

REGENERON

**ISEF**

A PROGRAM OF  
SOCIETY FOR SCIENCE

**DALLAS | 2023**

# **FUTURE FORWARD**

**REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR**  
May 13–19, 2023

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# Welcome from Regeneron



## REGENERON

### **George D. Yancopoulos, M.D., Ph.D.**

Co-founder, President & Chief Scientific Officer  
Science Talent Search 1976

### **Leonard S. Schleifer, M.D., Ph.D.**

Co-founder, President & Chief Executive Officer  
Science Talent Search 1970

Dear Finalists,

Congratulations on being a 2023 Regeneron International Science and Engineering Fair (ISEF) finalist. We hope your ISEF experience lives up to your expectations of this distinguished competition. Many brilliant and important STEM leaders have passed through ISEF's halls, and now you are among this next generation of inventors, entrepreneurs and educators. We are proud of all that you have accomplished.

Regeneron is honored to sponsor ISEF, shining a light on the world's top young science talent and the critical role you and your science can play in addressing our world's most important challenges. Supporting ISEF is a natural extension of Regeneron's mission to use science to improve human health.

We both got our start with science research in high school, as part of the then Westinghouse Science Talent Search (STS), now known as the Regeneron STS, the oldest science and math competition for high school seniors in the United States.

It was this positive experience that helped set us on our paths and gave us the confidence to become physician-scientists and entrepreneurs. Since founding our biotechnology company 35 years ago, we have worked to turn groundbreaking science into medicines that improve human lives, including our treatments for blindness-causing diseases, numerous cancers, allergic diseases and Ebola. In this spirit, we are committed to supporting the young scientists who will keep improving our world and public health for generations to come.

We believe that you will be making the important discoveries of tomorrow.

We look forward to learning about your projects during ISEF and watching as you spend the week celebrating innovation, competing for top honors and making friends.

At Regeneron, we've built a culture that shares much of this energy—one of curiosity, scientific excellence and camaraderie. Our dream was to create a company where scientists are the heroes. Your work at ISEF helps extend this dream even further: you are our heroes, and we can't wait to see what you do next to improve the world! Congratulations once again, and good luck in all your future endeavors.

Sincerely,

### **Leonard S. Schleifer, M.D., Ph.D.**

Co-founder, President & Chief Executive Officer  
Science Talent Search 1970

### **George D. Yancopoulos, M.D., Ph.D.**

Co-founder, President & Chief Scientific Officer  
Science Talent Search 1976

# Welcome from Society for Science



## SOCIETY FOR SCIENCE

**Maya Ajmera**  
President & CEO  
Executive Publisher, Science News  
Science Talent Search 1985

Congratulations on being a finalist at the Regeneron International Science and Engineering Fair 2023!

Society for Science is so excited to be able to host everyone together, in person, for the first time since 2019. Our world has changed tremendously since we were last all together. Of course, the pandemic, war and civil unrest have impacted us all, but we have also seen dramatic changes in science and technology, from vaccines to new discoveries in our galaxy to the breathtaking speed in which artificial intelligence has impacted our lives.

The work that you are doing as a top student scientist or engineer has the power to change lives. You are truly among an elite group. Tens of millions of students compete in science fairs every year around the globe, with only about 1,800 students invited to join us as a finalist. Alumni have gone on to win some of the most prestigious awards, including the Nobel Prize and MacArthur Fellowships; they have gone on to launch companies and they have gone on to academia to teach the next generation of scientists and engineers.

While you are here, I encourage you to take advantage of everything that Regeneron ISEF has to offer. The nearly \$9 million being given away in awards this week is not the only benefit of attending Regeneron ISEF. The real prize is the opportunity to connect with so many young scientists and engineers from around the world. Many alumni stay in touch with one another, developing not only lifelong friendships, but also collaborating professionally later in life.

I also look forward to meeting you—the top young innovators from around the world—to hear more about your ideas and research. When I was a high school student, I participated in science fairs—I understand the hard work and sweat equity that has gone into each and every project on display here this week.

It's extraordinarily exciting to think about the fact that the projects being judged here this week seek to take on and solve some of our world's greatest challenges. You are tomorrow's problem solvers, and the stewards of our future.

Please enjoy this week and celebrate your accomplishments. I also encourage you to thank the people who helped you get here—your teachers, parents and mentors who supported you through the years. It takes a true community to develop talent like yours!

The Society for Science would like to thank all our sponsors including our title sponsor, Regeneron, judges and volunteers who make this event possible, as well as the people who work so diligently to organize science fairs around the world.

I hope all of you have a wonderful time at Regeneron ISEF 2023, and we hope to see you all next year in Los Angeles, California, for Regeneron ISEF 2024!

Only my best,

A handwritten signature in black ink that reads "Maya Ajmera". The signature is fluid and cursive, with a prominent initial 'M'.

**Maya Ajmera**  
President & CEO  
Society for Science  
Executive Publisher, Science News  
Science Talent Search 1985

# REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR



## ABOUT REGENERON ISEF

The Regeneron International Science and Engineering Fair (Regeneron ISEF), a program of Society for Science for over 70 years, is the world's largest global science competition for high school students. Through an international network of local, regional and national science fairs, millions of students are encouraged to explore their passion for scientific inquiry. Each spring, a group of these students is selected as finalists and offered the opportunity to compete for nearly \$9 million in awards and scholarships.

In 2019, Regeneron became the title sponsor of ISEF to help reward and celebrate the best and brightest young minds globally and encourage them to pursue careers in STEM as a way to positively impact the world. Regeneron ISEF is supported by a community of additional sponsors, including Akamai Foundation, Beal Bank, Gordon and Betty Moore Foundation, Howmet Aerospace Foundation, Jacobs, King Abdulaziz & his Companions Foundation for Giftedness & Creativity, Lyda Hill Philanthropies, Microsoft, National Geographic Society, Perot Museum of Nature and Science, Richard F. Caris Charitable Trust II, Rise, Robert I. Schattner Foundation, Siemens Energy, Texas A&M University, Cesco Linguistic Services, Insaco, Oracle Academy, Southern Methodist University, The University of Texas at Dallas, Army ROTC, ExxonMobil and The Hogle Foundation.

ISEF alumni have gone on to have world-changing careers in science and engineering and have earned some of the most esteemed honors. Our alumni include National Medal of Science recipients, MacArthur Foundation Fellows, National Academy of Sciences and National Academy of Engineering inductees and a range of entrepreneurs.

Learn more at <https://www.societyforscience.org/isef>

# Social Media

## USE #REGENERONISEF

Share your photos and videos to join the conversation.

Enjoy all the best Regeneron ISEF highlights:



twitter.com/**regeneron**  
twitter.com/**society4science**



instagram.com/**regeneron**  
instagram.com/**society4science**



facebook.com/**regeneron**  
facebook.com/**societyforscience**



@**society4science**

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**SOCIETY FOR SCIENCE**

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# Grand Awards 2023

## GRAND AWARDS AT REGENERON ISEF 2023

### **George D. Yancopoulos Innovator Award: \$75,000**

The George D. Yancopoulos Innovator Award recognizes the Best of the Best among the outstanding students from around the world who participate in Regeneron ISEF. The winning project will be selected on the basis of outstanding and innovative research, as well as on the potential impact of the work — in the field and on the world at large.

### **Regeneron Young Scientist Awards: \$50,000**

This award will be presented to two projects that are best able to demonstrate their commitment to innovation in tackling challenging scientific questions, using authentic research practices and creating solutions to the problems of tomorrow.

### **Gordon E. Moore Award for Positive Outcomes for Future Generations: \$50,000**

This award will be presented to the project that best demonstrates the founding principle of the Gordon and Betty Moore Foundation to make an enduring difference for future generations through rigorous scientific inquiry and a passion for discovery and invention.

### **Craig R. Barrett Award for Innovation: \$10,000**

This award will be presented to the project that best demonstrates an innovation in Science, Technology, Engineering and Math, recognizing that research and innovation are dependent on the integration of these disciplines, as well as the impact they collectively have on our everyday lives.

### **Peggy Scripps Award for Science Communication: \$10,000**

This award will be presented to the project that is best able to communicate their project to the lay public, explaining both the science and its potential impact on society.

### **H. Robert Horvitz Prize for Fundamental Research: \$10,000**

This award will be presented to the project that represents the best in fundamental research that furthers our understanding of science and/or mathematics and promotes the understanding of natural phenomena without clearly defined applications towards processes or products in mind.

### **Dudley R. Herschbach SIYSS Award**

This award is a multi-disciplinary seminar inspiring youth to science, highlighting some of the most remarkable achievements by young scientists around the world. The award is named for Dudley R. Herschbach, Harvard Professor Emeritus and 1986 Nobel Laureate in Chemistry. He is Board Chairman Emeritus of the Society for Science. The winning finalists will receive an all-expense paid trip to attend the Stockholm International Youth Science Seminar, which includes attendance at the Nobel Prize Ceremonies in Stockholm, Sweden.

### **EU Contest for Young Scientists Award**

This award will be presented to two projects that will represent Regeneron ISEF at the EU Contest for Young Scientists to be held in Brussels, Belgium, September 12–17, 2023.



# Category Sponsors

## CATEGORY AWARDS SPONSORS AT REGENERON ISEF 2023

- **Animal Sciences**  
Society for Science
- **Behavioral and Social Sciences**  
Society for Science
- **Biochemistry**  
Regeneron
- **Biomedical and Health Sciences**  
Regeneron
- **Biomedical Engineering**  
Society for Science
- **Cellular and Molecular Biology**  
Regeneron
- **Chemistry**  
Beal Bank
- **Computational Biology and Bioinformatics**  
Regeneron
- **Earth and Environmental Sciences**  
National Geographic Society
- **Embedded Systems**  
Microsoft
- **Energy: Sustainable Materials and Design**  
Siemens Energy
- **Engineering Technology: Statics and Dynamics**  
Howmet Aerospace Foundation
- **Environmental Engineering**  
Jacobs
- **Materials Science**  
Howmet Aerospace Foundation
- **Mathematics**  
Akamai Foundation
- **Microbiology**  
Robert I. Schattner Foundation
- **Physics and Astronomy**  
Richard F. Caris Charitable Trust II
- **Plant Sciences**  
Society for Science
- **Robotics and Intelligent Machines**  
Regeneron
- **Systems Software**  
Microsoft
- **Translational Medical Science**  
Regeneron

# ISEF Special Award Organizations

**Special Award Organizations—representing a wide variety of scientific disciplines—provide awards, scholarships, internship and prizes to hundreds of ISEF finalists.**

**Thank you to these organizations!**

Acoustical Society of America

Air Force Research Laboratory on behalf of the United States Air Force

American Chemical Society

American Committee for the Weizmann Institute of Science

American Mathematical Society

American Psychological Association

Arizona State University

Association for Computing Machinery

Association for the Advancement of Artificial Intelligence

Central Intelligence Agency

China Association for Science and Technology

Drug, Chemical & Associated Technologies Association

Florida Institute of Technology

Fondazione Bruno Kessler

IEEE Foundation

International Council on Systems Engineering

K. Soumyanath Memorial Award

King Abdulaziz & his Companions Foundation for Giftedness & Creativity

Lawrence Technological University

London International Youth Science Forum CIC

Long Island University

Missouri University of Science and Technology

# ISEF Special Award Organizations

Mu Alpha Theta, National High School  
and Two-Year College Mathematics Honor Society

National Anti-Vivisection Society

National Geographic Society

National Oceanic and Atmospheric Administration

National Security Agency Research Directorate

National Taiwan Science Education Center

NC State College of Engineering

Office of Naval Research on behalf of the United States Navy and Marine Corps

Patent and Trademark Office Society

Qorvo

Ricoh USA, Inc

SAE International

Serving Society Through Science

Shanghai Youth Science Education Society

Sigma Xi, The Scientific Research Honor Society

The Potamkin Prize for Students

TÜBİTAK: The Scientific and Technological Research Institution of Türkiye

United States Agency for International Development

United States Environmental Protection Agency

University of Arizona

University of North Texas at Dallas

University of Texas at Arlington

University of Texas at Dallas

Westlake University

Wolfram Research, Inc.

YM American Academy

attend the  
**OPENING  
CEREMONY**

**REGENERON**  
**ISEF**  
A PROGRAM OF  
SOCIETY FOR SCIENCE  
**DALLAS | 2023**

**May 15, 2023, 7:00 p.m.**

Hear from top STEM executives making an impact on our world.



**MICHAEL S.  
BROWN**

- Distinguished Chair in Biomedical Sciences, University of Texas Southwestern Medical Center
- Nobel Prize in Physiology or Medicine 1985



**CLAUDIA  
JARAMILLO**

- Executive Vice President for Strategy and Development, Jacobs



**MAYA  
AJMERA**

- President & CEO, Society for Science
- Executive Publisher, Science News
- STS 1985



**HOPE  
SHIMABUKU**

- Regional Director, Texas Regional USPTO



**LINDA  
SILVER**

- Eugene McDermott Chief Executive Officer, Perot Museum of Nature and Science

# EXCELLENCE IN SCIENCE AND TECHNOLOGY PANEL

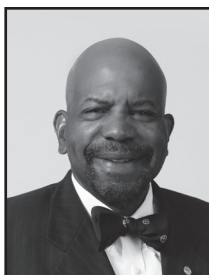
May 16, 2023, 2:00 p.m.

Sponsored by Society for Science



## ELISSA HALLEM

- Professor and Vice Chair for Graduate Studies, Department of Microbiology, Immunology and Molecular Genetics, UCLA
- MacArthur Fellowship 2012



## CATO LAURENCIN

- University Professor, University of Connecticut
- Chief Executive Officer, The Cato Laurencin Institute for Regenerative Engineering, University of Connecticut
- National Medal of Technology and Innovation 2016

## Moderated by



## RICHARD HARRIS

- Journalist
- Author, "Rigor Mortis: How Sloppy Science Creates Worthless Cures, Crushes Hope, and Wastes Billions"



## W.E. MOERNER

- Harry S. Mosher Professor of Chemistry and Professor by Courtesy of Applied Physics, Stanford University
- Nobel Prize in Chemistry 2014



## KIM ORTH

- Earl A. Forsythe Chair in Biomedical Science, UT Southwestern Medical Center
- Investigator, Howard Hughes Medical Institute
- National Academy of Sciences 2020



# INNOVATION, ENTREPRENEURSHIP AND IMPACT PANEL

May 16, 2023, 1:00 p.m. Sponsored by Rise



## CATHERINE HAVASI

- Chief of Innovation and Technology Strategy, Babel Street
- Co-founder of Luminoso Technologies, Inc.
- STS 1999; ISEF 1998–1999



## JONAH KALLENBACH

- Co-founder & CEO, Reverie Labs
- STS 2013, ISEF 2011–2012

## Moderated by



## MAYA AJMERA

- President & CEO, Society for Science
- Executive Publisher, Science News
- STS 1985



## SHANNON NANGLE

- Co-founder & CEO, Circe
- ISEF 2004–2005



## NIKHITA SINGH

- Co-founder and CPO, Artificial, Inc.
- ISEF 2007–2008



**LYDA HILL**<sup>®</sup>  
PHILANTHROPIES

# WOMEN IN STEM PANEL

**May 16, 2023, 11:00 a.m.** Sponsored by Lyda Hill Philanthropies



**ANJALI CHADHA**

- Founder & CEO, Empowered, Inc.
- Undergraduate, MIT Biological Engineering
- STS 2019, ISEF 2017–2018, BCM 2015



**KAVYA KOPPARAPU**

- Founder, GirlsComputingLeague
- Research Engineer, Deep Mind
- Harvard University 2022, Computer Science and Healthcare Innovation
- STS 2018, ISEF 2017, BCM 2013

**Moderated by**



**NICOLE SMALL**

- CEO – LH Capital, Inc./ Lyda Hill Philanthropies



**MAGAN LEWIS**

- Equipment & Automated Field Sensing Lead, Bayer
- Seed World's 2022 Future Leader of the Seed Industry
- ISEF 2002, DCYSC 1999



**ERIN SMITH**

- Founder, FacePrint
- Senior Atlantic Fellow for Equity in Brain Health, Global Brain Health Institute
- Innovation Fellow, Meadows Mental Health Policy Institute
- Undergraduate, Stanford University, Neuroscience and Computer Science
- STS 2018, ISEF 2017–2018



# In Recognition

## Thank you to the dedicated committee members of Regeneron ISEF 2023

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William Glaunsinger	Charles Vukotich
Chris Gould	Janet Vukotich
Alicia Martinez	

# In Recognition

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Mark Litzinger	Jeanne Waggener
Valerie Martinez	Elizabeth Wright
	Brighton Yau

# In Recognition

Society for Science, Regeneron and the Dallas Local Arrangements Committee recognize with gratitude the judges, volunteers, parents, teachers and fair directors who make Regeneron ISEF possible year after year. The following individuals, volunteers, and organizations are recognized for their special dedication to Regeneron ISEF.

Milena Acosta	Andy Macy
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Cheryl Braun	Will Murray
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Laney Lane	Kay Yang
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Caitlin Sullivan  
Natalie Sutton  
Raina van Duym

# **REGENERON®**

**Society for Science thanks the Regeneron Team  
who so greatly contributed to the success  
of Regeneron ISEF 2023**

**Leonard S. Schleifer**

Co-founder, President & Chief Executive Officer

**George D. Yancopoulos**

Co-Founder, President & Chief Scientific Officer

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**Joseph Brown**

Manager, Corporate Communications

**Tara Valenza**

Senior Manager, Digital Communications & Branding

**And the dozens of Regeneron employees who judge,  
interpret and volunteer at Regeneron ISEF.**

# CONGRATULATIONS TO THE 2023 REGENERON ISEF FINALISTS

At Regeneron, we are committed to fostering the next generation of scientific innovators who can solve society's greatest challenges.

**More than 90 percent** of our community investments are focused on STEM education and STEM outreach and equity initiatives. We aim to:



**EXPOSE**  
young minds  
to the power of science



**EQUIP**  
students with  
scientific skills



**ELEVATE**  
the best and  
brightest young scientists

LEARN MORE:  
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🐦 @REGENERON

**REGENERON**  
SCIENCE TO MEDICINE®

# Finalist Directory

## COUNTRIES, REGIONS AND TERRITORIES PARTICIPATING IN REGENERON ISEF 2023

### LEGEND

- Each # next to the finalist's name indicates previous ISEF participation
- "T" precedes the name of a Teacher-Sponsor of the project
- "T" after the project ID indicates a team project

### AMERICAN SAMOA

Pago Pago, American Samoa, TEAS01, American Samoa Science Fair

**ANIM037 An Improved Insecticidal Bait To Control Invasive *Technomyrmex vitiensis* (Fijian White-Footed Ants)**

Heleina Maria Lucille Willis, 17, Senior, Fa'asao Marist High School, Pago Pago, American Samoa, T: Cassandra Garcia

**BCHM034 Antipodal Algae: Energy Solution for a Tropical Island**

Amelie Ruoyi Chen, 16, Sophomore, Pacific Horizons School, Pago Pago, American Samoa, T: Karen Dizon

**EAEV054 Comparing the Effects of Fish Hydrolysate and Fish Emulsion on the Growth of Okra (*Abelmoschus esculentus*)**

Dimple Dezeree Bonhart, 17, Senior, Fa'asao Marist High School, Pago Pago, American Samoa, T: Cassandra Garcia

### ARMENIA

Yerevan, Armenia, ARM002, Armenian School Science Festival

**ENEV056T A Biodegradable Revolution: An Industrial Device to Produce Biodegradable Polymer Films**

Ilona Artazyan, 17, Senior, Anzhela Matevosyan, 17, Junior, Ayb School, Yerevan, Armenia, T: Lilit Hambardzumyan

### AUSTRALIA

Oatlands, Australia, AUS004, Australian Science and Engineering Fair

**BMEDO50 Running Away From Cancer: An Investigation Into the Dynamic Metabolism of Cancer Cells Under an Increase in Extracellular Lactate Concentration**

Sarah Grace Arnold, 18, Senior, Menai High School, Illawong, New South Wales, Australia, T: Ann Hanna

**CHEM051 Demystifying the Soapberry: The Effect of Concentration, Temperature and pH on Soapberry Surfactant and Its Effectiveness in Comparison to Detergent and Bio-Detergent**

Alexandra Prokhorov, 16, Sophomore, Presbyterian Ladies' College, Sydney, New South Wales, Australia, T: Maria-Luisa Gutierrez

**CHEM056 Investigating the Effectiveness of Montmorillonite-Alginate Nanocomposite Beads in the Removal of Anionic Tartrazine and Amaranth Azo Dyes From Wastewater, Quantified via UV-Visible Spectrophotometry**

Thien Tran, 18, Senior, Queensland Academies for Health Sciences, Southport, Queensland, Australia, T: Anir Lal

**EAEV058 Hydroxyapatite as a Novel, Efficacious, and Marine Friendly UV-Filter**

Stanley Hao Chen Wey, 18, Senior, Queensland Academies for Health Sciences, Southport, Queensland, Australia, T: Anir Lal

**MATH039 'String' Theory: How Long Is a Piece of String?**

Anubhav Dhruv Ammangi, 16, Junior, Redeemer Baptist School, North Parramatta, New South Wales, Australia, T: Jenelle Seaman



# Finalist Directory

- PHYS054** **Analysis of Elemental Abundances in Transition Disk Post-AGB Binary Systems for Planet Formation**  
Yi Wei (William) Yang, 18, Senior, James Ruse Agricultural High School, Sydney, New South Wales, Australia, T: Carina Dennis
- PHYS059** **Measuring the Dark Matter Content of NGC5102 Using Combined Observations of Gas and Stars**  
Olivia Silcock, 19, Senior, William Clarke College, Kellyville, New South Wales, Australia, T: Dan Miller
- ROBO057** **Transmission-Line Assessment and Review System (TARS): An AI and Robotics Enabled Drone for the Inspection and Maintenance of High Voltage Transmission Lines**  
Kai Turner, 18, Senior, Northern Beaches Secondary College Manly Campus, Sydney, New South Wales, Australia, T: Kate Farrow
- SOFT029** **EmSafe: Investigating the Emergency Call Service in Australia and the Development of a Modern and Efficient Contact System**  
Rahul Kumar, 16, Junior, Brisbane Grammar School, Spring Hill, Qld, Australia, T: Tanya Neilsen

## AZERBAIJAN

**Baku, Azerbaijan, AZR001, Azerbaijan Science and Engineering Fair**

- BCHM003** **Getting Artificial Bone From Corn-Cob Ash and Mussel Shells With Bioceramic Method**  
Kamran Mirzali, 15, Sophomore, The Modern Educational Complex in Honour of Heydar Aliyev, Baku, Nasimi, Azerbaijan, T: Fuad Agayev
- EGSD009T** **Application of Hybrid Energy Systems Based on Triboelectric Nanogenerators to Intelligent Transportation Systems**  
Misir Huseynli, 17, Junior, Ayshan Hajiyeva, 18, Junior, Young Talents High School, Baku, Azerbaijan, Young Talents Lyceum, Baku, Azerbaijan, T: Orkhan Gulahmadov
- ENEV010T** **EcoRobot**  
Eyyub Shenal, 15, Sophomore, Elkhan Hamidov, 17, Junior, Baku Turk Anadolu Lisesi, Baku, Nizami, Azerbaijan, Istedad High School, Sumgait, Azerbaijan, T: Sabina Isayeva
- MATH010** **Euler's Number and Its Properties**  
Nurlana Alili, 16, Junior, Secondary School #17, Baku, Azerbaijan, T: Elnur Khalilov
- MATS006T** **Pure breATH**  
Ayaz Omarli#, 16, Junior, Omar Ibrahimov, 15, Sophomore, Young Talents Lyceum, Baku, Azerbaijan, T: Ulviyya Hasanova
- ROBO009** **Smart Rescue and Firefighter Machine (SRFM)**  
Mahammad Abbasli, 17, Junior, Lyceum Named after Academician Zarifa Aliyeva, Baku, Azerbaijan, T: Rafiga Bagirova
- ROBO018T** **Smart Pill Dispenser: Helping Patients Take Their Medication on Time**  
Araz Jabrayilov, 17, Junior, Ibrahim Abdullayev, 16, Sophomore, The International School of Azerbaijan, Baku, Azerbaijan, T: Nigar Michael

## BELGIUM

**Brussels, Belgium, EUB001, European Union Contest for Young Scientists (EUCYS)**

- CHEM048** **Optimization of the Synthesis of the Fluorescent Dye "Nile Red"**  
Meda Surdokaite, 20, Senior, Kauno r. Raudondvario gimnazija, Raudondvaris, Kauno, Lithuania, T: Marta Marciulionyte
- MATH035T** **A New Method of Solving the Bernoulli Quadrisection Problem and Its Application to Other Problems in Euclidean Geometry**  
Aditya Joshi, 16, Sophomore, Aditya Kumar, 16, Junior, Synge Street CBS, Dublin, Leinster, Ireland, T: John Davin

## BRAZIL

**Novo Hamburgo, Brazil, BRA001, International Fair of South America – MOSTRATEC**

- ANIM001** **Use of an Artificial Intelligence Model for Drug Redirection Against Feline Rhinotracheitis**  
Naiara Pereira Martins, 17, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia do Maranhao – Unidade Imperatriz, Imperatriz, Maranhao, Brazil, T: Carlos Martins

# Finalist Directory

- EBED001T** **Micro-Controlled Device for Calculation of Irregular Areas Using the Gauss Method, Phase II**  
Gustavo Guimaraes de Carvalho, 19, Senior, Paulo Sergio Neves Regatieri, 19, Senior, Paulo Cesar Murata Filho, 19, Senior, Instituto Federal de Educacao, Ciencia de Tecnologia de Sao Paulo - IFSP Campus Campinas, Campinas, Sao Paulo, Brazil, T: Edson Duarte
- EBED003** **Development of a Low-Cost Network System to Monitor Landslides in Urban Hills**  
Lucas Hadlich Camargo Sampaio, 17, Senior, Colegio Dante Alighieri, São Paulo, Brazil, T: Wayner Klen
- ENBM002** **Organ Box: The Use of the Technology to Aid in the Transport and Tracking of Organs in the Transplantation Process**  
Rafaela Milanski Ribas, 16, Sophomore, Eureka – Escola de Tecnologia e Pesquisa, Cascavel, Parana, Brazil, T: Maycon Lourenco
- ENBM004** **The Development of an Alternative Exhalation Valve for Mechanical Ventilation by Additive Manufacturing**  
Sofia Nascimento Mazin Mazin, 18, Junior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Sandro Auler
- ENBM008T** **Electronic Device to Aid in the Correction of Foot Drop Syndrome**  
Rebeca Apolinario Goulart, 17, Senior, Eloah Marvila Padrone, 18, Senior, Escola Tecnica Estadual Henrique Lage, Niteroi, Rio de Janeiro, Brazil, T: Altair Santos  
T: Altair dos Santos
- ENEV003T** **Use of Graphene Associated With Nanoporous Inorganic Membrane for Water Treatment**  
Manuela Prado Machado, 19, Senior, Helena Flores Moschetta, 19, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Schana da Silva
- PLNT010** **APPANC: Development of an Application for Scientific Dissemination of PANCs**  
Heloisa Serra Rodrigues de Souza, 15, Junior, SESI School Rector Miguel Calmon, Salvador, Brazil, T: Lorena Vieira
- TMED003** **Development of Fluopisn C. Liposomal: A Bioactive Compound to Control Pathogenic Bacteria**  
Luiza Nabarro Ikeda Silva, 16, Junior, Colegio Interativa, Londrina, Parana, Brazil, T: Leonardo Fernandez
- Sao Paulo, Brazil, BRA002, FEBRACE –Feira Brasileira de Ciencias e Engenharia**
- ANIM036** **Pharmacaule: Larvicidal, Insecticide and Repellent Potential of Active Principles of Tucum-Mirim (*Astrocaryum acaule*) in the Control of Arthropods That Transmit Arboviruses**  
Gustavo Botega Serra, 17, Senior, Escola Santa Teresinha, Imperatriz, Maranhao, Brazil, T: Zilmar Soares
- BCHM023** **Investigation of Manganese Cellular Transport Mechanisms During Cancer-Associated Metallomic Imbalance**  
Juliana Do Carmo Godinho, 19, Senior, Instituto Federal de Educacao Ciencia e Tecnologia do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, T: Mariana Stelling
- BEHA034** **Prevalence Protocol for Attention to Dropout Rates (PPADR): Strategies to Promote the Permanence of Students in High School**  
Kamylla Gontijo de Melo, 19, Senior, Escola Alef Peretz- Unidade Paraisopolis, Sao Paulo, Sao Paulo, Brazil, T: Ednilson Aparecido Quarenta
- CHEM043T** **Nano-Emulsions From Essential Oils: A Sustainable Solution in Agriculture**  
Pamela Nunes Avelar, 18, Senior, Beatriz Pires Meneghetti, 17, Senior, Yasmin Ferrari Altoe Francisco, 17, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia do Espirito Santo, Vila Velha, Espirito Santo, Brazil, T: Hildegardo Franca T: Hildegardo Franca, T: Hildegardo Franca
- ENEV054** **An Alternative Design of a Rainwater Harvesting System: Mitigating the Effects of the Drought in the Semi-arid Region of Brazil**  
Vitoria Sabrina Silva Leite, 17, Senior, Escola Estadual Monsenhor Raimundo Gurgel, Mossoro, Rio Grande do Norte, Brazil, T: Antonio Serginaldo Bezerra



 SOCIETY FOR SCIENCE

# COME VISIT THE ISEF STORE

## HALL B

**SUNDAY:** 9AM-4PM

**MONDAY:** 9AM-4PM

**TUESDAY:** 9AM-11AM

**WEDNESDAY:** 9AM-1PM



# Finalist Directory

- ENEV055T** **Low-Cost Ecological Filter for Water Treatment, Made on the Basis of Activated Carbon From the Biomass of the Black Jurema (*Mimosa hostilis*)**  
Lauanda Vitoriano Lima, 16, Senior, Kalyne Vitoria Ferreira Falcao Pereira, 17, Senior, EEEP Antonio Rodrigues de Oliveira, Pedra Branca, Brazil, T: Francisco Renato Moreira Da Silva
- MATS039** **Developing a Novel Biodegradable Plastic Film With *Psidium guajava*' Byproduct**  
Juliana Pereira da Silva, 18, Senior, EEMTI Marconi Coelho Reis, Cascavel, Ceara, Brazil, T: Heloína Capistrano
- MATS040** **Activated Carbon Synthesized From *Pithecellobium Dulce* for Methylene Blue Removal**  
Caio Nunes Santana, 18, Senior, Instituto Federal da Bahia (IFBA)–Campus Camacari, Camacari, Bahia, Brazil, T: Luciene Carvalho
- SOFT035** **Color Filtering System for Quantifying the Percentage of Afforestation Through Satellite Images: A Statistical Analysis**  
Goncalo Ponte Leite, 16, Junior, Colegio Sao Francisco De Sales - Diocesano, Teresina–PI, Piaui (PI), Brazil, T: Victor Carvalho

## BULGARIA

Sofia, Bulgaria, BGR001, Bulgarian Science and Innovation Fair

- MATH002** **Proof of the Complete Presence of a Modulo 4 Bias for the Semiprimes**  
Nikola Slavkov Gyulev, 16, Sophomore, Model High School of Mathematics "Akademik Kiril Popov", Plovdiv, Bulgaria, T: Ilian Drumev
- MATH003** **The Shape of Polynomial Map  $x \hat{a}^*$   $kx^n \text{ Mod } P$**   
Stefan Milkov Gaydarov, 17, Sophomore, Model High School of Mathematics "Akademik Kiril Popov", Plovdiv, Bulgaria, T: Ilian Drumev
- ROBO001** **RSTOD: Novel Auxiliary Learning Techniques for Efficient and Controllable Task-Oriented Conversational Agents**  
# Radostin Lozanov Cholakov, 17, Junior, Model High School of Mathematics "Akademik Kiril Popov", Plovdiv, Bulgaria, T: Ilian Drumev
- SOFT004** **Increasing Computer Vision Models Interpretability**  
Delyan Lyubomirov Boychev, 17, Junior, High School of Mathematics and Natural Sciences "Vasil Drumev", Veliko Tarnovo, Veliko Tarnovo, Bulgaria, T: Lilyana Bobeva

## CANADA

Hamilton, Canada, CAN001, Bay Area Science and Engineering Fair

- ENBMO65** **Sugar High!: Integrating Glucose and Ketone Testing to Improve Prevention of Diabetic Ketoacidosis**  
# Isra Galer Bashir, 18, Senior, Westdale Secondary School, Hamilton, Ontario, Canada, T: Erin Lepischak
- ROBO051** **Pothole Patrol: An Innovative Robotic Solution for Road Maintenance Using Sustainable Materials**  
# Anthony Matteo Saturnino, 17, Senior, Bishop Ryan Catholic Secondary School, Hannon, Ontario, Canada, T: Mara Gazzola
- ROBO052** **Bionic Squid-Inspired Robot Facilitating Underwater Monitorization and Preservation of Coral Reefs**  
Zixuan Li, 16, Junior, Ridley College, St. Catharines, Ontario, Canada, T: Heather Rhind
- TMED056** **The COVID Cardiac Connection: A Novel Pre-Participation Screening Tool to Identify Subclinical Cardiomyopathy After SARS-CoV-2 Infection in Young Athletes**  
Nicholas Pacifici, 14, Freshman, St. Mary Catholic Secondary School, Hamilton, Ontario, Canada, T: Natasha Grubisic
- Pickering, Canada, CAN002, Youth Science Canada–Team Canada**
- EAEV049** **Plankton Wars: An Innovative Analysis of *Daphnia* Genotype Biomanipulation for Algae Bloom Prevention**  
Annabelle Marie Rayson, 17, Senior, Saint Patrick's Catholic High School, Sarnia, Ontario, Canada, T: Diane Yurkewich

# Finalist Directory

- EBED025** **Seeing Cells Without a Lens: Compact 3D Digital Lensless Holographic Microscopy for Wide-field Imaging**  
Thomas Zhirui Yang, 16, Junior, University of Toronto Schools, Toronto, Ontario, Canada, T: Julie Stoyka
- ENBM050** **Detecting Hypoxia Through the Non-Invasive Monitoring of Sweat Lactate and Tissue Oxygenation**  
# Cindy Cheng, 16, Sophomore, Laurel Heights Secondary School, Waterloo, Ontario, Canada, T: Sarah Beaton
- ENBM051** **Pee Xylophone: A Novel Non-Invasive Bladder Pressure Measurement System**  
Krish Modi, 18, Senior, Northern Collegiate Institute and Vocational School, Sarnia, Ontario, Canada, T: Melissa Mallette
- ENBM054** **HemiStride: Design of a Low-Cost and Backdrivable Lower-Limb Exoskeleton for Hemiplegic Patients**  
Tara Tianru Zhan, 16, Sophomore, David Thompson Secondary, Vancouver, British Columbia, Canada, T: Susan Leong
- ENEV050** **Detection of Harmful Microorganisms in Drinking Water Using Deep Learning**  
Keerthan Kamala Krishnamoorthy, 16, Junior, Fort Richmond Collegiate, Winnipeg, Manitoba, Canada, T: Jennifer Piasecki
- ROBO040** **A Novel Pre-Hospital Indoor Rescue Drone System for Cardiac Arrest Patient Emergency Assistance and Medication Delivery Through Remote EMS Surveillance**  
Max Du, 15, Sophomore, Western Canada High School, Calgary, Alberta, Canada, T: Carma Cornea
- ROBO041** **SPRKD: Effective Knowledge Distillation for Deep Neural Networks via Saddle Region Approximation**  
Aditya Dewan, 17, Junior, The Woodlands School - Secondary, Mississauga, Ontario, Canada, T: Trisha Raybould
- Montreal, Canada, CAN004, Montreal Regional Science and Technology Fair**
- ENBM066** **SimplyVent: A Low-Cost Mechanical Ventilator**  
# Kayla Joy Salasidis, 16, Junior, Herzliah High School, Montreal, Quebec, Canada, T: Patrick Elbaz
- ETSD047T** **Reconnaissance & Medical Drone**  
Christos Velmachos, 16, Sophomore, Nathan Ikho Aruna, 16, Sophomore, Laval Senior Academy, Laval, Quebec, Canada, T: Heather McPherson T: Heather McPherson
- ROBO053T** **Artificial Sign Language: A Virtual Translator for American Sign Language (ASL) Users**  
Xin Lei Lin, 17, Senior, Aly Shariff, 18, Senior, Marianopolis College, Westmount, Quebec, Canada, T: Angela Keane

## CHILE

### Santiago, Chile, CHL003, Fundacion Club Ciencias Chile

**MCRO001T** **Measurement of Antibiosis of Algae From the Chilean Intertidal Zone on Pathogenic ATCC Bacteria**

Damaris Cancino, 17, Senior, Katalina Fuentes, 17, Senior, Liceo Claudina Urrutia, Cauquenes, Maule, Chile, T: Fredy Segura

## CHINA

### Beijing, China, CHN001, China Adolescents Science and Technology Innovation Contest

**ANIM018** **Cracking the Code: New Genetic Link Between Sleep and Aging-slo-1 in *C. elegans***

Yunzhe Liang, 17, Junior, No.1 High School Affiliated to Tongji University, Shanghai, Shanghai, China, T: Ting Cai

**BEHA011** **Farewell, Range Anxiety: Planning Layout of Public Charging Facilities for Urban Electric Vehicles**

Ziyue Jiang, 15, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Jin Liu

**CELL019** **A Simple, Effective Approach to Screen and Identify H2A-H2B Binding Proteins**

Yuhui Liu, 16, Junior, Beijing National Day School, Beijing, China, T: Xiangmei Dou

# Finalist Directory

- CHEM021** **Green Method to Lower the 8%: Facile and Sustainable Preparation of Superhydrophobic Concrete/Brick Surface**  
Yiling Zhang, 16, Junior, Shanghai Fuxing Senior High School, Shanghai, Shanghai, China, T: Gengfeng Zheng
- EAEV019** **Bioaccumulation of AgNPs of Different Sizes and Coatings Along the Aquatic Food Chain**  
Jia Han, 17, Senior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Bo Li
- EBED016** **Make Smart Devices More Accessible: Engineering of a Novel Low-Cost, Multi-Direction Distance Sensor and Its Application in Obstacle Avoidance of UAV**  
Hairong Huang, 17, Junior, Hangzhou Xuejun High School of Zhejiang Province, Hangzhou, China, T: Xiaotian Shen
- EBED017** **Designing and Engineering a Smart Robot for Collecting and Arranging Badminton Shuttlecocks**  
Ziling Wang, 17, Junior, No. 2 High School of East China Normal University, Shanghai, Shanghai, China, T: Zhentang Wang
- EGSD018** **Study on the Property of LiFePO<sub>4</sub> Battery and Extending Its Life Span Through DMSO-SnF<sub>2</sub> Protection Methods**  
Jiaxuan Wang, 18, Senior, Nanjing Foreign Language School, Nanjing, Jiangsu, China, T: Zhong Jin
- ENBM020** **Development of Ankle Exoskeleton Device With Complex Functions of Rehabilitation Assessment, Rehabilitation Guidance and Rehabilitation Exercise**  
Yanbing Jin, 18, Junior, Shanghai Pinghe Bilingual School, Shanghai, China, T: Yinghe Lv
- ENBM033** **TremorChecker: An Affordable and Convenient Contactless Early Screener for Parkinson's Disease Based on E-field Sensing**  
Yiding Tian, 18, Senior, Shenzhen Middle School, Shenzhen, Guangdong, China, T: Nan Hu
- ENEV023** **Resource Recycling of Shield Tunnel Waste Soils Improved by Industrial Waste Phosphogypsum**  
Ziyi Ding, 17, Junior, Nanjing Foreign Language School, Nanjing, Jiangsu, China, T: Yongfeng Deng
- ETSD011** **How the Surrounding Multi-Scale Building Clusters Affect the Wind Loads of the Super High-Rise Building**  
Zhifei Li, 17, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Zhibin Sun
- ETSD015** **Exploring Stick-Climbing and Grabber-Wheel Hybridization: The Development of an Inchworm Robot with Integrated Skateboard Mechanism**  
Yuyang Wang, 16, Sophomore, Shanghai Pinghe Bilingual School, Shanghai, China, T: Lucheng Wang
- ETSD016** **Design and Implementation of the Fish Gill Imitation Side-Window Regulator for Ducted Fan UAVs**  
Zihao Liu, 16, Junior, The High School Affiliated to Beijing Normal University, Beijing, Beijing, China, T: Ya Zhang
- ETSD017T** **Preliminary Study on Overwinter Storage of Breeding Forest Frogs: A New Model of Intelligent Overwinter Storage Method for Breeding Forest Frogs**  
Yuxi Shi, 17, Junior, Meiniu Song, 17, Junior, Fushun No.2 Senior High School, Fushun, Liaoning, China, T: Dewei Zhang
- ETSD019** **Spring & Sunflower: Two Flexible Grasping Machine Made of Rigid Material Based on Origami Structure**  
Jiayi Shi, 18, Senior, Shanghai World Foreign Language Academy, Shanghai, China, T: Tao Lin
- MCRO016** **Little Health Guard in the Kitchen: Preliminary Application of Perilla Extract in Kitchen Supplies**  
Yimeng Xu, 17, Junior, Taizhou No. 1 High School, Taizhou, Zhejiang, China, T: Jingbei Yu
- MCRO017** **The Magic Mulching Film: Effects of Lignin-Based Fully Biodegradable Mulching Film on Soil Microorganisms**  
Shuyang Wu, 17, Junior, Taizhou No. 1 High School, Taizhou, Zhejiang, China, T: Zhengyan Chen

# Finalist Directory

- PHYS017**     **How To Brush the Ice To Score Better in Curling?: The Influence of Different Angles Between Curling Brushes and Ice Surfaces on Curling Deceleration Movements**  
Minxin Wang, 16, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Boqiang Ma
- PHYS019**     **Thin-Film Lithium Niobate Bragg Grating Tunable Filter Using Femtosecond Laser Lithography**  
# Chengyue Jiang, 16, Junior, Shanghai Pinghe Bilingual School, Shanghai, China, T: Yinghe Lv
- PHYS020**     **Which Features Contribute to Galaxy Morphology Classification?: A Novel Explainable Artificial Intelligence Approach**  
Mingxuan Xie, 17, Junior, Guangzhou Zhixin High School, Guangzhou, Guangdong, China, T: Zhicheng Liang
- PLNT018T**     **Exploring the Impact of *Lactobacillus rhamnosus* on Nitric Oxide Stimulation of Peanut Roots**  
Zifan Zhang, 16, Junior, Mengze Hou, 16, Junior, Beijing No. 8 High School, Beijing, Beijing, China, T: Yue Hou
- PLNT020**     **Elucidation of the Biosynthesis Pathway of Acylated Flavonoid Glycosides in *Pseudognaphalium affine* and Exploration of Its Key Enzymes**  
Dongtian Liu, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Ying Xiao
- ROBO019**     **The Story of the Stone: A Novel Rubbing Restoration Method Using Generative Adversarial Network**  
Gongbo Sun, 18, Senior, Beijing National Day School, Beijing, China, T: Zijie Zheng
- SOFT022**     **A Scoring System of Chinese Calligraphy Copy Work**  
Leyao Gu, 17, Junior, No. 2 High School of East China Normal University, Shanghai, Shanghai, China, T: Xiaojin Yu
- TMED023**     **Nationality, Poverty, and the Prevalence of Disease-Spreading Mosquitoes: A Longitudinal Study in Yunnan, China**  
Jingquan Tao, 16, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Wei Fang
- Chengdu, China, CHN008, Sichuan Science Fair**
- BCHM001**     **A Novel Electrochemiluminescence Biosensing System Using Photonic Crystal as Luminescence-Enhanced Substrates for the Ultrasensitive Detection of Food-Borne Harmful Substances**  
Harrison Hao-Tian Tang, 18, Sophomore, Shanghai High School International Division, Shanghai, China, T: Chenglei Zhang
- EBED004**     **A Fully Automatic Self-Assembling Modular Robot System**  
Yik Chun John Peng, 17, Junior, Shanghai American School–Puxi Campus, Shanghai, Shanghai, China, T: Gregory Rose
- EGSD002** **Energy-Free Power Saving Device for Air Conditioners**  
Eugene Yi-Jin Chen, 16, Sophomore, Shanghai High School International Division, Shanghai, China, T: DongSheng Zhang
- ETSD039**     **Highly Adaptable, Strong, and Flexible Biotic Robotic Arm: A Modular Gear Chain Mechanism for Single-Handed Task Mastery**  
Han Wang, 16, Sophomore, BASIS International School Hangzhou, HangZhou, ZheJiang, China, T: Huajie Ke
- ROBO003**     **Action-Aware Vision Language Navigation: A Novel Reinforcement Learning Framework for Dynamic Navigation in VR and Beyond**  
Jasmine Ziyu Liu, 16, Junior, Shanghai American School–Pudong Campus, Shanghai, Shanghai, China, T: Ian Miller



