummett**  
Program Specialist

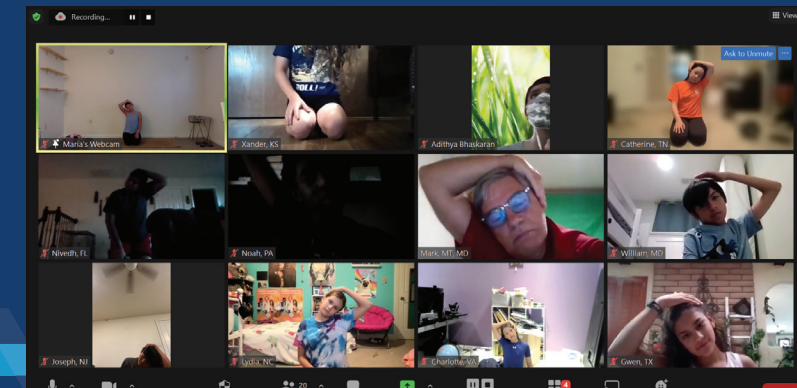
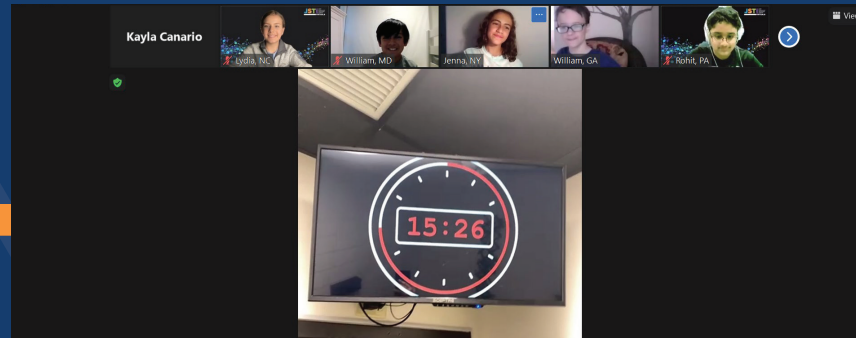
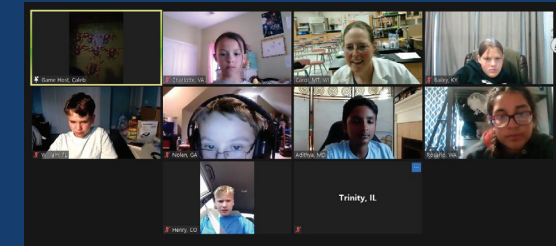
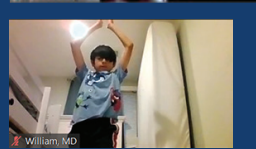
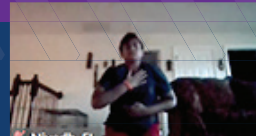
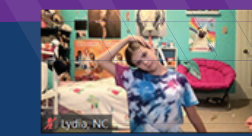