# Finalist Directory

## CHINA, HONG KONG SPECIAL ADMINISTRATIVE REGION

Hong Kong, China, Hong Kong Special Administrative Region, HKG001,  
Hong Kong S&T Invention Contest

- EAEV006T** **A Study on Diving Behaviors of *Macaca mulatta* in Hong Kong: Implications of Climate Change**  
Shi Yao Wei, 16, Junior, Shanshan Lin, 15, Freshman, Yeuk Tong Rita Zhan, 13, Freshman, Victoria Shanghai Academy, Harrow International School Hong Kong, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Haipeng Liu
- EBED006** **Detection of Skateboarding Tricks Based on Gyroscopic Data**  
Ziyue Fang, 17, Junior, Singapore International School (Hong Kong), Hong Kong, Wong Chuk Hang, China, Hong Kong Special Administrative Region, T: Paul Satish
- ENBM006** **A Pose Based Gait Analysis System for Cerebral Palsy Patients Using AI and Computer Vision**  
Edward Zhu, 16, Junior, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Christine Doleman
- ENBM007** **Servo-Controlled Semi-Rigid Exoskeleton Designed for the Human Knee**  
Runxing Kenneth Fu, 17, Junior, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Lijuan Chen
- MATSO05T** **Anti-Forma Chitogel From the Hydrogel of Chitosan of Shells of *Hermetia Illucens***  
Guojun Wu, 17, Junior, Wai Ki Wong, 17, Junior, Carmel Pak U Secondary School, Hong Kong, China, Hong Kong Special Administrative Region, T: Yuen Yu Ip

## CHINA, MACAO SPECIAL ADMINISTRATIVE REGION

Macao, China, Macao Special Administrative Region, MAC001, Macao Region Science Fair

- EAEV017T** **Synergistic Effect of Co-Exposure to SOA and Transition Metals Induces Toxicity and Developmental Defects *in vitro* and *in vivo***  
Kuan I Liu, 14, Freshman, Hoi Fong Choi, 15, Sophomore, Hio Chit Ng, 15, Freshman, Yuet Wah College, Macau, China, Macao Special Administrative Region, T: Cinderella Chy Lei
- ETSD010** **Design and Development of Enhanced Fuel Tank Service Kit for Aircraft**  
Lok Iao Lao, 15, Freshman, Pui Ching Middle School, Macao, China, Macao Special Administrative Region, T: Haonian Min
- MATSO09T** **Investigation of the Whitening Activity of Ginsenosides From *Panax notoginseng* and Optimization of the Dosage Form**  
Ka Seong Feng, 17, Junior, Keng Cheong Chong, 16, Junior, Ka Wai Lu, 17, Junior, Pui Ching Middle School, Macao, China, Macao Special Administrative Region, T: Hio Fai Io
- PHYS016** **Shape-Dependent Oriented Meteorites: Insights From Trajectory and Surface Texture Analysis**  
Si Xing Huang, 17, Junior, Kao Yip Middle School, Macao, China, Macao Special Administrative Region, T: I Ieng Ho
- SOFT008** **Comprehelp: A Reading Comprehension Question Generation System Based on Transformer**  
Wai In Chu, 17, Junior, Pui Ching Middle School, Macao, China, Macao Special Administrative Region, T: Vai Vai Ho
- TMED019T** **Using Lotus (*Nelumbo nucifera*) Infusions to Ameliorate Symptoms of Neurodegenerative Diseases**  
Iok Kei Ma, 17, Junior, Ngai Long Chan, 16, Junior, Shannon Cheung, 17, Junior, Pui Ching Middle School, Macao, China, Macao Special Administrative Region, Pui Ching Middle School, Macau, China, Macao Special Administrative Region, T: Leng Leng Leong

## CHINESE TAIPEI

Taipei, Taiwan, TWN001, Taiwan International Science Fair

- ANIM017** **Protect Our Health by Water Bear (*Macrobiotus sp.*)**  
Chien-Hung Yen, 18, Senior, Chu-Lin Private High School, New Taipei City, Taiwan, Chinese Taipei, T: Chia-Yi Yen

# Finalist Directory

- BEHA026** **Investigate Cortical Activation During Motor Functions Using fNIRS in Healthy Adults**  
Pei-Yun Chen, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, Chinese Taipei,  
T: Yan-Ci Liu
- BMED019** **Eliminating Drug Resistance of Lung Cancer Through Inducing Autophagy  
by Targeting USP24**  
Sin-Wei Tang, 18, Senior, National Tainan First Senior High School, Tainan City,  
Chinese Taipei, T: Jan-Jong Hung
- CELL020** **Novel Function of Paxillin in Modulating RNA Splicing During Early Neuron  
Development**  
Guan-Zhu Pan, 17, Senior, The Affiliated Senior High School of National Taiwan Normal  
University, Taipei City, Chinese Taipei, T: Pei-Lin Cheng
- CHEM018** **Inorganic-Organic-Biological Hybrid Nanocomposite for Multifunctional  
Biomedical Engineering**  
Tzu Tien Hsieh, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, Chinese Taipei,  
T: Ming Chih Hsu
- EAEV029** **Physical Disturbances Affect Food Availability To Shape Benthic Community  
Structure in Submarine Canyons**  
Szu-Yun Ko, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, Chinese Taipei,  
T: Yu-Mei Lin
- ENEV025T** **Enhanced Electrocatalytic Selective CO<sub>2</sub> to Syngas Production:  
Road to the Carbon-Neutral Future**  
Huai Wen Chang, 18, Senior, Xi Chen, 18, Senior, Taipei First Girls High School,  
Taipei City, Chinese Taipei, T: Ming Chi Hsu T: Ming Chih Hsu
- ETSD021** **The Fusion of Glazes Color in Random Forest**  
Jo-Ya Chen, 17, Senior, Kaohsiung Municipal Kaohsiung Girls' Senior High School,  
Kaohsiung, Taiwan, Chinese Taipei, T: Hsiao Cheng Lin
- MATH016** **Power Sum Identities From Zigzag Chords**  
Chun-Chi Chang, 17, Junior, Taichung First Senior High School, Taichung, Taiwan,  
T: Pei-Chun Lin
- MATH017** **On Indefinite Reflection of Light Beam Off of Convex Decreasing Curves**  
Da-Fu Chiu, 18, Senior, Taipei City Non-school-based Experimental Education at Senior  
High School Level, Taipei City, Taiwan, Chinese Taipei, T: Kuo-Chang Chen
- PHYS023** **Condensed Fluidic Elasticity Mapping Using Resonant Vibro-Impact Nonlinear  
Dynamics**  
Zi-Yu Chen, 16, Junior, Taipei First Girls High School, Taipei City, Chinese Taipei,  
T: Li-Hsien Chien
- PLNT031T** **Identification of Novel Drought-Resistant Genes From Gene-Environment Association  
in *Arabidopsis thaliana***  
Ying-Hsin Hsiao, 17, Senior, Wan-Hung Li, 18, Senior, Taipei First Girls High School,  
Taipei City, Chinese Taipei, T: Hung-Hsiang Lee

## CZECH REPUBLIC

### Prague, Czech Republic, CZE001, Students' Professional Activities (SPA)

- BMED002** **Neuroinflammation in the Choroid Plexus During Alzheimer's Disease**  
Karolina Jerabkova, 19, Junior, Gymnazium Brno-Reckovice, Brno, Jihomoravsky Kraj,  
Czech Republic, T: Michal Kunak
- CELL002** **Dinucleoside Polyphosphate RNAs as Substrates for Decapping Enzyme DXO**  
Zuzana Buchova, 18, Junior, Gymnazium Praha 6 Arabska 14, Prague, Czech Republic,  
T: Simon Hrozinka
- CHEM004** **Using Microfluidics in Metabolic Engineering for Environmental Protection**  
Lukas Drdla, 19, Junior, Gymnazium Brno, Trida Kapitana Jarose, Prispevkova  
Organizace, Brno, South Moravian Region, Czech Republic, T: Veronika Kyasova
- PLNT001** **Analysis of Gene Interaction Between the Transcription Factor and Genes  
That Regulates Flowering of *Arabidopsis thaliana***  
Adela Uhrova, 18, Junior, Gymnazium Boticka, Praha 2, Prague, Czech Republic,  
T: Vlasta Cepelova

# Finalist Directory

## **Praha 4, Czech Republic, CZE002, AMAVET Czech Republic Science Fair**

### **CBIO059 From LUCA to Cyanobacteria: Simulation of Prokaryotic Evolution With Geological Processes Using Software Unity**

Lukas Dubsik, 19, Senior, Gymnazium Brno-Reckovice, Brno, Jihomoravsky Kraj, Czech Republic, T: Katerina Cibulkova

### **EAEV077 Fossil Association of the Stity Locality (Bystrice Lithofacial Development of the Bohemian Cretaceous Basin)**

Ales Janderka, 19, Senior, Gymnazium Sumperk Masaryk Square 8, Sumperk, Czech Republic, T: Petr Opekar

### **EBED042 OriLive: A LoRa Mesh Network System for Orienteering Split Times Collection**

Matej Neumann, 19, Junior, DELTA – High School of Computer Science and Economics, Pardubice, Pardubicky kraj, Czech Republic, T: Jan Koupil

## **DENMARK**

### **Copenhagen, Denmark, DNK001, Unge Forskere**

#### **PHYS001 On the Aerodynamics of Snowflakes: An Experimental Study of the Relation Between the Shape and Aerodynamics of Early Aggregates**

Emma Weiss Nielsen, 19, Senior, Gymnasiet HTX Lillebælt, Fredericia, Syddanmark, Denmark, T: Thomas Nielsen

#### **PHYS003T Improving the Efficiency of Tuned Liquid Dampers by Determining the Optimal Specifications to Fit a Specific Structure**

Anders Lendal Holm, 17, Junior, Theodor Anton Sivager, 18, Junior, HTX Roskilde, Roskilde, Region Sjælland, Denmark, T: Christine Lehn-Schioler

#### **SOFT002 OSINTer: Helping Experts Tackle the Cyber Threats of Tomorrow**

Bertram Madsen, 19, Senior, Bagsvaerd Kostskole og Gymnasium, Bagsvaerd, Region Hovedstaden, Denmark, T: Kirsten Thogersen

## **EGYPT**

### **North Coast & West of Egypt, Egypt, EGY002, Bibliotheca Alexandrina Science and Engineering Fair – Alexandria**

#### **BCHM025 Zero Wasted *Phragmites australis***

Aya Mohamed Abd-Elmoneim Yossef Zayan, 16, Junior, STEM School of Alexandria, Alexandria, Egypt, T: Eman Mohamed Ali

#### **EAEV071T Geothermal Energy**

Yousef Ahmed Mohamed Elsheshtawy Elmahalawy, 17, Senior, Mohamed Ahmed Mohamed Elsayed Elbarraz, 18, Senior, Glory American School, Mansoura, Dakahliya, Egypt, T: Mohamed Elgohary

#### **ENBM075T Brain Guide Application**

Mentalla Mohamed Ahmed Zahab, 19, Senior, Noor Ahmed Bedeer Darwish, 18, Senior, Kafr EL-Sheikh STEM School, Kafr EL-Sheikh, Egypt, T: Hanan Hekal T: Hanan Hekal

#### **ENEV068T Agricultural Intelligence: A Smart Farm That Solves the Causes and Consequences of Climate Change in Agriculture**

Mohamed Elsayed Khalil Elhariry, 17, Senior, Kareim Wessam Ahmed Samir, 17, Junior, STEM School of Alexandria, Alexandria, Egypt, T: Eman Ali

#### **ROBO070T Eco-Packaging**

Youssef Alaa Abdelsadek Elasrag, 17, Senior, Mohamed Shawky Selim, 17, Senior, Gharbiya STEM School, Tanta, Gharbiya, Egypt, T: Hala Hassan

#### **SOFT042 Lost in Time**

Jana Mohamed Ibrahim Mohamed Ismail, 16, Junior, El Nasr Girls' College, Alexandria, Alexandria, Egypt, T: Heba Kholief

### **Cairo, Egypt, EGY001, Egypt Science and Engineering Fair – Cairo & Upper Egypt**

#### **BEHA043T Little Mermaid: Improving Social Communication Level for Mildly Autistic Children Using Video Call-Based Mobile Application Game**

Shahd Nooh#, 17, Junior, Sama Nooh#, 17, Junior, Sharkya STEM School, Zagazig, Sharkia, Egypt, T: Mohamed El Zeftawy

#### **BEHA049T A Sensory Room Without Room**

Rahma Wael Soliman, 17, Junior, Basmala Khaled Ahmed, 18, Junior, Obour STEM School, Obour, Kalubya, Egypt, T: Eman Ahmed T: Eman Aboseif

# Finalist Directory

- EBED039T** **The Smart Agriculture System (Greeno)**  
Ahmed Atef Atef, 17, Senior, Fareeda Fathy Muhammad, 17, Junior, El-Sadat STEM School, El-Sadat, Menofia, Egypt, Alfarouk Islamic Language School, Cairo, Egypt, T: Doaa Tahoun
- EBED041T** **Voice Note Chair**  
Yassen Moustafa Olwi, 18, Senior, Abdalah Mohamed Saad, 17, Senior, Bani Sweif STEM School, New Beni Suef, Egypt, T: Hossam Mohamed
- EBED044T** **Speaking Gloves: Cheap and Improved Wearable Gloves That Translate Sign Language Into Speech Using Velostat Based Sensors and Machine Learning**  
Mohamad Hamada Fahmy, 17, Junior, Yousef Hassan Ramadan, 16, Junior, Obour STEM School, Obour, Kalubya, Egypt, T: Mohamed Fouda
- EGSD054T** **Green Transportation: Decreasing Power Consumption and Harnessing Wind Energy in Vehicles**  
Ebraam Wadee Nabil, 17, Junior, Nouredin Shaban Farhana, 16, Junior, Sharkya STEM School, Zagazig, Sharkia, Egypt, T: Ahmed Ashour
- ENBM074T** **A Novel Power-Optimized CMOS sEMG Device With Ultra Low-Noise Integrated With ConvNet (VGG16) for Biomedical Applications**  
Ahmed Ayman#, 17, Senior, Mohamed Sabry#, 17, Senior, El-Sadat STEM School, El-Sadat, Menofia, Egypt, T: Doaa Tahoun
- ENEV067T** **Sustainable Rice Straw**  
Jana Ahmed Hassan, 16, Junior, Mohamed Ahmed Sakr, 17, Junior, Obour STEM School, Obour, Kalubya, Egypt, T: Ahmed Sayed T: Mahmoud Hassan
- ROBO061T** **EEG Sensors Detect Brain Dysfunctions and Intervene in Dangerous Driving**  
Lena Walid Aly, 16, Junior, Habiba Waleed Sorour, 17, Junior, Maadi STEM School for Girls, Cairo, Egypt, T: Sameh Abobakr
- ESTONIA**  
**Tartu, Estonia, EST001, Estonian Young Scientist Contest**
- CHEM001** **The Utilization of Platinum Catalysts Deposited on Carbon Support Synthesized From Coffee Grounds in a Polymer Electrolyte Membrane Fuel Cell**  
Sander Simson, 19, Senior, Tallinn Secondary School of Science, Tallinn, Harjumaa, Estonia, T: Jaak Nerut
- ENEV001** **Decomposition of Artificial Materials With Oyster Mushroom (*Pleurotus ostreatus*) Culture**  
Ketly Ilvest, 18, Junior, Saaremaa Upper Secondary School, Kuressaare, Saaremaa, Estonia, T: Irja Truuma
- GERMANY**  
**Hamburg, Germany, DEU001, Jugend Forscht**
- ANIM003** **Land-based Aquaculture — Sustainable!**  
Tonya Avemarg, 16, Junior, Gymnasium Altenholz, Altenholz, Schleswig-Holstein, Germany, T: Annika Overdiek
- CHEM015T** **Best Practice in Wastewater Technology: Phosphorus Recycling by Electroflotation**  
Hannah Amrhein, 18, Junior, Hanna Fries, 17, Junior, Lena Fries, 17, Junior, Julius-Echter-Gymnasium Elsenfeld, Elsenfeld, Bavaria, Germany, T: Roland Full
- EAEV004** **SMS | Sphagnum MicroSpheres: The Fast Moor Renaturation**  
Cornelius-Agidian Damian-Magnus Quint, 19, Senior, Hermann-Tast-Schule, Husum, Nordfriesland, Germany, T: Thomas Adler
- ENEV006** **The MiPlaFi 2.0: Washing Clothes With a Clear Conscience**  
Luise Florentine Mast, 19, Senior, Kerschensteinerschule, Stuttgart, Baden-Wuerttemberg, Germany, T: Heinz Weippert
- ETSD013** **RLP: Fully Automated Rocket Launch Pad (Including Mobile App Control, Weather Evaluation and Live Video)**  
Hendrik Ridder, 16, Junior, Gymnasium Vegesack, Bremen, Germany, T: Matthias Wachtendorf

# Finalist Directory

- MCRO014T** **Computer-Aided Investigation of the Influence of Microplastics on *Paramecia***  
Emil August Botezatu, 17, Senior, Josua Zehner, 19, Senior, Dascha Dobrozki, 19, Senior, CJD Christophorusschule Rostock, Rostock, Mecklenburg-Vorpommern, Germany, T: Thomas Borowitz
- PHYS004T** **Let's Twist Again: The Physics of a Rotational Pendulum**  
Florian Frederik Bauer, 16, Senior, Verona Miftari, 17, Senior, Hans Thoma Gymnasium, Lorrach, Germany, T: Pirmin Gohn
- PLNT003** **Crop Meshing Method (CMM): Drought Resilience Through Intentional Soil Development**  
Rufus Wegner, 19, Senior, St. Michael Gymnasium, Bad Munstereifel, Germany, T: Nikolaus Weiler
- ROBO006T** **Development of Optical Varroa Mite Detection on Bees With Neural Networks**  
Albert Dehne, 19, Senior, Daniel Friedrich Cermann, 19, Senior, Richard Ueltzen, 18, Senior, Albert-Schweitzer-Gymnasium, Erfurt, Thuringen, Germany, T: Frank Paulig

## GHANA

- Accra, Ghana, GHA001, MISE Research Program**
- CBIO004T** **Using Machine Learning to Discover Novel Drug Combinations Against Malaria**  
David Wiredu Antwi, 18, Junior, Anoushka De, 17, Junior, Saint Adelaide International Schools, Accra, Greater Accra, Ghana, Lincoln Community School, Accra, Greater Accra, Ghana, T: Prudencio Tossou
- ROBO005T** **Boundary Based Anomaly Detection in Deep Neural Networks**  
Priscilla Seyram Ahiakpor, 17, Junior, Ridaan Gupta, 16, Junior, Lincoln Community School, Accra, Greater Accra, Ghana, T: Will Pamperin T: Mostafa El Araby

## GUAM

- Piti, Guam, TEGU01, Guam Island-Wide Science Fair**
- ANIM045** **Understanding the Role of Coral Pigmentation in Response to Coral Bleaching**  
Angel Gabrielle Payumo, 17, Junior, George Washington High School, Hagatna, Guam, T: Darlene Quichocho
- EAEV061** **Invisible Groundwater Discharge Patterns Across Tumon Bay, Guam: Discovery of Vital Habitats Sustained by Tumon Bay Karst Watershed Discharges From an Uplifted Carbonate Aquifer**  
Andrew Gio Kang, 15, Sophomore, John F. Kennedy High School, Tamuning, Guam, T: Colette Beausoliel

## HAITI

- Port-au-Prince, Haiti, HTI001, Expo-Sciences Haiti**
- EAEV044T** **ECOHUB: A Rewarding Ecological Platform**  
Angie-Reyna Leddycia Saint-Vil, 19, Senior, Djeika Ketsia Lafortune, 18, Senior, Adjael Joannie Marshall Paul, 18, Senior, College Marie-Anne, Port-au-Prince, Ouest, Haiti, T: Wilson Porportte
- EGSD030T** **Affordable and Readily Accessible Solar Dehydrator**  
Marc Lesly Lesly Morency, 17, Senior, Witchy Rosemane, 18, Senior, Olivier Rolles Louis Marie, 17, Senior, College Saint-Jeseph Du Cap-Haitien, Cap-Haïtien, Nord, Cap-Haïtien, Haiti, T: Andrallé Cherfils
- MATS054T** **Optimum**  
Djelessane (Annie) Dorothe Flygneau, 17, Senior, Wenshley Jn Baptiste, 18, Senior, Abigaëlle Belizaire, 19, Senior, College Dominique Savio, Petion-Ville, Port-au-Prince, Haiti, Collège Dominique Savio, Pétiön-ville, Ouest, Haiti, T: Darnley Begin

## HUNGARY

- Budapest, Hungary, HUN001, Innovation Contest for Young Scientists**
- ENEV005** **Rusty: The Social Mirror Technology**  
Nora Anna Kovacs, 18, Senior, Janos Zsigmond Unitarian High School, Cluj-Napoca, Cluj, Romania, T: Ervin Gyenge

# Finalist Directory

**ETSD004** **Developing a Motorized UV Illuminator Device for Photochemical Ligand-Binding**  
Benedek Laszlo Barna, 18, Senior, Szent Istvan High School, Budapest, Hungary,  
T: Susanne Prokop

## INDIA

**New Delhi, India, IND001, IRIS (Initiative for Research and Innovation in STEM)**

**BCHM010T** **HepaEase: Development of an Instigating Risk Assessment Tool and xLFIA Validating Potential Urinary Biomarkers for Early Detection of NAFLD**

Ishan Choudhary, 15, Sophomore, Aditya Kumar Jha, 14, Sophomore, Bharatiya Vidya Bhavan's R.K. Sarda Vidya Mandir, Raipur, Chhattisgarh, India, T: Sushil Pandey

**BEHA014** **Brain-Wave Stimulation as a Technique for Preventing and Treating Alzheimer's, Parkinson's and Other Movement Disorders and Improving Cognitive Abilities**  
Samarth Pandey, 17, Junior, DBMS English School, Jamshedpur, Jharkhand, India,  
T: Hirak Biswas

**BEHA021** **DysDiag: A Novel Risk Assessment and Screening Tool for Learning Disorders in Children**  
Spurti Nimbali, 16, Junior, Delhi Public School, R. K. Puram, Delhi, New Delhi, India,  
T: Shalini Harisukh

**CBIO015T** **Curalgia: A Novel Deep-Learning Based Framework for the Risk Assessment of Differentially Diagnosed Disease Such as Fibromyalgia**  
Sneha Pandey, 18, Senior, Vineet Narayan Prajapati, 17, Senior, Bharatiya Vidya Bhavan's R.K. Sarda Vidya Mandir, Raipur, Chhattisgarh, India, T: Sushil Pandey

**CBIO016T** **Machine Learning Augmented Histopathological Diagnosis of an Aggressive Variant of Liver Cancer**  
Shashvat Rastogi, 16, Junior, Vivasvat Rastogi, 16, Junior, Vasant Valley School, New Delhi, Delhi, India, T: Swaty Nag

**CELL010** **Cytotoxicity and Pro-Apoptosis on MCF-7 Breast Cancer Cells Using Polyherbal Formulation (PHF), MAT20**  
Sohan Tarigopula, 16, Junior, The International School of Bangalore (TISB), Bangalore, Karnataka, India, T: Jyothsna Rao

**CELL027** **Enhancing Beta Carotene Production in Yeast Cells**  
Tejas Gupta, 18, Senior, Head Start Educational Academy, Bengaluru, Karnataka, India,  
T: Nesil Baby

**CELL053** **In vitro Characterization of Umbilical Cord Mesenchymal Stem Cells (UC-MSCs) in a Novel Xeno-Free, Human Blood-Derived Supplement**  
Vedant Rajashekhar Lakkundi, 17, Senior, Indus International School Bangalore, Bangalore, Karnataka, India, T: Jyothsna Rao

**CHEM019** **Study of the Phytochemical Composition of *Averrhoa carambola* Extract and Its Effect on Water Biopollutants**  
# Sarvesh Prabhu, 17, Senior, FIITJEE Junior College, Hyderabad, Telangana, India,  
T: Subha Prabhu

**CHEM022** **Innovative Use of Nanoparticles Against Industrial CO<sub>2</sub> Emissions**  
Tanmay Vikram Parikh, 17, Senior, Centre Point School Katol Road, Nagpur, Maharashtra, India, T: Vikram Parikh

**EGSD040T** **Smart Solution for Eco Pollution**  
Mohan Durga Manikanta Nalla, 15, Freshman, Vinay Kumar Varada, 18, Freshman, BGK ZPH School, Pedana, Andhra Pradesh, India, T: Lakshmi Devi Kollati

**ENBM028** **Measuring Progression of Parkinson's Disease Using Wearables and Sensors**  
# Jui Abhijit Keskar, 17, Junior, Indus International School, Pune, Maharashtra, India,  
T: Anupriya Dhooli

**ENBM034** **EyeShift: Eye Care and Posture Control Device With an Intuitive Interface for Glasses**  
Shaurya Khosla, 17, Junior, Saint John's High School, Chandigarh, India, T: Bharat Kakkar

**ENEVO65** **Electrical Power Generation From Contrasting Interfacial Activities of Boron and Nitrogen Doped Graphene Extracted From Plastic Waste**  
# Ahitagni Das, 18, Senior, Delhi Public School Siliguri, Siliguri, West Bengal, India,  
T: Rajib Roy

# Finalist Directory

- MATH020** **On Enumeration of Semigroup Ideals**  
Parth Prashant Chavan, 18, Senior, Aditya English Medium School, Pune, Maharashtra, India, T: Jeffery Yu
- MATH023** **Elementary Proofs of the Properties of the Sierpinski Gasket Graph**  
Anushka Tonapi, 14, Freshman, Sri Kumaran Children's Home – CBSE, Bangalore, Karnataka, India, T: Vishnupriya Giridharan
- ROBO022** **Gradient Boosting Based Optimization Algorithm Using Model Selection to Reduce Overfitting**  
Agnij Moitra, 15, Sophomore, Birla Vidya Niketan, New Delhi, Delhi, India, T: Deepika Pareek
- ROBO028** **A Data-Driven Diagnosis and Prognosis Method for Machinery Tools Based on EMD and Dual-Task Deep Neural Networks**  
Nandika Auluck, 17, Senior, Sat Paul Mittal School, Ludhiana, Punjab, India, T: Seetaram Maurya
- TMEDO21T** **Ovydrome's Catch: A Biosensor for the Early Detection of Polycystic Ovarian Syndrome With and Approach to Prevent Further Gynecological Cancers**  
Soumya Agrawal, 16, Sophomore, Vanshika Digania, 16, Sophomore, Bharatiya Vidya Bhavan's R.K. Sarda Vidya Mandir, Raipur, Chhattisgarh, India, T: Sushil Pandey
- TMEDO22** **LCNN: Deep Convolutional Network (CNN) for Early Detection of Stage of Liver Disease**  
Aarna Shekhar, 15, Sophomore, Shri Ram School - DLF Campus, Gurugram, Haryana, India, T: Babita Chahal

## IRAQ

- Erbil, Iraq, IRQ001, INPO (Iraq National Project Olympiad)**
- BMEDO63T** **Fever Care**  
Balla Peshtivan Sedeeq#, 15, Sophomore, Ghandi Abdulrahman Mahmood#, 16, Sophomore, Kirkuk Cag Boys College, Kirkuk, Iraq, T: Ibrahim Mohammed
- EAEV079T** **Smart Chilly Water Tank System**  
Liya Hawkar Askandar, 16, Junior, Nina Halgurd Jalal, 16, Junior, Slemani Girls' High School, Slemani, Iraq, T: Lanya Tofiq
- SOFT048** **Shining Me**  
Nvar Nawrol Ali, 17, Junior, Halabjay Shaheed Communal Boys' College, Halabja, Iraq, T: Mabast Mohsin

## IRELAND

- Dublin, Ireland, IRL001, BT Young Scientist & Technology Exhibition**
- ENEVO22T** **Developing an Economically Viable Desalination Device for Individuals in Developing Countries**  
Oisin Patrick O'Neill, 16, Sophomore, Darragh James Henderson, 16, Sophomore, Oatlands College, Dublin, Leinster, Ireland, T: Avril Gaynor
- Dublin 16, Ireland, IRL002, SciFest**
- MATH007T** **A Group-Theoretic Generalization of Pythagoras' Theorem**  
Liam Timothy Waldron, 18, Senior, Luke O'Sullivan, 18, Senior, Rachel Brenda Griffin, 18, Senior, Killarney Community College, Killarney, Kerry, Ireland, T: Maire Spillane

## ISRAEL

- Jerusalem, Israel, ISRO01, The Israeli Young Scientists Contest**
- BMEDO34** **From Gene to Syndrome: Understanding the Relationship Between Alternative Splicing in Elastin and ASD Development**  
Tamar Tzohari, 17, Senior, Israel Arts and Science Academy, Jerusalem, Israel, T: Israel Rappaport
- CELL032** **B Cells Genetic Engineering With a Gene for HIV Antibodies Production, by an Innovative Method Based on the Class-Switch Recombination Process and by CRISPR/Cas9**  
Lior Lubek, 18, Senior, Ilan Ramon, Hod Hasharon, Central District, Israel, T: Dalia Gal



# Finalist Directory

- EBED028** **FBC: A Robotic System Designed to Prevent Avian Nesting on Residential Balconies**  
Lior Rogov, 18, Senior, Ahad HaAm High School, Petah Tikva, Israel, T: Zafrir Mor
- ETSD033** **Could Future Supersonic Aircraft Engines Be More Fuel Efficient? Proof of Concept for a Dual-Mode Supersonic Propulsion System**  
Daniel Shafir, 17, Senior, Galili High School, Kefar Sava, Central District-Hamerkaz, Israel, T: Zafrir Mor
- ROBO037** **A Single Usage Is All You Need: Generating an Entire Text by Using a Causal Language Model Once**  
Yoni Kremer, 18, Senior, Ironi Dalet, Tel Aviv-Yafo, Tel-Aviv-Jaffa, Israel, T: Ido Goodis

## ITALY

- Milano, Italy, ITA001, I Giovani e le Scienze**
- CHEMO40T** **LURING: Periodic Precipitations for the Controlled Release of Drugs**  
Marco Zecchin#, 16, Sophomore, Alessia Facchinetti, 16, Sophomore, Istituto Tecnico Industriale G. Omar, Novara, Italy, T: Celestino Fontaneto
- MATSO33T** **Bio-Sustainable, Water-Soluble and Antimicrobial Film Derived From Citrus Waste**  
Lisa Pantanali, 17, Senior, Edoardo Paron, 17, Senior, ISIS Arturo Malignani Udine, Italy, T: Elena Scrazzolo
- PHYS038** **Analyzing the Viability of Primordial Black Holes as a Significant Component of Cosmological Dark Matter**  
Federico Stanzani, 17, Senior, Liceo Steam International, Bologna, Italy, T: Riccardo Schiavi

## JAPAN

- Tokyo, Japan, JPN001, Japan Students Science Awards**
- ANIM022T** **Growth of Tidal Snail *Cerithidea moerchii* Depends on Submergence Rate and Height of Reed Stem in Brackish Mud Flats**  
Harune Omori, 17, Junior, Daiki Urakawa, 18, Junior, Nagasaki Prefectural Nagasaki Hokuyodai High School, Nishisonogi-gun, Nagasaki, Japan, T: Hikaru Miyazaki
- PHYS022** **How Ants Climb Smooth, Vertical and Overhanging Walls**  
Hana Blundell, 18, Senior, Osaka Prefectural Tennoji High School, Osaka, Japan, T: Toshiyuki Morinaka
- ROBO023** **Michishirube: AI Assist Cane for Visually Impaired**  
Haruki Takada, 17, Junior, Gunma Prefecture Takasaki High School, Takasaki, Gunma, Japan, T: Naoyuki Okada
- Tokyo, Japan, JPN002, Japan Science & Engineering Challenge**
- BEHA010** **Performing Pleasant Music With Mathematics**  
Yumi Ogasawara, 17, Junior, Otsuma Tama Senior High School, Tama, Tokyo, Japan, T: Yazawa Hironori
- EGSD017T** **Novel Ammonia Production Method Using Both Microbubbles and Iron Electrodes for Seawater Electrolysis**  
Mitsuki Ishigaki, 17, Junior, Yuka Ando#, 17, Junior, Erena Aihara, 17, Junior, Shizuoka Kita High School, Shizuoka-City, Shizuoka-Pref., Japan, T: Yuji Takagi
- ENEV017** **Measuring and Visualizing the Concentration of Aerosol Particles Using Flame Photometry**  
Sasara Mizutani, 17, Junior, Tokyo Metropolitan Koishikawa Secondary School, Honkomagome, Bunkyo-ku, Tokyo, Japan, T: Yuta Kato
- MATSO15T** **Analyzing a 400-Year-Old Mystery, the Makeup Method of Producing Green With Charcoal and Beni**  
Yuri Minoura, 17, Junior, Otoha Mitsuyoshi, 17, Junior, Bunkyo Gakuin University Girl's Senior High School, Komagome, Tokyo, Japan, T: Nobuzumi Iwakawa
- PHYS009** **A Mathematical Study About the Sustaining Phenomenon of Overtone in Flageolet Harmonics on Bowed String Instruments**  
Shodai Tanaka, 18, Junior, Sapporo Kaisei Secondary School, Sapporo, Hokkaido, Japan, T: Keita Inoue



# Finalist Directory

- PHYS010T** **Ninja Had the Noise Canceling Technology: Mechanisms and Application of Saoto-Kikigane**  
Michiru Tsurumaru, 17, Junior, Yamaguchi Prefectural Tokuyama Senior Highschool, Shunan, Yamaguchi, Japan, T: Takeshi Suetani
- PLNT015** **Discovery of Light-Induced Acquisition of Photosynthetic Capacity in Plant Roots and the Examination of Its Evolutionary Advantages**  
Momoha Kono, 19, Senior, Secondary School attached to the Faculty of Education, the University of Tokyo, Tokyo, Japan, T: Haruka Mitsuhori
- PLNT016T** **Wouldn't Hurt a Fly: The Efficacy of Plant Latex as an Insect Repellent**  
Reno Yokoyama, 17, Junior, Haruka Sakate, 18, Senior, Yuna Watari, 17, Junior, Shimane Prefectural Hamada High School, Hamada, Shimane, Japan, T: Susumu Fukumitsu

## JORDAN

Amman, Jordan, JOR001, Science Fair of The Jordanian Ministry of Education

- BEHA005** **Developing a Non-Invasive Eye Tracking Screening Tool for Early Detection of Alzheimer's Disease**  
Saher Aloran, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu-jama'ah
- BEHA006** **The Power of When: The Influence of Different Chronotypes on Students' Academic Performance**  
# Leen Hamadeh Allouh, 16, Junior, Tabariah, Irbid, Jordan, Jordan, T: Rasha Zoubi
- CHEM010** **Adsorption of Dyes and Heavy Metals From Water Using a Mixture of Jordanian Diatomite and Bentonite**  
Sewar Sadi Alsallal, 16, Junior, Arwa Bint Abdul Muttalib School, Aqaba, Aqaba, Jordan, T: Rania Alfuqara
- CHEM014T** **Designing an Approach for Recovering Energy From Waste Polyethylene Terephthalate (PET) Bottles and Fibers**  
Rama Yousef Hodaib, 17, Junior, Lina Kamal Abd-Al Hafiz, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abujammaah
- EGSD015T** **EVault: For the Advancement of Energy Storage Technology**  
Adham Hesham Alqasem, 16, Junior, Ahmad Awni Al-Dalaeen, 17, Junior, Hussein Awad Hussein Attia, 17, Junior, Al-Hassad Al-Tarbawi Schools, Amman, Jordan, AlHassad AlTarbawi Schools, Amman, Amman, Jordan, T: Abdullah Harb T: Abdallah Harb
- ENBM014T** **Using Analyzed Data From EEG Readings for Electrical Stimulation of Limb Muscles: An Innovative Approach to Neurorehabilitation**  
Rashed Abdullah, 17, Junior, Rayyan Theeb, 16, Junior, Saleh Al-Hinti, 16, Junior, Islamic Educational College, Amman, Jubieha, Jordan, Islamic Educational College-Jubeiha, Amman, Jordan, T: Ashraf Abu Khait
- ENEV015T** **A New Concept of ECO-Friendly Material That Can Replace Plastic**  
Shahd Omar Daoud, 17, Junior, Mera Alkasassbeh, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abujammaah T: Sawsan Abujammaah
- ENEV016T** **Efficient Removal of Ca and Mg Ions From Water Using Jordanian Zeolite: A Low-Cost and Recyclable Environmental Solution**  
Areen Rami Alashmawy#, 16, Junior, Sara Iyad Altarawneh#, 17, Junior, King Abdullah II School for Excellence, Aqaba, Aqaba, Jordan, T: Rania Alfugara
- MATSO14** **Analyzing the Effects of Metal Oxides on the Electrical Properties of Polymers With and Without the Presence of Multi-Walled Carbon Nano-Tubes**  
Firas Khalil, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu-jama'ah

## KAZAKHSTAN

Astana City, Kazakhstan, KAZ001, DARYN National Junior Science Projects Competition

- CHEM061** **Study of the Processes of Purification of Aqueous Media From Arsenic Ions Using Membrane Sorbents**  
Aldiyar Erlanovich Suleimbekov, 16, Sophomore, High School No. 60, Astana, Astana, Kazakhstan, T: Anastasiya Mashentseva

# Finalist Directory

## MATH042

### **L-Tromino Tilings for Portions of Square Lattice**

Sagyn Jumadildayev, 15, Sophomore, Nazarbayev Intellectual School of Physics and Math, Almaty, Kazakhstan, T: Ramazan Sultan

## ROBO073

### **Aq Zhol: Multifunctional Device With Advanced Road Safety Monitoring System**

Asylkhan Kali, 18, Junior, Nazarbayev Intellectual School of Physics and Mathematics in Kokshetau, Kokshetau, Aqmola Region, Kazakhstan, T: Laura Shegirova

## KENYA

### **Nairobi, Kenya, KEN001, Kenya Science and Engineering Fair**

## ENBM035T

### **Biomarkers Based Technology for Detecting Respiratory Infections Using Resin-B-Testing Kit**

Musa Latifa Juma, 17, Junior, Casadra Muthoni Waitherero, 17, Senior, Saint Thomas Girls Secondary School, Kilifi, Mombasa, Kenya, T: Bonface Keya

## ENBM043T

### **A Solar Powered Portable Ventilator for Use in Remote Areas**

Grace Tassy, 18, Junior, Wakajuma Obanda Abiero, 17, Senior, Maryhill Girls' High School, Thika, Kiambu, Kenya, Maryhill Girls' High School, Thika, Kiambu, Kenya, T: George Mwangi

## ENEV044T

### **IoT Based Dynamic Solid Waste Collection and Management System**

Victorene Obanda Obanda, 18, Senior, Sharon Obanda Ndirangu, 15, Senior, Maryhill Girls' High School, Thika, Kiambu, Kenya, T: George Mwangi

## ENEV081T

### **Biochar: An Environmentally Friendly Fuel Source**

Esther Osiago, 16, Weda Michelle Odero, 18, Senior, Moi Girls School Nairobi, Nairobi, Nairobi, Kenya, T: Charles Odero

## MATS023T

### **Design of a Continuous Penta-Membrane Hybrid Filter for Absolute Filtration Water**

Shylah Jepchirchir Mutai, 17, Junior, Olyviah Jepkoech Mutai, 17, Junior, Machakos Girls High School, Machakos, Kenya, T: Harryson Kiyingo T: Harryson Kiyingo

## LATVIA

### **Riga, Latvia, LVA001, National Centre for Education of the Republic of Latvia**

## BMEDO60

### **Wastewater Surveillance for the Identification of the Presence of SARS-CoV-2 and the Observation of Mutations of the Virus Variants**

Dora Berta Dumpe, 18, Senior, Riga Secondary School No. 64, Riga, Riga, Latvia, T: Inese Petere

## ETSD060

### **Creation of a Prototype Ion Engine and Improvement of Its Performance**

Kristers Tomsons, 18, Junior, Oskars Kalpaks Liepaja 15th Secondary School, Liepaja, Latvia, T: Anna Galina

## LUXEMBOURG

### **Luxembourg, Luxembourg, LUX001, National Contest "Jonk Fuerscher"**

## PHYS063

### **Analysis of the Method of Compressed Air Propulsion and Its Application to Model Rockets**

Moritz Nils Rohner, 16, Freshman, Lycee de Garcons Esch, Esch-sur-Alzette, Luxembourg, T: Jonathan Mengozzi

## SOFT046

### **A VR Puzzle Game With Hand-Tracking Mechanics**

Maxime Buck, 16, Sophomore, Lycee Michel Rodange Luxembourg, Luxembourg City, Luxembourg, T: Serge Quazzoti

## MALAYSIA

### **Putrajaya, Malaysia, MYS001, National Schools Science Innovation and Engineering Competition**

## CHEMO26T

### **Peanut Oil and Lemongrass Essential Oil Spray: A Novel, Cost-Effective and Eco-Friendly *Paederus fuscipes* Control Agent**

Wayne Ng, 17, Junior, Lucas John Teo, 17, Junior, Chung Ling High School Penang, Georgetown, Penang, Malaysia, T: Whey Cheng Heah

## CHEMO30T

### **Solving a Menace to Rice? TCCE Repellent: An Effective and Eco-friendly Turmeric and Clove Combined Extract as *Nilaparvata lugens* Repellent**

Samuel Wen Xuan Lee, 16, Junior, Zhi Han Khoo, 17, Junior, Elaine Koay, 17, Junior, Heng Ee High School, Georgetown, Penang, Malaysia, T: Sze Hui Chung

# Finalist Directory

- EBED022T** **Blind Swimmer Sensory Device 2.0**  
Nik Mifdzal Nik Nubhan, 16, Sophomore, Irfan Darwisy Mat Suhaimi, 16, Sophomore, Sekolah Sultan Alam Shah, Putrajaya, Wilayah Persekutuan, Malaysia, T: Samsiah Radiman
- ENEV036T** **Bio-Rean (A Biodegradable Planting Pot)**  
Durratul Aisyah Muhammad Zainudi, 16, Sophomore, Saidatus Syakirah Ibrahim, 16, Sophomore, Muhammad Zahirul Afiq Muhammad Zahid, 17, Junior, Sekolah Menengah Sains Sultan Mohamad Jiwa, Sungai Petani, Kedah, Malaysia, T: Noorsalawati Ahmad
- MATH024T** **On a New Variant of Prime Factorization Algorithm**  
Zhi Ping Ooi, 16, Junior, Jin Xian Tee, 17, Junior, Chung Ling High School Penang, Georgetown, Penang, Malaysia, T: Whey Cheng Heah
- MATS025T** **Organic Wastes as an Additive in Artificial Asphalt Production**  
Muhammad Faiz Ikhwan Ismail, 17, Junior, Nur Anisha Md Rodi, 16, Junior, Nursyadzliana Syadzlin Muhamadzlin, 17, Junior, Sekolah Menengah Kebangsaan Kampong Selamat, Sebrang Pera Utara, Pulau Pinang, Malaysia, T: Siti Suria Shafie

## MEXICO

**Puebla, Mexico, MEX003, Mexico National Science Cup**

- BEHA036T** **Design, Construction and Implementation of Educational Games Such as Learning Strategy for the Subject of Biology**  
Yurida Gamez, 17, Junior, Fernanda Asomoza, 17, Junior, Escuela Preparatoria Oficial No. 208, Axapusco, Estado de Mexico, Mexico, T: Jesus Bautista
- ENEV071T** **Resiblock Based by Marble Powder**  
Mayte Lopez Galeana, 15, Sophomore, Jesica Romero Romero, 15, Sophomore, Colegio de Bachilleres del Estado de Puebla Plantel 6, Puebla, Mexico, T: Felix Bernabe Romero

## NORTHERN IRELAND

**Lisburn, Northern Ireland, NFK001, Sentinus Young Innovators**

- SOFT005** **Virtual Academic Insight Aid**  
Michael Owen McMahon, 17, Senior, Lagan College, Belfast, United Kingdom, T: Sean Connolly

## NORTHERN MARIANA ISLANDS

- Saipan, Northern Mariana Islands, NMI001, Northern Mariana Islands Science & Engineering Fair**
- CBIO019** **Comparison Bioinformatics Study: Novel Machine Learning Algorithms for Detecting Zoonanthellae Expulsion for Insight Into Coral Conservation Efforts**  
Yelin Park, 17, Junior, Saipan International School, Saipan, Northern Mariana Islands, T: Tony Flores

## OMAN

**Muscat, Oman, OMN001, The Omani National Science Faire**

- BMEDO37T** **Antimicrobial Activity of Organic Herbal Extracts Infused With Ozone as a Combination Therapy on *Helicobacter pylori***  
Basma Khalid Al uwaisi, 17, Junior, Aalaa Yousuf AlAufi#, 16, Junior, Al Amal School, Muscat, Oman, T: Fakhria Al Shibani
- CHEMO38** **Natural-Based Post-Harvest Elongation**  
Ahlam Salim Al hinai, 16, Sophomore, AL Wadi AL Alaa, Bahla, AD Dakhiliyah, Oman, T: Tahani AlShuaili
- ENEV052T** **Valorization of Using Animal Bones to Produce 3D Printer Filament**  
Maryam Wahab Al Rahbi, 16, Junior, Shether Abdul Salam Al Kharusi, 17, Junior, Dohat al Adab, Bousher, Muscat, Oman, T: Iman Al Rahbi

## PAKISTAN

**Islamabad, Pakistan, PAK001, National Science and Engineering Fair Pakistan**

- BCHM031** **Targeting Drug Resistant Cancer Cells by Plant Based Bio-Active Compounds**  
Manahil Moazzam, 16, Junior, Lahore Grammar School, OPF Senior Girls Campus, Lahore, Punjab, Pakistan, T: Saima Sarfaraz

# Finalist Directory

- EAEV022T** **An Experimental Approach to Make Paper From Aquaculture By-Product**  
Fatima Haque, 18, Junior, Areebah Babar, 17, Junior, PakTurk International Schools and Colleges, Gulshan-e-Iqbal Girls Campus, Karachi, Sindh, Pakistan, T: Asifa Shahid
- EGSD019** **Fully Automatic Solar Panel Cleaning System**  
Mahad Ahmed, 14, Freshman, Scarsdale International School, Lahore, Punjab, Pakistan, T: Salma Afroz
- EGSD028** **FOURDUST: Turning Green Waste Into Energy**  
Hasan Raheel, 18, Senior, Aga Khan Higher Secondary School, Karachi, Sindh, Pakistan, T: Erum Jabeen
- MCRO024** **Development of Molecular Diagnostic Tool for Cotton Leaf Curl Disease (CLCuD) Using Betasatellite-Based Molecular Marker**  
Umer Sohail Meer, 17, Junior, International School Lahore, Lahore, Punjab, Pakistan, T: Mohammad Ali Amiruddin
- SOFT037** **Orchid Crop Advisor**  
Moazzam Mansoor, 14, Freshman, Engro Grammar School, Daharki, Sindh, Pakistan, T: Mehr un Nisa Sheikh

## PALESTINE

### Ramallah, Palestine, PSE001, Palestine Science and Technology Fair

- BEHA057T** **Integrated Care Platform That Utilizes Artificial Intelligence, and Extended Reality With Principles of Gamification to Integrate Palliative Care Services Into the Rehabilitation Journey**  
Anas Saud Abuamar, 16, Junior, Ayham Mohammad Khleif, 17, Junior, Bethlehem Secondary School for Boys, Bethlehem, Bethlehem, Palestine, T: Khalid Rashid  
T: Khalid Rashid
- CBIO065T** **Parallel: A High-Level Programming Language for Efficient Bioinformatics Scientific and Mathematical Built-In Functions With an Easy and Flexible Syntax**  
Ameed Eshtaya, 15, Sophomore, Osaïd Samer Abuomar, 16, Sophomore, Islamiya Secondary School, Nablus, Palestine, T: Ahmad Abu Arra
- ENBM082** **Test Yourself by Yourself**  
Israa Shawabka, 15, Sophomore, Fawwar Girls Secondary School, Hebron, West Bank, Palestine, T: Sajedah Talahmeh
- ENEV079** **Electronic Waste Management System**  
Sadeel Jamal Odi, 15, Sophomore, Alawda Secondary School for Girls, Bethlehem, Bethlehem, Palestine, T: Rana Khair
- ENEV080** **Investor of Greenhouse Gases**  
Leen Khaldoun Hussein, 15, Sophomore, Ramallah Girls High School, Ramallah, West Bank, Palestine, T: Kifah Khundaqji
- PLNT056** **Smart Agricultural Soil Management**  
Yamen Samir Bsharat, 15, Sophomore, Muscat Secondary School for Boys, Tulkarm, Palestine, T: Raef Bsharat
- SOFT047** **Derma X**  
Mesk Abdalsalam, 15, Sophomore, Talae' Al-Amal Secondary Schools, Nablus, West Bank, Palestine, T: Laila Omar

## PANAMA

### Panama City, Panama, PAN001, Feria Científica del Ingenio Juvenil

- BMED013** **Prevalence of Registered Cases for Chronic Kidney Disease in 2019 and March 2022 in Panama**  
#  
Missel De Los Angeles Camano, 15, Sophomore, Instituto Urraca, Panama, Veraguas, Panama, T: Karen Castrejo
- EAEV016** **Estimation of Carbon Sequestration in Urban Parks in the Rufina Alfaro Township, Panama City**  
Isabella Victoria Garcia, 16, Junior, Colegio San Agustin, Panama, Panama, T: Nathalia Tejedor

# Finalist Directory

## POLAND

### Warsaw, Poland, PLD001, E(x)plory Science Fair

- EAEVO21T** **Can Anthropogenic Pollutants (Microplastics and Fertilizers) Really Be Dangerous to Freshwater Zooplankton?**  
Karolina Markiewicz, 16, Junior, Oliwia Gorska, 16, Junior, XL Liceum Ogólnokształcące z Oddziałami Dwujęzycznymi im. Stefana Żeromskiego w Warszawie, Warsaw, Mazowieckie, Poland, T: Kamil Kwiecieri
- EBED019** **ZHELTA: Contactless, Programmable Keyboards for People With Disabilities**  
Filip Wojciech Piekos, 16, Junior, Zespół Szkół Technicznych i Ogólnokształcących im. Stefana Banacha w Jarosławiu, Jarosław, Podkarpackie, Poland, T: Artur Tutka
- MCRO023** **Studies on the Effect of Propolis on Cutibacterium Acnes in Overcoming Bacterial Resistance and Reducing Environmental Pollution Caused by Overuse of Antibiotics**  
Katarzyna Furmanek, 16, Sophomore, IX Liceum Ogólnokształcące im. Klementyny Hoffmanowej, Warsaw, Masovian voivodeship, Poland, T: Jolanta Nawrocka-Furmanek

## PORTUGAL

### Porto, Portugal, PRT001, Portuguese Contest for Young Scientists

- ENEVO58T** **E-Drone: Assessing Cargo Ship Exhaust Emissions Using Low-Cost Multi-Copter Unmanned Aerial Vehicles**  
Mariana Santos Ferreira Varajao Goncalves, 19, Senior, Joao Pedro Guimaraes Amorim Cunha, 18, Senior, Colegio Luso-Frances, Porto, Portugal, T: Rita Rocha
- MCRO045T** **Degradation of Polyethylene by Fungi**  
Valentina Vitoria Gomes, 18, Senior, Sarah Finck Macieira Condeixa, 18, Senior, Escola Secundaria Dr. Manuel Candeias Goncalves, Odemira, Baixo Alentejo, Portugal, T: Paula Canha

## PUERTO RICO

### Mayaguez, Puerto Rico, TEPR01, Puerto Rico Math Fair

- MATH025** **New P Formula To Calculate the Determinants of 3x3 Matrices in a More Algebraic Way**  
Karellen Velazquez, 17, Senior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Esperanza Soto-Rivera
- MATH030** **Fractal Based Time Series Forecasting**  
Ana Sofia Cabrera-Isaza, 16, Junior, CROEM HS, Mayaguez, Puerto Rico, T: Edwin Benvenuti
- MATH032** **Using Primes, Real, and Complex Numbers To Prove That Two Matrices Are Similar**  
# Karina Alanis Miranda, 16, Junior, CROEM HS, Mayaguez, Puerto Rico, T: Edwin Benvenuti

### Ponce, Puerto Rico, TEPR02, Arecibo Regional Science Fair

- ANIM035** **The Effect of a Diet on the Life Span of the *Danaus plexippus portoricensis* Butterfly**  
Kamila Oliveras, 14, Freshman, Brigida Alvarez Rodriguez Mathematics and Science High School, Vega Baja, Puerto Rico, T: Abigail Rivera
- ETSD040** **Integration of Technology in the NMD Surfboard Prototype for Greater Safety**  
# Noeliz Sophia Cordero, 17, Senior, Abelardo Martinez Otero, Arecibo, Puerto Rico, T: Michael Gutierrez
- ETSD046** **The Creation of a Dog Treat Dispenser That Activates With Water**  
Camila Cristina Gomez, 14, Freshman, Brigida Alvarez Rodriguez Mathematics and Science High School, Vega Baja, Puerto Rico, T: Abigail Rivera

### Ponce, Puerto Rico, TEPR03, Bayamon Regional Science Fair I

- ENEVO51** **Irrigation System for Tropical Climate**  
Angelica Alicea Ortiz, 16, Junior, Escuela Bilingue Especializada en Ciencias y Matematicas Papa Juan XXIII Secundaria, Bayamon, Puerto Rico, T: Natcha Leon
- ETSD041** **Improvements to the Design of Bridges for Resilience During Atmospheric Events in Puerto Rico**  
Admarie Alondra Rosario, 17, Junior, Escuela Bilingue Especializada en Ciencias y Matematicas Papa Juan XXIII Secundaria, Bayamon, Puerto Rico, T: Natcha Leon

# Finalist Directory

- SOFT034**     **Development of an Intelligent System for Rainwater Collection, Storage, and Irrigation With Arduino UNO**  
Sebastian Rivera Ayala, 18, Senior, Escuela Bilingue Especializada en Ciencias y Matematicas Papa Juan XXIII Secundaria, Bayamon, Puerto Rico, T: Natcha Leon Hugo
- Ponce, Puerto Rico, TEPR04, Caguas Regional Science Fair**
- BEHA039**     **Conditioning the Work Environment for the Community of Patients With Neurological Disorders**  
Adriana V. Valeria Rivera Perez, 17, Junior, Specialized School of Science and Mathematics Genaro Cautino Vazquez, Guayama, Puerto Rico, T: Haydee Laporte Berrios
- EGSD046**     **Disused Tires: An Alternative To Produce Biogas**  
Adielys Dinguis Garcia, 17, Senior, Superior Vocacional Benjamin Harrison, Cayey, Puerto Rico, T: Charles Marzant-Ortiz
- MCRO047**     **Sargassum fluitans as Substrate and Nutrient Source de novo Culture Media to Growth Marine Microorganisms**  
Layza Minnellis Alicea Lopez, 18, Senior, Superior Vocacional Benjamin Harrison, Cayey, Puerto Rico, T: Charles Marzant-Ortiz
- Sabana Grande, Puerto Rico, TEPR05, Humacao Regional Science Fair**
- EAEV056**     **Abundance and Distribution of Mosquitoes in Two Areas of an Educational Institution in the Municipality of Rio Grande, Puerto Rico**  
Wilfred Emil Rivera, 15, Sophomore, Escuela Pedro Falu Orellano, Rio Grande, Puerto Rico, T: Elizabeth Bonano
- ETSD045**     **Designing Mechanical Arms to Use on Flood-Prone Bridges to Save Lives**  
Eduardo Luis Sanchez, 17, Senior, Jose Collazo Colon, Juncos, Puerto Rico, T: Pamela Rivera
- PHYS044**     **On TESS Demographics and Data Mining of Prospect Earth-Twins via Habitability Constraints**  
Emily Nicole Aleman, 16, Junior, Centro Residencial de Oportunidades Educativas de Ceiba, Ceiba, Puerto Rico, T: Wilmayris Alvira
- Ponce, Puerto Rico, TEPR06, Ponce Regional Science Fair**
- CELL050**     **Effect of Osmotic Stress on the Expression of the Beta Amyloid 1-42 Gene of Alzheimer's Disease in Transgenic *C. elegans* Model**  
Adrian Noel Escalera Rivera, 17, Senior, Centro Residencial de Oportunidades Educativas de Villalba, Villalba, Puerto Rico, T: Rocío Hernandez Quinones
- ETSD048**     **Creation of Control Recovery Systems for Coupe Body Cars To Increase the Probability of Regaining Control at High Speeds**  
#  
Abdiel Urayoan Saez, 17, Senior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Jonatan Plaza Plaza
- MATSO46**     **Creation of Biodegradable Polymers From Starch of *Zea mays* Combined With Organic Resin**  
Angel Omar La Torre, 17, Senior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Kathia Rodriguez
- Sabana Grande, Puerto Rico, TEPR08, Mayaguez Regional Science Fair**
- ENEV063T**     **Generating Energy From Ocean Waves**  
Sofia Isabel Roman Garrastazu, 17, Senior, Annabelle Marie Garcia, 18, Senior, Dr. Carlos González High School, Aguada, Guaniquilla, Puerto Rico, T: Maria Mendoza
- TMED057**     **Effect of CaS Dispersion Concentration on Human Skin Benign and Melanoma Cell Viability**  
Kiara Yarelis Gonzalez, 18, Senior, Escuela Superior Patria Latorre Ramirez, San Sebastian, Puerto Rico, T: Shadai Lorenzo
- Ponce, Puerto Rico, TEPR09, San Juan Regional Science Fair**
- CBIO035**     **Eye Disease Diagnosis Using Deep Learning**  
#  
Karen Sofia Medina Aparicio, 17, Senior, University Gardens High School, San Juan, Puerto Rico, T: Xavier Pagan
- EGSD041**     **Accessory to Optimize the Functionality of Solar Cells Using Reflective Materials**  
Javier Andres Martinez-Ballagas, 17, Junior, University Gardens High School, San Juan, Puerto Rico, T: Xavier Pagan

# Finalist Directory

## Carolina, Puerto Rico, TEPR12, Puerto Rico Metropolitan Science Fair

- EBED040T** **Slot-Bee Care: A Self-Powered Beehive Monitoring System to Promote the Well-Being of Honeybees**  
Layla Sofia Ballet Torres, 16, Sophomore, Kayla Zoara Teron Villodas, 15, Sophomore, Colegio Rosa-Bell, Guaynabo, Puerto Rico, T: Yajaira Torres
- EGSD047** **Innovative Multifunctional Portable Cooler Capable of Efficiently Using Solar Energy During Emergency Situations: A Life-Changing Device**  
Iralys Rodriguez Ramos, 15, Sophomore, Madelcar Academy, Vega Baja, Puerto Rico, T: Juan Torres Sanchez
- EGSD048** **The Development of a Stream Generator Prototype Capable of Obtaining Tidal Energy From Diverse Bodies of Water**  
Andres Ricardo Guerra-Hernandez, 17, Junior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez-Rivera
- ENBM071T** **Non-Invasive Wearable Patch for Non-Enzymatic Glucose Monitoring Using Fluorescent Graphene Quantum Dots**  
Jerry Chen, 16, Junior, Saleh Sultan Yassin-Shehadeh, 16, Junior, Saint John's School, San Juan, Puerto Rico, T: Edna Guzman Ferreira
- ETSD051T** **Sustainable Aviation: Fuel Use Reduction Through Algorithmic Routing**  
Siona (Dolly) Pramoda, 14, Freshman, Meghna A. Pramoda, 15, Junior, Baldwin School of Puerto Rico, Guaynabo, Bayamón, Puerto Rico, T: Zacha Ortiz
- MCRO053** **The Characterization of a Phenolic-Protein Conjugated Patch as an Antimicrobial Agent to Prevent Infections in Wounds**  
Karina Michelle Lopez-Rivera, 18, Senior, Colegio Rosa-Bell, Guaynabo, Puerto Rico, T: Yajaira Torres
- SOFT039** **Development of a Videogame That Serves as an Innovative and Revolutionary Tool for the Diagnosis of Recurrent Abuse in Minors From 8 to 17 Years Old**  
Gabriela Nicole Martinez Disla, 18, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez-Rivera
- TMED058** **Use of *Borreira laevis* Herb (White Broomweed) To Dissolve Common Kidney Stones of Calcium Oxalate Crystals**  
Riccardo Lopez-Cepero Navarro, 17, Junior, Colegio San Ignacio de Loyola, San Juan, Puerto Rico, T: Laura Rosado
- TMED074** **Use of Red Harvester Ant (*Pogonomyrmex barbatus*) as a Biomarker to Identify Glucose in Human Urine**  
Diego Alexander Rivera Cartagena, 17, Junior, Colegio San Ignacio de Loyola, San Juan, Puerto Rico, T: Laura Rosado Rodriguez
- Mayaguez, Puerto Rico, TEPR10, SESO Regional Science Fair**
- SOFT015** **A Deep Learning Architecture Using EEG for Working Memory Assessment in Mild Cognitive Impairment**  
Sriniketan Sridhar, 15, Freshman, Southwestern Educational Society, Mayaguez, Puerto Rico, T: Melissa Segarra Ruiz

## QATAR

### Doha, Qatar, QAT001, The National Student Research Fair

- BMED064T** **The Effect of Immune Checkpoint Inhibitor Ipilimumab on the Development and Proliferation of Breast Cancer Stem Cells**  
Youssef Abdelaal Nasr, 17, Senior, Khalifa Waleed Al-Janahi#, 17, Senior, Hassan Ibn Thabit Secondary School for Boys, Doha, Qatar, T: Faisal Hassan T: Faisal Hassan
- CELL030T** **Tumor Suppressor Fbw7 Protein Aggregation: A Novel Tumorigenic Mechanism in Cancer?**  
Bashar Bilal Awwad, 16, Junior, Rashid Hamad AL Marri, 16, Junior, Omar Bin Abdulaiz Independent Secondary School for Boys, Doha, Qatar, T: Wael Aboushady
- EBED032T** **A Solar Powered Internet of Things (IoT) Based Real-Time Weather Monitoring System for Precision Agriculture and Farming**  
Saoud Abdulaziz Askar, 15, Junior, Ahmed Abdulaziz Almulla, 17, Junior, Qatar Science and Technology Secondary School for Boys, Doha, Ain Khalid, Qatar, T: Mahamood Alam



# Finalist Directory

**ENEV053T Toxicity Evaluation of Two Surfactants With Anticorrosion**  
Mohammed Khaled Alhajri, 16, Junior, Mohamed Yousef Aljaber, 16, Junior,  
Qatar Banking School for Boys, Doha, Qatar, T: Ahmed Shawer

## REPUBLIC OF MOLDOVA

**Chisinau, Republic of Moldova, MDA001, Moldova Science and Engineering Fair**

**CHEM065 New Semi-Synthetic Agents With Antibacterial and Antifungal Properties**  
Iulia Teleuca, 16, Junior, Theoretical High School "Orizont, Durlesti", Chiainau, Republic  
of Moldova, T: Vasilii Graur

**ETSD067 Developing a New Acoustic Levitation Platform Design for Non-Contact Handling  
in Electronics Assembly**  
Anton Bulancea, 16, Freshman, Alexandr Pushkin Lyceum, Chisinau, Republic  
of Moldova, T: Oleg Josan

## ROMANIA

**Suceava, Romania, ROM001, Romania Science and Engineering Fair**

**BCHM007 Glucocorticosteroids in Case of Genetic Mutations, Autoimmune Diseases  
or COVID-19**  
Iuliana Paula Hutanu, 18, Junior, Colegiul Tehnic Latcu Voda Siret, Siret, Suceava,  
Romania, T: Cristina Dumitras

**BCHM008 Methods of Predicting the Functions of Intrinsically Disordered Proteins:  
The Functions of Tau Protein**  
Ioana Madalina Caraus, 19, Senior, International Computer High School of Bucharest,  
Bucharest, Romania, T: Stefan Eugen Szedlacsek

**ENBM017T MotionShift Prosthetic Device for Replicating Natural Walking Using Artificial  
Neural Networks**  
Antonie Rares Grigoras, 18, Junior, Mihai Alexandru Hulubeac, 19, Senior, Petru Rares  
National College Suceava, Suceava, Romania, Colegiul National "Petru Rares" Suceava,  
Suceava, Romania, T: Anca Greculeac

**ENBM018 Three Layered Support Based on Collagen and Carbon Nanotubes Functionalized  
With Thiamphenicol as Drug Delivery System: A New Concept of Intelligent Wound  
Dressing**  
Bianca Mihaela Nemes, 18, Junior, Liceul Teoretic International de Informatica Bucuresti,  
Bucharest, Bucharest, Romania, T: Madalina Albu Kaya

**PHYS015 The Development of a Second-Order Autocorrelator for Measuring the Duration  
of Ultrashort Laser Pulses**  
Miruna Neacsu, 19, Senior, International Computer High School of Bucharest,  
Bucharest, Romania, T: Andrei Naziru

## SAUDI ARABIA

**Riyadh, Saudi Arabia, SAU001, Mawhiba Science & Engineering Fair**

**BEHA030 Development of 3D Printed Personalized Chewable Tablets for Use in Older Adults  
With Dysphagia**  
Hanadi Hassan Orayf, 17, Senior, Umm Salamah, Makkah, Makkah, Saudi Arabia,  
T: Raed Felimban

**BEHA032 A Deep-Learning System for Culture-Based Emotion Recognition**  
Juri Ibrahim Aljohani, 17, Senior, Al Aqeeq International School, Medina, Medina,  
Saudi Arabia, T: Youssef Mohammed

**BMEDO45 Conditional Inactivation of ap2-mrp by Di-Cre System Leads to Arrest  
in Plasmodium falciparum Growth**  
Jory Fadil Alturki, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia,  
T: Amit Subudhi

**BMEDO46 Upregulation of Innate Immune Response Genes in a SARS-CoV-2 Nucleocapsid  
Protein Dependent Manner**  
Zahraa Al Shubbar, 17, Senior, Dhahran Ahliyya School, Dammam, Eastern Province,  
Saudi Arabia, T: Muhammad Shuaib



# Finalist Directory

- CBIO032** **A Novel Exosome-Encapsulated-miRNA-Based Machine Learning Model for Blood-Based Diagnosis, Subtype Classification, and Stage Detection of Multiple Cancer Types**  
Abdullah Ali AlGziwi, 17, Senior, King Faisal School, Riyadh, Riyadh, Saudi Arabia, T: Huda AlKhalaf
- CELL038** **Development of Selective MIZ-1 BTB Domain Inhibitors Targeting HUWE1 E3 Ligase in MYC-Driven Cancers**  
Yousef Alsabban, 18, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Inas Zein
- CELL044** **Comparing the Effects of NSD2 and Its Cancerous Mutation on Nucleosomes to Identify Potential Routes for Inhibition**  
Nour Reda Jamjoom, 17, Senior, Jeddah Knowledge International School, Jeddah, Makkah, Saudi Arabia, T: Kacper Szczepski
- CHEM039** **A Bifunctional System for Atmospheric Water Harvesting and Direct Air Electrolysis for Hydrogen Production**  
Fatima Abdullah Alarfaj, 15, Sophomore, Al-Anjal Private School, Al Hofuf, Eastern, Saudi Arabia, T: Mahmoud Abdelnaby
- CHEM041** **Introducing a Novel Nanohybrids of Nickel and Cobalt Nanoparticles Loaded on Carboxymethyl Cellulose Core-Shell as an Anodic Catalyst for Urea Fuel Cells**  
Fatimah Abdrab Alameer Alboali, 17, Senior, Alkifah Academy, Al Hufuf, Eastern Province, Ahsaa, Saudi Arabia, T: Hany Abd El-Lateef
- CHEM053** **Bi-Functional MOF-Based Electrocatalyst for Efficient and Cost-Effective Hydrogen Production From Seawater**  
# Faisal Fahad Almuhaysh, 17, Junior, Alkifah Academy, Al Hufuf, Eastern Province, Ahsaa, Saudi Arabia, T: Aasif Helal
- EAEV050** **A New Approach for Optimizing a Light Scattering Coating Formulated With Different Sized BaSO<sub>4</sub> Particles for Energy Conservation Applications**  
Deema Mohammed Marwahi, 17, Senior, Al Hussan National Model School For Girls- Jubail, Al Jubail, Eastern, Saudi Arabia, T: Muhammad Mansha
- EAEV051** **Low-Cost Replicable Open-Source Mangrove Monitoring System**  
Dhay Shujaa, 17, Senior, Secondary Gifted School, Jeddah, Makkah, Saudi Arabia, T: Khaled Salama
- EBED029** **Highly Sensitive MEMS Cantilever Gas Sensor Using Deposited Nanostructured Sb-doped ZnO Thin Film Deposited by PLD for Low Concentration Detection of Ammonia Gas**  
Abdulmohsen Khalid Almansour, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Mohammed Aldosary
- EBED030** **Preventing Piracy of Integrated Circuits via a Provable Security Mechanism**  
Fatimeh Mohammed Al Ghannam, 18, Senior, Al-Anjal Private School, Al Hofuf, Eastern, Saudi Arabia, T: Mohamed El Massad
- EGSD031** **Engineering Hybrid System to Generate Renewable Energy From Solar and Raindrop Energy Using Newly Designed Compatible Piezoelectric Devices**  
Fajr Abdulmajeed Alkhalayfi, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Adnan Zaman
- EGSD032** **Concrete Electrolyte-Based Structural Supercapacitor Reinforced With Carbon-Modified Steel Mesh**  
Rataj Abdulrahman Alsulami, 17, Junior, Talented Secondary School, Jeddah, Makkah, Saudi Arabia, T: Mohammed Abdul Aziz
- EGSD034** **New Approach to Increase Hydrogen Production by Adding Magnetic Field to the Photoelectrochemical Water Splitting of Metal Oxides Thin Films**  
Taif Alhedmi, 17, Senior, Manarat Al-Riyadh, Riyadh, Saudi Arabia, T: Abdullah Alotaibi
- EGSD035** **Electrocatalytic Green H<sub>2</sub> Generation Using Novel Defect Engineered Cotio<sub>3-x</sub>/Tio<sub>2-x</sub>- Perovskite Nanostructures Synthesized by Pulsed Laser Processing**  
# Leen Ahmed Al-Mulhim, 16, Junior, University Schools, Dhahran, Eastern Province, Saudi Arabia, T: Zozo Ahmed

# Finalist Directory

- EGSD036** **Laser-Induced One-Step Green Synthesis of Graphene Nanoparticles for Fabrication of All-Solid-State Ultracapacitor**  
# Latifa Hesham Alghannam, 16, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Mohammed Gondal
- ENBM049** **The Effect of 3D Peptide Hydrogel Scaffold Stiffness on Osteoblast Proliferation and Differentiation for Bioengineering Applications**  
Hala Al Majed, 17, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Dana Alhattab
- ENBM053** **Generating Novel *E. coli* Nissle Cells Using a Reprogrammable CRISPR-Cas12 System for Targeted Drug Delivery**  
Wesam Fahd Algurashi, 18, Senior, Manarat Al Khobar National & International Schools, Al Khobar, Eastern Province, Saudi Arabia, T: Aaron Angles
- ENEV046** **A Multi-Functional and Highly Efficient Photo-Electrocatalytic 3D ZnO Nanoflowers for Simultaneous Water Splitting and Wastewater Treatment**  
# Maria Ghalib AlGhamdi, 17, Senior, Al Shams National Schools, Riyadh, Saudi Arabia, T: Nawal Al-Abass
- ENEV047** **Net Direct Air Capture: Novel Contact Liquid-Based Approach for Efficient, Cost-Effective, and Scalable Cryogenic Carbon Capture**  
Mohammed Ahmed Alarfaj, 17, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: William Roberts
- ENEV048** **Super Paramagnetic Nanoparticles as a Reusable Delivery System of Pesticides**  
Layan Mohammed Noorwali, 17, Senior, Talented Secondary School, Jeddah, Makkah, Saudi Arabia, T: Safyan Khan
- ETSD038** **Development of a Testing Platform for an Underwater Surveying Robot to Assess Coral Reef Health**  
Maria Qumsani, 18, Senior, Dar Jana International School, Jeddah, Saudi Arabia, T: Eric Feron
- ETSD043** **Kinetic Simulation of Ammonia/Hydrogen Combustion Under Gas Turbine Conditions for CO<sub>2</sub> Reduction**  
Leen Majed Qanash, 16, Senior, Jeddah Gifted School, Jeddah, Makkah Almukkarmah, Saudi Arabia, T: Mani Sarathy
- MATS034** **Development of a Novel and High Performance WO<sub>3</sub>/Al<sub>2</sub>O<sub>3</sub> Ceramic Composite Membrane for Oil-Water Separation**  
# Tahani Adel Ahmed, 17, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Mohammad Gondal
- MATS035** **Magnetic and Microwave-Absorbing Properties of Scandium-Doped Co<sub>0.5</sub>Ni<sub>0.5</sub>Fe<sub>2-x</sub>O<sub>4</sub> Nano-Spinel for High-Frequency Applications**  
Sarah Essam Alsulaim, 16, Junior, AlBassam Schools, Dammam, Saudi Arabia, T: Munirah Al-Messiere
- MATS037** **Development of Novel and Cost-Effective Perovskite Photoconductive Micro-Device for Terahertz Emission Applications**  
Retal Mohammed Jadaa, 17, Senior, Jeddah Gifted School, Jeddah, Makkah Almukkarmah, Saudi Arabia, T: Monerah Alkizzy
- MATS044** **Engineering of a Novel Low-Cost Hybrid Perovskite Material for Modulating LED Devices**  
Abeer Ali Alyousef, 16, Sophomore, Dohat Alibdaa International Schools, Alahsa, Eastern Province, Saudi Arabia, T: Essa Alharbi
- PLNT034** **Improving *Aquilaria crassna callus* Sesquiterpenoid Production Using MOFs**  
Yazan Alflayyeh, 18, Senior, King Faisal School, Riyadh, Riyadh, Saudi Arabia, T: Kyle Lauersen
- PLNT035** **The Effects of (Fe<sub>3</sub>O<sub>4</sub>) Nanoparticles on the Growth, Viability, and Toxicity of *Triticum aestivum L.* Plants**  
Layan Almalki, 16, Junior, Alfaisaliah Islamic Schools, AlKhobar, Saudi Arabia, T: Huseyin Tombuloglu
- PLNT036** **Bioactivity of New Series of Zaxinone Mimics in Rice Growth and Its Effect on Striga Germination**  
Noor Yousef Alhammad, 18, Senior, Al-Anjal Private School, Al Hofuf, Eastern, Saudi Arabia, T: Salim Al-Babili

# Finalist Directory

- ROBO035** **An Adaptable, Cost-Effective, Compact Approach to 3D Printer Self-Repair**  
Bandar Mahmood AlBraheem, 17, Senior, Manarat Al Khobar National & International Schools, Al Khobar, Eastern Province, Saudi Arabia, T: Eric Feron
- TMEDO46** **Development of Universal Multi-Target Antibody-Like Vaccines Against the Highly Pathogenic Coronaviruses**  
Faris Alyami, 17, Senior, Sada Al-Ibdaa, Khamis Mushayt, Asir, Saudi Arabia, T: Mohamed Alfaleh

## SINGAPORE

- Singapore, Singapore, SGP001, Singapore Science and Engineering Fair**
- EGSD024** **Perfectly Flawed: Leveraging on Defects in AgSbTe<sub>2</sub> via Ge Doping for Thermoelectric Waste Heat Harvesting**  
Ivan Joel Wen Jie You, 17, Junior, NUS High School of Mathematics & Science, Singapore, Singapore, T: Ai Lin Chong
- MATSO21** **Computational Discovery of Highly Sustainable and Efficient Metal-Organic Frameworks for SO<sub>2</sub> Capture**  
Ruotong Bai, 18, Senior, Hwa Chong Institution, Singapore, Singapore, T: Kelvin Tan
- MATSO22T** **Laser Tuned Micro-Fluorescence in Fish Scales for Steganography and Chemical Sensing**  
Georia Ang, 16, Sophomore, Tricia Tan, 15, Sophomore, Chung Cheng High School (Yishun), Singapore, Singapore, T: Chia Hwee Lim
- MCRO026** **Doctor Bartender: Phage Cocktails To Treat Multi-Drug Resistant *Mycobacterium abscessus***  
Jamie Wen, 17, Junior, Dunman High School, Singapore, Singapore, T: Shuang Ning Chin
- PHYSO27** **Gyro-Ring: Dynamics and Steady Precession of Ring on a Vertical Smooth Rod**  
XinRui Li, 18, Senior, Hwa Chong Institution, Singapore, Singapore, T: BiaoJin Pang
- ROBO027T** **Sign2Speak! Synthesizing Emotional Speech From Sign Language Through Deep Learning**  
Yu Xi Ong, 17, Senior, Mirdhini Shri Rajaram, 17, Senior, Raffles Institution, Singapore, Singapore, T: Bingquan Shen

## SLOVAKIA

- Bratislava, Slovakia, SVK002, AMAVET-Slovak Association for Youth, Science & Technology**
- MATSO30** **Smart Theranostic Lipid-Based Nanoparticles for Breast Cancer Treatment Using Hydrophobic Cytostatics**  
Ludmila Kvasnovska, 17, Junior, Gymnazium Jozefa Miloslava Hurbana, Cadca, Slovakia, T: Eva Kormendyova
- SOFT031T** **Evidence and Management of Warehouses With Eco-Based Materials**  
Vanessa Ciskova, 18, Senior, Vanesa Smolakova, 19, Senior, Stredna priemyselna skola elektrotechnicka, Presov, Presovsky kraj, Slovakia, T: Gabriela Mitrova

## SLOVENIA

- Ljubljana, Slovenia, SVN001, Slovenia Science and Engineering Fair**
- PHYSO21T** **Distance Measurement of Delta Scuti Variable Stars**  
Hana Brumec, 18, Senior, Damjan Dovnik, 19, Junior, Srednja Sola, Slovenska Bistrica, Slovenia, T: Marko Zigart

## SOUTH AFRICA

- Johannesburg, South Africa, ZAF001, Expo for Young Scientists–South Africa**
- CHEMO08** **Evaluation of Powdered Insulators for High Voltage Applications**  
Brandon de Greef, 18, Junior, Crawford International Ruimsig, Roodepoort, Gauteng, South Africa, T: Nicholas von Buddenbrock
- EAEV005** **The Impact of Land Use Type and Distance Downstream on the General River Health and Water Quality in the Eerste River, Stellenbosch, Western Cape, South Africa**  
Enzo Blignaut, 16, Sophomore, Paul Roos Gymnasium, Stellenbosch, Western Province, South Africa, T: Annami Van Rooyen

# Finalist Directory

- EAEV012** **Predicting the Likelihood and Severity of Sinkholes Occurring in Khutsong Due to Leakage From Underground Water Pipes**  
Keitumetse Kamogelo Sebatlelo, 17, Junior, Carleton Jones High School, Carletonville, Gauteng, South Africa, T: Idzai Gondo
- EBED010** **Improved System for Hazardous Gas and Heat Detection and an Alert System for Households**  
Tyla Elisabeth Shepstone, 16, Sophomore, Somerset College, Cape Town, Western Cape, South Africa, T: Clare Searle
- ENEV013** **SMARTer: Soil Moisture Artificially Intelligent Regression in a Domestic Garden Environment to Conserve Water**  
Yu Tang Shan, 17, Senior, St Johns College, Johannesburg, Gauteng, South Africa, T: Kevin Zheng
- MCRO008** **Land Use Effects on Soil Quality in Philippi, Western Cape, South Africa**  
Matthew John Witbooy, 18, Senior, Curro Durbanville High School, Cape Town, Western Cape, South Africa, T: Flip Theunissen

## SOUTH KOREA

Daegu, South Korea, KOR001, Korea Code Fair

- EBED023T** **VisionGuard: Control Hardware-Based Autonomous Driving for Enhancing Walking Safety and Mobility of the Visually Impaired**  
Seongbin Byun#, 16, Junior, Chaewon Huh#, 17, Senior, Wondong Lee, 17, Junior, Kyeongbuk High School, Daegu, South Korea, T: Sunhee Lee
- ROBO031T** **Personalized Wheelchair for Disabled With Mobility Loss**  
Seunghyeon Park, 17, Senior, Jinho Kim, 18, Senior, Korean Minjok Leadership Academy, Hoengseong, Gangwon, South Korea, T: Yeounsoo Kim
- SOFT011T** **Breaking Isolation: Medical Software Platform Utilizing Beneficial Medical Terms for Patients Without Sufficient Health Care Service**  
Donghyun Kim#, 18, Senior, Hyunwoo Cho, 16, Junior, Hyundai Senior High School, Seoul, Seoul, South Korea, Korea Digital Media High School, Ansan-si, South Korea, T: Hojin Choi
- SOFT025** **Improving Road Safety With Artificial Intelligence: A Low-Cost AI-CCTV Intervention for Detecting Vehicular Danger**  
Jeesung Lee, 17, Sophomore, St. Johnsbury Academy, Jeju, Jeju Special Self-Governing Province, South Korea, T: Deric Cole
- SOFT033T** **ALcode: Automatic Allergy Determination Program Using Public Data**  
JiSeok Lee, 16, Sophomore, YoonHyeok Kim, 14, Freshman, Jeo Hyeon High School, Goyang-si, Gyeonggi-do, South Korea, Pungdong Middle School, Goyang-si, Gyeonggi-do, South Korea, T: Myoung Yong Kang

Seoul, South Korea, KOR002, YSC (National Science Research Competition)

- ANIM015T** **Biomechanical Analysis of Labial Movement in the Hunting of Dragonfly Nymphs**  
Minseo Kim, 18, Senior, Sujin Kim, 18, Senior, Sejong Academy of Science and Arts, Sejong, Chungcheong, South Korea, T: Myeong Hee Kim T: Myeong Hee Kim
- CBIO034** **Modeling Viral Evolution and Epidemic Simulation Using Genetic Algorithms**  
Dain Kyung, 17, Junior, Chungnam Science High School, Gongju Si, Chungcheongnamdo, South Korea, T: Junghyun Paek
- EBED021T** **Classification of Watermelon's Inner State Based on Hitting Sound Using Machine Learning**  
Gaeun Lim, 17, Senior, Lee Tae Yoon, 18, Senior, Incheon Academy of Science and Arts, Incheon, Incheon, South Korea, T: Daeki Cho
- ROBO075T** **Cat Eye Disease Diagnostic Device**  
Sanghee Go, 15, Freshman, Hanwool Jang, 15, Freshman, Jecheon Girls' Middle School, Jecheon-si, Chungcheongbuk-do, South Korea, Naeto Middle School, Jecheon-si, Chungcheongbuk-do, South Korea, T: Lee Hyungsuk T: Hyungsuk Lee

Cheonan-Si, South Korea, KOR003, Korea Science Fair

- BEHA022** **Assessing Abnormalities in Spatial Awareness of Patients With Alzheimer's Disease Through the Line Quadrisection Test**  
Yurim Jin, 17, Senior, Korean Minjok Leadership Academy, Hoengseong, Gangwon, South Korea, T: Kyungsil Song

# Finalist Directory

- CHEM016T** **Raney Nickel: Introducing the New High-Activity and Cost-Effective Catalyst for the Sabatier Reaction**  
Hyoungseok Lee, 16, Junior, Junhyeok Park, 16, Junior, Jinsong Kim, 16, Junior, Daegu-il Science High School, Daegu, Gyeongsangbuk-do, South Korea, T: Kyuhan Jeong
- CHEM037T** **Application of Appropriate Technology Through the Adsorption of Copper Ions in Chestnut Trees**  
JeongAn Woo, 18, Senior, MinJi Kang, 18, Senior, Tae Eun Kim, 17, Senior, Kangwon Science High School, Wonju, South Korea, T: Yeon Ju Yu
- EAEV027T** **Demonstration and Efficiency Tests of the Biodegradation of Polyurethane by Microorganisms in the Gut of the *Zophobas atratus* Larvae**  
Yuhyun Choi, 18, Senior, Dahin Lee, 17, Senior, Korean Minjok Leadership Academy, Hoengseong, Gangwon, South Korea, T: Minho Kim
- ENEV019T** **Eco-Friendly Paper Food Packaging Using PVA Cross-Linking**  
JuHeon Lee, 16, Junior, Subin Lee, 16, Junior, Chungnam Science High School, Gongju Si, Chungcheongnamdo, South Korea, T: Chul Yong Park
- ENEV028T** **Evaluating the Decolorization Efficiency of an Invasive Species, *Lonicera japonica*, in Removing Acid Blue 113 Dye**  
Minjung Choi, 17, Junior, Jiwon Kwon, 17, Junior, Hajin Ruy, 18, Junior, Korea International School, Jeju Campus, Seogwipo-si, Jeju-do, South Korea, T: Joe Catron  
T: Joseph Catron
- ETSD007T** **A Proposal and an Evaluation of the Efficiency of the Tesla Turbine Heat Recovery System**  
Junseok Kang, 17, Senior, Seongwoo Min, 17, Senior, Yong-Wook Kim, 17, Senior, Korean Minjok Leadership Academy, Hoengseong, Gangwon, South Korea, T: Donghyuk Yang
- MATH027** **Promoting Efficient Allocation in Refugee Camps: Comparing Mechanisms With Minority Reserves**  
Gyulim Kang, 16, Junior, Singapore American School, Singapore, Singapore, Singapore, T: Ian Coppell
- MATSO16** **Effect of Sucrose on Directional Motions of Cholesterol Crystals Surfing on a Lipid Membrane**  
#  
Melissa Kim, 17, Junior, Seoul International School, Seoul, Gyunggi-Do, South Korea, T: Nam-Joon Cho
- MCRO030** **Inhibiting Superbug Formation by Blocking Bacterial Necrosignal Transmission Using Kimchi LAB Metabolites**  
Ann Lee, 16, Junior, Seoul International School, Seoul, Gyunggi-Do, South Korea, T: Sunny Kim
- PHYS029T** **Verification of Quantum Key Distribution via Description and Implementation of Mixed States**  
Jiwoo Hong, 17, Senior, Seongmin Hong, 18, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Zaeyoung Ghim
- ROBO015** **Applying Fractal Structure to Vision Transformer (ViT)**  
Sehun Jeong, 18, Junior, North London Collegiate School Jeju, Seogwipo-si, Jeju-do, South Korea, T: Jearson Rojas
- TMED015** **Colorimetric Detection of Oxalate and Calcium for the Early Screening of Urolithiasis**  
Jinwon Chang, 17, Senior, Korean Minjok Leadership Academy, Hoengseong, Gangwon, South Korea, T: Daehwan Kim
- TMED020** **Developing a Sensitive, Papain-Based Hydrogel Film That Colorimetrically Detects Glucose**  
Seoyun Lee, 17, Junior, Daegu International School, Dong-gu, Daegu, South Korea, T: Woorin Lee

## SPAIN

Barcelona, Spain, SPN001, Exporecerca Jove

- MATH043** **On the Location of Poles of Meromorphic Functions and Its Combinatorial Application**  
Oriol Coll-Estopa, 17, Senior, INS Ramon Turro i Darder, Barcelona, Spain, T: Jaume Carles Frisuelos

# Finalist Directory

**SOFT050** **Creation of a Virtual Assistant for the Elderly Using Artificial Intelligence Systems**  
Markus Urban, 17, Senior, Institut Joan Brudieu, La Seu d'Urgell, Lleida, Spain,  
T: Xavier Mane

## SWEDEN

**Stockholm, Sweden, SWE001, Utställningen Unga Forskare**

**CBIO060** **Developing and Utilizing a Whole-Cell Mathematical Model of IL-6 in Triple-Negative Breast Cancer: Predicting Cell Behavior and Targeted Anti-Tumorigenic Drug Interactions**

Yasma Najji Esteitieh, 17, Junior, Malmo Borgarskola, Malmo, Skane, Sweden,  
T: Louise Boucher

**PHYS048** **Modeling the Distribution of Dark Matter in the Milky Way Based on the Galaxy's Rotation Curve**

Tuva Alicia Kallberg, 19, Senior, Sven Eriksonsgymnasiet, Boras, Vastra Gotaland, Sweden, T: Mats Hillensjö