**Gary Cipinko**  
Instructional  
Technology Coordinator

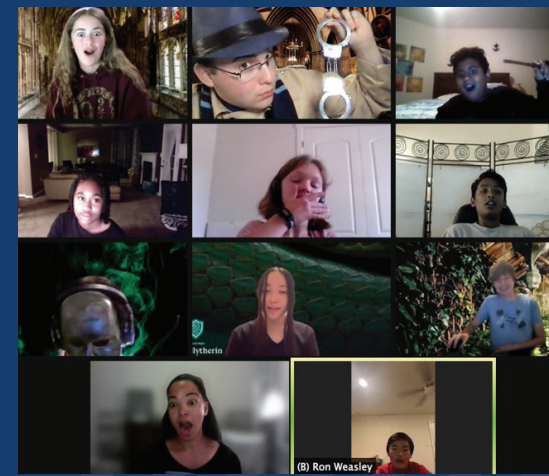
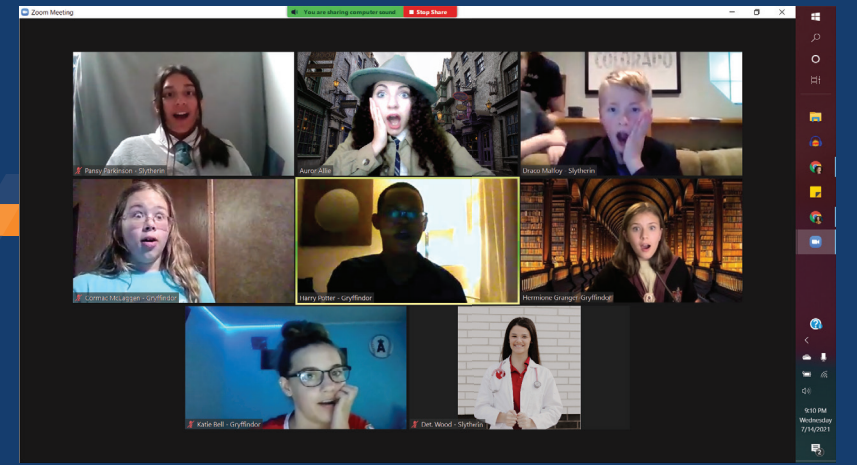
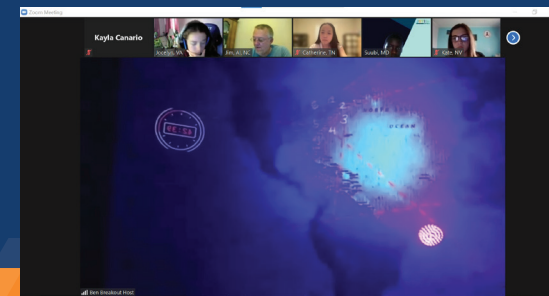
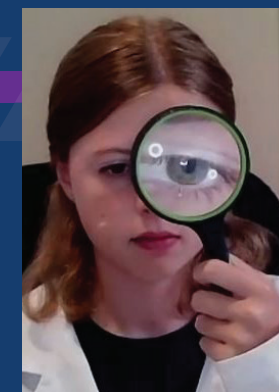
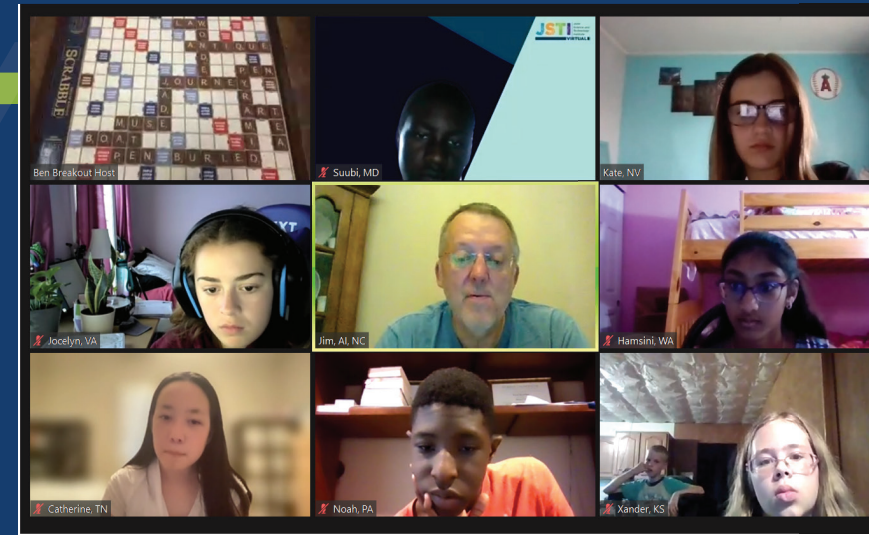




# Activities



# Activities





# Many Thanks

*In order to make this experience possible,  
we would like to thank the following organizations.*



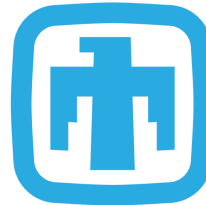
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