**PHYS061** **Quantifying Skyglow With a Consumer Camera**

Axel Sethsson, 18, Senior, Norra Reals Gymnasium, Stockholm, Stockholm, Sweden,  
T: Malin Mattsson

## SWITZERLAND

**Bern, Switzerland, CHE001, Swiss Youth in Science**

**CBIO002** **Characterization of MAS1 Tertiary Structure**

Nathan Oberti, 19, Senior, Liceo Cantonale Bellinzona, Bellinzona, Ticino, Switzerland,  
T: Davide Speziga

**ENEV004** **Direct Air Capture: Construction, Testing and Optimizing of a Prototype**

Denis Etienne Spring, 19, Senior, Kantonsschule Frauenfeld, Frauenfeld, Thurgau, Switzerland, T: Sebastian Pilgram

## THAILAND

**Pathum Thani, Thailand, THA002, Young Scientists Competition**

**BMEDO47T** **Neuroprotective Effect of Centella asiatica Ethanolic Extract on Toluene-Led Neurodegeneration in *Caenorhabditis elegans***

Pattaradol Leerojanaprapa, 17, Junior, Phubet Sanephakdee, 17, Junior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Tanawan Leeboonngam

**CBIO050T** **PROSynMOGN: Enhancing Molecular Graph Neural Networks Toward Predicting Synergistic Cancer Drug Combinations Driven by Protein Expression**

Kittiphat Pongarunotai, 16, Sophomore, Matin Kositchutima, 16, Junior, Tisorn Na phattalung, 17, Junior, Kamnoetvidya Science Academy, Rayong, Thailand,  
T: Bundit Boonyarit

**EGSD058T** **Biomass-Based Porous Carbon Electrode for Supercapacitor**

Tamonvan Maila-iad, 17, Senior, Natthaset Mekjaroenwiwattana, 17, Senior, Nathanon Srisuwan, 17, Senior, Benjamarachutit School, Mueng Nakon Si Thammarat, Nakhon Si Thammarat, Thailand, T: Janthip Chulasak

**PHYS057T** **A Study of Behavior for Magnetic Nanoparticles in Vascular System Through LAMMPS**

Thitiwat Kosolpattanadurong, 17, Junior, Nopparuj Sodsri, 17, Junior, Kamnoetvidya Science Academy, Rayong, Thailand, #41 "Harmony", Samara, Samara, Russian Federation, T: Adis Khetubol

**TMEDO73T** **A Game-Changing Idea for Rapid Cancer Screening: Detection of Circulating Tumor DNA on the Surface of Red Blood Cells**

Matina Boontem, 17, Senior, Chutinun Sukpongjirakul, 17, Senior, Wongsakon Malalaksamee, 17, Senior, Mahidol Wittayanusorn School, Nakhon Pathom, Thailand,  
T: Kiattipoom Rodpun

**TMEDO80T** **micKEY: Memory-Efficient Deep Learning for Personalized Biomarker Discovery and Cancer Origin Prediction From DNA Methylation Data**

Kasidech Aewsrisakul, 17, Junior, Pakanan Tussanapirom, 17, Junior, Triam Udom Suksa, Pathumwan, Bangkok, Thailand, T: Kobchai Duangrattanaert

# Finalist Directory

## THAILAND

**Bangkok, Thailand, THA001, SST-NSM National Science Projects Competition**

**ANIM024T Optimization of Green Lacewing (*Mallada basalis*) Survivability From Hatching and Foraging Behavior**

Pannathorn Siri, 15, Sophomore, Poon Trakultangmun, 18, Senior, Teepakorn Keawumdee, 17, Junior, Bangkok Christian College, Bangkok, Thailand, T: Chanan Keatsirisart

**ANIM025T A Sustainable Approach to Control the Destructive Red Palm Weevil Pests**

Sunyapat Akkarajeerawat, 15, Freshman, Thanatkorn Chauvanasmith, 15, Freshman, Bangkok Christian College, Bangkok, Thailand, T: Wanida Bhu-iam

**ANIM026T A Novel Non-Invasive Method to Detect Pebrine Disease in Sericulture by Using Phototaxis of Hatched Silkworm (*Bombyx mori*)**

Panatas Chaiprakan#, 17, Junior, Thanawit Namjaidee, 17, Junior, Kanyarin Sriwichai, 17, Junior, Damrongratsongkroh School, Muangchiangrai, Chiangrai, Thailand, T: Kiettisak Inrajsadon T: Kiettisak Inrajsadon

**EAEV028T A Novel Invention of Aerial Delivery of Planting Material for Burnt Forest Restoration Inspired by the Structure of *Kadsura coccinea* Fruit**

Naruephat Yajai, 18, Senior, Prompiriya Khattiyawong, 18, Senior, Jirapon Sengnongban#, 18, Senior, Princess Chulabhorn Science High School Pathumthani, Ladlumkaew, Pathumthani, Thailand, T: Khunthong Klaythong

**ENBMO63T Cardiac Self-Monitoring Tool (CS-M Tool) for Monitoring Cardiovascular Disease With Heart Sounds From a Stethoscope Utilizing a Mobile Application, Using a Neural Network Algorithm To Classify Heart Disease and Detect the Heartbeat**

Tanapat Charunworaphan, 17, Junior, Matt Tanthai Cosh, 16, Junior, Noppawit Chunram, 17, Junior, The Prince Royal's College, Mueang Chiang Mai, Chiang Mai, Thailand, T: Rungkan Wangboon

**MATSO28T Green One-Step Synthesis of Mushroom-Derived Carbon Dots as Fluorescent Paper-Based Sensors for Iron (III) Detection**

Kodchakorn Klongklaw, 17, Senior, Praeploy Kiatsuksri, 17, Senior, Bunyarak Phiomkaew, 18, Senior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Suranan Anantachaisilp

**PHYS026T Effect of the Planetary Magnetic Field on the Shape of Gas Giants' Polygons Based on Fluid Instabilities Principle**

Jinjuta Paripurana, 18, Senior, Pavarit Phanichkul, 18, Senior, Amada Panumonwatee, 18, Senior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Parinya Sirimachan

**TMEDO66T O-RA: Osteoarthritis Rehabilitation Assistant**

Kaewkla Sroykabkaew, 17, Junior, Napaschol Inthapan, 17, Junior, Krittapat Tragoolpua, 17, Junior, The Prince Royal's College, Mueang Chiang Mai, Chiang Mai, Thailand, T: Krittipong Wachirangkul

## TURKEY

**Ankara, Turkey, TUR002, Tubitak Fair**

**BCHM012T Development of Paper-Based Origami Biosensor Platforms for Colorimetric Detection of Biocontaminants**

Devin Inan, 18, Senior, Rumeysa Cicek, 16, Junior, Buca Inci-Ozer Tirnakli Science High School, Izmir, Izmir, Turkey, T: Cansu Kuru

**BCHM014 Polycaprolactone Hydrolysis Using Immobilized Enzymes**

Hasan Hakan Sarica, 19, Senior, Acarkent Doga Anatolian High School, Istanbul, Beykoz, Turkey, T: Makbule Nevra Duser

**BCHM016T Development of Functional Nanoplatforms by Green Synthesis for Various Bio-Applications**

Azra Demirkapilar, 16, Sophomore, Asli Ece Yilmaz, 17, Sophomore, Sehit Prof. Dr. Ilhan Varank Bilim ve Sanat Merkezi, Balikesir, Karesi, Turkey, T: PÄ±nar Sabaz

**CHEM024T Intelligent Hydrogel Synthesis and Bracelet Design to Detect Foreign Materials in the Human Body and in Beverages**

Sude Naz Gulsen, 16, Sophomore, Ekin Asyali, 16, Sophomore, Gaziantep Private Sanko College, Gaza Antep, Gaza Antep, Turkey, T: Ozgul Guner



# Finalist Directory

- ETSD018** **A Novel Gait Controller Method for More Stable Operation of Complex Legged Systems**  
Ahmet Kagan Altay, 17, Senior, Kocaeli Science High School, Kocaeli, Izmit, Turkey, T: Irfan Kaya
- MATH021** **Analysis of Hypocycloid Formation Processes From Different Perspectives and Polygonal Structures Seen in Trace Curves**  
Mehmet Emir Konac, 17, Sophomore, Malatya Bilim ve Sanat Merkezi, Malatya, Turkey, T: Mehmet Arslan
- MATS019T** **Development of a Novel Bolus Material for Radiotherapy Applications**  
Selin Yilmaz, 18, Senior, Arda Yesilyurt, 17, Junior, Cakabey Schools, IZMIR, Turkey, T: Hale Melis Soylu Gurer
- ROBO021** **Artificial Genius: Testing the Abilities of Artificial Intelligence in a More Turing Way**  
Batuhan Ipek, 18, Junior, Erzincan Fen Lisesi, Erzincan, Erzincan, Turkey, T: Sadi Aksu
- ROBO024T** **A Novel Transformer-Based Deep Learning Pipeline for Multilingual Fake News Detection**  
Begum Atay, 17, Sophomore, Kagan Agras, 16, Junior, METU Development Foundation Private High School, Ankara, Ankara, Turkey, T: Pinar Karagoz
- ROBO025T** **Teach Me Braille: A Kit Consisting of Modules and Applications That Can Provide Fully Efficient Education for Visually Impaired Students and Support the Problems Faced by Individuals in Their Daily Life With the Help of Machine Learning Approaches**  
Irem Duran, 16, Sophomore, Kerem Arslan, 18, Junior, Ibrahim Utku Derman, 17, Sophomore, Ataturk High School of Science, Istanbul, Turkey, T: Mehmet Durmus
- SOFT019T** **A Novel Passive Positioning System Based on Wave Mechanics**  
Haktan Altunkaya, 19, Senior, Selim Gidirislioglu, 18, Senior, Ataturk High School of Science, Istanbul, Istanbul, Turkey, T: Aykut Turunc
- TMEDO24** **Personalized Neurooncology Radiogenomic Classification and Recommendation Model With AI and MRI**  
Cagan Koska, 16, Sophomore, Izmir Atakent Anadolu Lisesi, Izmir, Turkey, T: Ilker Koska
- TMEDO25T** **Investigation of the Effects of *Ginkgo biloba*'s Extracellular Vesicles on Alzheimer's Disease**  
Meliha Aydan Yucel, 16, Sophomore, Belgin Balim Tastan, 16, Sophomore, Kultur Science High School, Istanbul, Istanbul, Turkey, T: Ozlem Dolmaz Celik
- UKRAINE**  
Kyiv, Ukraine, **UKR001, Eco-TechnoUkraine**
- BMEDO38T** **Expansion of Cord Blood Hematopoietic Progenitor Cells in Long-Term Culture on a Hydrogel Substrate in vitro**  
Iryna Toporova, 17, Junior, Valeriia Holod, 16, Junior, Specialized school No 194 "Perspective", Kyiv, Kyiv, Ukraine, Ukrainian Medical Lyceum National Medical University the Name of O. O. Bogomolets, Kyiv, Ukraine, T: Zoia Lysenko T: Irina Shinkarenko
- EGSD044** **Getting Electricity From Waterfalls**  
Illiya Oleksandrovych Sydorochuk, 15, Freshman, Zhytomyr City Center of Scientific and Technical Creativity of Student Youth, Zhytomyr, Ukraine, T: Anatolii Shubin
- SOFT036** **Quick Autonomous Pointer With Local Positioning**  
Denys Yuriyovych Hromovyi, 15, Sophomore, Cherkasy Gymnasium #31, Cherkasy, Cherkasy Oblast, Ukraine, T: Yuriy Belogorodsky

## UNITED STATES OF AMERICA

### ALABAMA

- Montgomery, **USAL01, Greater East Alabama Regional Science and Engineering Fair**
- ANIMO12** **Effects of Sublethal Methylmercury on Hippocampus and Telencephalon Volume of Zebra Finches**  
Sumin Park, 17, Junior, Loveless Academic Magnet Program High School, Montgomery, Alabama, T: Cara Brittain
- BEHA008** **External Feedback and the Effect on Adolescent Mentality**  
Rachel Noelle Allen, 18, Senior, Elmore County High School, Eclectic, Alabama, T: Virginia Vilardi



# Finalist Directory

- MATSO11T** **Mechanical Property Characterizations of Reprocessed Multi-Layer Packaging Blends**  
Lindsay Levy, 17, Junior, Raymond Yi-Cong Hou, 17, Senior, Loveless Academic Magnet Program High School, Montgomery, Alabama, T: Joseph Profio T: Yucheng Peng
- Birmingham, USAL02, Central Alabama Regional Science and Engineering Fair**
- ANIM014** **Investigating the Effects of *Papaver somniferum* Seeds and *Curcuma longa* on Wound Healing Using *Drosophila melanogaster* as a Model Organism**  
Anusha Singh, 16, Junior, Vestavia Hills High School, Vestavia Hills, Alabama, T: Jessica Sutherland
- EGSD016** **Developing Earth-Abundant Aluminum-Ion Batteries Using Chloroaluminate Ionic Liquid Electrolytes and Recycled Aluminum Scraps for Electric Vehicles and the Electricity Grid**  
Yiwen Wang, 16, Junior, Northridge High School, Tuscaloosa, Alabama, T: Alayna Townsend
- ETSD008** **TrackAiR: Optimal Tracking of Moving Aerial Targets With Online Reinforcement Learning**  
# Daniel Zhao, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Cecil Flournoy
- PHYS024** **Giant Superconducting Diode Effect From Controlled Edge Asymmetry**  
Amith Varambally, 18, Senior, Vestavia Hills High School, Vestavia Hills, Alabama, T: Roger Bittinger
- Huntsville, USAL03, North Alabama Regional Science and Engineering Fair**
- EBED011** **Frequency Modulated Continuous Wave RADAR for Blind Navigation**  
AnnaBekah Cress, 18, Senior, Libertas Classical Community, Decatur, Alabama, T: Jared Cress
- PHYS013** **Does the Color of an Astronomical Body Affect the Observation of Decreasing Intensity With the Transit Photometry Method?**  
Makaila Simone Jennings, 15, Junior, Key Destiny Homeschool, Huntsville, Alabama, T: Doresa Jennings
- Mobile, USAL04, Mobile Regional Science Fair**
- ENBMO25** **Optogenetic Modulation of Endothelial Cell Growth and Barrier Repair**  
Jayden Hsieh Lin, 17, Junior, WP Davidson High School, Mobile, Alabama, T: Robin Stefurak
- Auburn, USAL50, Alabama Science and Engineering Fair**
- BEHA044** **The Effects of Environmental Disparities on the Environmental Awareness of High School Students in the Greater Birmingham Area**  
Joscelyn Kalani James Peterson, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Cecil Flournoy
- CBIO053** **Development of a Simulated Platform That Replicates the Visual System Using Large Scale Neural Modeling and Performs Deep Brain Stimulation Using the Virtual Brain to Produce Synthetic Sight for the Visually Impaired**  
# Madhushalini Balaji, 17, Junior, James Clemens High School, Madison, Alabama, T: Kathryn Weir
- CELL052** **Investigating Transgenerational Phenotypes and Altered Behavior in *C. elegans* Mutants With Inappropriately Inherited Histone Methylation**  
Rhea Rastogi, 17, Junior, Loveless Academic Magnet Program High School, Montgomery, Alabama, T: David Katz
- ROBO060** **Leveraging Convolutional Neural Networks, Deep Learning, and Computer Vision in a Novel Approach to Rapid Banana Disease Detection**  
Kevin Zirui Yan, 16, Sophomore, Auburn High School, Auburn, Alabama, T: Yin Sun
- ALASKA**
- Anchorage, USAK50, Alaska Science and Engineering Fair**
- ANIM055** **Quantitative Environmental DNA Metabarcoding for the Enumeration of Pacific Salmon (*Oncorhynchus spp.*)**  
# Elizabeth Shao Djajalie, 17, Junior, Thunder Mountain High School, Juneau, Alaska, T: Carol May

# Finalist Directory

## ARIZONA

### Sierra Vista, USAZ02, SSVEC's Youth Engineering and Science Fair

**ETSD022T Universal Screwdriver**

Audrey Elizabeth Denham, 17, Senior, Dylan James Rubstello, 17, Junior, Kevin Theanh Tran, 17, Junior, Buena High School, Sierra Vista, Arizona, T: Amy Martinez

**ETSD025 Battle of the Octanes**

# Manuel Alejandro Castillo, 17, Senior, Veritas Christian Community School, Sierra Vista, Arizona, T: Melissa Bravenec

### Tucson, USAZ03, Southern Arizona Research, Science and Engineering Fair

**BCHM017 Molecular Modeling Guided Drug Design**

Hannah Kuo Feinberg, 17, Junior, BASIS Tucson North, Tucson, Arizona, T: Hannah Goodman

**CELL026 Novel Isolation and Filamentation of *Drosophila melanogaster* Phosphofructokinase-1**

Keona Peng Kuo, 16, Junior, University High School, Tucson, Arizona, T: Kevin Nieves Pichardo

**CHEM027T Anthocyanin-Based Polymeric Matrices That Can Detect Shrimp's Freshness**

Jorge Antonio Covarrubias, 14, Freshman, Estefany Valenzuela Regalado, 15, Freshman, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos T: Alfred Santos

**EAEV030 A Novel Approach on Mitigating Ocean Acidification by Enhancing Photosynthesis Rate of Macroalgae *Ulva lactuca***

Jimena Uribe Lin, 18, Senior, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

**EAEV031 Catching Plastics: Which Species of Algae Can Best Catch Microplastics?**

Serena Yung-I Rezende Tsao, 16, Sophomore, University High School, Tucson, Arizona, T: Elyse Wexler

**ENEV031 Packaging Waste Reduction by Optimal Cardboard Box Selection**

Jimmy Kwon, 15, Sophomore, BASIS Tucson North, Tucson, Arizona, T: John Paul-Mann

**MCRO027 Novel Oral Treatments Infused With Native Plant Extracts to Improve Oral Health in Developing Countries**

# Ashley Valencia, 16, Junior, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

**MCRO028 Novel Applications of Native Sonoran Desert Plants (NSDP), Year 3 Study**

# Andrea Romero, 18, Senior, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

### Phoenix, USAZ50, Arizona Science and Engineering Fair

**BCHM024T Experimental Characterization of Allosterically Relevant Mutations in Beta-Glucosidase Identified Using a Dynamics-Guided Computational Approach**

Michael Lau, 17, Junior, Sneha Lakamsani, 18, Senior, Maxwell Igwe, 17, Senior, Arizona College Prep High School, Chandler, Arizona, Hamilton High School, Chandler, Arizona, ASU SCENE, Tempe, Arizona, T: Jeremy Mills T: Debbie Nipar T: Bethany Kartchner

**BMED051 Hypothalamic EZH2: A Key Regulator of Leptin Sensitivity in Obesity**

Baochan Fan, 17, Junior, Hamilton High School, Chandler, Arizona, T: Debbie Nipar

**CBIO058 A Novel Breast Cancer Recurrence Risk Predictor Using a Deep Learning Multi-omics Data Integration Framework**

Ariana Ferdous Rahman, 15, Sophomore, BASIS Chandler, Chandler, Arizona, T: Daniel Hodge

**CELL054 Complexing of Aminoglycoside Lipo-Polymeric Nanoparticles for mRNA Transfection in Melanoma Cancer Cells**

Nina Yu, 17, Junior, Hamilton High School, Chandler, Arizona, T: Deborah Nipar

**CHEM049 Batch Adsorption of Methylene Blue Using Fresh Prickly Pear Cactus Cladodes as a Model Material for Textile Wastewater Remediation**

Maritza Roberts, 18, Junior, BASIS Tucson North, Tucson, Arizona, T: Derek Reichel

**EAEV068 FloodCast: Real-Time Flood Mapping and Prediction in Southeast Asia Using Remote Sensing Data**

Sruti Peddi, 17, Junior, BASIS Scottsdale, Scottsdale, Arizona, T: Ryan Carey

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- EAEV078**     **Forecasting County Level Crop Yield in Top Agricultural-Producing States Using Satellite Data**  
##     Chloe Feiyang Zhan, 16, Junior, Hamilton High School, Chandler, Arizona,  
T: Debbie Nipar
- EGSD053T**     **NASA Inspired Dual Axis Solar Tracker**  
Anthony Zhu, 17, Freshman, Joshua John, 14, Freshman, John Vu, 18, Freshman, Gilbert Classical Academy, Gilbert, Arizona, T: Vanessa Ameziane
- ETSD049**     **PTERA: Propeller Tilt Efficiency Rotor Aircraft**  
Yuvan Senthil, 16, Sophomore, BASIS Peoria, Peoria, Arizona, T: Marcos Guillen
- PLNT047**     **Evaluating the Impact of UVB Light Exposure on the Growth of Red Malabar Spinach**  
Ram Natraj Bubby, 17, Junior, BASIS Scottsdale, Scottsdale, Arizona, T: Ryan Carey
- ROBO059**     **Modeling the Dynamics of Functional Brain Networks With BrainSTEAM**  
#     Alexis Li, 17, Junior, Hamilton High School, Chandler, Arizona, T: Debbie Nipar
- ROBO062**     **Automatic Aquaponics**  
Julie Rodriguez, 14, Freshman, Andrada Polytechnic High School, Tucson, Arizona,  
T: Tiffany Newton
- SOFT041**     **Musical Chords: A Mobile App That Auto-Generates Chord Progressions**  
Aditya Lakshminarasimhan, 16, Sophomore, BASIS Scottsdale, Scottsdale, Arizona,  
T: Ryan Carey
- SOFT045**     **Analyzing the Effect of Mid-Circuit Measurement (MCM) on Spectator Qubits**  
Harshil Avlani, 17, Junior, BASIS Chandler, Chandler, Arizona, T: Daniel Hodge
- TMED063**     **A Novel Segmentation-Based AI Approach for the Early Detection of Diabetic Retinopathy and Macular Edema (DREAM) via Analysis of Retinal Fundus Images**  
Siddharth Adda, 17, Junior, BASIS Scottsdale, Scottsdale, Arizona, T: Ryan Carey
- ARKANSAS**
- Fayetteville, USAR03, Northwest Arkansas Regional Science and Engineering Fair**
- ENBM026**     **Optimizing Glycemic Control in Type 1 Diabetic Patients Using a Deep Learning-Based Artificial Pancreas With a Secure Glucagon and Insulin Delivery System**  
Rohan Singh, 16, Junior, Bentonville High School, Bentonville, Arkansas,  
T: John Mark Russell
- ENBM048**     **Improving Early Diagnosis and Treatment Monitoring of Tuberculosis With Novel Machine Learning Cough Analysis**  
#     Chandra Kiran Koushik Suda, 16, Junior, Bentonville High School, Bentonville, Arkansas,  
T: John Mark Russell
- MATS017**     **Growth & Characterization of Layered Magnets**  
#     Taksh Yogeshbhai Patel, 17, Senior, Fayetteville High School, Fayetteville, Arkansas,  
T: Matthew Holden
- Jonesboro, USAR04, Northeast Arkansas Regional Science Fair**
- BMED014**     **Does the Degree of the Q-Angle Affect the Frequency of ACL Injuries or Knee Pain?**  
Rayah Jeanette Turnbough, 17, Sophomore, Salem High School, Salem, Arkansas,  
T: Katie Southard
- ETSD029**     **Hot and Cold: Analyzing CPU Cooling Methods**  
Brandon Lee Elrod, 17, Junior, Harrisburg High School, Harrisburg, Arkansas,  
T: Chad Lacy
- PLNT017**     **A Two-Year Study: How Does Planting Configuration and Irrigation Method Affect Soybean Growth?**  
#     Sydney Rae Wolf, 16, Junior, The Academies at Jonesboro High School, Jonesboro, Arkansas, T: Allyson Goodin
- Little Rock, USAR05, Central Arkansas Regional Science and Engineering Fair**
- BCHM005**     **Deciphering the Radioprotective Effects of the Soy Isoflavone Genistein in Lung Cells**  
Siddharth Sridharan, 15, Freshman, Little Rock Central High School, Little Rock, Arkansas, T: Patrick Foley
- CELL011**     **Punicalagin Attenuates Chemotherapy-Induced Hepatotoxicity in Normal Cells**  
##     Bhavana Sridharan, 17, Junior, Little Rock Central High School, Little Rock, Arkansas,  
T: Lee Conrad

# Finalist Directory

- EGSD010** **Influence of Freezing Methods on the Supercapacitor Performance of Doped Carbon**  
# Ahmad Gohar Alam, 16, Junior, Little Rock Central High School, Little Rock, Arkansas,  
T: Patrick Foley
- MCRO010** **Norfloxacin and IR-780 Iodide Dye Ionic Combination Drug and Near-Infrared  
Photothermal Therapy as a Dual Mechanism Antibacterial Treatment Against  
Escherichia coli**  
Zaina Daaboul, 15, Sophomore, Little Rock Central High School, Little Rock, Arkansas,  
T: Tracy Brown
- ROBO014** **VAST (Voice and Spiral Tool): A Novel Multimodal Machine Learning Method  
To Detect Parkinson's Disease and Assess Severity**  
### Anu Iyer, 18, Senior, Little Rock Central High School, Little Rock, Arkansas,  
T: Lee Conrad
- Monticello, USAR06, Southeast Arkansas Regional Science Fair**
- BEHA040** **Can You Win Rock Paper Scissors?**  
Elliott Boyd, 16, Sophomore, Stuttgart High School, Stuttgart, Arkansas,  
T: Katherine Yancey
- Hot Springs, USAR07, West Central Regional Science fair**
- MCRO004** **Antibiotic Resistance Genes Identified in the Thermal Hot Springs National Park  
Public Water**  
Sydney Lynne Hammond, 18, Senior, Arkansas School for Mathematics, Sciences  
and the Arts, Hot Springs, Arkansas, T: Patrycja Krakowiak
- PLNT004** **Post-Fire Bryophyte Dynamics in a Temperate Mixed Forest**  
Charlotte Elizabeth Boehme, 18, Senior, Arkansas School for Mathematics, Sciences  
and the Arts, Hot Springs, Arkansas, T: Lindsey Waddell
- TMED009** **Investigating the Role of Rev1 in Maintaining Accurate DNA Replication Past G4  
Containing Regions in the Leading and Lagging Strands**  
Shreyam Tripathi, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts,  
Hot Springs, Arkansas, T: Patrycja Krakowiak
- Conway, USAR50, Arkansas State Science Fair**
- ANIM046T** **Examination of the Variability of Fall Armyworm Infestations in Arkansas  
and the Potential for Biopesticide Treatment of Soybeans**  
Drew Johnson, 17, Senior, Alyssa Nicole Thomas, 18, Senior, Arkansas School for  
Mathematics, Sciences and the Arts, Hot Springs, Arkansas, T: Lindsey Waddell
- CBIO041** **Tracking COVID-19 Variants of Concern in Wastewaters of Central Arkansas**  
# Olya Sophia Tryndyak, 15, Sophomore, Little Rock Central High School, Little Rock,  
Arkansas, T: Beth Maris
- ENEV070** **A Smart Sponge to Control Oil and Chemical Spills**  
Ahona Ghosh, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas,  
T: Patrick Foley
- ETSD052** **The Effects of Variable Rotor Pitch on Axial Compressor Efficiency**  
Joshua Peter McNeil, 17, Junior, Little Rock Central High School, Little Rock, Arkansas,  
T: Mary Maris
- PLNT045T** **Development of a Novel AI Soybean Root-Knot Nematode Stress Assessment  
(NASRKNSA) Model in Soybean Plants (Both Field and Home-Grown)**  
Amanda Navarro, 17, Senior, Charis Xiong, 18, Senior, Arkansas School for Mathematics,  
Sciences and the Arts, Hot Springs, Arkansas, T: Nicholas Seward T: Nicholas Seward
- TMED059** **Identifying Novel Drugs to Inhibit APOE4 as a Therapeutic Intervention  
for Treating Alzheimer's**  
Geethika Atluri, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas,  
T: Beth Maris
- CALIFORNIA**
- Los Angeles, USCA02, Los Angeles County Science and Engineering Fair**
- CHEM057T** **Conversion of Carbon Dioxide to Versatile Green Chemicals With Isoreticular  
Metal-Organic Frameworks**  
Sehoon Kang, 18, Junior, Zhehao Zhang, 17, Junior, Webb School of California,  
Claremont, California, T: Lisa Nacionales

# Finalist Directory

- TMED070** **New Generation Drug Development Pipeline From in silico Identification to Preclinical Evaluation for Novel Drug Candidates in Glioblastoma**  
Mahesh Arunachalam, 17, Junior, Crescenta Valley High School, La Crescenta, California, T: Orenda Tuason
- Fresno, USCA03, Fresno County Science Fair**
- BCHM020** **Anti-Androgen Therapeutic Agents: Use of PTLC and Microplate Counting to Measure Isolates From Four Promising California Indigenous Plants on Anti-Proliferation in LNCaP, DU145, PC-3, and 22Rv1 Prostate Cancer Cell Models**  
Eva Yihao Chen, 17, Senior, University High School, Fresno, California, T: Brenda Royce
- CBIO025** **Identifying Novel miRNA Targets and Therapeutics Through A Network-Based Computational Pipeline**  
# Jaspreet Kaur Sahota, 15, Sophomore, Sanger West High School, Fresno, California, T: Joel Orellana
- CHEM033** **Development of a Rapidly Calculating Energy Gap (rCEG) AI Model for Instantaneous Determination of the HOMO-LUMO Gap**  
Isaac Jian Wang, 17, Senior, Clovis North High School, Fresno, California, T: Kay Barrie
- EGSD042T** **Landfills and Methane: A One Year Study Into Actual and Controlled Bioreactor Production of Methane Using G.E.M.**  
Jacqueline Diana Rocha, 17, Junior, Breann Marie Amarante, 16, Junior, Fowler High School, Fowler, California, T: Stephanie Salas
- Sacramento, USCA04, Sacramento Regional Science and Engineering Fair**
- CHEM052** **The Effect of Superabsorbent Polymer on Soil Heavy Metal Immobilization**  
Pranavi Khanna, 18, Senior, Mira Loma High School, Sacramento, California, T: Mark Porter
- EGSD045** **Pura Aer 2: Dual-Stage, Energy-Efficient, Modular Air Purifier System, Inspired Porifera To Improve Air Quality**  
## Jordan Prawira, 16, Junior, Mountain House High School, Mountain House, California, T: Steven Geuss
- ENBM062** **Enabling Verbal Communication Through a Novel Usage of Brain-Computer Interfaces for the Differently Abled**  
# Rishabh Vijay Ambavanekar, 17, Junior, Vista del Lago High School, Folsom, California, T: Jessica Abulencia
- Bonita, USCA05, Greater San Diego Science and Engineering Fair**
- CBIO029** **Improved Generalizability and Performance on Small Datasets Using Hyper-Connected Neural Architectures, C. elegans-Inspired Networks, and Evolutionary Modeling**  
Agastya Sridharan, 17, Junior, Scripps Ranch High School, San Diego, California, T: Patty Fowler
- CBIO030** **Investigating the Underlying Molecular Patterns in Aggressive Brain Tumor ETMR to Develop a Robust Diagnostic Prediction Model**  
Saanvi Dogra, 15, Freshman, Del Norte High School, San Diego, California, T: Andrea Callicott
- ENEV086** **Utilizing 3D-Printed Engineered Living Materials To Break Down Environmental Pollutants**  
Sanjana Kumar, 17, Junior, Francis Parker School, San Diego, California, T: J.P. Pierce
- MCRO048** **A Self-Disinfecting Nanomaterial for Future Space Travel**  
Kara Fan, 18, Senior, Westview High School, San Diego, California, T: Scott Halandar
- PLNT033** **Reducing Lead Contamination Through Hydroponically-Grown Mycorrhizal Plants**  
Kate Xu, 15, Sophomore, Del Norte High School, San Diego, California, T: Briana West
- ROBO039T** **A Differentially-Geared, Omnidirectional Robotics Platform With Autonomous Jerk-Limited Navigation**  
Logan Mars Brown, 16, Sophomore, Nicholas Usher, 17, Junior, High Technical High North County, San Marcos, California, T: Caroline Sailor
- Novato, USCA06, Golden Gate STEM Fair**
- ROBO058** **AI-Based English to American Sign Language (ASL) Translation Enabled by the Largest Continuous ASL Dataset**  
Yehong Jiang, 16, Sophomore, The Nueva School, San Mateo, California, T: Mark Hurwitz
- TMED060** **Designing a Novel Primer Blocker Using Bioconjugation of Single Stranded Binding Protein and Oligonucleotides for Improved KRAS Mutation Detection**  
# Katie Sun, 17, Junior, Crystal Springs Uplands School, Hillsborough, California, T: Justin Thompson

# Finalist Directory

Burlingame, USCA07, Synopsys Silicon Valley Science and Technology Championship presented by the Santa Clara Valley Science and Engineering Fair Association

**ANIMO042 BeeWell: Developing an AI-Based Bee Health Assessment System Utilizing Computer Vision and Acoustic Signal Processing**

Andrew Y. Liang, 16, Sophomore, The Harker School, San Jose, California,  
T: Anuradha Datar

**CBIO047 Crucial Pathogenic Role of Elevated Mast Cells in Pulmonary Fibrosis Revealed by Single-Cell RNA-Sequencing Analysis**

Tiffany Chang, 18, Senior, The Harker School, San Jose, California, T: Chris Spenner

**CBIO048 RandomRibo: A Novel Tool for Transcript-Level Ribosome Velocity Determinant Identification With Single Codon Resolution**

Roshni Parulekar-Martins, 17, Senior, Homestead High School, Cupertino, California,  
T: Daniel Nunez

**CBIO049 A Model to Optimize Subthalamic Deep Brain Stimulation for Parkinson's Disease**

Ananya Dasaka, 16, Junior, Silver Creek High School, San Jose, California,  
T: James Staten

**CELL047 Quantification and Optimization of Circular RNA Stability for Improved RNA Therapeutics**

Reshma Kosaraju, 17, Junior, The Harker School, San Jose, California, T: Eric Johnson

**EAEV067 A Novel Physics Based Predictive Model for Wetland Eutrophication**

##  
Vedant Venkatasai Janapaty, 17, Junior, Silver Creek High School, San Jose, California,  
T: Bich Nguyen

**EBED036 Tactical Drone Detection and Tracking Using Machine-Learned Radio Interferometry: Lessons From Ukraine**

#  
Roy Gross, 18, Senior, Henry M. Gunn High School, Palo Alto, California,  
T: James Lincoln

**ENBM072 OctoGrasp: The Design and Construction of a Cephalopod-Inspired Prosthetic Arm**

Daniel Edison Siegel, 18, Senior, Palo Alto Senior High School, Palo Alto, California,  
T: Matthew Rossillon

**PHYS055 Discovering Gravitationally Lensed Galaxies Using a Vision Transformer Image Classification Model Trained on Synthetic and Real Data**

Gauri Todur, 15, Freshman, Santa Clara High School, Santa Clara, California,  
T: Suzanne Miller Moody

**PHYS056 Discovery of the Smallest Ever Ultra-Short-Period Planet Using Novel Phase Folding Detection System Parallelized on a Cheap GPU**

Kaitlyn Wang, 17, Junior, The Harker School, San Jose, California, T: Chris Spenner

**TMED061 HDformer: A Higher Dimensional Transformer With a Novel Time Square Attention Mechanism Utilizing Long Range Vascular Signals for Diabetes Detection, and an AI-Based PPG Wearable**

#  
Ella Selina Lan, 16, Junior, The Harker School, San Jose, California, T: Eric Nelson  
**TMED067 BioRx: An Integrative NLP Approach to Early Survival and Recurrence Prediction and Novel Biomarker Discovery in Unstructured Text-Based Clinical Narratives for Diabetes Patients**

##  
Snikitha Banda, 17, Senior, Notre Dame High School San Jose, San Jose, California,  
T: Chelsey Beck

Walnut Creek, USCA08, Contra Costa County Science and Engineering Fair

**ANIMO28 The Effect of Neonicotinoids on the Positive Transfer of Learning in Honeybees**

Charisse Zou, 17, Junior, Dougherty Valley High School, San Ramon, California,  
T: Jennifer Cincotta

**ENBM031 Female: Diagnostic and Evaluation System for Anemia in Teenage Girls Due to Their Menstrual Cycle**

Krishna Singhani, 15, Sophomore, Monte Vista High School, Danville, California,  
T: Preeti Singhani

**MATS026 CLAMP: A Contrastive Language and Molecule Pre-Training Network for Scaling Artificial Photosynthesis Candidate Identification**

Neel Redkar, 18, Senior, Dougherty Valley High School, San Ramon, California,  
T: Minu Basu

# Finalist Directory

## Danville, USCA09, The Alameda County Science and Engineering Fair

### BEHA045T **SEL-Pet: An Innovative Eye-Tracking and Audio Hybrid System for ASD Early Detection**

Alec Zhang, 16, Junior, Jingjing Liang, 14, Freshman, The Harker School, San Jose, California, T: Eric Johnson T: Miriam Allersma

### BMED053 **Novel Strategies for the Reversal of Cancer Cell Immortality**

Samuel Wu, 17, Senior, Dublin High School, Dublin, California, T: Julianne Sundstrom

### CHEM055 **The Effect of Copper-Aluminum Bimetallic Metal Organic Framework Based Electrode on the Energy Stored in a Supercapacitor**

# Aditi Bharadhwaj Kiran, 16, Sophomore, BASIS Independent Fremont, Fremont, California, T: Zeynep Araci

### EGSD055 **Arduino-Controlled Photobioreactor Algal Microbial Fuel Cell With Conveyor Belt Cathode for Boosted Biofilm Growth and Heavy Metal Removal**

Anwasha Ghosh, 17, Junior, Dublin High School, Dublin, California, T: Trevor Johnston

### ENBM080T **Development of 3D Printed Soft Origami-Inspired AI-driven Millirobot for Biomedical Applications**

Victor Luo, 15, Freshman, James Charlie Gu, 16, Sophomore, Nathan Xu, 16, Junior, Mission San Jose High School, Fremont, California, BASIS Independent Fremont, Fremont, California, Saint Francis High School, Mountain View, California,

T: Oana Seremeta T: Anuj Chaudhri T: Chihiro Ikezi

### ENEV072 **Effects of RootPipes on Landfill Gas Emissions**

Kennesha Garg, 17, Junior, American High School, Fremont, California, T: Natalia Fernandes-Rossi

## Palos Verdes Peninsula, USCA10, Palos Verdes Peninsula Unified School District Science and Engineering Fair

### CELL021T **The Development of the C2F Seawater to Freshwater Converting Bioplant**

Anna Peti-Peterdi, 17, Junior, Lena Peresztegi, 15, Freshman, Daniel Peresztegi, 16, Junior, Palos Verdes High School, Palos Verdes Estates, California, T: Julie Munoz

### ENBM021 **Hydrogel-Assisted Brain Transplantation of HOXA3-Expressing Endothelial Progenitor Cells for Brain Repair After Stroke**

Christine Xie, 17, Junior, Palos Verdes High School, Palos Verdes Estates, California, T: Julie Munoz

### ETSD002 **A Novel Control System for Autonomous Quadcopter Navigation**

Anish Anand, 15, Freshman, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Mark Greenberg

### ROBO007 **A Novel Super-Resolution AI Engine and Multi-Stage Abnormality Detection Pipeline for Early Blindness Prevention**

Justin Liu, 17, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Mark Greenberg

### ROBO008 **Designing and Constructing an Automatic, Non-Electrical Dependent Cardiopulmonary Resuscitation Machine Gen 2.0**

# Andreas John Tempereau, 17, Senior, Palos Verdes High School, Palos Verdes Estates, California, T: Julie Munoz

### SOFT006 **SuperVision: A Novel Integrated Sensing and Computational Framework to Enable Superhuman Epiretinal Prostheses**

# William Huang, 18, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Mark Greenberg

## Santa Cruz, USCA11, Santa Cruz County Science and Engineering Fair

### EBED037 **Low-Cost Solar Powered Water Quality Monitoring Device With 24/7 Uploading to Public Access Website**

Jack Driscoll-Natale, 17, Junior, Pacific Collegiate School, Santa Cruz, California, T: Wayne Conley

### ENEV073 **How Can PLA Degrade in an Aerobic Home Compost?**

Hazel Campbell, 14, Freshman, Pacific Collegiate School, Santa Cruz, California, T: Elliott Campbell



# Finalist Directory

## Salinas, USCA12, Monterey County Science and Engineering Fair

**MCRO039** **Analysis of Osmoadaptation Systems in *C. reinhardtii* in Response to Osmotic Stress Produced by Toxic Brine Dumping Cycles**

# Rithik Bhushan, 16, Junior, Monterey High School, Monterey, California, T: Jason Nicholson

## San Bernardino, USCA13, San Bernardino, Inyo, Mono, (SIM) Science and Engineering Fair

**BMEDO41** **Developing a Preventative Treatment for Age-Related Macular Degeneration**

# Snow Cameron, 16, Junior, Upland High School, Upland, California, T: Christopher Morgan

**CELL040** **A New Method to Assess Cytotoxicity of Osteoblasts Exposed to EDTA**

Isabella Lepe, 17, Senior, Wilmer Amina Carter High School, Rialto, California,  
T: Catherine Sanchez

**MATH033** **Optimizing the Build Parameters of a Linear Delta Robot**

Zahed Siddiqui, 16, Junior, Los Osos High School, Rancho Cucamonga, California,  
T: Lawrence Su

**ROBO054T** **Color and Object Detection for the Blind**

Priscilla Elena Munoz, 16, Sophomore, Danaya Jaslene Figueroa, 16, Sophomore,  
Grand Terrace High School, Grand Terrace, California, T: Matthew Johnson

## Riverside, USCA15, Riverside County Science and Engineering Fair

**BCHM018T** **Refining the Analysis and Tracking of Cell Behavior to Improve Understanding on How Metabolites Impact Glioblastoma Cell Lines**

Sungwon Hur, 17, Junior, Moises Yul Hur, 17, Junior, Martin Luther King High School,  
Riverside, California, T: Michele Hampton

**CHEM034** **Synthesis and In-Depth Evaluation of Degradable Copolymers via Cyclic Ketene Acetal Incorporation**

Angelina Yang, 16, Junior, Eleanor Roosevelt High School, Eastvale, California,  
T: Kelly Howell

**MCRO033** **Natural vs. Synthetic Antibiotics in Battling *E. coli* Bacteria**

Brooke Jayenna Vansuch, 16, Sophomore, Temescal Canyon High School, Lake Elsinore,  
California, T: Julie Beckius

## Bakersfield, USCA16, Kern County Regional Science Fair

**BEHA031** **The Effect of Ergonomics on Students' Performance**

Aarohi R. Patel, 17, Junior, Stockdale High School, Bakersfield, California, T: Jill Reynolds

**ENBM036** **3D Printed Silicone Wound Care Dressing With Carbon Composite Structure Containing Porous Fibers for Reinforcement and Uniform Biocide Delivery**

## Harjaisal Singh Brar, 17, Junior, Stockdale High School, Bakersfield, California,  
T: Jill Reynolds

## Camarillo, USCA17, Ventura County Science Fair

**BEHA048** **The Feasibility and Public Perception of Implementing AED Drones Into EMS Systems**

Emily Irene Bryant, 17, Junior, Thousand Oaks High School, Thousand Oaks, California,  
T: Felix McGinnis

## Los Angeles, USCA50, California Science & Engineering Fair

**ANIM053** **Development of a Predictive Model of Honey Bee Foraging Activity Under Different Climate Conditions**

Vince Wu, 15, Sophomore, Palo Alto Senior High School, Palo Alto, California, T: Sefika Eris

**CBIO067** **Lipid Bilayer Bending Due to Membrane-Protein Interactions: A Computational Investigation**

Nandana Madhukara, 16, Sophomore, Canyon Crest Academy, San Diego, California,  
T: Christopher Lee

**ENEV082** **Testing the Effectiveness of a Bioplastic Layer Bonded to Natural Chelating Agents on the Minimization of Lead Iodide Leaching in Perovskite Solar Cells and a Novel Antireflective Coating Derived From Corn and Lotus Leaf Imprints on the Cell**

# Sasha Masson, 17, Junior, The Harker School, San Jose, California, T: Michael Pistacci

## COLORADO

### Alamosa, USCO01, San Luis Valley Regional Science Fair, Inc.

**ENBM037** **Utilizing 3D Printing Technology to Engineer Prosthetic Human Heart Valves**

# Claire Andrea Seger, 16, Sophomore, Monte Vista High School, Monte Vista, Colorado,  
T: Loree Harvey



# Finalist Directory

## Brush, USCO03, Morgan-Washington Bi-County Science Fair

**PHYS011** **Performance of Pyramidal Airfoils With Wings in an Oscillating Wind Tunnel**  
Bailey Terese Link#, 18, Senior, Parker Erik Stone, 18, Senior, Brush High School,  
Brush, Colorado, T: Erik Stone

## Colorado Springs, USCO04, Pikes Peak Regional Science Fair

**EGSD011** **Buoy Wave Energy Converters Capture of Ocean Wave Energy**  
Natalie Elizabeth Muro, 15, Freshman, William J. Palmer High School, Colorado  
Springs, Colorado, T: Nathaniel Lohmann

**EGSD022** **Electrify Your Step — The Next Stride: Converting Foot Traffic Into Renewable Energy Using Piezoelectric Transducers**

# Shrey Rohilla, 16, Sophomore, The Classical Academy - North, Colorado Springs,  
Colorado, T: Jennifer Smith

**MCRO011** **Am I Effective?**

Vanya Lavu, 16, Sophomore, The Classical Academy - North, Colorado Springs,  
Colorado, T: Sophia Smith

## La Junta, USCO07, Arkansas Valley Regional Science Fair

**ANIM030T** **How Qualities of Soil Affect Where *Aphonopelma hentzi* Burrow in the Colorado Grassland**

Everett Armstrong Ediger, 16, Junior, Zoey Alyson Montoya, 16, Sophomore, La Junta  
High School, La Junta, Colorado, T: Julia Barta

## Joes, USCO08, Northeast Colorado Regional Science Fair

**ANIM013** **The Effect of Light and Fertilizer Exposure on Planaria Regeneration**

Nayla Ramos Vega, 15, Sophomore, Yuma High School, Yuma, Colorado,  
T: Amy Melby

## Boulder, USCO09, Corden Pharma Colorado Regional Science Fair

**EGSD012** **Investigating Natural Hydrogels to Sustain Bioluminescent Algae for Sustainable Lighting and CO<sub>2</sub> Removal**

Amrita Saini, 17, Junior, Peak to Peak Charter School, Lafayette, Colorado,  
T: Robert Hettmansperger

**PHYS012** **Effect of Different Rover Wheel Materials on Triboelectric Charge of Lunar Simulant Dust Particles**

Alexandra Flint, 18, Senior, Peak to Peak Charter School, Lafayette, Colorado,  
T: Robert Hettmansperger

**SOFT012** **American Sign Language Translator**

Liam Patrick Sweeney, 18, Senior, Centaurus High School, Lafayette, Colorado,  
T: Nicholas Cady

## Denver, USCO10, Denver Regional Science and Engineering Fair

**BEHA012** **Analyzing Data of Data Analysis of Analyzed Data About Exoplanets**

Evelyn Patricia Seevers, 14, Freshman, Conifer High School, Conifer, Colorado,  
T: Stephanie Seevers

**BMED010** **Evaluating the Performance of Natural and Commercial Moisturizers for Dry Skin: A Study Using Agar Agar Skin Model**

Vignesh Velmurugan, 15, Freshman, Cherry Creek High School, Greenwood Village,  
Colorado, T: Kalpana Velmurugan

**ETSD070** **A New Rocket Nozzle Design To Improve Performance at High Altitudes**

Ersel Ozan Serdar, 15, Sophomore, Cherry Creek High School, Greenwood Village,  
Colorado, T: Ethan Dusto

## Pueblo, USCO11, Southern Colorado Regional STEM Fair

**ETSD069 R.O.T. (Rate of Travel) Slide**

Kenneth Clayton Zittel, 17, Junior, Central High School, Pueblo, Colorado,  
T: Jamie Withnell

## Fort Collins, USCO50, Colorado Science and Engineering Fair

**ANIM029** **The Efficacy of Abiotic/Biotic Factors and Trap Design for Effective Capture of Invasive American Bullfrog Tadpoles (*Lithobates catesbeianus*)**

# Marissa Lilianna Martinez, 18, Senior, Monte Vista High School, Monte Vista,  
Colorado, T: Loree' Harvey

# Finalist Directory

- CBIO062** **A Novel Phosphosite Localization Approach Using Tandem Phosphoprotein Mass Spectra and Temporal Dilated Networks**  
Margaret Madeleine Arthur, 17, Junior, Fairview High School, Boulder, Colorado,  
T: Paul Strode
- ETSD063** **Moon-Opoly II: Employing Additive Manufacturing Technology for Lunar Construction With Waterless Concrete**  
# Nathaniel Ellis, 16, Junior, Durango High School, Durango, Colorado, T: Ann Drummond
- PLNT052** **The Effect of Heavy Metal Toxicity on *Solanum tuberosum*, *Cucurbita pepo*, *Medicago sativa*, and *Capsicum annuum* Plants Inoculated With Mycorrhizae**  
Carlos Antonio Ochoa-Marquez, 18, Senior, Monte Vista High School, Monte Vista, Colorado,  
T: Loree' Harvey
- TMED013** **Model Validation and Preclinical Testing of Digestive Enzymes for Gluten Breakdown: A Move to Cure Gluten Intolerance and Celiac Disease**  
## Aditi Avinash, 16, Junior, Rock Canyon High School, Littleton, Colorado, T: Susanne Petri

## CONNECTICUT

Sandy Hook, USCT50, Connecticut Science & Engineering Fair

- CBIO027** **Cell Type-Specific Expression of the Molecular Players in Mouse Prefrontal Cortex During Cocaine Addiction**  
Eric Jiyu Teng, 17, Junior, Kent School, Kent, Connecticut, T: Jesse Klingebiel
- EBED024** **A Self-Stabilizing Haptic Accessibility Mouse for Parkinson's Sufferers**  
Jingyuan Zhang, 17, Sophomore, Choate Rosemary Hall, Wallingford, Connecticut,  
T: Jan Cook
- ENEVO43** **Concurrent Removal of Rising, Soluble Ocean Carbon Dioxide and Oil-in-Water Contaminants via Multi-Functional Remediation Framework**  
# Naomi Park, 17, Junior, Greenwich High School, Greenwich, Connecticut,  
T: Andrew Bramante
- ETSD037** **Eco-Navigator: Novel Routing Software Optimized to Reduce Greenhouse Gas Emissions and Generate Fuel Savings for Wind-Assisted Ships**  
Thomas Ewald, 17, Junior, Brunswick School, Greenwich, Connecticut, T: Dana Montanez
- MCRO032** **Knockdown of the Essential 23S rRNA Methyltransferase, *rv3579c*, Increases the Susceptibility of Mycobacterium Tuberculosis to Macrolides**  
Yuriy Sandmeier, 19, Senior, King School, Stamford, Connecticut, T: Victoria Schulman
- ROBO038T** **ParkBD: A Novel Multi-Modal Deep Learning Framework for Parkinson's Disease Severity Prediction and Treatment Using Clinical and Blood-Based Biomarker Data**  
Diya Girish Kumar, 16, Junior, Shriya Jonnalagadda, 17, Junior, Brookfield High School, Brookfield, Connecticut, T: Jonathan Neuhausel
- TMED035** **Non-Invasive Pre-Screening Approach for Early Detection of the Human Papillomavirus (HPV) to Aid in Cervical Cancer Prevention in Underrepresented Demographics**  
Ana-Lois Davis, 18, Junior, Academy of Aerospace and Engineering, Windsor, Connecticut,  
T: Michelle Bellinger

## FLORIDA

Okeechobee, USFL01, Heartland Regional Science and Engineering Fair

- CELL004** **FadA-Secreting Fusobacterium nucleatum Promotes Inflammatory and Immunomodulatory Response in Colorectal Cancer (Year 2)**  
## Angela Huang, 17, Senior, Sebring High School, Sebring, Florida, T: Amy Bubb
- EAEVO23** **Do Cattle That Graze Off of Farmfields That Have Been Farmed With Plastic Mulch Have Microplastics in Them?**  
Laina Marie Canary, 16, Sophomore, Hardee Senior High School, Wauchula, Florida,  
T: Robert Beatty

Deland, USFL04, Tomoka Region Science and Engineering Fair

- ENEVO07** **Recycling Polyethylene Terephthalate to Reduce Plastic Waste**  
Lehigh Acres, USFL05, Thomas Alva Edison Kiwanis Science and Engineering Fair
- BMED029** **Development of a Low-Cost Machine Learning Diagnostic Device and Medical IoT Application as a Novel Approach to Combating Retinal Diseases**  
# Aum Jaykumar Dhruv, 18, Senior, Fort Myers High School, Fort Myers, Florida,  
T: Anthony Sangermano

# Finalist Directory

- CELL037** **Determining the Effect of Acetic Acid on Alginate Bead Membrane Permeability to Aid the Implementation of Allogeneic Transplantation Without Immunosuppression**  
Megan D'Souza, 16, Sophomore, Community School of Naples, Naples, Florida,  
T: Kelly Percivall
- EAEV034** **Utilizing Nutrient Enriched Biologically Activated Bioremediation Units as a Soil Amendment in a Cyclic Remediation System (A Novel Fifth Year Study)**  
###  
Morgan Taylor Barnes, 18, Senior, Canterbury School, Fort Myers, Florida,  
T: Kati Morris
- ENBM042** **Corneal Applanation Scleral Buckling Model (C.A.S.B.M)**  
Sonia Patel, 16, Junior, Community School of Naples, Naples, Florida,  
T: Kelly Percivall
- ENEV041** **Using *Chlorella vulgaris* and *Spirulina major* To Create an Open System Bioreactor Generating Electricity While Running an Air Purification and CO<sub>2</sub> Sequestration System (A 3rd Year Study)**  
Amaya Jennifer Etcheverry, 16, Junior, Community School of Naples, Naples, Florida, T: Kelly Percivall
- ROBO034** **Optimizing Traffic Flow: Implementing Neural Networks and Deep RL Machine Learning Algorithms to Make Traffic Management More Effectual**  
Dhruva Sharma, 16, Sophomore, Fort Myers High School, Fort Myers, Florida,  
T: Anthony Sangermano
- Port St. Lucie, USFL06, St. Lucie County Regional Science and Engineering Fair**  
**CHEM023** **Color Wave- Investigating the Impact of Organic Dyes on Dye Sensitized Solar Cell Performance**  
Dominique Thomas, 18, Senior, Treasure Coast High School, Port St. Lucie, Florida, T: John Williams III
- Valparaiso, USFL07, Panhandle Regional Science and Engineering Fair**  
**EAEV035** **Reducing Coral Bleaching Using Natural Resources and a Self-Sufficient Solar-Powered Filtration System (Year 4)**  
#  
Marisol Rose Enguidanos, 17, Junior, Niceville High School, Niceville, Florida,  
T: Scarlett Brock
- MATH029** **Folding the Future: An Innovative Approach to Solving the Supply Chain Crisis With Geometry**  
Aurora Mendenhall, 16, Junior, Niceville High School, Niceville, Florida,  
T: Scarlett Brock
- Gainesville, USFL08, Alachua Region Science and Engineering Fair**  
**ENEV009** **Iron-Modified Biochar Recovers Phosphorus From Wastewater as Fertilizer Through Column Filters and Flow Reactors (Year 2)**  
Angela Li Gao, 17, Senior, F. W. Buchholz High School, Gainesville, Florida,  
T: Marc Moody
- Ft Lauderdale, USFL09, Broward Regional Science & Engineering Fair**  
**BEHA046** **The Effect of Intermittent Metabolic Switching (IMS) on the Cognitive and Behavioral Abilities of Mutant *Drosophila*, Leading to Brief Synaptic Neuroplasticity as an Alzheimer's Model**  
Emma Marie Colarte Delgado, 16, Sophomore, American Heritage School, Plantation, Florida, T: Leya Joykutty
- MATS050** **3D Printing Personalized Knee Implants: Novel Computational Geometric Models for Stem Cell Regeneration in Meniscus Tears**  
#  
Calvin Thomas Mathew, 16, Sophomore, American Heritage School, Plantation, Florida, T: Leya Joykutty
- PLNT048** **Mitigation of Decreased Protein Synthesis Under Elevated Carbon Dioxide in *Arabidopsis thaliana* Using Transgenic and Exogenous Approaches**  
Jacob Noah Federici, 17, Junior, American Heritage School, Plantation, Florida,  
T: Leya Joykutty

# Finalist Directory

- ENBM012** **Detecting Myofascial Tightness in the Lower Extremities**  
Sophia Marie Weiner, 17, Junior, Holy Trinity Episcopal Academy, Melbourne, Florida,  
T: Daniel Angotti
- ENEV076** **Engineering a Completely Biodegradable Water Treatment System To Reverse Eutrophication in Leachate Canals That Lead Into the Indian River**  
Robert Zrallack, 18, Senior, Titusville High School, Titusville, Florida, T: Jason Rowe
- West Palm Beach, USFL29, Palm Beach Regional Science and Engineering Fair**
- ANIM051** **The Effect of Type 2 Diabetic Treatment on the Morphology of the Offspring of *D. melanogaster***  
Lia Lapidot, 18, Senior, American Heritage School of Boca Delray, Delray Beach, Florida,  
T: Brittnee McDole
- CBIO069** **Computational Analysis of Human Antibody Repertoires To Inform Design of HIV-1 Vaccines**  
Ava Allwardt, 17, Junior, Saint Andrew's School, Boca Raton, Florida, T: Michael Farzan
- EGSD059** **Effects of Artificial Algal-Bacterial Symbioses (*E. coli* K-12, *C. freundii*, & *E. coli* MC4100) on Microbial Hydrogen Production**  
Samara Rashid, 18, Senior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Brittnee McDole
- ENEV078** **O.D.O.B.A**  
Isabella Lackner, 16, Sophomore, Florida Atlantic University High School, Boca Raton, Florida, T: Katherine Hendrickson
- TMED077** **Investigating the Effects of Vinblastine Sulfate Combined With Alpha Tocopheryl Succinate on A549 Lung Cancer Cells and Prostate Cancer Cells**  
Rohith Karthik, 17, Senior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Britnee McDole
- TMED078** **The Effect of Nicotinamide on the Il-6 Expression and Cell Count of Barrett's Esophagus Expressing Cells**  
Sruthi Sai Balasubramanian, 18, Senior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Brittnee McDole
- TMED079** **Analyzing the Effects of Turmeric & Curcumin on Tau Aggregation & Amyloid Beta Plaques on *Caenorhabditis elegans* and Its Further Implications Into Alzheimer's Disease**  
Aayushi Ranjan, 16, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Brittnee McDole
- Land O' Lakes, USFL30, Pasco Regional Science and Engineering Showcase**
- MCRO007** **Preventing Surgical Site Infections: Designing a Novel Post-Surgical Treatment Using Silver Nitrate and Ayurvedic Extracts in Combination With DNA Sequence Analysis**  
Meghna Manjith, 17, Junior, Wiregrass Ranch High School, Wesley Chapel, Florida,  
T: Branden Anglin
- PLNT008** **An Innovative Approach to Promoting Lignin Biosynthesis in *S. lycopersicum* Using Sound Waves**  
Caroline McHale, 17, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida,  
T: Branden Anglin
- Vero Beach, USFL31, Indian River Regional Science and Engineering Fair**
- MCRO003** **Identifying, Cloning, and Validating a Lysin Gene Into *E. coli***  
Elizabeth Claire De Schouwer, 17, Senior, Vero Beach High School, Vero Beach, Florida,  
T: Nicole Mosblech
- Sarasota, USFL32, Sarasota County STEM Fair**
- BCHM035** **How Will the Population of Human Gut Microbe *Lactobacillus fermentum* Be Affected by Exposure to Macromolecules Glycerol, Zein, and Gliadin?**  
#  
Rylee Lynn Mulhollen, 18, Senior, Sarasota High School, Sarasota, Florida,  
T: Andrew Harshman
- MCRO064** **Wastewater Treatment Chemicals' Effect on *Escherichia coli* WP2 pKM101 Mutation & Antibiotic Resistance Genes**  
#  
Nicholas Wright Cox, 17, Senior, Sarasota High School, Sarasota, Florida,  
T: Andrew Harshman

# Finalist Directory

## Jacksonville, USFL10, Northeast Florida Regional Science and Engineering Fair

**ANIM006** **The Role of VEGF-B and NRP-1 Axis in Regulating Mitochondrial Homeostasis in Ischemic Heart Disease**

Riya Kar, 17, Junior, The Bolles School, Jacksonville, Florida, T: Kathryn Halloran

**BEHA017** **Spark Care+: Personalized Music Therapy for Relaxation and Energizing Using a Mobile and AI Approach**

# Sarah Chaeyoon Park, 15, Sophomore, The Bolles School, Jacksonville, Florida, T: Kathryn Halloran

**CBIO005** **Utilizing Unsupervised Machine Learning to Derive and Analyze Therapeutically Insightful Regions of Bacteriophage Genomes**

William Robert Rosenberg, 17, Junior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

## Newberry, USFL11, Suwannee Valley Regional Science and Engineering Fair

**ANIM023** **How Do Moon Phases Affect the Calving Rate in Dairy Cattle?**

Gloria Lynn Gilliam, 17, Junior, Lafayette High School, Mayo, Florida, T: Case Emerson

## Bartow, USFL12, Polk Region Science and Engineering Fair

**PLNT029** **Impact of Methylene Blue Dye on Response of *Solanum lycopersicum* to Stress Caused by High Salinity**

# Ellen Rose Jones, 18, Senior, Haines City IB East, Lake Wales, Florida, T: Anna Clarke

## Viera, USFL13, Brevard South Science and Engineering Fair

**CHEM006** **Novel Red Blood Cell Membrane-Wrapped Septenary High-Entropy-Alloy Nanoparticles for Photothermal Osteosarcoma Treatment, Year 2**

# Laya Damaraju, 18, Senior, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp

**EAEV010** **Muck Accumulation and Nutrient Cycling Within Salt Wedge Zones in the Indian River Lagoon: A Second Year Study**

Ava Auter, 18, Senior, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp

**EBED008** **3rd-Eye: A Novel Embedded System for Driver Attentiveness Monitoring Using Data Fusion and Machine Learning (Year 2)**

Pranav Ponnusamy, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Sally Kempfer

## Satellite Beach, USFL14, Brevard Intracoastal Regional Science and Engineering Fair

**ENEV021** **An Engineered Hub & Spoke System to Seek & Destroy HABs (Year 4)**

Sharanya Natarajan, 15, Freshman, Edgewood Junior Senior High School, Merritt Island, Florida, T: Meredith Reninger

**PLNT024** **Targeted Mutagenesis of the Arabidopsis deoxyhypusine Synthase Gene via CRISPR/Cas9 Enzyme Engineering Generating an Increase in Carbon Sequestration and Photosynthetic Rate**

Samantha Ariel Cohen-Pinsky, 18, Senior, Satellite High School, Satellite Beach, Florida, T: Magdalena Molledo

**TMED007** **Seaweed and Spheroids: Investigating the Maintained Anti-Cancer Efficacy of the Seaweed Extract Fucoic Acid Against Adenocarcinoma Cultured Two and Three Dimensionally, Year III**

Jeremiah Feizi, 17, Senior, Satellite High School, Satellite Beach, Florida, T: Loren Kingsley

## Coral Gables, USFL15, South Florida Science and Engineering Fair

**ANIM005** **Burmese Python Sightings and Temperature Extremes and Fluctuations**

Elena Kristina Beck, 15, Freshman, Coral Reef Senior High School, Miami, Florida, T: Lauriann Carbajal

**BMED003** **SOX7: Novel Autistic Gene Identified Through Analysis of Multiomics and Human Brain Organoids**

Jane Zhao, 17, Junior, School for Advanced Studies - South, Miami, Florida, T: Dahis Manzanares

# Finalist Directory

- EAEV008** **Hurricane Rapid Intensification Convolutional Neural Network: A Novel Deep Learning Model for Predicting Tropical Cyclone Rapid Intensification Using 20 Years of Satellite Rainfall Data**  
### Sunny You, 16, Junior, Miami Palmetto Senior High School, Pinecrest, Florida, T: Pamela Shlachtman
- EAEV084T** **The Resilience of *Daphnia* to Liquid Household Products**  
Elif Kaya, 18, Senior, Isis Penelope San Martin, 18, Senior, Eduardo Alfaro, 18, Senior, Downtown Doral Charter Upper School, Doral, Florida, T: Merly Ovares T: Merly Ovares
- MATH008** **A Logistic Regression Model Representing the Genetic Landscape Differences Between Bipolar Disorder 1 and Bipolar Disorder 2**  
# Lucas Gutman, 17, Junior, iPrep Academy North, Miami, Florida, T: David Buncher
- MATH009** **Correlations in Cryptocurrencies: A Comparative Safe-Haven Analysis**  
Dawson Medina, 17, Junior, Westminster Christian School, Palmetto Bay, Florida, T: Lisa Garrido
- TMED008** **Leveraging AI to Assist Cardiovascular Disease Diagnosis**  
Ethan Thomas, 16, Sophomore, Ransom Everglades School, Miami, Florida, T: Susan Mactye
- Ocala, USFL16, Big Springs Regional Science Fair**
- CHEM005T** **Design of Experiment Optimisation of the Suzuki Cross-Coupling: A Synthesis of Biphenyl, Catalysed by Palladium Tetrakis, from Phenylboronic Acid and Bromobenzene**  
Diana Gegaj#, 17, Senior, Litian Zheng, 18, Senior, Vanguard High School, Ocala, Florida, T: Eddy Rey-Castellanos
- MATH006** **Application of Michaelis-Menten Rational Function Models, Parametric Calculations, and Differential Equations to Determine the Most Influential Factor on Histamine Levels**  
# Camille Aguilera Duma, 17, Junior, Vanguard High School, Ocala, Florida, T: Eddy Rey-Castellanos
- MCRO002** **Bi-Directional Hygiene: Using the Microbiome to Combat Nosocomial Infection**  
Rishit Arnav Shaquib, 16, Junior, Vanguard High School, Ocala, Florida, T: Candace Roy
- Davenport, USFL17, Dr. Nelson Ying-Orange County Science Exposition**
- CBIO017** **Using Artificial Intelligence Neural Networks to Repurpose Pre-Existing Drugs and Analyze Drug Relationships, Year 3**  
## Krithik Seela, 17, Senior, Lake Highland Preparatory School, Orlando, Florida, T: Lisa Davenport
- MATS052** **The Novel Development of a Bio-Based Smart Material for Pharmaceutical Packaging and Temperature Insulation**  
# Genesis Angelyne Cely, 17, Senior, Trinity Preparatory School, Winter Park, Florida, T: Romina Jannotti
- MATS053** **Biodegradable Magnesium Implants for Bone Repair**  
Ashna Mathur, 16, Sophomore, Lake Highland Preparatory School, Orlando, Florida, T: Lisa Davenport
- PHYS066** **Extending the Analysis of TNO Data to Longer Wavelengths in Advance of James Webb Space Telescope Data**  
Aryan Pathak, 17, Junior, Lake Highland Preparatory School, Orlando, Florida, T: Lisa Davenport
- Wildwood, USFL18, Sumter County Regional Science Fair**
- ANIM002** **Aloe...Is It Me You're Looking for? A Clinical Trial to Determine the Effect of Aloe Vera on Dogs' Skin Allergies**  
# Kadie Mariano, 17, Junior, Wildwood High School, Wildwood, Florida, T: Emily Keeler
- EAEV007** **Are Growth Rates of Pine Trees Affected by Depth to Groundwater?**  
Alynza Isabella McBride, 16, Sophomore, South Sumter High School, Bushnell, Florida, T: Stephanie Yarbrough
- ENBM010** **A Method for Papnicolaou Tests Utilizing a Novel Cytobrush To Reduce Acute Pain and Increase Effective Sample Collection**  
# Hannah Grace Kennedy, 18, Senior, The Villages Charter High School, The Villages, Florida, T: Monica Vinas

# Finalist Directory

- ENBM011T** **Shoulder and Leg Prosthetic With a Dynamic Magnetic Shoulder**  
Brandon M. Martinez, 18, Senior, Raquel M. Rowland, 17, Senior, Wildwood High School, Wildwood, Florida, T: Emily Keeler
- PHYS005** **Establishing a Correlation Between Variation of Thermodynamics and Corresponding Aerodynamics in Descent of Maple Samara Seed**  
Jose M Carvajal-Beltran, 16, Sophomore, Wildwood High School, Wildwood, Florida, T: Emily Keeler
- Pensacola, USFL20, West Panhandle Regional Science and Engineering Fair**
- ENEV026** **Pollution Tracker**  
Shrinithi Sridhar, 15, Freshman, Pensacola High School, Pensacola, Florida, T: Suzanne Ryals
- St. Augustine, USFL21, St. Johns County STEM Fair**
- BMED004** **Sex Differences in Cardiac Energetics During Viral Myocarditis**  
Kathryn Alexandra Shapiro, 17, Senior, Ponte Vedra High School, Ponte Vedra, Florida, T: Kathryn Kehoe
- CELL028** **Mitochondrial Dysfunction in TDP-43 Knockout HeLa Cells**  
Ella McCarthy, 18, Senior, Ponte Vedra High School, Ponte Vedra, Florida, T: Kathryn Kehoe
- Sanford, USFL23, Seminole County Regional Science, Mathematics & Engineering Fair**
- ANIM019** **Using Pavlovian Conditioning to Promote Attraction of *Apis mellifera* to the Endangered Orchid *Prosthechea cochleata*, Year 2**  
Ella Pilacek, 17, Junior, Oviedo High School, Oviedo, Florida, T: William Furiosi
- CELL005** **Engineering a Novel Polymeric Coating Incorporating Osteogenically-Active Antimicrobial Proteins to Combat Bone Implant Infection Related to Biofilm Formation**
- # Anouska Seal, 17, Junior, Paul J. Hagerty High School, Oviedo, Florida, T: Angela Campbell
- ENBM009** **Exploring Tissue Viability and Tubule Formation of 3D Bio-Printed MDCK Cells and Canine Smooth Muscle Cells**  
Ethan Chen Reshad, 18, Senior, Oviedo High School, Oviedo, Florida, T: William Furiosi
- Stuart, USFL25, Martin County Regional Science and Engineering Fair**
- PLNT053** **Quantification of *Macrophomina phaseolina* Survival After Organic Soil Treatments Under Multiple Temperature Regimes**
- # Nira Goyal, 16, Junior, Martin County High School, Stuart, Florida, T: Jennifer Borges
- Tallahassee, USFL26, Capital Regional Science and Engineering Fair**
- CBIO006** **Defining and Modeling Nuclear Migration in the Early *Drosophila* Embryo**  
Leah Gebre Kiro, 17, Junior, Maclay School, Tallahassee, Florida, T: Ariel Evans
- CELL007** **Modulation of EMT Gene Expression Using CRISPRa/i to Investigate Lung Cancer Mechanosensation**
- # Shiv Patel, 16, Junior, Maclay School, Tallahassee, Florida, T: Ariel Evans
- Tampa, USFL27, Hillsborough Regional Science Fair**
- BCHM021** **Measuring the Effect of a Stimulating Decongestant in Combination With Other Substances on Cricket Action Potential**  
Alessia Francesca Concas, 16, Junior, C. Leon King High School, Tampa, Florida, T: Brynna McFarland
- ENBM058** **Using an Electroencephalogram and a Transcutaneous Electrical Nerve Stimulation (TENS) Unit to Develop a Noninvasive Neuroprosthetic for Quadriplegic Patients**  
Rudra Patel, 16, Sophomore, Middleton High School, Tampa, Florida, T: Bhagyashree Kulkarni
- Melbourne, USFL28, Brevard Mainland Regional Science and Engineering Fair**
- CELL022** **A Novel Imaging Technique: Using Fluorescent Dyed Silica Nanoparticles in Identifying Leukemia Biomarkers**  
Jasmine Amelia Bohannon, 18, Senior, Rockledge High School, Rockledge, Florida, T: Aaron Leblanc



# Finalist Directory

## Howey In The Hills, USFL34, Lake County Regional Science & Engineering Fair

**BMEDO05** **Screening an Underrepresented Demographic, Lake County, Through a Cumulative Questionnaire on Cardiovascular Health and Its Relation to Diet**

Niya Satish Patel, 16, Junior, Mount Dora High School, Mount Dora, Florida,  
T: Collin Olson

**SOFT017** **A Cloud SaaS (Software as a Service) That Makes Your Pet's Information Easily Shareable Using Standard Web Communication Formats Such as API's, QR, and NFC (Near Field Communication) Protocols**

Jasmine Alexandria Gaines, 15, Freshman, East Ridge High School, Clermont, Florida,  
T: Eric Calabrese

## Orange Park, USFL35, Clay Rotary Regional Science and Engineering Fair

**MATSO24** **Titanium Bonds: A Study on the Efficacy of Varied Surface Preparation Methods of Titanium Substrates for Optimised Structural Adhesion**

Nha Thanh Emma Duong, 18, Senior, Ridgeview High School, Orange Park, Florida,  
T: Bethany Derosie

**ROBO010** **Motion Profiling Algorithm for Improved Intelligent Machine Target Correction**

Alexander James Gordon, 17, Junior, Ridgeview High School, Orange Park, Florida,  
T: Bethany Derosie

## Orlando, USFL50, State Science and Engineering Fair of Florida - Ying Scholars

**ANIM008** **Year 4: Evaluating the Efficacy of Novel Volatile Beer Blend and Coumaphos Acaricide for Small Hive Beetle Treatment Within Honey Bee Hives**

Atreya Manaswi, 17, Sophomore, Orlando Science Schools, Orlando, Florida,  
T: Judith Bright

**BEHA050** **Understanding the Impact of Celebrity Endorsements on the Artificial Growth of Altcoins Through a Multi-Level Latent Class Analysis and Software Based Approach (Year 2)**

# Rushil Shah, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida,  
T: Mary Schropp

**BMEDO58** **Utilizing *Caulobacter crescentus* To Target the Bcl-2 Gene and NF- $\kappa$ B to Cause Apoptosis in Nasal Squamous Cell Carcinoma**

Maya Mohanty, 17, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Brittnee McDole

**CHEM059** **Development and Characterization of a Novel Instantaneous-Crosslinking Pectin-Based Hydrogel**

# Nolan Wen, 18, Senior, American Heritage School of Boca Delray, Delray Beach, Florida,  
T: Kevin Kang

**EBED020** **Year II: Designing a Novel LiDAR Navigation System With Haptic Feedback, Bluetooth and App Integration for the Visually Impaired**

# Tiffani Rai Gay, 16, Sophomore, Orlando Science Schools, Orlando, Florida,  
T: Judith Bright

**ENBM081** **A Novel Application of Microfluidics to Develop a Rapid and Cost-Effective Objective Diagnostic Method for Parkinson's Disease**

Deeksha Kumaresh, 17, Senior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Darryl Dieujuste

**MCRO060** **In Pursuit of New Soil-Based Bacteriophages That Infect *Gordonia rubripertincta*: Discovering Evergreen**

Chloe Barreto-Massad, 17, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Brittnee McDole

**PHYS031** **A Novel Method of Determining Air Shower Muon Half-Life Using Time of Flight**

Dillen Scott, 18, Senior, Satellite High School, Satellite Beach, Florida,  
T: Magdalena Molledo

## GEORGIA

### Atlanta, USGA03, Atlanta City Science & Engineering Fair

**BMEDO15** **Identification of Environmental Risk Factors Triggering Amyotrophic Lateral Sclerosis in Veterans**

Ella Grace Sipe, 15, Sophomore, North Atlanta High School, Atlanta, Georgia,  
T: Dana Peebles



# Finalist Directory

- CBIO012** **Genetic and Environmental Contributions to Racial and Ethnic Differences in Complex Disease and Their Relations to Health Disparities in the US and UK**  
Jeremiah Longino, 18, Senior, South Atlanta High School, Atlanta, Georgia,  
T: Brian Cook
- ROBO026** **A Dexterous Gripper for Complex and Delicate Tasks**  
Edward Andrew Botchwey, 18, Senior, Charles R. Drew Charter School, Atlanta, Georgia,  
T: Courtney Bryant
- Stone Mtn, USGA04, Dekalb Science & Engineering Fair**
- TMEDO05** **Identification of Cell-Free DNA Methylation Signatures as a Potential Genomic Biomarker of Alzheimer's Disease**  
Deeksha Khanna, 17, Junior, Chamblee Charter High School, Chamblee, Georgia,  
T: Jacqueline Stephens
- McDonough, USGA06, Henry County Science and Engineering Fair**
- EBED005** **Deployable Broadband Emergency Communications Network**  
#  
Jonathan Luke Dorminy, 16, Sophomore, Sola Fide Home School, McDonough, Georgia,  
T: Ann Dorminy
- EGSD003** **Tracking vs. Fixed-Angle Solar**  
Noah Lee Seelhammer, 16, Sophomore, Union Grove High School, McDonough, Georgia, T: Miranda Sears
- Milledgeville, USGA07, Georgia College & State University Regional Science and Engineering Fair**
- ANIM050** **It's a Bloody Topic**  
Nicholas Herbert Jackson, 16, Junior, Johnson County High School, Wrightsville, Georgia, T: Michael Caneega
- CHEM025** **Determination of Heavy Metals Through Tetra Hydroxyphenyl Porphyrin-Doped Sol-Gels**  
Morgan K. Collins, 18, Senior, Putnam County High School, 300 War Eagle Dr, Georgia,  
T: Catrena Lisse
- Griffin, USGA09, Griffin RESA Regional Science Fair**
- EAEV020** **Sustainable Eating to Save Our Planet**  
Roshan Purna Kolachina, 17, Junior, McIntosh High School, Peachtree City, Georgia,  
T: Seth Bishop
- EBED018** **Haptic Vision: An Assistive Device for the Visually Impaired**  
Aadi Vinayak Vaidya, 14, Freshman, McIntosh High School, Peachtree City, Georgia,  
T: Seth Bishop
- PLNT005** **Algae Science: Analyzing Photosynthesis Rates of Agitated vs. Still Algae**  
Briana Senoj-Marie Jones, 18, Senior, Newton College and Career Academy, Covington, Georgia, T: Laura Lambert
- Perry, USGA10, Houston Regional Science and Engineering Fair**
- BMEDO16** **Developing Cellulose Nanocomposite Hydrogel as a Value-Added Product From Biomass Waste for Wound Dressing**  
Vageesh Sai Degala, 16, Junior, Houston County High School, Warner Robins, Georgia,  
T: Jenny Gutshall
- ROBO029** **CoVNet: A Deep Convolutional Neural Network Model for Improving COVID-19 Detection**  
Shiva Kevin Soundappan, 16, Junior, Houston County High School, Warner Robins, Georgia, T: Jenny Gutshall
- Suwanee, USGA11, Gwinnett Regional Fair**
- EGSD020** **Comparative Analysis of Plant-Derived Dyes in Dye-Sensitized Solar Cells: Maximizing Energy Production Efficiency**  
Rohan Kumar, 16, Junior, Paul Duke STEM High School, Norcross, Georgia,  
T: Tiffany Bookal
- ENBM022** **Measuring Blood Glucose Without Finger Stick: NIR Spectroscopy**  
Sohum Trivedi, 16, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Courtney Cox

# Finalist Directory

- MCROO18T** **Evaluating the Antimicrobial Properties of Materials in Kenya**  
Jayson Ndungu, 17, Junior, Aayan Mushfik Mukul, 16, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Rhonda Rackley, T: Courtney Cox
- MCROO19** **Turning the Phage: Effects of Bacteriophages on *E. coli* K12**  
Afreen Ali, 16, Sophomore, Peachtree Ridge High School, Suwanee, Georgia, T: Corey Wellmaker
- PLNT019** **Effect of Exogenous L-Glutamine on Soybeans**  
Paula Gonzalez, 17, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Courtney Cox
- ROBO020** **CogVR: A Novel AI Therapeutic System for MS Patients**  
Krish Saxena, 16, Sophomore, Collins Hill High School, Suwanee, Georgia, T: Frankie Morin
- Conyers, USGA12, Rockdale Regional Science & Engineering Fair**
- CELL017T** **Alleviating DNA Demethylation of 5hmC in Neurons and Zebrafish Embryos**  
Abigail Grace Buchanan, 17, Junior, Alexa Malkia Apiyo, 16, Junior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Shelley Seagraves, T: Laura Rogers
- ENBMO23** **The Use of Aloe Vera and Silver Nanoparticles in Wound Healing**  
#  
Dylan Burkey, 18, Senior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Shelley Seagraves
- PLNT021T** **Utilizing FGE To Improve Agricultural Health**  
Jessica Rhee, 17, Junior, Camille Hall, 17, Junior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Laura Rogers, T: Scott Robinson
- Atlanta, USGA13, Fulton County Regional Science & Engineering Fair**
- MATSO01** **Novel Piezoelectric Nanogenerator for Biomedical Applications**  
Annika Joshi, 17, Junior, Johns Creek High School, Johns Creek, Georgia, T: Nicole Ferreira
- PLNT014T** **Black Gold: The Effect of C3 vs. C4 Feedstock on Carbon Sequestration of Resultant Biochar**  
Swathi Mugundu Pradeep, 16, Junior, Chinmaya Saran, 17, Junior, Northview High School, Johns Creek, Georgia, T: Pallavi Rallapalli
- Marietta, USGA14, Cobb/Paulding Regional Science Fair**
- CBIO011** **Targeted Drug Delivery for Aortic Aneurysms: Using Computational Fluid Dynamics to Optimize Drug Delivery & Treatment**  
#  
Misha Nilesh Patel, 17, Junior, Wheeler High School, Marietta, Georgia, T: Joel Howell
- SOFT018** **EyePal: A Novel Multimodal Diagnosis & Prevention System to Enable Accessible and Individualized Glaucoma Detection**  
#  
Rohan Kalia, 17, Sophomore, Wheeler High School, Marietta, Georgia, T: Joel Howell
- Jonesboro, USGA15, Clayton County Regional Science & Engineering Fair**
- CHEM036** **Facile Liquid-Liquid Fractionation for the Reuse of Magnetite Nanoparticles in the Eco-Friendly Removal of Immiscible Pollutants**  
#  
Amy Pham, 17, Senior, Elite Scholars Academy, Jonesboro, Georgia, T: Reshawndra Hutchins
- ENBMO44T** **Can Vibrational Frequencies Assess Joint Health?**  
Jacob William Riad, 18, Senior, Barbara Anabella Simmons, 17, Senior, Martha Ellen Stilwell School of the Arts, Jonesboro, Georgia, T: Rajini Sundararaj
- Athens, USGA50, Georgia State Science and Engineering Fair**
- EBED043T** **Micro-Q: A Low-Cost, Portable, IoT-Based Fluorometer**  
Vineeth Sendiraj, 16, Junior, Madhav Gulati, 18, Senior, Lambert High School, Suwanee, Georgia, T: Janet Standeven
- ENEV074T** **Mastering Menstruation: Counteracting Period Poverty**  
Olivia Margaretha Lynne Ray, 18, Senior, Emily Nicole Wagner, 18, Senior, Whitewater High School, Fayetteville, Georgia, T: Shelley Kozlowski
- ETSD058T** **Underwater Robotics: Manipulation and Photogrammetry**  
Makenna Reilly, 16, Junior, Violet Marian Brockmann, 15, Freshman, Lanier High School, Buford, Georgia, T: Michael Reilly

# Finalist Directory

## HAWAII

**Waipahu, USHI01, Hawaii Association of Independent Schools Science and Engineering Fair**  
**BMED006 Identifying and Mitigating Renal Toxicity of Lithium on Bipolar Disorder Using HEK293 Cells**

Amara Kanoelani Martin, 17, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Gail Ishimoto

**CELL006 Possible Use of MicroRNA-488 as a Biomarker for Bad Prognosis in Type 2 Diabetes**  
Ming-Hao Alex Lee, 18, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan

**Waipahu, USHI02, Leeward District Science and Engineering Fair**  
**BMED007 Investigating the Impact of Pyruvate Kinase Muscle Isoform 2 (PKM2) Knockout on Cardiac Murine Cellular Hypertrophy**

Cheydon Jim Tabiolo Agos, 17, Junior, Waipahu High School, Waipahu, Hawaii, T: Tanya Cobbin

**MATS007 Analyzing the Strength of Different Edible Biodegradable Films**  
Kayla Nguyen, 16, Junior, Waipahu High School, Waipahu, Hawaii, T: Tanya Cobbin

**Puunene, USHI03, Maui County Regional Science and Engineering Fair**

**EAEV076T The Effects of Coastal Erosion**

Penelope Kalolaine Tupou, 16, Junior, Brie-Ann Shiyo Fukutomi, 16, Sophomore, Henry Perrine Baldwin High School, Wailuku, Hawaii, T: Hannibal Starbuck, T: Hannibal Starbuck

**Lihue, USHI04, Kauai Regional Science & Engineering Fair**

**ANIM043 Lure Comparison for Capturing Male Culex Mosquitoes**

Lauryn Hideko Hashimoto, 16, Sophomore, Kauai High School, Lihue, Hawaii, T: Kevin Johnson

**BCHM037 Creating Perfusable Tissue Scaffolds From Decellularized Plant Leaves**

Jaxyn Kai Cable-Treadwell, 17, Senior, Kauai High School, Lihue, Hawaii, T: Kevin Johnson

**Hilo, USHI05, Hawaii District Science and Engineering Fair**

**PHYS006 Investigating the M-Sigma Relation: An Analysis of Active Galactic Nuclei Mass Evolution Patterns**

Ciana-Lei Bence, 18, Senior, Kamehameha Schools Hawaii Campus, Keaau, Hawaii, T: Kehau Kalili

**TMED011 Identifying the Molecular Mechanisms of a Safer Neuroblastoma Cure Using the Native Hawaiian 'Awapuhi (*Zingiber zerumbet*) Herb**

### Rachel Z. Tao, 17, Senior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki

**Kaneohe, USHI06, Windward District Science and Engineering Fair**

**ANIM007 The Effect of Anthropogenic Noise Pollution on the Photosynthetic Yield of *Aiptasia***

Sage Kamani Marley Andrews, 17, Junior, Kailua High School, Kailua, Hawaii, T: Sara Anglin

**ETSD003 Modeling and Designing a Sustainable Bicycle Helmet**

Kailan Gertonson, 18, Senior, Kalaheo High School, Kailua, Hawaii, T: Diana Chun

**Aiea, USHI07, Central Oahu District Science and Engineering Fair**

**ENEV008 Decontamination of Heavy Metals Through Phytoremediation by Native Hawaiian Plants**

Kenneth J. Yi, 16, Junior, Mililani High School, Mililani, Hawaii, T: John Sandvig

**ETSD023 Biomass Powered Desalination Year III: Combustion Tuning by Closed Loop Control System**

Cassidy Ibanez, 17, Junior, Mililani High School, Mililani, Hawaii, T: Namthip Sitachitta

**Honolulu, USHI08, Honolulu District Science & Engineering Fair**

**CHEM007 Chemical Reclamation of Precious Metals to Reduce Environmental Contamination**

Vincent A. Grillo, 18, Senior, Kalani High School, Honolulu, Hawaii, T: Bryan Silver

# Finalist Directory

- ENEV011** **Testing the Effectiveness of *Sabellastarte spectabilis* as a Potential Bioremediator**  
Kian Kenneth Francisco Sanchez, 16, Sophomore, University Laboratory School, Honolulu, Hawaii, T: Jennifer Seki-Wong
- MATSO08** **Observing the Benefits of the Involvement of Pressure in the Annealing of 3D Printed Components for Higher-Strength Applications**  
Jefferson Young, 18, Senior, Kalani High School, Honolulu, Hawaii, T: Bryan Silver
- Kailua-Kona, USHI09, West Hawaii District Fair**
- ROBO017** **Classifying Coral Species Using Machine Learning Algorithms**  
Aiden Ankrum, 18, Senior, Kealakehe High School, Kailua-Kona, Hawaii, T: Justin Brown
- Honolulu, USHI50, Hawaii State Science and Engineering Fair**
- BEHA058** **Determining Whether the Onset Age of Bilingualism Enhances Cognitive Control**  
Michelle Choi, 18, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan
- BMED067** **Cytotoxicity of Mamaki (*Pipturus albidus*) on LNCaP Cells**  
Christian James Kalama Roy, 17, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Gail Ishimoto
- CHEM063** **The Chemical Profiling and Antibacterial Evaluation of Extracts from *Garcinia xanthochymus***  
Alanna Sun, 17, Senior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki
- ##**
- EAEV081** **Studies on *Gracilaria salicornia*: Zinc Oxide (ZnO) Sunscreen Exposure and Use as Agricultural Fertilizer**  
Madison Rieko Hiilani Murata, 16, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Gail Ishimoto
- ETSD064** **Modification of Induction Motor Designs for Higher Efficiency and Starting Torque**  
# Paul Watson Varricatt, 18, Senior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki
- ETSD065T** **The Use of Electrohydrodynamic Thrust in Marine Propulsion Systems**  
Aysa Jones, 17, Junior, Sebastian Rojas, 16, Junior, Kanoaomauloakai Sonny DaSilva, 17, Senior, Kailua High School, Kailua, Hawaii, T: Sara Anglin T: Sara Anglin
- MCRO065** **Detecting *Prevotella* and *Sneathia* in Adolescent Vaginal Microbiomes Using 16s rRNA Gene Sequencing and Spreading Awareness of Under-Recognized Women's Health Issues Through CARE: A Health Marketing Campaign**  
Ellsha Lumina Florence Johnston, 17, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan
- IDAHO**
- Boise, USID01, Northern Idaho Science & Engineering Fair**
- ENEV032** **Using Plants to Remove Heavy Metals From Wastewater**  
Holly Lynn Brannan, 19, Senior, Grangeville High School, Grangeville, Idaho, T: Shaun Bass
- ETSD032** **Refining Novel Drone Design to Increase Efficiency**  
# Caden Joel Perry, 18, Senior, Moscow High School, Moscow, Idaho, T: Pat Blount
- Boise, USID02, Western Idaho Science & Engineering Fair**
- MCRO015T** **Managing Rainbow Trout Disease and Antibiotic Resistance by Raising Naturally Resistant Strains**  
Amulya Sai Tanikella, 15, Sophomore, Kiana Mohammadi, 16, Sophomore, Treasure Valley Math and Science Center, Boise, Idaho, T: Julie Ekhoﬀ
- ROBO016** **Pedestrian AI**  
Kathy Nie, 15, Sophomore, Timberline High School, Boise, Idaho, T: Heidi Pluska
- Boise, USID03, Eastern Idaho Science & Engineering Fair**
- PHYS007** **Tsunami Sound (T-Sound): Neutralizing Tsunamis Using Acoustic Gravity Waves**  
Jasmine Aubrey Lima, 15, Sophomore, American Heritage Charter School, Idaho Falls, Idaho, T: Alaysha Whitworth
- PLNT007** **The Effects of Gibberellin Concentration on the Development of Bean Plants**  
Logan Edward Krohn, 17, Junior, American Heritage Charter School, Idaho Falls, Idaho, T: Alaysha Whitworth

# Finalist Directory

## ILLINOIS

### CHICAGO, USIL01, Chicago Public Schools Student Science Fair

**CELL034** **Transcriptome Changes of Hematopoietic Stem and Progenitor Cells in Peripheral Blood of COVID-19 Patients by scRNA-seq**

Zhouqi Shao, 17, Junior, Whitney M. Young Magnet High School, Chicago, Illinois, T: Anna Gallardo

**CELL035** **A Novel siRNA-Based Drug for the Treatment of Hepatocellular Carcinoma**

# Ritvik Viniak, 18, Senior, Walter Payton College Preparatory High School, Chicago, Illinois, T: Walter Kinderman

**EAEV041** **Predicting Large Wildfires Using Machine Learning Approach Towards Environmental Justice via Remote Sensing**

Nikita Agrawal, 17, Junior, Whitney M. Young Magnet High School, Chicago, Illinois, T: Anna Gallardo

**ENBM046** **mPOC and Hydroxyapatite Implant for Bone Tissue Regeneration**

## Maya Joshi, 18, Senior, Walter Payton College Preparatory High School, Chicago, Illinois, T: Walter Kinderman

### Bowen, USIL04, Illinois Junior Academy of Science Region X Science Fair

**ENEV038** **The Development of a Mobile, Arduino-Based Water Quality Testing Apparatus**

Macy M. Putnam, 17, Senior, Southeastern Junior/Senior High School, Augusta, Illinois, T: Kassie Henry

### Evanston, USIL05, Illinois Junior Academy of Science North Suburban Region 6 Science and Engineering Fair

**CHEM020** **Green Synthesis and Testing of ZIF-8 as a Carbon Dioxide Capturing Agent**

# Zahra Zulfiqar Nathani, 18, Senior, Niles Township West High School, Skokie, Illinois, T: Parin Patel

**PHYS018** **Accelerating CERN and LIGO Big Data Processing Using an Optical Correlator**

Aarushi Tiwari, 18, Sophomore, Adlai E. Stevenson High School, Lincolnshire, Illinois, T: Christina Palffy

## INDIANA

### Terre Haute, USIN20, Hoosier Science and Engineering Fair Region 1

**ENEV059** **Sustainable Water Purification by Indigenous Fruit Waste Technology (SWIFT): Ingenious Solution to Reuse Food Waste to Reduce Environmental Pollution**

# Rohan Prakash Bhosale, 16, Sophomore, Carmel High School, Carmel, Indiana, T: Prakash Bhosale

**ROBO046** **BrainTrain: Aligning Deep Neural Networks to Human Behavior to Improve Robustness and Generalization**

Bharath Anand, 14, Freshman, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Rebecca Creech

### Terre Haute, USIN21, Hoosier Science and Engineering Fair Region 2

**TMED053** **Advancing Early Detection of Kidney Cancer (Year 2): A Novel Automated Workflow for Proteomic Profiling of Urinary Extracellular Vesicles**

# Zheng-Chi Lee, 17, Junior, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Rebecca Creech

### Terre Haute, USIN22, Hoosier Science and Engineering Fair Region 3

**EAEV052** **Short Range Hourly Temperature Forecasting in Relation to National Weather Prediction Models: A Breakthrough**

Mira Nuthakki, 15, Freshman, Carmel High School, Carmel, Indiana, T: Jennifer Drudge

**TMED050** **Detection of Malignant Lung Tumors From CT Scans Through Deep Learning-Based Artificial Intelligence Algorithms**

Sophia Fu, 16, Sophomore, Carmel High School, Carmel, Indiana, T: Haoda Fu

### Terre Haute, USIN23, Hoosier Science and Engineering Fair Region 4

**PLNT037** **Effects of *Pseudomonas fluorescens* and *Mycorrhizal Fungi* in Grafts**

Samuel Reed Martin, 15, Freshman, Northwestern High School, Kokomo, Indiana, T: Linda Wilson

# Finalist Directory

- PLNT039** **Inhibiting Fungi Growth With Iodine, Sodium Thiosulfate, and Vitamin C**  
Savannah Kaylee Curtis, 15, Freshman, Northwestern High School, Kokomo, Indiana, T: Linda Wilson
- Terre Haute, USIN24, Hoosier Science and Engineering Fair Region 5**  
**ROBO042** **Advancing Multimodal Muscle Signal Processing: Pruning-Enhanced Machine Learning for sEMG and Mechanomyogram Integration in Task-Specific Hand Rehabilitation and Assistance**  
Minran Wang, 16, Sophomore, Culver Academies, Culver, Indiana, T: Medhi Meziane
- TMED051** **The Effects of APC Loss on Response to Chemotherapy in Ovarian Cancer Cells**  
Lucinda Flanagan, 18, Senior, Marian High School, Mishawaka, Indiana, T: Ken Andrzejewski
- Terre Haute, USIN25, Hoosier Science and Engineering Fair Region 6**  
**PHYS041** **Quantum Algorithms to Solve the Traveling Salesman Problem**  
# Sean Borneman, 14, Sophomore, Bloomington High School South, Bloomington, Indiana, T: Joshua Borneman
- ROBO048** **Where to Build Food Banks: A Machine Learning Approach**  
Gavin Zhibo Ruan, 15, Sophomore, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Rebecca Creech
- Terre Haute, USIN26, Hoosier Science and Engineering Fair Region 7**  
**BMED036** **Platinum Induced Gene Expression Yields Insights to Chemotherapy Resistance**  
# May Elizabeth Weston, 17, Senior, Marian High School, Mishawaka, Indiana, T: Ken Andrzejewski
- EGSD033** **Crystallization and Morphology Tailoring via Functionalized Ligands for Efficient and Stable Perovskite Solar Cells**  
# Raunak Dani, 16, Junior, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Rebecca Creech
- Terre Haute, USIN27, Hoosier Science and Engineering Fair Region 8**  
**BCHM022** **Using Virtual Reality to Study the Effects of Mutations on BET Protein Interactions**  
Grace Wenyi Yang, 18, Senior, Carmel High School, Carmel, Indiana, T: Jennifer Drudge
- PHYS042** **Controlling the Properties of Magnetic Molecules to Develop the Potential Single Molecular Transistor**  
# Jonathan Yang, 16, Junior, Carmel High School, Carmel, Indiana, T: Jennifer Drudge
- Terre Haute, USIN50, Hoosier Science and Engineering Fair**  
**CBIO031** **Convolutional Neural Networks on Stethoscope Audios: COPD Diagnosis and Clinical Feature Identification**  
## Minnie Liang, 18, Senior, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Rebecca Creech
- EAEV047** **A Rapid One-Step Field-Based Detection Method for Nanoplastics in Wastewater Samples**  
Vidhatri L. Iyer, 15, Freshman, University High School of Indiana, Carmel, Indiana, T: Erica Posthuma
- ENBM059** **Levitating Magnetic Insoles: A Novel Approach to Alleviating Plantar Fasciitis Through the Reduction and Redistribution of Plantar Pressures**  
Yue Yu, 17, Junior, Culver Academies, Culver, Indiana, T: David Lawrence
- IOWA**  
**Cedar Rapids, USIA01, Eastern Iowa Science and Engineering Fair**  
**ANIM034** **The Effect of Synchronization Hormones on Reproductive Ewes**  
Everlee Harvey, 17, Senior, Central Lee High School, Donnellson, Iowa, T: Alicia Schiller

# Finalist Directory

- EAEV040**     **The Effects of the Denitrifications Process Through Bioreactors, *Avena sativa*, Triticum, and Secale Cereal**  
Jacob Thomas Hohl, 18, Senior, Central Lee High School, Donnellson, Iowa,  
T: Alicia Schiller
- MCRO035**     **Home Remedies of the *Apis mellifera* Kind vs. *Streptococcus***  
Sidney D'Lynn Gruntmeir, 16, Junior, Central Lee High School, Donnellson,  
Iowa, T: Alicia Schiller-Haynes
- Mapleton, USIA02, Western Iowa Science and Engineering Fair**
- CHEM045**     **Using *Lutjanus campechanus* Scales as a Biosorbent to Filter Cu<sup>2+</sup>, Pb<sup>2+</sup>, and Cd<sup>2+</sup> From Water**  
Kiersten Jean Knobbe, 18, Senior, Guthrie Center High School, Guthrie  
Center, Iowa, T: Jennifer Reed
- PLNT041**     **Increasing Soil Decomposition Rates With Organic and Natural Soil Additives**  
Taylor Janelle Ommen, 15, Sophomore, West Central Valley High School,  
Stuart, Iowa, T: Gail Kunch
- Ames, USIA50, State Science and Technology Fair of Iowa**
- BCHM027**     **Do Bees Vector Pollutants in the Honey They Make?: Phase II**  
Aiden Konig, 16, Sophomore, Danville Junior/Senior High School, Danville,  
Iowa, T: Gail Kunch
- CELL048**     **Determining Fat Preference for Triple Negative Breast Cancer Cells**  
Michael Lee, 16, Junior, West High School, Iowa City, Iowa, T: Carolyn Walling
- CELL049**     **Characterizing Differences in Growth and Invasion Between Epithelial and Mesenchymal Cell Lines in Oral Cavity Squamous Cell Carcinoma**  
Lillian Graham, 17, Junior, West High School, Iowa City, Iowa,  
T: Carolyn Walling
- ENBM073**     **The Effects of Xenotransplantation on Anterior Cruciate Ligament Grafts in Humans**  
Keira Laine Campbell, 15, Sophomore, Keokuk High School, Keokuk, Iowa,  
T: Arie Schiller
- ENEV075**     **Pura Aerem: A Five-Stage Extension to Catalytic Converters Designed to Purify the Gasses and Pollutants Exiting Gas-Powered Vehicles**  
Shanza Sami, 14, Freshman, West High School, Iowa City, Iowa,  
T: Carolyn Walling
- MATSO47**     **Structural and Flammable Attributes of Monoammonium Phosphate and Sodium Tetraborate Pressure Treated Wood Phase III**  
Joseph Daniel Schneider, 18, Senior, Beckman Catholic High School,  
Dyersville, Iowa, T: Cheryl Kluesner
- MCRO054T**     **CRAB vs Pepper: The Effect of Bioenhancers on Ampicillin-Sulbactam as a Treatment Against *A. baumannii***  
Avyay Balaji, 15, Sophomore, Ananya Balaji, 15, Sophomore, Ames High  
School, Ames, Iowa, T: DeAnna Tibben

## KANSAS

- El Dorado, USKS50, Kansas State Science and Engineering Fair**
- BEHA052**     **Do Males and Females Have the Same Reaction Time?**  
Savannah Clingan, 15, Freshman, Hays High School, Hays, Kansas,  
T: Cheryl Shepherd-Adams
- CELL055**     **Effects of Nrf2 Activator Dimethyl Fumarate on CD8 and CD4 Effector Functions**  
Anvesha Sharda, 17, Junior, Manhattan High School, Manhattan, Kansas,  
T: Janet Hanson



# Finalist Directory

## KENTUCKY

### Louisville, USKY02, Louisville Regional Science and Engineering Fair

**BCHM015** **Disfiguring *E. coli* Biofilm Structure Through Hydrolysis of Extracellular Polymeric Substance via Application of Bacterial Protease and Amylase**

Muhilan Balasubramanian, 16, Sophomore, Ballard High School, Louisville, Kentucky,  
T: Kathy Cail

**EAEV069** **The Cloud**

Carson R. Baker, 15, Freshman, Ballard High School, Louisville, Kentucky,  
T: Katherie Cail

**ENBM041** **A Non-Invasive and Novel Method for the Early Detection of Pancreatic Cancer**

Krithik Varma Nadimpally, 16, Junior, Ballard High School, Louisville, Kentucky,  
T: Glenda Jones

**PHYS014** **Quarkonium Dynamics in Phase Space**

Gabriel Ayden Nowaskie, 17, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Cheryl Kirby-Stokes

### Louisville, USKY03, Dupont Manual High School Regional Fair

**CBIO014** **SquidNet: A Novel GAN-based Algorithm for the Color Normalization of Histopathological Images**

Sai Charan Jaavadi, 16, Junior, duPont Manual High School, Louisville, Kentucky,  
T: Keri Polevchak

**ENBM038T** **Screening for Multiple Gastrointestinal Cancers With CanDELA: Low-Cost, Automated Gastrointestinal Cancer Detection Utilizing Magnetic Bead miRNA Extraction, Peristaltic Pump-Based Liquid Handling, miRNA Amplification and Fluorescence Spectroscopy With Support Vector Networks**

Rishabh Ranjan#, 17, Junior, Gopalaniruddh Saisantosh Tadinada#, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

**ENEV030T** **Evaluating Chemically Enhanced Natural Materials for Oil Spill Cleanup**

Valerie Nicole Mohrmann, 16, Sophomore, Zahra Chasmawala, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

**ETSD024** **Decentralized, Autonomous Drone Swarms for Real-Time Mapping Applications and Natural Disaster Relief**

Richard Lian, 17, Junior, duPont Manual High School, Louisville, Kentucky,  
T: Keri Polevchak

**ROBO030** **Cost-Effective Robotic Arm Prosthesis Integrating Haptic Feedback, EMG Bands, FDM 3D Printing, and Novel Grasp-Type Auto Assistance Using Machine Vision**

#  
Jilly Abraham Choi, 16, Sophomore, duPont Manual High School, Louisville, Kentucky,  
T: Keri Polevchak

### Highland Heights, USKY04, Science and Engineering Fair of Northern Kentucky

**BMEDO26** **The Effect of Propylene Glycol on *Chlamydomonas reinhardtii* in Correlation to the Effect of Vaping on Human Lung Cells**

Mary Caroline Wall, 17, Junior, Notre Dame Academy, Park Hills, Kentucky,  
T: William Stamm

### Lexington, USKY05, Central Kentucky Regional Science and Engineering Fair

**BCHM019** **The Effects of Running-Induced Cathepsin B Secretion on Stroke Recovery**

Ana Veronica Despa, 18, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young

**MATH028** **Hereditary Atomicity and ACCP in Monoids and Integral Domains**

Joseph Amichai Vulakh, 17, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young

**TMEDO34** **DAE-XGBOOST: Developing a Method for Classifying Neoplasms via MicroRNAs for Biopsy Verification**

#  
Emily Yang Hu, 18, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

### Richmond, USKY50, Kentucky Science and Engineering Fair

**CBIO036** **Identifying a Novel Gene Signature to Predict Drug Resistance in Epilepsy Patients**

Tony Xu, 17, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young



# Finalist Directory

- CHEM046**    **Development and Validation of a Novel Clinical Diagnostic Platform With Breath Analysis and Machine Learning**  
Justin Huang, 16, Sophomore, duPont Manual High School, Louisville, Kentucky,  
T: Jessie Newhouse
- MATSO42**    **4-D Printed Low-Cost Novel Shape Memory Polymers for Industrial, Robotics and Disaster Relief Applications**  
Vallabh Ramesh, 15, Freshman, duPont Manual High School, Louisville, Kentucky,  
T: Keri Polevchak
- MCRO055**    **The Effect of Distance on Bacteria Growth From Hot Air Drying Machines**  
Zita An Nguyen, 16, Sophomore, duPont Manual High School, Louisville, Kentucky,  
T: Keri Polevchak
- PHYS045**    **The Implementation of a Pressure-Regulated System to Increase the Efficiency of the OxyCART System**  
Anirudh Srinivasan, 17, Junior, duPont Manual High School, Louisville, Kentucky,  
T: Keri Polevchak

## LOUISIANA

- Baton Rouge, USLA01, Louisiana Region VII-Science and Engineering Fair**
- ENBMO03**    **Generation of 3D Co-Cultured Breast Cancer Spheroids to Study the Spatial Distribution of Fibroblast-Produced Collagen**  
# Margaret Catherine Moe, 17, Senior, Saint Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia
- MATSO04**    **The Removal of Lead(II) and Chromium(VI) Ions From Water Using UV-C Light and Immobilized TiO<sub>2</sub> Nanoparticles**  
# Keanna Luo, 18, Senior, Baton Rouge Magnet High School, Baton Rouge, Louisiana,  
T: Lai Cao
- TMEDO02**    **Examining the Effects of Dietary Restriction on Mitophagy in *C. elegans***  
Orna Mukhopadhyay, 17, Senior, Baton Rouge Magnet High School, Baton Rouge, Louisiana, T: Lai Cao
- Bossier City, USLA02, Bossier Parish Community College Louisiana Region I Science and Engineering Fair**
- CELL024**    **Novel Imaging Approaches for the Quantification of Changes in Perivascular Space Volume and Morphology in Response to Transcranial Direct Current Stimulation**  
Andrew Minagar, 18, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana,  
T: Kris Clements
- MATH013**    **On Fractal Knots: Algorithmic Generation and Quantitative Analysis**  
## Nhi Dao, 18, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana,  
T: Kris Clements
- TMEDO38**    **Resting State Connectivity With Language Domains of the Cerebellum: Can Language Domains of the Brain Be Identified Using Resting State Magnetic Resonance Imaging?**  
Anika Alla, 17, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana,  
T: Kris Clements
- Houma, USLA03, Terrebonne Parish Science Fair**
- CHEM017**    **Rocket Ready Go!**  
Cody J. LeBoeuf, 16, Junior, South Terrebonne High School, Bourg, Louisiana,  
T: Chris Brown
- ENEV012**    **Solar Powered Water Purification Devices: Which Color Is Best?**  
Rosalyn Frances Hubbell, 15, Freshman, H.L. Bourgeois High School, Gray, Louisiana,  
T: Regina Chustz
- Lake Charles, USLA05, Louisiana Region V Science and Engineering Fair**
- CELL013**    **Characterization of Epstein-Barr Virus-Infected Atypical Memory B Cells**  
# Joy Dong, 18, Senior, Louisiana School for Math, Science, and the Arts, Natchitoches, Louisiana, T: Micah Luftig

# Finalist Directory

- CHEM003**    **Preserving Aquatic Life From the Harmful Effects of Ocean Acidification**  
# Susanna Angel Chiruguru, 15, Sophomore, LaGrange Senior High School, Lake Charles, Louisiana, T: Inyasamma Karanam
- New Orleans, USLA08, Greater New Orleans Science and Engineering Fair**
- ANIM016T**    **Testing Time Variables of Submersion on *Pomacea bridgesii* Egg Clusters**  
Bryce Ashton Martin, 17, Junior, Rohan Ramireddi Reddy, 17, Junior, Isidore Newman School, New Orleans, Louisiana, T: Matthew Jones
- BEHA016**    **Tides of Stress: The Impact of Hurricanes on Emotion Regulation During a Pandemic**  
Vaishnavi Sai Kumbala, 15, Sophomore, Haynes Academy for Advanced Studies, Metairie, Louisiana, T: Hazim Dayeh
- EAEV024**    **The Levels of Nitrogen and Phosphorus Compounds in Run-Off After Using Various Types of Fertilizers**  
Jayden Davis, 16, Junior, Holy Cross School, New Orleans, Louisiana, T: Katherine Schilling
- PLNT026T**    **Effects of Soil pH on Stomatal Density in *Vigna unguiculata***  
Amy Thuy-Trinh Nguyen, 17, Senior, Isaac Jabaley, 18, Senior, Benjamin Franklin High School, New Orleans, Louisiana, T: Lisa Hartman
- Baton Rouge, USLA50, Louisiana Science and Engineering Fair**
- BMED054**    **CaSR – GSH Interaction: Finding an Effective Antagonist**  
Raj Letchuman, 17, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements
- EBED038**    **Detecting Hidden Security Threats With Thermal Camera**  
Kenzie Stentiford, 15, Sophomore, St. Joseph's Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia
- ENEV062**    **Combustion Carbon Capture via Aqueous Solutions**  
Ella Nicole Barker, 17, Junior, Saint Joseph's Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia
- ETSD054**    **3D Printed Bricks Based Off Mud Dauber Wasp Nest**  
Josephine Ellen Day, 17, Senior, Iberville Math, Science, and Arts Academy East, St. Gabriel, Louisiana, T: Mary Ellen Day

## MAINE

### Bar Harbor, USME50, Maine State Science Fair

- BEHA053**    **The STEM Gap: What Is the Cause of the Disparity Between Males and Females in the STEM Fields?**  
Anh Ngoc Van Vo, 17, Senior, John Bapst Memorial High School, Bangor, Maine, T: Emma Bragdon
- MCRO061**    **An Antimicrobial-Bacterial Cellulose-Manuka Honey Loaded Dressing for the Active Treatment and Monitoring of Wounds**  
# Emma Markowitz, 18, Senior, Maine Homeschool, Trevett, Maine, T: Lisa Markowitz
- PLNT049T**    **The Effects of Arbuscular Mycorrhizal Fungi and Mushroom Substrate on the Plant Growth and Soil Characteristics for PE Microplastics-Contaminated Soil**  
May Ki-Ok Shin, 19, Senior, Jiwon Choi, 18, Junior, Fryeburg Academy, Fryeburg, Maine, T: Dylan Harry

## MARYLAND

### Annapolis, USMD01, Anne Arundel County Regional Science and Engineering Expo

- EAEV033**    **Worming Through Plastics**  
Lily McCallister, 16, Sophomore, Severna Park Senior High School, Severna Park, Maryland, T: Teresa Stahl
- ENEV037**    **Utilizing the Adsorption Properties of Renewable Mediums to Reduce Methane**  
# Megan Reyna Yeager, 16, Sophomore, Chesapeake Science Point Public Charter School, Hanover, Maryland, T: Robert Woerner
- MCRO031**    **Please Protect My Flagella**  
Addison Haley Johns, 15, Sophomore, Annapolis High School, Annapolis, Maryland, T: Kathleen Cochran

# Finalist Directory

## Frederick, USMD02, Frederick County Science and Engineering Fair

- ENBMO60T** **DIVA: Spatial Navigation for the Visually Impaired Using Depth Sensing Artificial Intelligence and Convolutional Neural Networks**  
Karthik Muthukkumar, 16, Sophomore, Pranav Sristy, 15, Sophomore, Tarun Malarvasan, 15, Sophomore, Urbana High School, Ijamsville, Maryland, T: Seth Smucker
- ROBO045T** **Alice: Robotic Hand to Translate English to ASL Using Speech to Text Technology for Hard of Hearing Individuals**  
AleK Tekeyan, 16, Sophomore, Jeanelle Lin, 16, Sophomore, Tuscarora High School, Frederick, Maryland, T: Aaron Miles

## Rockville, USMD03, ScienceMontgomery

- CBIO042** **Investigating Chemotherapy Dose-Dependent Metabolic Changes in Cancer Cells Through Computational Modeling and Experimental Validation**  
Sudhish Madapur Swain, 16, Junior, Montgomery Blair High School, Silver Spring, Maryland, T: Angelique Bosse
- CHEMO42** **Highly Electrically Conductive Biomass-Derived Carbon Fibers**  
Julia Artemis Gelfond, 18, Senior, Montgomery Blair High School, Silver Spring, Maryland, T: Angelique Bosse
- ENBMO55** **MiniPose: Real-Time 3D Joint Estimation and Reconstruction With LiDAR and Low-Resolution Visual Data**  
Daniel Mathew, 16, Junior, Poolesville High School, Poolesville, Maryland, T: Kevin Lee

## Capitol Heights, USMD05, Prince George's Area Science Fair

- ETSD028** **MagFlow: A Revolutionary Magnetic Coupling System for More Than Just Generating Flow**  
Evan Michael Walsh, 15, Sophomore, Great Mills High School, Great Mills, Maryland, T: Charles Skinner
- MATSO41** **Bulletproof Backpack Insert: Armadillo Skin**  
Ava Elizabeth Cotroneo, 16, Sophomore, Dr. James A. Forrest Career And Technology Center, Leonardtown, Maryland, T: Nathan Swick
- MCRO034** **Tracking Viral Evolution: Disease Diversity of Cloned Deformed Wing Virus in Honeybee Populations**  
Alriana Ashlyn Buller-Jarrett, 18, Senior, Charles Herbert Flowers High School, Springdale, Maryland, T: Karen Shelton

## Baltimore, USMD07, Morgan State University Science-Mathematics-Engineering Fair

- SOFT030** **Guiding Responses to Climate Change: Integrating Fourier Transformation and Residual Learning for Arctic Sea Ice Forecasting**  
Louis Lapp, 17, Junior, Baltimore Polytechnic Institute, Baltimore, Maryland, T: Kowsar Ahmed
- TMEDO41** **Higher Serum Testosterone Level Was Associated With Lower Risk of Prediabetes in US Adults: Findings From Nationally Representative Data**  
Jason Jiaze Wang, 16, Junior, Marriotts Ridge High School, Marriottsville, Maryland, T: David Hong

## MASSACHUSETTS

### Bridgewater, USMA01, Massachusetts Region V Science Fair

- ROBO043** **Treating COVID-19 With Machine Learning**  
Evan Zhang, 17, Junior, Dover-Sherborn High School, Dover, Massachusetts, T: Kurt Amber

### Medford, USMA02, Massachusetts Region IV Science Fair

- ROBO055** **Developing a Precision Rocket Landing Algorithm Using Convolutional Neural Networks and Model Predictive Control Algorithms**  
Timucin Erbas, 16, Junior, Acton Boxborough Regional High School, Acton, Massachusetts, T: Brian Dempsey

### Fall River, USMA03, Massachusetts Region III Science Fair

- EAEV082** **Are There Microplastics in Fast-Food?**  
Molly Abigail Cullen, 15, Sophomore, Bishop Feehan High School, Attleboro, Massachusetts, T: Audrey Lavertu

# Finalist Directory

## Cambridge, USMA04, Massachusetts Region I Science Fair

**MCRO038** **The Deletion of a Disulfide Bridge Through Site-Directed Mutagenesis to Adapt Cutinase to the Biodegradation of Polyethylene Terephthalate**  
Elizabeth Zofia Hanechak, 16, Sophomore, Pope Francis Preparatory School, Springfield, Massachusetts, T: Robert Brodeur

## Worcester, USMA05, Massachusetts Region II State Science Fair

**ETSD050** **A Novel CubeSat-Based System for On-Orbit Millimetric Debris Detection and Characterization**

# Nevin Thinagar, 17, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

**TMED076** **The Effectiveness of a Standardized Mixture of Antioxidants as a Preventative Treatment for PTSD and Its Symptoms in *C. elegans***

Anshika Shekhar, 16, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

## Boston, USMA06, Massachusetts Region VI Science Fair

**EAEV073** **Novel Multivariate Analysis of Road Erosion Factors Through the Utilization of Structural Equation Modeling (SEM) to Model Road Erosion Risk**

# Zach Chen, 17, Junior, Boston Latin School, Boston, Massachusetts, T: Kathleen Bateman

## Dudley, USMA50, Massachusetts State Science & Engineering Fair

**BMED066** **A Novel Proteomics-Based Model for Determining the Effects of Microplastics on Disease Pathways: Using *in silico* Machine Learning and *in vivo* *Dugesia dorocephala* Model**

Pranav Narasimha Addanki, 15, Sophomore, Canton High School, Canton, Massachusetts, T: Rebecca Stang

**CBIO064** **Measuring Genetic Diversity and Change in a Predator Prey Relationship**

Yaniv Dylan Taussky, 16, Sophomore, Wellesley High School, Wellesley, Massachusetts, T: Michael Krieger

**EAEV066T** **The Electrolytic Extraction of Dawsonite From Ocean Water: Efficient Saltwater Mineral Recovery Through Electrolysis**

Dylan Nayan Striek, 15, Sophomore, Rylee Jane Blair, 17, Junior, Disha Mudenu, 17, Junior, Hopkinton High School, Hopkinton, Massachusetts, T: Kristen Murphy

**ENEV077** **Novel Wearable Volatile Organic Compound Detection and Mitigation via Cumulative Solvatochromism and Dietary Modification**

Aryan Mago, 16, Junior, Groton School, Groton, Massachusetts, T: Stephen Belsky

**ETSD055** **Control System for an Autonomous Sailboat**

Caden Ashmore, 16, Junior, Grafton High School, Grafton, Massachusetts, T: William Kelleher

**MATSO48** **Efficient Fog Harvesting Interface With Bio-Inspired Multilayer Micro Kirigami**

Huiyi Wen, 17, Junior, Tabor Academy, Marion, Massachusetts, T: David Wellstead

**ROBO044** **An Under-Actuated Fast-Running Bipedal Lizard Robot With Optimized Lateral Bending**

Arielsie Li, 17, Junior, Phillips Academy, Andover, Massachusetts, T: Keith Robinson

**ROBO067** **Cost-Effective and Educational Refreshable Braille Display With Cognitive Learning Features**

Nagamitish Nagamuralee, 17, Senior, Lexington High School, Lexington, Massachusetts, T: Cheryl Zurbrick

**ROBO076** **A Novel Pneumatically-Actuated Soft Robotic Hand With 3D Vision-Based Teleoperation**

Hanna Matusik, 16, Junior, Lexington High School, Lexington, Massachusetts, T: Reginald Hobbs

## MICHIGAN

### Farmington, USMI02, Science and Engineering Fair of Metropolitan Detroit

**CBIO020** **Novel Machine Learning Software for DeNoising and Visualizing EEG Data**

Ashwin Mahendran, 16, Junior, Dakota High School, Macomb, Michigan, T: Jon Jones

# Finalist Directory

- CBIO026** **Autonomous Navigation Solution for Medical Microbots With Deep Reinforcement Learning**  
# Vikram Srinivas Goddla, 17, Junior, Detroit Country Day School, Beverly Hills, Michigan, T: Patricia Hanlan
- CELL033** **Pattern of IRG1/Acod1 Expression in the Tumor Microenvironment as Revealed by Single-Cell RNA Seq Analysis**  
Austin Feng, 17, Senior, Cranbrook Kingswood School, Bloomfield Hills, Michigan, T: Stephanie Kokoszka
- ENBM045T** **A Wearable Sensor for Continuous Heart Sound Monitoring**  
Olivia Xu, 15, Sophomore, Anthony Li, 16, Sophomore, Lillian Jing, 16, Sophomore, Troy High School, Troy, Michigan, T: Rebecca Brewer
- ENEV042** **Use Of Aerial Drone Technology To Monitor Air Quality in Urban Communities**  
Omaree Ishmael, 17, Senior, Davis Aerospace, Detroit, Michigan, T: Sharon Holloway
- ETSD030** **Turbulent Jet Flow to Induce Entrainment for Atmospheric Rocket Flight**  
Akshaj Sharma, 16, Junior, International Academy, Troy, Michigan, T: Jaclyn Toepel-Hartzell
- SOFT028** **Applications of Quantum Randomness in Healthcare Informatics**  
Anirudh S. Venkat, 17, Junior, Huron High School, Ann Arbor, Michigan, T: Andrew Collins
- TMEDO36** **A Novel Approach to Systemic in silico Drug Discovery Using a Machine Learning-Based Prediction of Binding Affinity**  
Fuga Takahashi, 16, Junior, Novi High School, Novi, Michigan, T: James Didio
- Bloomfield Hills, USMIO3, Flint Regional Science & Engineering Fair**
- EAEV042** **Assessing Microplastics and Genotoxicity of Rivers in the Great Lakes Bay Area Using S9 Enzymes to Simulate Human Environment**  
# Anthony Daoud, 16, Junior, Saginaw Arts and Sciences Academy, Saginaw, Michigan, T: Matthew Miller
- EGSD026T** **Generating Hydrogen and Oxygen to Power an Internal Combustion Engine as a Function of Dry Cells and Amperage**  
Andrew Joseph Wagner#, 18, Senior, Olivia Jean Wagner#, 15, Sophomore, Nouvel Catholic Central High School, Saginaw, Michigan, Herbert Henry Dow High School, Midland, Michigan, T: Clara Wagner T: Claire Fries
- MATH031** **Creating and Assessing a Tool to Organize Graphs Using Hooke's Law**  
Joseph Crachiola, 18, Senior, Saginaw Arts and Sciences Academy, Saginaw, Michigan, T: Brad Yurgens
- TMEDO39** **NueROX: A Visual Diagnosing System Using a Fully Optimized Convolutional Neural Network Architecture for Rapid and Efficient Classification of Tumorous and Non-Tumorous Brain MRI's and a Model for the Segmentation, Dimension, and Severity Estimation of Brain Tumors**  
Akhilesh Reddy Kanmanthreddy, 15, Sophomore, Saginaw Arts and Sciences Academy, Saginaw, Michigan, T: John Barnes
- Kalamazoo, USMIO7, Southwest Michigan Science & Engineering Fair**
- CHEM044** **Characterization and Optical Properties of Nanoplastics Synthesized From Common Household Products**  
Sreya Mulakkayala, 18, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Rebecca Joyce
- PLNT040T** **Invasive Plant Species Management: Development of a Novel Identification System**  
Ashika Bhavani Gullapalli#, 18, Senior, Fayyaz Razi, 18, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Rebecca Joyce
- Farmington, USMI50, Michigan Science and Engineering Fair**
- SOFT026** **3D Acoustic Simulation and Optimization Algorithms for Transcranial Focused Ultrasound Delivered With Robotic Systems**  
## Michelle Hua, 18, Senior, Cranbrook Kingswood School, Bloomfield Hills, Michigan, T: Stephanie Kokoszka
- TMEDO40** **Innovative Combination Therapy for Treating Brain Tumors: Using Avatar Models to Help Improve Patient Outcomes**  
Constantine Steven Kalkanis, 16, Junior, Detroit Country Day School, Beverly Hills, Michigan, T: Lara McMillan

# Finalist Directory

## MINNESOTA

### Duluth, USMN02, Northeast Minnesota Regional Science Fair

**BMEDO01** **Disinfectant Properties of *Nuphar advena*: An Ethnopharmaceutical Approach**  
# Johanna Bernu, 16, Sophomore, Cloquet Senior High School, Cloquet, Minnesota,  
T: Cynthia Welsh

**EAEV001** **Using Microplastics to Sequester Organophosphate Pollutants**  
## Emelyn Claire Beaster, 18, Senior, East High School, Duluth, Minnesota,  
T: Cheryl Kurosky

### Plymouth, USMN04, Twin Cities Regional Science Fair

**EGSD013** **Making Natural Gas From Compost**  
Sarah Danay Zamudio, 16, Sophomore, Burnsville High School, Burnsville, Minnesota,  
T: Mike Huemoeller

**ENEV018** **Green Electronics: A Feasible Solution to Reduce E-Waste Pollutions**  
John Zhongtai Liu, 14, Freshman, Mounds View High School, Arden Hills, Minnesota,  
T: Yuyang Liu

**PLNT011** **Impact of Biochar as Soil Amendment on Produce Yield (Year 1)**  
Sriram Sureshkumar, 16, Sophomore, Mahtomedi High School, Mahtomedi, Minnesota,  
T: Asha Joshi

**SOFT009** **Detecting Cataracts From Front-View Retinal Images Using Machine Learning**  
Lakshika Nanda Kumar Reddy, 17, Junior, Math and Science Academy, Woodbury,  
Minnesota, T: Nanda Kumar Narayana Reddy

### Crookston, USMN05, Western Minnesota Regional Science Fair

**EAEV011** **The Study of Aquatic Plants Effect on Polluted Waters**  
Isabella Wimmer, 16, Sophomore, Perham High School, Perham, Minnesota,  
T: Shawn Stafki

### Rochester, USMN07, Rochester Regional Science & Engineering Fair

**CELL009** **Altering Mitochondrial Bioenergetic Pathways to Overcome Melphalan Resistance in Multiple Myeloma, Year 2**

# Isha Kapoor, 17, Junior, Mayo High School, Rochester, Minnesota, T: Christin Stegenga  
**TMEDO12** **Cure of Breast Cancer-Year 6: Novel Approaches in the Therapy of Metastatic Breast Cancer Using Clinical Databases and 3D Organoid Model**

### Christine Song, 18, Senior, Mayo High School, Rochester, Minnesota, T: Sarah Michet

### Plymouth, USMN09, St. Paul Science Fair

**EGSD014** **Wood-n't It Be Nice: Demonstrating a Novel Continuous Piezoelectric Charge Pump**  
# Maggie Banks, 17, Junior, Mounds Park Academy, St. Paul, Minnesota, T: Marc Shapiro

**ENBM015** **The Effect of Gefitinib on Cell Proliferation and Invasion in 2D and 3D Cultures of MDA-MB-231 Breast Cancer Cells**  
Henry Thomas Choi, 17, Junior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker

### Plymouth, USMN10, Western Suburbs Science Fair

**CELL014** **Beyond Neurons: Mapping the Fine-Scale Organization of Blood Vessels in the Brain May Provide New Insights Into the Mechanisms of Dementia**

Arreh Jain, 17, Senior, Wayzata High School, Plymouth, Minnesota, T: Princesa Hansen  
**EBED013** **Wi-C.A.R.E: Wifi Computer-Assisted Remote Eldercare (Year 4)**

## Shreshth Shrivastava, 16, Junior, Eden Prairie High School, Eden Prairie, Minnesota,  
T: Princesa Hansen

**MATH014** **Extremal Problems on the Steiner k-Distance and the Steiner k-Wiener Index**  
**Andrew Li Zhang, 17, Senior, Wayzata High School, Plymouth, Minnesota,**  
**T: Hua Wang**

**MATS012** **The Application of Mushroom Mycelium as a Biomaterial and Leather Alternative**  
Ana Morgan Stewart, 18, Senior, Minnetonka High School, Minnetonka, Minnesota,  
T: Kimberly Hoehne

**PLNT012** **Protecting Plants: Investigating the Relationship Between Fertilizers and Insect Damage in an Urban Garden**  
Sarah Marie Peterson, 18, Senior, Breck School, Golden Valley, Minnesota,  
T: Kati Kragtorp

# Finalist Directory

## St. Paul, USMN50, Minnesota Academy of Science State Science & Engineering Fair

**EBED031T Project WASP: Autonomous Self-Watering Planter Using Atmospheric Water**  
Rishi Bhargava, 17, Junior, Humza Murad, 17, Junior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Kate Lockwood

**EGSD049 SkyWindFarm: Design of a Novel Vertical Airborne Wind Turbine Clean Energy Farm**  
Yash Dagade, 17, Junior, Eden Prairie High School, Eden Prairie, Minnesota, T: Princessa Hansen

**ENBM056 Personalization of Deep Brain Stimulation Surgery Pre-Operational Planning: Integration of 7-Tesla MRI Segmentations Into 3-D Brain Visualization Platform**

# Karen Claire Nakamura, 18, Senior, Math and Science Academy, Woodbury, Minnesota, T: Oren Solomon

**ETSD042 Unbind the Blind: Engineering an Emergency Evacuation Solution for the Visually Impaired**  
Muminah Nihaar Mohammed, 17, Junior, Al-Amal School, Fridley, Minnesota, T: Hala Bazzi

## MISSISSIPPI

### Ocean Springs, USMS01, Mississippi Region VI Science and Engineering Fair

**BEHA009 Analyzing the Access to Quality Nutrition of Students**  
# Dia Kher, 17, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

**BMED017 Investigating the Potential for Vitamin D3 to Serve as a Therapeutic Against the Degenerative Effects of Diabetes Using *Drosophila melanogaster* as a Model Organism**

# Madison Grace Echols, 18, Senior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

### Booneville, USMS02, Mississippi Region IV Science Fair

**MCRO059 The Effects of *Serratia marcescens* Algicidal Production of Prodigiosin on the Growth of *Microcystis aeruginosa*: An Environmentally-Preventative Approach**  
# Emerson Reese Morris, 18, Senior, St. Patrick Catholic High School, Biloxi, Mississippi, T: Deborah Worrel

**TMED071 Neuroendoscopic Bias: A Comparison of EVD and IVF in IVH Secondary to SICH: A Pediatric Oncologic Case Study on Neuroendoscopy, External Ventricular Drainage, and Intraventricular Fibrinolysis Regarding Intraventricular Hemorrhage Secondary to Spontaneous Supratentorial Intracerebral Hemorrhage in Children With Atypical Teratoid Rhabdoid Tumor (T2N1M1)**  
Adler Paige Brogdon, 16, Sophomore, St. Patrick Catholic High School, Biloxi, Mississippi, T: Deborah Worrel

### Cleveland, USMS03, Mississippi Region III Science and Engineering Fair

**ETSD034 Modeling Lattice Fins as Flight Control Surfaces for a Precision Guided Landing of Reusable Rockets**  
# Rushyendranath Reddy Nalamalapu, 17, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

**MCRO036 Antibacterial Effects of Culinary Spices on *Serratia marcescens* and *Bacillus cereus***  
Lisa Renee Seid, 17, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

### Jackson, USMS05, Mississippi Region II Science and Engineering Fair

**EAEV053 Runoff of Chemical Herbicide Paraquat and Its Concentration in the Environment**  
Pranav Reddy, 15, Sophomore, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Grace Bellnap

**MATS036 Design of Multifunctional Magnetic Nanoparticle for Separating and Combating Waterborne Pathogen**  
Gautam Ray, 17, Junior, Jackson Academy, Jackson, Mississippi, T: Avijit Pramanik

**MCRO037 Investigating Anti-bacterial Resistance for Developing Nanomedicines Using Citrate-Based Gold Nanoparticles and Urea-Derived Carbon Nanodots**  
# Jonmejoy Agniva Dhar, 18, Senior, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Mackenzie Gibbs



# Finalist Directory

## Mississippi State, USMS06, Mississippi Region V Science and Engineering Fair

**BMED018** **Metaheuristic Analysis of Transcriptional Control to Capture Leukemia Cell Line Characteristics**

Nicholas Popescu, 17, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

**PLNT022** **The Effect of Low Voltage Electricity on the Plant Health and Germination of *Raphanus sativus* and *Pisum sativum***

Ashton Taylor, 17, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

## Oxford, USMS07, Mississippi Region VII Science and Engineering Fair

**MCRO025** **What's in That Crack? Exploring Urban Micro Environments for Novel Amoeboid Diversity Using Next-Gen Sequencing**

Danielle Elizabeth McConnell, 17, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

**PLNT025** **Vertical Farming: An Approach to Sustainable Agriculture and Food Security for the Future: Cultivation, Yield and Product Quality**

# Rishi Nautiyal, 16, Junior, Oxford High School, Oxford, Mississippi, T: Suman Chandra

## Hattiesburg, USMS50, Mississippi Science and Engineering State Fair

**ANIM048** **Role of Aryl Hydrocarbon Receptor in Larval *Danio rerio* Benzo[a]pyrene-mediated Behavioral Effects**

Arika Araya Gardner, 17, Senior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Joseph Barnard

**BEHA054T** **The Effectiveness of Auditory Sub-Threshold Stimuli on Improving the Academic Performance and Mental Propensity of Students With Learning Disabilities**

Shayleen Dorian Moeini#, 16, Sophomore, Madilyn Ann Dickinson#, 15, Sophomore, St. Patrick Catholic High School, Biloxi, Mississippi, T: Deborah Worrel

## MISSOURI

### Cape Girardeau, USMO01, Southeast Missouri Regional Science Fair

**BCHM009** **The Effect of pH of Water on the Biodegradation of Microplastics via the *Micrococcus luteus* Bacteria**

# Kaden Dane Luker, 17, Senior, Jackson Senior High School, Jackson, Missouri, T: Brittany Kelley

**PLNT046T** **Can Natural Bryophyta Gardens Affect Air Quality, and Overall Health, and Possibly Put Forth New Ways to Rid the Atmosphere of Greenhouse Gasses? A Small Piece of the Bigger Picture**

Jasmine Elizabeth Muench, 17, Junior, Erin Elizabeth Holly, 17, Junior, Perryville Senior High School, Perryville, Missouri, T: Leanna Thele

### Joplin, USMO03, Missouri Southern Regional Science Fair

**ANIM041** **The Effect of Various Diet Consumption on Simulated Alzheimer's Disease Responses**

Anna Katherine Barnhart, 16, Junior, Joplin High School, Joplin, Missouri, T: Karisa Boyer

### Kansas City, USMO04, Greater Kansas City Science & Engineering Fair

**BCHM028** **Characterization of Engineered Protein LLHP Repression Through the Induction of DNA Looping**

Mia Stamos, 17, Junior, Shawnee Mission East, Prairie Village, Kansas, T: Kenneth Lee

**CBIO063** **The Use of Topological Scoring and Chemical Cross-Linking to Identify Direct Protein Interactions in the Sin3 Complex**

Abigail Rose West, 18, Senior, Shawnee Mission West High School, Overland Park, Kansas, T: Kenneth Lee

**CELL046** **Alzheimer's and Aftins: Understanding the Role of Mitochondria in Alzheimer's Disease**

Caleb Andrew Gilmore, 17, Senior, Shawnee Mission East, Prairie Village, Kansas, T: Kenneth Lee

**EAEV070** **Analysis of the Extent of Microplastic Contamination Through the Study of Beach Sand**

Elizabeth Rose Barnes, 14, Freshman, Shawnee Mission West High School, Overland Park, Kansas, T: Kenneth Lee

# Finalist Directory

## Wentzville, USMO05, Missouri Tri-County Regional Science and Engineering Fair

**ANIM044** **The Effect of Anthropogenic Noise on Bumblebee Foraging Patterns: Further Investigated**

# Lila Carlene Sverdrup, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess

**CELL051** **The Mechanism of Action by Which p38 Alpha/Beta Regulate DUX4 Gene Expression**

Andrew James Bufalo, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess

## St. Louis, USMO07, Academy of Science - Greater St. Louis Science Fair

**CHEM011** **Modified Nanoporous Gold Sensor for the Electrochemical Detection of Acetaminophen**

Alice Wang Liu, 16, Junior, Marquette High School, Chesterfield, Missouri, T: Cathy Farrar

**ETSD014** **Aural Real-Time Position: Determining Model and Influencing Factors**

Alex Chen, 18, Senior, Marquette High School, Chesterfield, Missouri, T: Cathy Farrar

## Greenfield, USMO08, Ozarks Science and Engineering Fair

**ENBM070** **Solve Deblurring and Super Resolution in Low-Dose Computer Tomography via One Novel Neural Network**

Mingjun Feng, 17, Junior, Nixa High School, Nixa, Missouri, T: Christina Shepherd

**ENEV066** **Novel Application of Oidiiodendron truncatum to Inhibit Growth**

Nicole Katherine Westhusing, 15, Freshman, Camdenton High School, Camdenton, Missouri, T: Andrew Fecteau

## Hillsboro, USMO09, Mastodon Art/Science Regional Fair

**PLNT043** **The Unique Properties of Onondaga Cave Algae**

Cameron James Tedrick, 16, Sophomore, St. Clair High School, St. Clair, Missouri, T: Ben Martin

**ROBO047** **A Fully Autonomous Heterogeneous Drone Swarm for Collaborative Target Pursuit**

Michelle Wang, 18, Senior, Carbondale Community High School, Carbondale, Illinois, T: Christi McGee

## Fayette, USMO10, Central Methodist Eagles Science and Engineering Fair

**CBIO068** **BIO-PLEX: An Innovative Biocomputational Approach to Decode the Secrets of the 2022 Mpox Resurgence**

Saathvik R. Kannan, 17, Junior, David H. Hickman High School, Columbia, Missouri, T: Kamal Singh

## MONTANA

### Billings, USMT01, MSU Billings Science Expo

**EAEV083T** **Investigation of Fecal Indicator Bacteria in the Baker Lake via Monitoring of Fecal Coliforms and Genomic Analysis**

Cheyenne May Dame, 19, Senior, Conrad M Hess, 16, Junior, Baker High School, Baker, Montana, T: Linda Rost

### Butte, USMT02, Montana Tech Regional Science and Engineering Fair

**CELL031** **The Impact of Gut-Brain Neurotransmitter Signaling on Reproductive Success**

Faith Vyn You, 16, Sophomore, Hellgate High School, Missoula, Montana, T: Willow Affleck

**CELL058** **Purification of the MED1 Receptor Interaction Domain**

Shaun Stephen Liechty, 18, Senior, Sentinel High School, Missoula, Montana, T: Kelly Nelson

### Great Falls, USMT04, Great Falls College MSU Regional Science & Engineering Fair

**ANIM027** **Calories Count**

Hal McGregor, 16, Sophomore, Cascade Public Schools, Cascade, Montana, T: Kendra Lane

**CHEM028** **Using Surfactants to Fight Fire**

Tyler John Lane, 15, Sophomore, Cascade Public Schools, Cascade, Montana, T: Kendra Lane

# Finalist Directory

## Missoula, USMT50, Montana Science Fair

- ANIM052T** **Equine Engineering: Guaranteeing Pressure-Free Performance**  
Zoey Lee Wright, 16, Sophomore, Brylee Ann Wright, 16, Sophomore, Simms High School, Simms, Montana, T: Vonda Harrison
- BEHA055** **Die Verwante Woord Project: Learning Afrikaans Using HD-tDCS**  
Garrett Michael Goulstone, 15, Sophomore, Hellgate High School, Missoula, Montana, T: Willow Affleck
- MATS032** **Silk Fibroin-Coated Drug-Eluting Sutures**  
# Mila McKay, 18, Senior, Hellgate High School, Missoula, Montana, T: Willow Affleck

## NEBRASKA

### Hastings, USNE01, Central Nebraska Science and Engineering Fair

- BEHA033** **The Influence of Career Technical Student Organizations on College Success and Self Perceived Efficacy**  
Samantha Bonifas, 18, Senior, Silver Lake High School, Roseland, Nebraska, T: Kim Bonifas
- EGSD037** **Investigating the Use of Structural Supports to Optimize the Production of Algae**  
Kiara Kay McGuire, 17, Senior, Ogallala High School, Ogallala, Nebraska, T: Jennifer Jones
- ETSD026** **How Do Shock Pistons Affect the Efficiency and Ride Quality of a Shock?**  
Dominic Stutesman, 17, Junior, Adams Central Jr.-Sr. High School, Hastings, Nebraska, T: Jay Cecrle

## NEVADA

### Spring Creek, USNV01, Elko County STEM Fair

- BMEDO12** **Medicinal Effects of *Sambucus caerulea* and *Lomatium dissectum* on A549 Lung Cancer Cells**  
# Tziavi Brynn Melendez, 18, Senior, Owyhee High School, Owyhee, Nevada, T: Dietlinde Dann
- BMEDO33** **Medicinal Uses of *Artemisia tridentata***  
Mattisen Lee Jones, 18, Senior, Owyhee High School, Owyhee, Nevada, T: Dietlinde Beneder-Dann

### Las Vegas, USNV02, Beal Bank USA Southern Nevada Regional Science & Engineering Fair

- CHEM060T** **Developing an Ethylene Scavenging Polyurethane Foam Packaging Material That Delays the Ripening Process of Climacteric Produce**  
Samuel Chen, 16, Junior, Jennifer Hsu, 17, Junior, Ed W. Clark High School, Las Vegas, Nevada, T: Zeola Braxton

## NEW HAMPSHIRE

### Nashua, USNH50, New Hampshire Science & Engineering Expo

- BMEDO31** **Computational Analysis of MicroRNA Variants Regulating GLUT3 in ADHD**  
Aden Geonhee Lee, 17, Junior, Phillips Exeter Academy, Exeter, New Hampshire, T: Anne Rankin
- CBIO024** **Differential Gene Expression Between Mucinous and Non-Mucinous Colorectal Adenocarcinomas**  
Aditya Bakshi, 17, Senior, Nashua High School South, Nashua, New Hampshire, T: Cynthia Pitkin
- ENEV035** **An Economical and High-Precision Approach for Nitrate Detection and Filtration to Ensure Quality Drinking Water**  
# Abhinav Avvaru, 16, Junior, Nashua High School South, Nashua, New Hampshire, T: Gwen Goodwin

# Finalist Directory

## NEW JERSEY

### Lebanon, USNJ01, Terra North Jersey STEM Fair

**CBIO038** **Discovering Small-Molecule Inhibitors of the c-MET/HGFR Tyrosine Kinase via Machine Learning**

Elliott Junhan Yoon, 16, Junior, Tenafly High School, Tenafly, New Jersey, T: Aparna Subramaniam

**CELL042** **Targeting Neoantigens Derived From the ZRSR2 Mutation in Hematologic Malignancies**

Jacob Winick, 18, Senior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni

**ETSD056** **A Novel Autonomous Vertical Take-Off and Landing (VTOL) Aircraft Using a Variable Thrust Control Vector and Morphing Wing Configuration System**

Samhita Pokkunuri, 15, Sophomore, Old Bridge High School, Matawan, New Jersey, T: Vito Cangelosi

**MATH034** **Extending the Vieta-Newton Theorem**

Jeffrey Xu, 17, Junior, Montgomery High School, Skillman, New Jersey, T: Mihaela Tingire

**MATSO45** **GLASS: A Geometric Local Attention-Based Model to Design Superconducting Structures**

Andy Xu, 17, Senior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni

**MATSO49** **Silk Analysis of Silkworms Fed Microcrystalline Cellulose and Cellulose Acetate**

Melinda Deng, 17, Junior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni

### Spring Lake, USNJ02, Jersey City Medical Center/Barnabas Health STEM Showcase

**ROBO071** **Preventing Trespasser Fatalities in NJ Transit Rail Lines Using a YOLO Single-Stage Convolutional Neural Network**

Aditya Jain, 17, Junior, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey, T: Maria Osoria

**TMED075** **Novel Therapeutic Efficacy of Curcumin and Fish Oil (Omega-3 Fatty Acids) on Inhibiting Neuroinflammation and Neuronal Apoptosis in *Mus musculus* Microglial Cells**

Ehtesham Suhail, 16, Junior, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey, T: Maria Osoria

### Yardley, USNJ03, Mercer Science and Engineering Fair

**MATH041** **Strict Inequalities for the n-Crossing Number**

Nicholas David Hagedorn, 17, Junior, Princeton High School, Princeton, New Jersey, T: Ryan Walsh

**ROBO066** **A Low Cost and Effective Robot: A Four-Wheeled Omnidirectional Robot Equipped With a Multitude of Sensors in Addition to Machine Vision to Successfully Introduce Students to Robotics Through RoboCup**

Naveen Enock, 17, Junior, West Windsor-Plainsboro High School South, West Windsor Township, New Jersey, T: Danielle Bugge

### Hackensack, USNJ04, BCA Research Expo

**BMED027** **Sulforaphane and Panobinostat: A Novel Therapy for Glioblastoma Multiforme**

Harika Sri Koduru, 17, Senior, Bergen County Academies, Hackensack, New Jersey, T: German Sabio

**ENBM039** **Novel Approach to Creating Hyper-Customizable Egg Models for Embryonic Analysis**

Muhammad Hosam Eldin El-Sherbiny, 15, Sophomore, Bergen County Academies, Hackensack, New Jersey, T: Carlos Nodarse

**PHYS030T** **Efficient Computation of Casuality in Globally-Hyperbolic Spacetimes Using Link Invariants**

Mark Gabriel Suppiah, 17, Junior, Justin Zhang, 17, Junior, Jeremy Seth Pitcock, 16, Junior, Bergen County Academies, Hackensack, New Jersey, T: Ozgur Dogru

# Finalist Directory

## NEW MEXICO

- Albuquerque, USAI50, National American Indian Science and Engineering Fair**  
**ENEVO64 DINE (Digitally INtegrated Environmental) Arduino Platform for Environmental Quality, Safety, and Health**  
Ember Bahe, 16, Junior, Navajo Preparatory School, Farmington, New Mexico,  
T: Yolanda Flores
- TMEDO62 Black Walnut: Indigenous Medicine Realized**  
Ariel Green, 17, Senior, Northwest Technology Center, Fairview, Oklahoma,  
T: Shawn Cusack
- Albuquerque, USNM01, Central New Mexico Regional Science and Engineering Challenge**  
**ANIM040 Diets of a Diet: How Does the Introduction of Different Minerals/Vitamins Affect the Lifespan of Feeder Crickets?**  
George Miles Privett, 17, Junior, Rio Rancho High School, Rio Rancho, New Mexico,  
T: Jennifer Miyashiro
- EAEVO80 Addressing Disparities in Air Quality Monitoring: Using Machine Learning and Remote Sensing to Estimate the Distribution of PM2.5 in Mexico**  
## Eliana Kai Juarez, 18, Senior, V. Sue Cleveland High School, Rio Rancho, New Mexico,  
T: Leah Felty
- EBED034 A Fault Management System for Deep-Space CubeSats**  
# Landon Flemming, 18, Senior, Explore Academy, Albuquerque, New Mexico,  
T: Melissa Chouinard-Jahant
- TMEDO55 Deep Learning Prediction and *in vitro* Validation of Novel Anti-Cancer Peptides From Marine Taxa Database**  
# Aditya Kiran Koushik, 16, Junior, La Cueva High School, Albuquerque, New Mexico,  
T: Lena Eddings
- Farmington, USNM02, San Juan New Mexico Regional Science and Engineering Fair**  
**BCHM013 Toxin Capturing Algae and the Effect on the Mitotic Index of *Allium cepa* Root Tip of Tsaille Lake, Navajo Nation**  
Kandis Jaiden Antonio, 17, Junior, Navajo Preparatory School, Farmington, New Mexico,  
T: Yolanda Flores
- CHEM013 Artificial Synthesis of Aromatic Amino Acid Tyrosine, Based on Pi-to-Pi\* Absorbance Peaks**  
## Jordyn Begay, 17, Junior, Navajo Preparatory School, Farmington, New Mexico,  
T: Yolanda Flores
- Grants, USNM03, Four Corners Regional Science and Engineering Fair**  
**CHEM035 Insects: Meat of the Future**  
## Alexia Lynn Munson, 17, Junior, Grants High School, Grants, New Mexico,  
T: Jason Grosch
- Las Vegas, USNM05, Northeastern New Mexico Regional Science and Engineering Fair**  
**ENEVO33 Engineered Underwater Vehicle for Ocean Litter Mapping**  
# Daniel Kim, 17, Junior, Los Alamos High School, Los Alamos, New Mexico,  
T: Michela Ombelli
- ENEVO34 Developing a Deep Learning Model to Approximate the Convolutional Geometry of Wildfires**  
Gene Goh Huntley, 15, Sophomore, Academy for Technology and the Classics, Santa Fe, New Mexico, T: David Kriegshauser
- Socorro, USNM50, New Mexico Science and Engineering Fair**  
**CHEM064 Construction of Oxygen Permeable Vessels Stage 2: Impact of Cellulose Fiber Lengths on Structure and Functionality**  
# Katherine Carrillo Ortiz, 17, Junior, Academy for Technology and the Classics, Santa Fe, New Mexico, T: David Kriegshauser
- ENEVO84T Utilizing an Experimental Compost To Accelerate the Degradation Process of Low Crystallinity PET Plastics and Employing Molecular Docking To Analyze Targeted Binding Pockets**  
Steven Xu, 16, Sophomore, Sylvia Xu, 14, Freshman, Ivan Belyaev#, 18, Senior, New Mexico Military Institute, Roswell, New Mexico, T: Demvia Maslian

# Finalist Directory

- ENEV085** **Toxicological Study of Treated Produced Water for Water Conservation, Reclamation, and Reuse**  
## Haoyu Bradley Wang, 17, Senior, Centennial High School, Las Cruces, New Mexico, T: Lisa Weinbaum
- MATS055T** **Research for Super-Absorbent Polymer Materials From Tapioca Starch and Applications for Producing Fire-Resistant Hydrogel Products**  
Khang Luu, 17, Junior, Thomas Patrik Wirta, 18, Junior, Ewa Maria Zapala, 18, Junior, Armand Hammer United World College, Montezuma, New Mexico, T: Ramaiah Vva
- PLNT058T** **Utilizing Crop Starches Incorporating Capsaicinoids and Glucosinolates Extracted From Locally Produced Plants To Synthesize Bio-Degradable Insect Detering and Weed Barrier Plastics as an Alternative to Commercially Produced Agricultural Plastics**  
Evan Daniel Kennedy, 17, Junior, Isaac Jaden Armenta Perez, 16, Junior, Lucas Tang, 14, Freshman, New Mexico Military Institute, Roswell, New Mexico, T: Frank Kimbler

## NEW YORK

### Poughkeepsie, USNY01, Dutchess County Regional Science Fair

- BMEDO65** **Combating Antibiotic Resistance in *E. coli***  
Aksat Shah, 17, Junior, Roy C Ketcham Senior High School, Wappingers Falls, New York, T: Patricia Glancey
- EAEV059** **Biological Buffers: Countering Ocean Acidification**  
Nafiah Farid Mohammed, 16, Junior, John Jay Senior High School, Hopewell Junction, New York, T: Leah Miller

### Halesite, USNY02, Long Island Science and Engineering Fair

- ANIM021** **The Ability of Vitamin E to Improve the Reproduction, Locomotor Fitness, and Metabolic Respiration of Nicotine-Induced *D. melanogaster***  
Ibrahim Qadri, 17, Senior, Valley Stream South High School, Valley Stream, New York, T: Melissa Torregrosa
- BEHA015** **Occupational Stress and Mental Health Outcomes Among the Emergency Medical Services Population**  
Mikayla Schwartz, 18, Senior, Paul D. Schreiber High School, Port Washington, New York, T: Elizabeth Thomas
- BEHA018** **Impacts of Levodopa and Traditional Medicines on the Locomotion of Alpha-Synuclein *Caenorhabditis elegans***  
Elif Koch, 18, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Raymond Tesar
- BEHA019** **The Correlation Between Peroxisome Levels and Short-Term Memory Loss in a PINK1-/- Rat Model of Parkinson's Disease**  
Holy Mary Zaher, 17, Senior, Smithtown High School East, St. James, New York, T: Maria Zeitlin
- BMEDO21** **Investigating the Anti-Inflammatory Effects of Famotidine**  
Jake Ethan Konigsberg, 17, Senior, Roslyn High School, Roslyn Heights, New York, T: Allyson Weseley
- BMEDO28** **The Neurobiology of Suicide: Claudin-5 Is a Novel Biomarker of Suicide Pathogenesis**  
# Natasha Kulviwat, 16, Junior, Jericho High School, Jericho, New York, T: Serena McCalla
- CBIO013** **Micro-Changing Short Tandem Repeats: Investigating a Novel Genomic Factor of Polymorphism in 10 Human Cancers**  
# Kevin Zhu, 18, Senior, Jericho High School, Jericho, New York, T: Serena McCalla
- CELL023** **Rethinking Pancreatic Ductal Adenocarcinoma (PDAC) Prognosis: Analysis of KRAS-Dependent Biomarkers Across Subtypes**  
Lucas Sher, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla
- EAEV025** **Analysis of Microplastic Compositions in Salt and Freshwater on the South Shore of Long Island**  
Emma Fallon, 18, Senior, West Islip High School, West Islip, New York, T: Mary Kroll

# Finalist Directory

- EAEV026** **Laboratory Studies of X-Ray Amorphous Phases: Constraining the Amorphous Components in Martian Soils and Rocks**  
Joseph Daniel Sciotto, 17, Senior, Ward Melville High School, East Setauket, New York, T: Marnie Kula
- EAEV039** **Cost-Effective Air Quality Monitoring Using Readily Available Programming Interfaces**  
Kevin Mauricio Leal, 17, Senior, Brentwood High School, Brentwood, New York, T: Rebecca Grella
- EGSD021** **Production of Plasma-Enhanced SiO<sub>2</sub> Films for Optimizing Photovoltaic Cells**  
Emily Gloria Theodosopoulos, 18, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger
- ENBMO40** **Bidirectional 12-Lead Electrocardiogram and Electrogram Reconstruction Using a Cycle Generative Adversarial Network**  
##  
**ENEV024T** **Developing a Hydroponic System With the Incorporation of an Arduino Uno Powered pH Sensor**  
Sofia Eliza Maciel-Seidman, 16, Junior, Joy Kim, 17, Junior, Riya Saha, 16, Junior, Bethpage High School, Bethpage, New York, T: Nicole Dulaney
- MATS020** **An Advanced Computer App for Simulating White-Beam Diffraction Laue Patterns in Modern X-Ray Crystallography**  
Vincent W. Huang, 16, Junior, Syosset High School, Syosset, New York, T: Mary Hendrickson
- MCRO022** **Pioneering Microbial Communities and Biofilm Succession on Plastic in a New York City Waterway**  
Sammer Soliman, 18, Senior, John F. Kennedy High School, Bellmore, New York, T: Barbi Frank
- PHYS025T** **VaSt-ID: Novel Application for Variable Star Identification and Classification Using Machine Learning**  
Yida Pan, 17, Junior, Luke Huang, 17, Junior, William A. Shine Great Neck South High School, Great Neck, New York, T: Nicole Spinelli
- PLNT023** **Alteration in Concentration and Spatial Distribution of Selenium, Copper, and Essential Physiological Micronutrients in *Saccharina latissima* in a Dose Response to Carbon Dioxide**  
Jack Charles Schultz, 18, Senior, Westhampton Beach High School, Westhampton Beach, New York, T: Dianna Gobler
- SOFT020** **Fusing ConvNeXt and Histogram of Oriented Gradients (CNHOG) for Modular and Efficient Driver Distraction Detection**  
Samay Lakhani, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla
- TMED026T** **FetA.I.: A Novel Fetal Health Classification Program Using Soft Voting With Deep and Ensemble Learning**  
Richard Li Xu, 16, Sophomore, Yifu Zuo, 16, Sophomore, William A. Shine Great Neck South High School, Great Neck, New York, T: Nicole Spinelli
- New York, USNY03, Terra New York City STEM Fair**
- ANIM047T** **Can SLEAP be Used to Track and Quantify Octopus Arm Movement?**  
Tara Isabel Lago, 17, Senior, Mariella Reynoso, 18, Senior, Staten Island Technical High School, Staten Island, New York, T: John Davis
- BCHM033** **Development of a Short Peptide to Prevent Non-Thrombogenic Clot Formation on Hydrophobic Surfaces**  
Rommy Sasson, 18, Senior, Brooklyn Technical High School, Brooklyn, New York, T: Michael Estrella
- BEHA056** **Auditory Acuity and Auditory Feedback Response in Children With and Without Residual Speech Sound Disorder**  
Asuka Koda, 18, Senior, The Bronx High School of Science, Bronx, New York, T: Max Chomet
- BMED061** **Novel Pharmacogenomic Methodology for the Discovery of First-In-Class Mechanisms of Phenothiazine Derivatives to Delay and Rescue Alzheimer's Disease Pathology and Extend Lifespan in *C. elegans***  
Kun-Hyung Roh, 18, Junior, The Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov



# Finalist Directory

- CBIO057** **Coupling the Cybernetic Model With Flux Balance Analysis for Dynamic Simulation of Overflow Metabolism in *Escherichia coli***  
Kiera Chan, 16, Junior, Staten Island Technical High School, Staten Island, New York, T: John Davis
- CELL056** **The Effect of NMDA Receptor Blockade on Neurogenesis and Neural Crest Development**  
Kiele Almeida Morgan, 17, Senior, The Bronx High School of Science, Bronx, New York, T: Max Chomet
- EAEV074T** **Effect of Drought on Grassland Bird Species in an Urban Reclaimed Landfill**  
Erica Yu, 16, Junior, Angel Huang, 16, Junior, Staten Island Technical High School, Staten Island, New York, T: John Davis
- ENBM079** **Fabricating Breast-Cancer-Cell-Laden Microspheres With Microfluidics to Simulate the Tumor Microenvironment**  
Siddiq Mohammed, 18, Senior, Bronx High School of Science, Bronx, New York, T: Wagner Marisa
- MATH040** **On Numbers Whose Integer Parts of Powers Are Always Composite**  
# Aaron Kim, 18, Junior, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov
- MCRO058** **Intra and Interspecies Control of Bacterial Growth Through Quorum Sensing Molecules**  
Bailey Howe, 17, Senior, Brooklyn Technical High School, Brooklyn, New York, T: Michael Estrella
- PHYS065** **Results of Synthetic High-Resolution Spectra From Titan Surface Observations**  
Lucas Libshutz, 18, Senior, Columbia Grammar and Preparatory School, New York City, New York, T: Ilya Yashin
- PLNT054T** **The Combined Effects of Varying Gravity Levels and Light Exposures on Garden Cress Development Using a Low-Cost 3D Printed Clinostat**  
Alana Falter, 18, Senior, Benjamin Casey Kwait-Gonchar, 17, Senior, Brooklyn Technical High School, Brooklyn, New York, T: Michael Estrella
- ROBO063** **"The Truth Will Come Out": Defending Against the Viral Spread of Misinformation by Characterizing User Responses to Fake News**  
Taj Jethwani-Keyser, 17, Senior, The Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov
- Mahopac, USNY05, Regeneron-Westchester Science and Engineering Fair**
- BEHA027** **Validity and Utility of Smudge.io's CNS Tap Test for Measuring Fatigue in Adolescent Athletes**  
Lucy Roach, 17, Senior, Ossining High School, Ossining, New York, T: Angelo Piccirillo
- BMED039** **The Effect of Copper (II) Sulfate Pentahydrate Concentration on Locomotor Ability and Lifespan of Transgenic Alzheimer's Model *Drosophila melanogaster***  
Lauren Davidson, 17, Senior, Harrison High School, Harrison, New York, T: Allison Blunt
- BMED040** **Investigating the Efficacy of Hyperbaric Oxygen in Modulating IL-6 and EPO in Stem Cell Transplant Patients**  
Maya Nitta, 18, Senior, John Jay High School, Cross River, New York, T: Annmarie Lipinsky
- CBIO033** **Implementation of Land Cover Data to Forecast West Nile Virus in the United States**  
# Noah Nager, 18, Senior, Hackley School, Tarrytown, New York, T: Andrew Ying
- CBIO039** **Deep Neural Network to Predict Progression From Mild to Severe Acute Kidney Injury**  
Aneesh Naresh, 17, Senior, Ardsley High School, Ardsley, New York, T: James Dowd
- CBIO040** **Single Cell Topological and Transcription Analysis of Antimetastatic Effects of CARM1 Inhibitors**  
Nuanyang Wang, 18, Senior, Edgemont High School, Scarsdale, New York, T: Talia Dardis

# Finalist Directory

- CELL036** **Electron Transport Chain Acts as Potential Regulator of ER-Mitochondria Interactions**  
Sarah Delia Jennings, 17, Senior, Ossining High School, Ossining, New York,  
T: Valerie Holmes
- CELL039** **KHDC3 in Grandparents Regulates Gene Expression in the Livers of Wild-Type Females**  
Hailey Finkelstein, 18, Senior, Ardsley High School, Ardsley, New York,  
T: James Dowd
- CELL041** **PTEN Regulates pMoesin and F-actin to Control Cellular Morphology**  
Alicia Chang, 17, Senior, Ardsley High School, Ardsley, New York, T: Jaime Dowd
- CELL043** **Cetaceans' Genomes Unmasking the Secrets Behind Peto's Paradox, Aging and the Evolution of the SWI/SNF Chromatin Remodeling Complex**  
Emily Stangel, 18, Senior, Byram Hills High School, Armonk, New York,  
T: Caroline Matthew
- EGSD038** **Piezoelectric Energy Harvesting in Daily Life: Powering the Next Generation of Modern Technology**  
Sienna Marie Giuseppi, 16, Junior, Pelham Memorial High School, Pelham, New York, T: Steven Beltecas
- ENEV061** **Rational Protein Engineering of PETase From Ideonella sakaiensis to Stimulate the Bioremediation of PET Pollution**  
Chloe Spencer Bernstein, 17, Senior, Byram Hills High School, Armonk, New York,  
T: Caroline Matthew
- MATSO29** **Cross-Sectional Shape of Gold Nanopillars Directly Affects the Number of Single Photon Emission Sites in Deformed WSe2**  
Ada Arda Uysal, 18, Senior, Ossining High School, Ossining, New York,  
T: Valerie Holmes
- PHYS039** **Exploration and Analysis of Glitch Sizes and Their Patterns From 112 New Glitches in 30 New Pulsars**  
Robbie Shepherd, 17, Senior, Pelham Memorial High School, Pelham, New York,  
T: Steven Beltecas
- PHYS040** **Determining DUNE Convolutional Neural Network Neutrino Identification Biases**  
Allisa Remeza, 17, Junior, Harrison High School, Harrison, New York,  
T: Allison Blunt
- PHYS058** **A Novel Atmospheric Technosignature Grading System to Optimize the Detection of Extraterrestrial Activity on G-Type Exoplanets Using Next-Generation Space Telescopes**  
Advait Huggahalli, 17, Junior, Horace Greeley High School, Chappaqua, New York,  
T: Lisa Papernik
- TMEDO44** **Investigating Connections Between Sensorimotor Impairment and Resting-State Functional MRI of the Spinal Cord in Multiple Sclerosis**  
Emma Van Praagh, 18, Senior, Pelham Memorial High School, Pelham, New York,  
T: Steven Beltecas
- TMEDO45** **Investigating the Theranostic Potential of Antibody X Against Small Cell Lung Cancer**  
Maxwell Ma, 16, Junior, Irvington High School, Irvington, New York,  
T: Nadia Parikka
- TMEDO48** **Predicting Patients at Risk for Preventable Adverse Events Upon Discharge From the Hospital With an Acute Exacerbation of Congestive Heart Failure**  
Mia Hoxhaj, 18, Senior, Pleasantville High School, Pleasantville, New York,  
T: Christine Pallotta
- TMEDO49** **Selective Inhibition of Matrix Metalloproteinase-9 Attenuates Traumatic Brain Injury-Mediated Blood-Brain Barrier Disruption in a Novel Dynamic *in vitro* Model**  
Samantha Maya Milewicz, 18, Senior, Byram Hills High School, Armonk, New York,  
T: Caroline Matthew

# Finalist Directory

## Syracuse, USNY06, Central New York Science and Engineering Fair

- BMEDO52** **Process of Developing MccJ25 as Universal Antimicrobial Drug**  
Manya Kukkar, 14, Freshman, Vestal Senior High School, Vestal, New York, T: Vinita Kukkar
- BMEDO55T** **Application of Deep Learning Models Into the Prediction of Interleukin-6 and -8 Cytokines in Sickle Cell Anemia Patients**  
Ethan Beauzile, 16, Sophomore, Dylan Nguyen, 16, Junior, Lukas Mathew Abraham, 17, Junior, Binghamton High School, Binghamton, New York, Alexander W. Dreyfoos School of the Arts, West Palm Beach, Florida, Suncoast Community High School, Riviera Beach, Florida, T: Cyrus Clark

## Saratoga Springs, USNY07, Greater Capital Region Science and Engineering Fair, Inc.

- BEHA038** **When to Teach Intellectual Humility? An Investigation Into High School and Middle School Students**  
Daniel Anton, 17, Senior, Nyack High School, Nyack, New York, T: Katherine Jacobson
- ENBM064** **Viability of External Reading of a Flexible Sphere's Internal Fluid Pressure and Its Application in Measuring Intraocular Pressure**  
Tarun Jacob, 17, Junior, Niskayuna High School, Niskayuna, New York, T: Laura Favata
- TMEDO54** **A Multifaceted Approach to Determine the Therapeutic Efficacy of Ventral Pallidum Deep Brain Stimulation for Epilepsy**  
Carsyn Emilie Bonesteel, 18, Senior, Burnt Hills-Ballston Lake High School, Burnt Hills, New York, T: Regina Reals

## Utica, USNY08, Utica University Regional Science Fair

- MCRO057** **The Effect of the Nonionic Detergent NP-40 on Pigment Production and Biofilm Development in *Pseudomonas uticensis***  
Angelina Le, 16, Sophomore, Thomas R. Proctor High School, Utica, New York, T: Lawrence Aaronson

## Syracuse, USNY09, Terra Rochester Finger Lakes Science & Engineering Fair

- PHYS036** **A Machine Learning Approach to Determine the Number of Exoplanets in a Given Planetary System Based on NASA Exoplanet Archive Data**  
Maureen Zhang, 16, Junior, Pittsford Sutherland High School, Pittsford, New York, T: Daniel Hosey

## Syracuse, USNY11, Terra WNY STEM Fair

- BEHA020** **MLOffense: Multilingual Offensive Language Detection and Target Identification on Social Media Using Graph Attention Transformer Model**  
Grant Wang, 16, Junior, Williamsville East High School, East Amherst, New York, T: Michael Belling
- MATH022** **Pointed Fusion Categories Over Non-Algebraically Closed Fields**  
# Sophie Zhu, 16, Senior, Williamsville East High School, East Amherst, New York, T: Julia Plavnik

## Winthrop, USNY13, Terra Northeast STEM Fair

- EGSD060T** **Faster Than Wind!**  
Olivia Beth Mero, 17, Junior, Jaden Dillon Mero, 14, Freshman, Moriah Central School, Port Henry, New York, T: Tiffany Pinheiro

## Glen Cove, USNY50, New York State Science and Engineering Fair

- BCHM026** **Alpha-Lipoic Acid Treatment of *Drosophila melanogaster* as a Novel Therapeutic Method Targeting mTOR-Associated Cognitive Deficits in Fragile X Syndrome**  
Xinyi Zhang, 17, Senior, William A. Shine Great Neck South High School, Great Neck, New York, T: Nicole Spinelli
- BEHA042** **Novel Prenatal ASD Diagnosis Tool**  
Emma Maliar, 17, Senior, William A. Shine Great Neck South High School, Great Neck, New York, T: Nicole Spinelli
- BMEDO48** **Investigating Anatomical Connectivity in Individuals With Autism Spectrum Disorder Using Magnetic Resonance Imaging**  
Caterina Maria Stoica, 17, Junior, The Masters School, Dobbs Ferry, New York, T: Kristina Gremski

# Finalist Directory

- CBIO043** **The Annotation of Novel Datasets for the Training of Cellori (Cell Origin) Spots, a Deep Learning Algorithm for RNA FISH Spot Detection**  
Alexandre Tourneux, 16, Junior, George W. Hewlett High School, Hewlett, New York,  
T: Terrence Bissoondial
- CBIO045** **Deep Learning Accelerated Lattice Boltzmann Simulations for Multiscale Modeling of Thrombosis**  
Amit Saha, 18, Senior, William A. Shine Great Neck South High School, Great Neck,  
New York, T: Nicole Spinelli
- EAEV060** **Infestation of Parthenogenetic *Haemaphysalis iongicornis* Ticks in New York Schoolyards: Implications for Spread of Tick-Borne Disease**  
Audrey Erin Schneckler, 17, Senior, Ossining High School, Ossining, New York,  
T: Angelo Piccirillo
- EAEV063** **Evaluating the Detrimental Effects of Mask Leachates on the Growth of *Anabaena Cyanobacterium* Through Spectrometry and Chlorophyll Analysis**  
Maggie Wang, 17, Senior, Plainview-Old Bethpage John F. Kennedy High School,  
Plainview, New York, T: Raymond Tesar
- ENBM068** **Spatially Multiplexed Gold Leaf Electrodes for Affordable Pathogenic Detection**  
# Alex Lin Wang, 18, Senior, Syosset High School, Syosset, New York, T: Veronica Ade
- ENEV060** **The Dual Roles of Activated Carbon as an Adsorbent and Photocatalyst for Azo Dye Removal**  
# Emily Kim, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla
- MATH038** **The Sinkhorn Limit of Positive  $3 \times 3$  Matrices**  
Jason Wu, 18, Senior, Half Hollow Hills High School East, Dix Hills, New York,  
T: Michael Lake
- MCRO051** **A Model for Reversing the Cardiotoxic Effects of Doxorubicin via Fisetin in *Saccharomyces cerevisiae***  
Julia Cherchever, 17, Junior, Garden City High School, Garden City, New York,  
T: Steven Gordon
- PHYS050** **Co-Evolving Across Time: Black Holes as Regulators of Their Host Galaxy Properties**  
Sarah Jean Gardner, 17, Senior, Ossining High School, Ossining, New York,  
T: Angelo Piccirillo
- PHYS053** **The Impact of Initial Flame Conditions on Thermonuclear Supernova Simulations**  
Ellis Eisenberg, 17, Senior, Half Hollow Hills High School West, Dix Hills, New York,  
T: Michael Lake
- ROBO056** **A Deep Neural Architecture Search Net-Based Wearable Object Classification System for the Visually Impaired**  
Aniketh Arvind, 17, Junior, Hackley School, Tarrytown, New York, T: Andrew Ying
- SOFT040** **A Framework for Effective Ransomware Detection and Mitigation**  
Eric Ruike Song, 17, Junior, Yorktown High School, Yorktown Heights, New York,  
T: Paul Rubeo

## NORTH CAROLINA

- Charlotte, USNC01, Charlotte-Mecklenburg Regional Science Fair**
- BEHA029** **Modeling the Changes in the Prevalence of Chronic PTSD and Comorbid Mental Illnesses in Undergraduate Male and Female Students**  
Martina Banasova, 17, Senior, Ardrey Kell High School, Charlotte, North Carolina,  
T: Robert Gotwals
- EAEV043** **Study of Future Atmospheric Concentrations of CO<sub>2</sub> and CH<sub>4</sub> on Global Heat Absorption and Retention**  
Nicholas Moore, 14, Freshman, South Iredell High School, Statesville, North Carolina,  
T: Jennifer Cartelli
- Durham, USNC03, North Carolina Science Fair Region 3B**
- BCHM006** **Developing a Selective SUV39H1 Inhibitor to Improve Cancer Prognosis**  
David Nahm Kim, 17, Senior, North Carolina School of Science and Mathematics,  
Durham, North Carolina, T: Tim Anglin

# Finalist Directory

- BMEDO11** **DiaMiR: A MicroRNA (miR-23) Microneedle Patch for Type-2 Diabetes Control**  
George Cheng, 17, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Michael Cargill
- Raleigh, USNC50, North Carolina State Science Fair**
- BMEDO43** **Production of Recombinant Cataract-Inducing Alpha-B Crystallin With *E. coli***  
Maximilian Wang, 16, Junior, Isaac Bear Early College High School, Wilmington, North Carolina, T: Ying Wang
- CELL045** **Inducing Osmotic Stress in *C. elegans* to Observe Mutation Bias in Gpdh-1**  
Carter Addison Schrag, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Heather Mallory
- EAEV048** **Mapping Soil Organic Carbon for Regenerative Agriculture and Reducing Atmospheric Carbon Using Multispectral Satellite Imagery and Machine Learning**  
Reyansh Bahl, 17, Junior, Green Level High School, Cary, North Carolina, T: Aticila Mormando
- EBED027T** **Inexpensive Glasses for the Blind and Visually Impaired Using AI and OpenCV**  
Mehdi Hussain, 17, Junior, Arnav Kumar Mahajan, 17, Junior, Rithinteja Aechan, 17, Junior, Green Level High School, Cary, North Carolina, T: Baileigh Baker
- ENBMO57** **Near-Wall Vorticity as an Indicator of Marfan Syndrome**  
Naveen Ramasamy, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Robert Gotwals
- ENBMO61T** **ARAIID: A Novel Real-Time Augmented Reality and Artificial Intelligence Driven Navigation System & Surgical Pipeline for Cardiovascular Surgery**  
Ethan Sud, 16, Junior, Abhinav Gurram#, 17, Junior, Green Hope High School, Cary, North Carolina, T: Bala Gurram
- ENEV049** **Designing an Activated Carbon Filter to Reduce Water Contamination From Fire Water Runoff**  
Riley Johnson, 17, Senior, Charles D. Owen High School, Black Mountain, North Carolina, T: Grady Bailey
- MATH037** **Improving Bitcoin's Post-Quantum Transaction Efficiency With a Novel Lattice-Based Aggregate Signature Scheme Based on CRYSTALS-Dilithium and a STARK Protocol**
- #** Yunjia Quan, 16, Junior, Charlotte Country Day School, Charlotte, North Carolina, T: Laura Trojan
- PHYS037** **A Novel Method in Improving the Accuracy of Exoplanet Classification Using Machine Learning**  
Brian Zhang, 16, Junior, William G. Enloe High School, Raleigh, North Carolina, T: Shawn Culbreth
- PHYS049** **Unveiling Distant Worlds: Discovering 13 Ultracool Y-Dwarf Candidates With a Novel Model-Based Machine Learning Detection Technique**  
Ankit Biswas, 15, Freshman, Providence High School, Charlotte, North Carolina, T: Danielle Grecu
- TMEDO47** **The Key to Fighting Infections: The Development of an Antimicrobial Solution**  
Isabel Marie Garcia, 15, Freshman, Isaac Bear Early College High School, Wilmington, North Carolina, T: Bryan Bishop
- TMEDO52** **Design of a CLIPTAC Probe Molecule for the Treatment of EGFR Mutated Adenocarcinoma**  
Grace Helen Otos, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Tim Anglin

## NORTH DAKOTA

- Elgin, USND01, Southwest Central North Dakota Regional Science and Engineering Fair**
- CHEM054** **Think Ink**  
Victoria Grace Richter, 16, Sophomore, Flasher High School, Flasher, North Dakota, T: Tana Schafer

# Finalist Directory

- TMED069** **Is It Worse Than Nicotine?**  
James Gessey, 16, Sophomore, Flasher High School, Flasher, North Dakota,  
T: Tana Schafer
- Hankinson, USND03, Southeast North Dakota Regional Science and Engineering Fair**  
**BEHA037** **Examining the Effects of Media-Related Confirmation Bias on Adults**  
Kardelen Joy Hanson, 17, Junior, Hankinson Public School, Hankinson, North Dakota,  
T: Patty Kratcha
- CBIO046** **Do Single-Cell Hi-C Data Follow a Power-Law Decay?**  
Patrick Tianci Shen, 17, Junior, Davies High School, Fargo, North Dakota,  
T: Molly Werner
- MCRO042** **Brush Up!**  
Kenadi Marie David, 16, Sophomore, Hankinson Public School, Hankinson,  
North Dakota, T: Patty Kratcha
- Grand Forks, USND05, Northeast North Dakota Regional Science and Engineering Fair**  
**ENEVO29** **Sustainable Solutions: Comparing Electrochemical vs. Traditional Methods of Wastewater Remediation**  
Malory Jane Kemp, 15, Freshman, Cavalier Public High School, Cavalier,  
North Dakota, T: Deanna Grandalen
- Tioga, USND06, Northwest North Dakota Regional Science Fair**  
**MCRO043** **Brand vs. Natural**  
Madison Evelyn Mock, 15, Freshman, Trenton High School, Trenton, North Dakota,  
T: Robert Turcotte
- MCRO049** **Sporty Bacteria**  
Jada Rose Turcotte, 17, Junior, Trenton High School, Trenton, North Dakota,  
T: Robert Turcotte
- ROBO050** **Paramount Power Plow**  
# Gracie Nutt, 18, Senior, Tioga High School, Tioga, North Dakota, T: Deb Moe
- Watford City, USND50, North Dakota State Science and Engineering Fair**  
**ANIM038** **Water *Daphnia* vs. Marine Pollutants**  
Karlee Rose Hoyt, 17, Junior, Trenton High School, Trenton, North Dakota,  
T: Robert Turcotte
- ENEVO57** **Sustainable Hydroponic Production Using Automated Agricultural Nutrient Reclamation**  
## Gavin Donald Kratcha, 17, Junior, Hankinson Public School, Hankinson, North Dakota,  
T: Patty Kratcha
- MCRO044** **Antimicrobial Resistance of a Biofilm-Forming Pathogen Probed With Antipyretic Pharmaceuticals and Antibiotics**  
# Jada Rose Bonogofsky, 18, Senior, Flasher High School, Flasher, North Dakota,  
T: Tana Schafer
- OHIO**
- Athens, USOH01, Southeastern Ohio Regional Science and Engineering Fair**  
**ENBM069** **A Human Ultrasonic Echolocation Device for Assisting the Visually Impaired**  
Macy Long, 18, Senior, Zane Trace High School, Chillicothe, Ohio, T: John Scott
- Cleveland Heights, USOH02, Northeastern Ohio Science and Engineering Fair**  
**BEHA025** **Comparing the Effectiveness of Verbal and Visual Prompting on Verbal and Nonverbal Students With Autism**  
Taylor Schindley, 17, Senior, Mentor High School, Mentor, Ohio, T: Lori Cohen
- BMED030** **Role of CRMP2 Interaction With Kinase CDK5 in Forming the Neurofibrillary Tangles of Alzheimer's Disease**  
Samyuktha Krishna Iyer, 17, Junior, Laurel School, Shaker Heights, Ohio,  
T: Kimberly Corrigan
- EAEVO38** **Examination of the Differences in Physiological Responses of *Daphnia* to Different Chemical Pollutants**  
Madeleine M Bender, 18, Senior, Mentor High School, Mentor, Ohio, T: Lori Cohen

# Finalist Directory

- MATS031** **Biomimetic Composites With Natural Fiber Reinforced, Recyclable Biobased Benzoxazine Resins**  
Beatrice Anne Hardacre, 16, Junior, Hawken School, Gates Mills, Ohio,  
T: Hatsuo Ishida
- PHYS032** **DSLR Camera Photometry and Star Tracking**  
Bryn P. Morgan, 17, Senior, West Geauga High School, Chesterland, Ohio,  
T: Stephanie Meyer
- Shaker Heights, USOH05, Hathaway Brown Upper School Fair**
- BMEDO23** **MFN2: A Novel Therapeutic Target for Alzheimer's Disease**  
#  
Julia Yuemin Zhu, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio,  
T: Andrew Clifford
- CELL025** **3D Human Stem Cell Model for Neural Development**  
Ishita Kopparapu, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio,  
T: Andrew Clifford
- ENBMO24** **Real-Time Microfluidic Evaluation of Hemostatic Properties of Procoagulant Synthetic Platelets**  
#  
Neha Sangani, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio,  
T: Andrew Clifford
- ENBMO27** **Developing a Preliminary Ultrasonic Continuous Glucose Monitoring (CGM) Implant System**  
Gauri Gandhi, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio,  
T: Andrew Clifford
- Bryan, USOH06, Northwest Ohio Science and Engineering Fair**
- EAEV018** **Trihalomethane Occurrence and Formation Within Water Distribution Systems in Public Schools**  
Elizabeth Theobald, 17, Junior, Archbold High School, Archbold, Ohio,  
T: Cristin Hagans
- PLNT028** **Examining Produce Yield of *Capsicum annuum* in Compost Enriched Soil While Tracking Household Waste Reduction**  
James Blaine Bell IV, 18, Senior, Hilltop High School, West Unity, Ohio,  
T: Cristin Hagans
- Dublin, USOH50, Buckeye Science and Engineering Fair**
- ANIM049** **Marigold Petals and Tomato Fruit as Feed Additives to Improve Health Attributes of Quail Eggs**  
Kara Elizabeth Jones, 15, Sophomore, Central Christian School, Kidron, Ohio,  
T: Michelle Jones
- BMEDO57** **Identification of Biomarkers for Cartilage Damage in Osteoarthritis by RNA-Seq and Proteomic Analysis**  
Sophie Xufei Zhuang, 16, Junior, Dublin Jerome High School, Dublin, Ohio,  
T: Amy Pochodylo
- EGSD052** **Organic Solar Cells and the Investigation of Non-Halogenated-Solvent-Processable Organic Photovoltaics**  
Zoltan Erik Kotrebai, 17, Junior, Hawken School, Gates Mills, Ohio, T: Lacy Chick
- EGSD056** **Lignin Assisted Water Electrolysis for Sustainable Hydrogen Production and Lignin Valorization**  
##  
Johan DeMessie, 18, Senior, William Mason High School, Mason, Ohio,  
T: Karen Young
- PHYS060** **Determining the Abundance of Visible Population III Star Clusters in Proximity to High-Redshift Quasars**  
Maxwell Rohan Chandar-Kouba, 18, Senior, Ottawa Hills Junior/Senior High School, Ottawa Hills, Ohio, T: Jeremy Nixon
- TMEDO72** **A Study of the Complex of Human Protein IRF3 and Viral Protein (SARS-CoV-2) ORF7a**  
Suneha Dhawan Shelke, 17, Senior, Sylvania Northview High School, Sylvania, Ohio, T: Kathryn Nelson



# Finalist Directory

## OKLAHOMA

### Bartlesville, USOK02, Bartlesville District Science Fair

#### BEHA024 Pupil Dilation Responding to Emotional Stimuli

Saskia Pehmoeiller, 16, Sophomore, Bartlesville High School, Bartlesville, Oklahoma,  
T: Jessica Strain

#### MCRO006 Preventing Food Waste by Testing the Effectiveness of Preservatives

Fin Paul Salerno, 15, Freshman, Bartlesville High School, Bartlesville, Oklahoma,  
T: Shelley Brown

#### PLNT006 Determining the Growth Rate of a Lima Bean Plant Through a Development on Hydroponics

Ingeyla Ghorl, 14, Freshman, Bartlesville High School, Bartlesville, Oklahoma,  
T: Shelley Brown

### Muskogee, USOK05, Muskogee Regional Science and Engineering Fair

#### ETSD068T Belt or String, Which Is Better?

Phat Tan Nguyen, 18, Senior, JoAnn Marie Sheppard, 17, Senior, Keeghan Christopher Hess, 17, Senior, Muskogee High School, Muskogee, Oklahoma,  
T: Janet Lopez

### Tulsa, USOK10, Tulsa Regional Science Fair

#### BMED022 Effect of Daily Exercise on Sleep Efficiency, Percentage of Deep Non-REM Sleep, and Heart Rate Variability

Erica Frances Lambrecht, 17, Senior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Chaunna Steen

#### MCRO052T Enhancing the Effectiveness of the Antibiotic Ampicillin Against *Escherichia coli*

Vincent Peters, 18, Senior, Annie Elizabeth Schloss, 18, Senior, Styriling Murray, 17, Senior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Chaunna Steen

### Stillwater, USOK50, Oklahoma State Science and Engineering Fair

#### ANIM039 The Impact of Natural Antioxidants on Color, Quality, and Consumer Acceptability of Ground Beef Patties

Callen Luke Veit, 15, Sophomore, Morrison High School, Morrison, Oklahoma,  
T: Tammy Will

#### EAEV064T Effects of FeHEDTA Pesticide on Cell Regeneration in *Planaria dorocephala*

Rylee Grace Ruddick, 16, Sophomore, Chloe Roshea Robbins, 15, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Jessica Strain

#### ETSD062T The Use of Microcontrollers To Create a Self-Regulating Environment That Can Sustain an Ecosystem in Extraterrestrial Conditions

Mason Jude Istre, 16, Sophomore, William Steven Soranno, 16, Sophomore, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Chaunna Steen

## OREGON

### Gresham, USOR01, Gresham-Barlow Science Expo

#### ENEV027T A Novel Adversarial Autoencoder With Latent-Based Optimization to Design De-Novo Ionic Liquids for Post-Combustion Carbon Capture

Arjun Malpani, 15, Sophomore, Siddharth Daniel D'costa, 16, Sophomore, Sunset High School, Portland, Oregon, Jesuit High School, Portland, Oregon,  
T: Mario Martinez, T: Lara Shamieh

#### PLNT027T The Effects of Developing Vegetation in Microgravity

Kalehya Mercedes McNeal, 18, Senior, Andi Herman, 17, Senior, Sam Barlow High School, Gresham, Oregon, T: Neal Bridgnell

#### TMED027 OncoPharML: A Machine-Learning Approach for Cancer Biomarkers Identification and Multi-Omics-Based Targeted Cancer Drug Prediction

## Darsh S. Mandera, 18, Senior, Jesuit High School, Portland, Oregon, T: Lara Shamieh

### Beaverton, USOR04, Beaverton-Hillsboro Science Expo

#### CELL016 Integrating Machine Learning with 3D Organoid Modeling to Identify Biomarkers to Combat Drug Resistance in Cancer

# Ekansh Mittal, 17, Junior, Westview High School, Portland, Oregon,  
T: Michelle Bilderbeck

# Finalist Directory

- ENBM016** **Spatiotemporal-Aware Glioblastoma Multiforme Tumor Growth Modeling With Deep Encoder-Decoder Networks**  
### Rishab Kumar Jain, 18, Senior, Westview High School, Portland, Oregon, T: Taylor Kauffman
- MATS013** **Novel Small Scale Carbon Dioxide Capture Polymer Membrane for Sudden Infant Death Syndrome Prevention**  
Autri Aparajita Das, 16, Sophomore, Sunset High School, Portland, Oregon, T: Korin Riske
- SOFT014** **CompaCT: Fractal-Based Heuristic Pixel Segmentation for Enhanced Lossless Compression of High-Color DICOM Medical Images**  
Taaha Khan, 16, Sophomore, Sunset High School, Portland, Oregon, T: Korin Riske
- Portland, USOR05, Aardvark Science Exposition**
- ANIM010** **The Effect of Circulating ACTH and Insulin Hormones on Equine Temperament**  
Lauren Raine Tittel, 16, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg
- BEHA004** **Future of Work: The Effect of Social Isolation on Cognition of *Blaptica dubia***  
Yasmin Iyer, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg
- EAEV009** **The Effect of Rainwater Origin on the Heavy Metal Content, pH, and Ion Percentage**  
Jiaming Zhang, 15, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg
- EGSD004** **Urea Concentration on Microbial Fuel Cell Power Output for Applications in Waste Management**  
Nina Kaiser, 16, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Peter Kimball
- SOFT007** **Engineering a Component-Based Programming Language**  
Diego Zhen-Yi Frias, 16, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg
- Wilsonville, USOR06, CREST-Jane Goodall Science Symposium**
- BEHA007** **Beyond the Nuclear Family: A Century of Representation in Images and Text of Children's Literature**  
Annamika Konkola, 15, Sophomore, West Linn High School, West Linn, Oregon, T: Brian Delfatti
- EAEV015T** **Microscopic Menace: What Are the Effects of Cyanobacteria Blooms on Primary Productivity, Toxicity, and Microorganisms?**  
Melinda Lin#, 17, Senior, Uma Aditi Grover#, 17, Senior, West Linn High School, West Linn, Oregon, T: Julie McDevitt
- EBED012** **ASCEND: Aqueous Spectrometric Copper-Electrolytic Nutrient Detector**  
## Aditi Bhaskar, 18, Senior, Wilsonville High School, Wilsonville, Oregon, T: CJ Koll
- TMEDO28T** **Identifying Relationships Between the Gut Microbiome and Melanoma Patients' Responses to Immunotherapy Using Machine Learning Techniques**  
Arush Goswami##, 18, Senior, Wilsonville High School, Wilsonville, Oregon, West Linn High School, West Linn, Oregon, T: Harold Coller
- Salem, USOR07, Central Western Oregon Science Expo**
- PHYS008** **Simulating the Dynamics, Collisions, and Morphology of Galactic Ultralight Dark Matter Haloes**  
## Leon Garcia, 18, Senior, Corvallis High School, Corvallis, Oregon, T: Matthew Kirby
- Bend, USOR08, Central Oregon Community College Regional Science Expo**
- CHEM032** **Efficiently Screening the Most Abundant Bioactive Molecular Moiety: *In silico* Structure Property Relationships of Primary Amide Bioisosteres**  
Curran Robert Jacobus, 16, Junior, Bend Senior High School, Bend, Oregon, T: Casie Bullock

# Finalist Directory

- TMEDO18** **DermaScan: Using Convolutional Neural Networks to Detect and Prevent Skin Cancer in Underrepresented Communities by Using an Android App**  
# Emma Johl Nordstrom, 17, Junior, Trinity Lutheran School, Bend, Oregon,  
T: Thomas Stueve
- Banks, USOR50, Northwest Science Expo**
- ENEV083** **Smart Wildlife Sentinel (SWS): Preventing Wildlife-Vehicle Collisions and Monitoring Road Ecology With Embedded IoT Systems and Deep Learning**  
# Alan Peijun Ma, 18, Senior, Jesuit High School, Portland, Oregon, T: Lara Shamieh
- MCRO062** **Mush-Room for Improvement**  
Yuankai Alex Gao, 17, Junior, Oregon Episcopal School, Portland, Oregon,  
T: Bettina Gregg
- PHYS062** **Skew-Axis Cylinder Lens Optical System: Novel Method of Clinical Optometry of Astigmatism, Characterization, Theoretical Modelling, and Implementation**  
# Alexander Plekhanov, 17, Junior, Beaverton Academy of Science and Engineering, Hillsboro, Oregon, T: Melissa Shell
- PLNT050** **Seed Morphology and Dispersal of *Achyrachaena mollis***  
# Rachel Catherine Warner, 18, Senior, Oregon City High School, Oregon City, Oregon, T: Elizabeth Scott
- PLNT051T** **Modeling the Impacts of Daikon Cover Crop Water Storage in Dry Farming**  
Grace Sato, 18, Senior, Alan James Kolesnikov, 17, Senior, West Linn High School, West Linn, Oregon, T: Geoff Bingham
- ROBO069** **NeuroMotus: An Intelligent Exoskeleton System to Improve Cerebral Palsy Patient Mobility Using Brain Computer Interface**  
## Ishan Ahluwalia, 17, Junior, Jesuit High School, Portland, Oregon, T: Lara Shamieh

## PENNSYLVANIA

- Harrisburg, USPA01, Capital Area Science and Engineering Fair**
- ENBMO84** **Wearable Memory Assistive Device for Dementia and Alzheimer's Patients Using Machine Learning Facial Recognition**  
Anshi Paul, 15, Sophomore, Hershey High School, Hershey, Pennsylvania,  
T: Jason Sibbach
- ROBO074** **A Novel Convolutional Neural Network Random Forest Hybrid Model to Aid in the Identification of Tree Species Using Multispectral and LiDAR Data**  
Isaiah Antoine Houssou, 15, Sophomore, Camp Hill High School, Camp Hill, Pennsylvania, T: Amy Diehl
- Lancaster, USPA02, North Museum Science and Engineering Fair**
- BMEDO20** **Immune Checkpoint Regulation in Molecular Subtypes of Endometrial Cancer: Expression of PD-L1 and PD-1**  
Dominick Baksh, 16, Sophomore, Lancaster Catholic High School, Lancaster, Pennsylvania, T: Anne Bleistine
- EGSD023** **Which Savonius Vertical-Axis Wind Turbine Is More Efficient: One With a Wind Deflector or One Without?**  
Kai Theodore Jasper Unwin-Wisnosky, 14, Freshman, McCaskey High School, Lancaster, Pennsylvania, T: Jo Ellen Wisnosky
- Exton, USPA03, Delaware Valley Science Fairs**
- BCHMO32** **Determining Most Effective Method of Inhibiting Breast Cancer Inducing Protein RAD52, Year 2**  
Dhaval Tantry, 18, Senior, Central Bucks High School East, Doylestown, Pennsylvania, T: Mark Hayden
- CBIO051** **CAPCODRE: A Computational Systems Biology and Machine Learning-Based Approach to Predict Cognitive Disorder Risk in the Elderly**  
# Srilekha Mamidala, 17, Junior, Garnet Valley High School, Glen Mills, Pennsylvania,  
T: Brenda Frost
- CBIO052** **Machine Learning Identification of Potential PARP-1 Inhibitors for Alzheimer's Disease Treatment**  
Yueyi Bao, 16, Sophomore, The Hill School, Pottstown, Pennsylvania,  
T: Jared Courtney

# Finalist Directory

- CBIO061** **MicroScan: A Computer Vision Tool To Assist Malaria Microscopy Diagnosis**  
Anish Kishor Pallod, 15, Freshman, Parkland High School, Allentown, Pennsylvania,  
T: Kaitlin Heintzelman
- CELL057** **A Novel Epigenetic Approach for Vascular Elastic Matrix Regeneration:  
Evaluating the Proteomic Interactions of siRNA-Based Gene Silencing in the  
EGFR Signaling Pathway of Abdominal Aortic Aneurysms**  
# Rayna Malhotra, 16, Junior, Moravian Academy, Bethlehem, Pennsylvania,  
T: Wendy Sheetz
- ENBM076** **Stroke Rehabilitation Crutch Robot With Auto-Follow and Fall Alarming System**  
Zeshen Chen, 17, Sophomore, The Hill School, Pottstown, Pennsylvania,  
T: Hoda Ehsan
- MCRO066** **Targeting Signaling Molecules of *P. aeruginosa* by Using Mucin as an Anti-  
Quorum Sensing Drug: A Novel Design To Evaluate Efficacy in the Context  
of Multidrug Resistance**  
# Maryam Abdel-Azim, 16, Junior, Central Bucks High School East, Doylestown,  
Pennsylvania, T: Judith Elinow
- PHYS064** **Adding Kepler Data to a TESS Exoplanet Classification Model: A Novel Approach  
in Exoplanet Classification Utilizing Deep Learning**  
Jerry Lu Wang, 14, Freshman, Parkland High School, Allentown, Pennsylvania,  
T: Kaitlin Heintzelman
- PLNT055** **Correlation Between Various Methods of Fertilizer and Development  
of *Salicornia europaea***  
Sarah Nicole Taylor, 18, Senior, The Marine Academy of Science and Technology,  
Highlands, New Jersey, T: Liza Baskin
- ROBO072** **Rapid Cardiac Screening Using Deep Learning: A Novel Interpretable AI Model  
for Cardiovascular Health Assessment**  
Samuel Wang, 17, Senior, Germantown Academy, Fort Washington, Pennsylvania,  
T: Sarah Kesten
- SOFT043** **Low-Cost Real-Time Silent Communicator for Complete Quadriplegia  
(Paralyzed) Patients**  
Sonia Leo, 14, Freshman, Moorestown High School, Moorestown, New Jersey,  
T: Sean Watson
- TMED064** **Mesenchymal Stem Cell Therapy for Celiac Disease**  
# Grace S. Yacobe, 16, Sophomore, Academy of Notre Dame de Namur, Villanova,  
Pennsylvania, T: Jessica Reid
- Pittsburgh, USPA04, Pittsburgh Regional Science & Engineering Fair**
- CBIO044** **An Iterative Neural Network Based Approach to Automated IFT-20 Sensory  
Neuron Identification in *Caenorhabditis elegans***  
## Arvind Seshan, 18, Senior, Fox Chapel Area High School, Pittsburgh, Pennsylvania,  
T: Justin Patterson
- CHEM050** **Photopolymerized Superabsorbent Polymers Prepared From Bio-Resources**  
Grace Li Wang, 18, Senior, Franklin Regional Senior High School, Murrysville,  
Pennsylvania, T: Todd Binnig
- ENBM067** **An Empirical Evaluation of Textiles for Reusable Menstrual Pads**  
Nina Cranor, 17, Junior, Pittsburgh Science and Technology Academy, Pittsburgh,  
Pennsylvania, T: Brian Rose
- MCRO050** **Biosynthetic Engineering of Novel Multifunctioning Electroactive Bacterial  
Cellulose-Carbon Nanotube Therapeutic Bandages for Rapid Clearance of  
Vancomycin-Intermediate *Staphylococcus aureus***  
Daniel Levin, 18, Senior, Pittsburgh Allderdice High School, Pittsburgh,  
Pennsylvania, T: Janet Waldeck
- PHYS052** **Application of Luminosity Modulus in Exoplanet Transits**  
James Terrell, 17, Junior, Sewickley Academy, Sewickley, Pennsylvania,  
T: Benjamin Spicer
- SOFT038** **Finding JavaScript Vulnerabilities With Concolic Execution Using Switched  
MUS Reduction on Quivers**  
# Landon Penn Colaresi, 17, Senior, Pittsburgh Allderdice High School, Pittsburgh,  
Pennsylvania, T: Janet Waldeck

# Finalist Directory

## Reading, USPA05, Reading and Berks Science and Engineering Fair

**ANIM031** **Visible Light and Its Influence on the Embryonic Viability of the Cricket *Acheta domestica***

Matthew James Ferenz, 17, Junior, Daniel Boone Area High School, Birdsboro, Pennsylvania, T: Dana Godfrey

**EAEV037** **Experiments to Determine Radon Levels in Household Water and Measure the Effectiveness of Mitigation Options**

Paige Hinkle, 15, Sophomore, Wilson High School, West Lawn, Pennsylvania, T: Joseph Melograna

**PLNT030** **Extraction of Terpene Content in *Humulus lupulus L.* (Common Hops) Varieties**

Kamella Gechter, 18, Senior, Conrad Weiser High School, Robesonia, Pennsylvania, T: John Siefert

## York, USPA06, York County Science and Engineering Fair

**PLNT013** **What Is the Effect of the pH of Water Used to Dilute Fertilizers on Mineral Content in Soil?**

Amishi Singla, 16, Sophomore, Dallastown Area High School, Dallastown, Pennsylvania, T: Michele Wallace

## RHODE ISLAND

### Warwick, USRI50, Rhode Island Science and Engineering Fair

**CBIO018** **VisRNA: Interactive Visualization Platform of ScRNA-Seq Data Reveals Key Driver Genes and Mechanisms of Non-Small Cell Lung Cancer**

Xingchuan Ma, 16, Sophomore, Portsmouth Abbey School, Portsmouth, Rhode Island, T: Stephen Zins

**CBIO022** **Non-Invasive Assessment of Colorectal Cancer Risk Using Machine Learning Models Deployed as Both a Website and API**

Bence Lukacsy, 17, Senior, Barrington High School, Barrington, Rhode Island, T: Diana Siliezar

## SOUTH CAROLINA

### North Augusta, USSC01, Central Savannah River Area Science and Engineering Fair

**CBIO021** **Multi-Drug Resistance in Advanced-Stage Breast Cancer: A Data Science Approach Analyzing Drug Transporter Gene Amplification and Patient Survival**

# Nidhi Shenoy, 18, Senior, Lakeside High School, Evans, Georgia, T: David Arrington

### Seabrook, USSC02, Sea Island Regional Science Fair

**CBIO028** **Fingerprint Patterns Being Genetically Inherited Through Biological Relations**

Riley Emerson Wilbert, 14, Freshman, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: George Ramseur

**EAEV046** **The Effect of Runoff and Eutrophication on Mangroves**

Charles Garland Hardwick, 16, Sophomore, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: George Ramseur

### Charleston, USSC03, Low Country Science Fair

**ENBM077** **MoJoint: A Motion Visualization and Kinematic Analysis Software for Temporomandibular Joint**

# Angela Mei, 17, Senior, Academic Magnet High School, North Charleston, South Carolina, T: Katharine Metzner-Roop

### Columbia, USSC04, USC Central South Carolina Region II Science and Engineering Fair

**EAEV045** **Microplastics From Mats: How Abiotic Environmental Factors Affect the Degradation of Polyethylene Foam Water Mats Into Microplastics**

Carlynn Denise Rychener, 18, Senior, Chapin High School, Chapin, South Carolina, T: Lisa Maylath

**ROBO036** **Object Recognition With Contextual Reasoning Based Fuzzy Neural Networks for the Uncertainty Output**

Andy L. Yang, 16, Junior, Dutch Fork High School, Irmo, South Carolina, T: Jonathan Wheeler

# Finalist Directory

## **Spartanburg, USSC07, Piedmont South Carolina Region III Science Fair**

### **BEHA023 The Effect of Listening to Music While Taking Standardized Tests**

Caroline Rae Watson, 17, Junior, James F. Byrnes High School, Duncan, South Carolina, T: Patricia White

## **SOUTH DAKOTA**

### **Aberdeen, USSD01, Northern South Dakota Science and Math Fair**

#### **BMED062T Comparing Potassium Concentration of Potatoes in Varying pH Levels**

Jia Yi Wang, 17, Senior, Sophia Uttermark, 18, Senior, Aberdeen Central High School, Aberdeen, South Dakota, T: Charles Hermansen

#### **CHEM058 A Study on the Kinetics of Thionin**

Dustin Joseph Hermansen, 18, Senior, Aberdeen Central High School, Aberdeen, South Dakota, T: Charles Hermansen

#### **EAEV075 The Effects of Magnetism on the Regeneration of Tricladida**

Jodyn Bawek, 17, Junior, Doland High School, Doland, South Dakota, T: Melissa Knox

### **Brookings, USSD02, Eastern South Dakota Science and Engineering Fair**

#### **BEHA059 Conservation and Functional Enrichment of Neurotransmitter Receptors in Addiction**

Owen Michael Watson, 17, Junior, O'Gorman High School, Sioux Falls, South Dakota, T: Randy Faustino

#### **CHEM062T Assessing the Viability of Using Spent Coffee Grounds To Make Cellulose-Based Biodegradable Food Packaging Films**

Anika Hooda, 16, Freshman, Sampada Nepal, 17, Junior, Brookings High School, Brookings, South Dakota, T: Laura Hummel T: Srinivas Janaswamy

#### **MCRO063 The Effect of Microgravity on the Gut Microbiome**

Alex Kidangathazhe, 14, Freshman, Brookings High School, Brookings, South Dakota, T: Laura Hummel

### **Rapid City, USSD03, High Plains Regional Science and Engineering Fair**

#### **ETSD044 Stealthy Shapes**

Louis Rancour, 16, Sophomore, Rancour, Wasta, South Dakota, T: Thomas Rancour

## **TENNESSEE**

### **Chattanooga, USTN01, Chattanooga Regional Science and Engineering Fair**

#### **ETSD061 Axial Compressor Design for High Compression-Low Temperature Brayton Cycle Power Unit With Decoupled Hot and Cold Ends**

Ziyang Michael Xing, 18, Senior, Baylor School, Chattanooga, Tennessee, T: Mary Loveless

#### **TMED065 An Eye-Opener to Early Detection and Prevention of Alzheimer's and Glioblastoma Brain Tumors: Using a Multi-Output Regression Convolutional Neural Network Model and Smart Contact Lenses to Detect Alzheimer's and Brain Tumors**

# Anya Parambath, 17, Senior, Girls Preparatory School, Chattanooga, Tennessee, T: Tracie Durham

### **Knoxville, USTN04, Southern Appalachian Science and Engineering Fair**

#### **EGSD050 The Solubility of Noble Gases in Molten Salts**

Roxanne Farahi, 17, Senior, Oak Ridge High School, Oak Ridge, Tennessee, T: Jessica Williams

#### **MCRO056 Analysis of Biofilms on Microplastics Sampled From Wastewater Treatment Plant Effluent**

Duncan Shawn Arnold, 18, Senior, L&N STEM Academy, Knoxville, Tennessee, T: Bryan Schultz

### **Memphis, USTN05, Memphis-Shelby County Science and Engineering Fair**

#### **TMED081 IntelliBind: A Novel Deep-Learning Framework for High-Affinity Antibody Design**

Arihant Jain, 15, Sophomore, Mountain View High School, Mountain View, California, T: David Cmaylo

# Finalist Directory

## Murfreesboro, USTN06, Middle Tennessee Science and Engineering Fair

- BCHM029** **Investigating Gamma S Crystallin Degradation in Normal and Cataract Lenses**  
Michael Dexun Kong, 17, Junior, Montgomery Bell Academy, Nashville, Tennessee,  
T: Zhen Wang
- ENBM083** **Optimal Acquisition and Processing Strategies for Accurate and Precise Neurite Orientation Dispersion and Density Imaging (NODDI) Modeling of the Spinal Cord**  
Chekayli Watney Meyer, 17, Senior, Harpeth Hall, Nashville, Tennessee,  
T: Valerie Guenst

## TEXAS

### Dallas, USTX01, Beal Bank Dallas Regional Science and Engineering Fair

- CBIO001T** **A Novel Application of Machine Learning Algorithms on Toxin Proteins to Predict Molecular Function**  
Ameya Kulkarni, 16, Junior, Praneeth Muvva, 17, Junior, Coppell High School, Coppell, Texas, T: Holly Anderson
- CELL003** **Attenuation of Methylglyoxal Cytotoxicity With Fisetin Rescue in *Saccharomyces cerevisiae***  
# Zehra Jaffery, 17, Junior, Plano West Senior High School, Plano, Texas,  
T: Emily Sharma
- EGSD001** **A Halide/Organic Membrane-Free Redox Flow Battery**  
# Otto Beall, 17, Senior, Plano East Senior High School, Plano, Texas, T: Julie Baker
- MATH004** **The Easiest Hard Problem: A Heuristic Solution to the Two-Way Partitioning Problem Using Probabilistic Algorithms**  
# Meryl Zhang, 15, Sophomore, R. C. Clark High School, Plano, Texas,  
T: James Lynch
- MATS002** **Pleurotus ostreatus as a More Sustainable Alternative to the Kraft Method in Papermaking**  
Shivani Oviya Nathan, 16, Sophomore, Jasper High School, Plano, Texas,  
T: Michele Poovey
- MCRO013** **Designing a Personalized Probiotic to Prevent/Alleviate Type Two Diabetes and Inflammatory Bowel Disease**  
Rohan Jagarlamudi, 16, Junior, Alcuin School, Dallas, Texas, T: Cecilia Mir
- ROBO004** **FISQ: A Few-Shot, Interpretable, and Self-Supervised Quantum Machine Learning Approach to Automated Real-Time Prediction Across Multiple Domains**  
Shobhit Agarwal, 16, Junior, Rick Reedy High School, Frisco, Texas,  
T: Derek McDowell
- SOFT001** **EduBoost: An Interpretable Grey-Box Model Approach to Identify and Prevent Student Failure and Dropout**  
Andy Qin, 17, Junior, Plano West Senior High School, Plano, Texas, T: Emily Sharma
- TMEDO01** **The Earthworm Squirm: Multiple Sclerosis Hypnosis Investigating the Potentiality of an Alternative, Realistic Cure of *Encephalomyelitis disseminata* (Multiple Sclerosis) Using the Neoblasts from *Dugesia tigrina* (Planaria) on *Lumbricus terrestris* (Earthworms)**  
Alanna Gabrielle Polyak, 16, Junior, Plano West Senior High School, Plano, Texas,  
T: Emily Sharma
- ### El Paso, USTX02, Sun Country Science Fair
- BCHM002T** **The Effects of Different Concentrations of Gold Nanoparticles on *Daphnia magna***  
Daisy Corralejo, 16, Sophomore, Ana Sofia Chavarria, 16, Sophomore, Kimora Rae Bishop, 16, Sophomore, Valle Verde Early College High School, El Paso, Texas,  
T: Sarah Welsh
- EBED007** **Optimizing Aero-Stability in Model Rockets Using Advanced Flight Algorithm and Servo-Actuated Thrust Vector Control**  
Rodrigo Valdes, 16, Sophomore, Harmony Science Academy – El Paso, El Paso, Texas, T: Anais Valdes



# Finalist Directory

- TMED017**     **The Disruption of Nicotine Vapor With Medium Chain Triglycerides**  
Heidi Danielle Houck, 16, Sophomore, Transmountain Early College High School, El Paso, Texas, T: David Esparza
- Arlington, USTX03, Fort Worth Regional Science and Engineering Fair**
- ANIM009**     **Mitigating the Harmful Effects of Radiation Therapy With the Synergistic Effects of Curcumin Bioavailability and Piperine on *Dugesia dorotocephala***  
Aliza Tharani, 17, Junior, Colleyville Heritage High School, Colleyville, Texas, T: Sonya Loughran
- BEHA002**     **Psychopathy, Intellectual Humility, and Social Media: A Strategy to Prevent School Shootings?**  
Maya Shah, 15, Sophomore, Martin STEM School, Arlington, Texas, T: Mudita Shah
- CBIO003**     **ENStaDTI: An Ensemble Graph-Learning and Multilayer Stacking-Based Deep Learning Pipeline to Predict Novel Drug-Target Interactions for Large-Scale Drug Repurposing and Drug Discovery**  
#  
Shreya Amalapurapu, 18, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez
- CELL001**     **TNF Ligand Promotes Angiogenesis in Triple Negative Breast Cancer Through Activation of Inflammatory Regulatory Networks**  
Harsh Singh, 16, Junior, Marcus High School, Flower Mound, Texas, T: Swati Singh
- EBED002**     **IVY: Intelligent Vision System for the Visually Impaired**  
#  
Sarang Goel, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez
- ETSD005**     **Energy Consumption Prediction Using Machine Learning With State-Based Appliance Features Identified by Design of Experiments**  
#  
Eshan Chandra Singhal, 17, Senior, The Oakridge School, Arlington, Texas, T: Jeffrey Farley
- MATH005T**     **Using Mathematical Modeling to Create Non-Gerrymandered Congressional Voting Maps**  
Jayanth Narasimha Pandit#, 18, Senior, Ethan Aditya Rebello, 16, Junior, Zachary Christopher Li, 17, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez
- Weslaco, USTX04, Rio Grande Valley Regional Science and Engineering Fair**
- CHEM031T**     **What's Cooking? Effects of Cookware and Cooling Materials on Air Quality**  
Vivian Alexa Mayorga, 18, Senior, Maritza Cantu, 18, Senior, James Pace High School, Brownsville, Texas, T: Dora Lopez
- EBED015**     **Incorporating a Micro Embedded Optical Heart Rate Sensor to Wirelessly Monitor ER Patients' Biomarkers**  
#  
Ashley Gabriela Nunez, 18, Senior, James Pace High School, Brownsville, Texas, T: Dora Lopez
- ENBM019**     **The Fabrication of Electrospayed Minocycline Loaded PLGA Microparticles**  
Julio Alec Ledezma, 18, Senior, Brownsville Early College High School, Brownsville, Texas, T: Samuel Ortiz
- MATH015**     **A Computational Epidemiological Review of Socioeconomic Disparities as Risk Factors for Lung Disease Across Texas Counties**  
#  
Dyllan Mackenzie Lozano-Lomeli, 18, Senior, James Pace High School, Brownsville, Texas, T: Dora Lopez
- MATS018T**     **An Approach to Reduce Microplastic Pollution Using Green Chemistry**  
Sofia Isabella Estrada, 17, Junior, Ava Elizabeth Davies, 17, Junior, James Pace High School, Brownsville, Texas, T: Ashley Saenz
- SOFT013**     **A.I. Tic-Tac-Toe**  
Claudio Reyes, 16, Junior, Harmony School of Innovation— Brownsville, Brownsville, Texas, T: Salvador Pina
- Houston, USTX05, Science Engineering Fair of Houston**
- ANIM004**     **Is Your Cat or Dog Really Spayed?: A Novel Test to Diagnose Ovarian Remnant Syndrome**  
Melina Kumar, 15, Sophomore, Clear Lake High School, Houston, Texas, T: Robin Mayeaux

# Finalist Directory

- BEHA003** **Anxi: A Novel Natural Language Processing System for the Detection and Prevention of Anxiety Disorders**  
# Pranav Somani, 18, Senior, College Park High School, The Woodlands, Texas, T: Joseph Ewbank
- CBIO008T** **Monco: A Novel Deep Learning Pipeline to Predict Drug Candidates for the Inhibition of EZH2 Cofactors in Pediatric Neuroblastoma**  
Jaagat Prashar, 17, Junior, Jaanak Prashar, 17, Junior, Jordan High School, Fulshear, Texas, T: Oscar Le
- CHEM002T** **Engineering a Cost-Effective and Biodegradable Cellulosic Battery Composition**  
Shivani Mundra#, 17, Junior, Madelyn Puza#, 17, Junior, College Park High School, The Woodlands, Texas, T: Stephanie Marts
- EAEV002** **An Analysis Into the Removal of Microplastics From Water Using Oil-Based Ferrofluids**  
Rishab Ghosh, 17, Junior, College Park High School, The Woodlands, Texas, T: Larissa Coffee
- ENBM013T** **DiaVest II: A Non-Invasive Glucose Monitoring System for Diabetes Management**  
Rohan Mehta, 16, Junior, Roshan Mehta, 16, Junior, Shreyas Vatts, 18, Junior, College Park High School, The Woodlands, Texas, T: Joseph Ewbank
- ETSD001T** **ArmAssist: A Lightweight, Concealable Active Arm Support That Empowers Victims of Muscular Atrophy**  
Donovan Jose Burke, 16, Sophomore, Henry Fernando Aceves, 15, Sophomore, College Park High School, The Woodlands, Texas, T: Joseph Ewbank
- MATH011** **Ending States of a Special Variant of the Chip-Firing Algorithm**  
Rich Wang, 18, Senior, William P. Clements High School, Sugar Land, Texas, T: Diana Morgan
- MATS003** **Programmable Matter II: Optimizing Logical Topology and Automating Manufacture of a Microscale, Self-Reconfigurable Swarm Robotic System**  
### Sohi Sanjay Patel, 17, Senior, College Park High School, The Woodlands, Texas, T: Stephanie Marts
- PHYS002** **Investigating the Effect of Qubit Entanglement on Quantum Decoherence**  
Jesse Daniel Miller, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Joseph Ewbank
- PLNT009T** **Optimization of Starch Content in Lemna minor Through Modified Environmental Conditions**  
Felix Yizhuo Li, 17, Junior, Anshul Ashesh Desai, 17, Junior, College Park High School, The Woodlands, Texas, T: Stephanie Marts
- ROBO012T** **An Autonomous Over-the-Board Chess Solution for Players in Isolated Conditions**  
Landon Patrick Doughty, 16, Sophomore, Ayaan Javaid Dhuka, 16, Sophomore, Caiman Antonio Moreno-Earle, 15, Sophomore, Saint John's School, Houston, Texas, T: Franco Posa
- Kilgore, USTX06, East Texas Regional Science Fair**
- CHEM012** **Sunsick: Finding the Right Formula**  
Addison Jane Barnes, 15, Sophomore, Hughes Springs High School, Hughes Springs, Texas, T: Lindsy Boles
- Laredo, USTX07, United Independent School District Regional Science Fair**
- BEHA001** **An Innovative Non-Humanoid Automaton to Ameliorate Children With Social Emotional Learning Uncommunicative Skills**  
Sofia Ivana Vela, 17, Junior, John B. Alexander High School, Laredo, Texas, T: Veronica Villarreal
- Lubbock, USTX08, South Plains Regional Science and Engineering Fair**
- MCRO005** **Identifying Novel Modes of Inhibition of *C. pusillum* and *B. subtilis* Bacteria, Against Deadly Bat Fungus, *Pseudogymnoascus destructans* (Year 8)**  
# Calvin Kirtley Harold Carpenter, 17, Junior, All Saints Episcopal High School, Lubbock, Texas, T: Penny Carpenter

# Finalist Directory

- SOFT003** **A Robust and Interpretable Deep Neural Network Algorithm for Leukemia Identification in Peripheral Blood Smear Cells**  
## Leonardo Amato Regis de Farias, 18, Senior, Lubbock High School, Lubbock, Texas, T: Milene de Farias
- Odessa, USTX09, Permian Basin Science & Engineering Fair**  
**PLNT002** **Why So Dry? Comparing Hydrogels to Conserve Water in Soil**  
Mateya Grace Trees, 14, Freshman, San Angelo Home School, San Angelo, Texas, T: Janice Trees
- San Antonio, USTX11, Alamo Regional Science and Engineering Fair**  
**ANIM011** **Investigating the Link Between Visual Impairment and Ischemia-Reperfusion Injury: Potential Interventions To Mitigate Damage**  
# Joanna Sohn, 16, Junior, Keystone School, San Antonio, Texas, T: Jason Nydegger
- ANIM020** **Does Constant Blue or Orange Light Accelerate Butterfly Development?**  
# Josephine Elizabeth Schultz, 15, Sophomore, Winston Churchill High School, San Antonio, Texas, T: Theodore Schultz
- BMED008** **Influences of a Maternal High-Fat Diet (HFD) and Serotonin Transporter (SERT) Deficiencies on Cognitive Flexibility**  
Amber Rebecca Elizalde, 18, Senior, Health Careers High School, San Antonio, Texas, T: Erin Snow
- CBIO009** **Advancing Autoimmune Disease Treatment With AI-Assisted Gene Expression Analysis**  
Sarah Cross, 18, Senior, Keystone School, San Antonio, Texas, T: Jason Nydegger
- CBIO010** **Multi-Dimensional Interpretable Interaction Network (MDiIN) for Modeling Aging Health and Mortality**  
## Hannah Guan, 17, Senior, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Sarah Chavez
- ETSD006** **Converting a Gas Engine To Use Compressed Air**  
Victor Robert Moran, 17, Junior, John Jay Science and Engineering Academy, San Antonio, Texas, T: Gilbert Huizar
- TMED014T** **Investigating the Effect of Traumatic Brain Injury and THIP on Short-Term Memory in *Drosophila melanogaster* Using Aversive Phototaxic Suppression**  
Niraj Om Srivastava, 16, Junior, Abby Miriam Montemayor, 16, Junior, Keystone School, San Antonio, Texas, T: Jason Nydegger
- Waco, USTX12, Central Texas Science and Engineering Fair**  
**MATH001** **Is Benford's Law Irrational?: Does Benford's Law Apply to the Decimal Digits of Irrational Numbers?**  
Abigail Marie Olmstead, 15, Freshman, Greater Waco Christian Home Educators, Waco, Texas, T: Kim Olmstead
- Austin, USTX13, Austin Energy Regional Science Festival**  
**BCHM004T** **A Novel Approach to Treating Parkinson's Disease With Amino Acids to Alleviate LRRK2 Gene Mutation Symptoms in *C. elegans* Evaluated via the Use of Multidimensional Analysis Methods**  
Rajvi Rakesh Babaria##, 17, Senior, Halley Madyson Compuesto#, 18, Senior, Vista Ridge High School, Cedar Park, Texas, T: Rhonda Christman
- BMED009** ***In silico* Accelerated Drug Discovery and Development Utilizing Human Physiological Modeling and Simulation**  
# Aaron George, 16, Sophomore, Saint Dominic Savio Catholic High School, Austin, Texas, T: Pam Koo
- EBED009** **A Novel Approach to Series Elastic Actuation in Neurorehabilitative Soft Robotics Using Resistance Pressure Sensors to Rotate Servo-Controlled Appendages Accurately**  
Amisha Sao, 17, Junior, Round Rock High School, Round Rock, Texas, T: Marla Menchaca
- MATH012** **Improving Contemporary Mathematical Models of Metastatic Cancer to Predict Optimal Treatment: Analyzing Glycolysis, Treatment, and PACC Quiescence**  
Caitlin Elaine Garrett, 17, Junior, Vandegrift High School, Austin, Texas, T: Justyne Biddle

# Finalist Directory

- MATS010** **Carbon Dioxide Capture and Storage Utilizing Metal Hydroxides and Biochar**  
Grace J. Huh, 16, Sophomore, Westwood High School, Austin, Texas,  
T: William Davis
- ROBO013** **REPNET: A Reproductive Training Architecture for Reinforcement Learning Neural Networks**  
Tiernan Lindauer, 18, Senior, Vista Ridge High School, Cedar Park, Texas,  
T: Jacob Hoffman
- TMEDO10** **The Cross-Application of Oxidative Stress Conceptualizations to Inflammatory Microglia's Role in Neurological Diseases for Candidate Drug Discovery**  
Amna Siddiqui, 16, Sophomore, Austin Peace Academy, Austin, Texas,  
T: Nahed Abougalala
- Laredo, USTX14, Laredo Independent School District Science Fair**
- EAEV014** **Cognitive Regeneration of Planaria**  
Giselle Luna, 16, Sophomore, Dr. Dennis D. Cantu Early College High School, Laredo, Texas, T: Lorena Castaneda
- Corpus Christi, USTX15, Coastal Bend Regional Science Fair**
- ENBM001** **Heat Screen: A Novel Approach to Monitoring Heat Stress**  
# Cuauhtemoc Zamora, 16, Sophomore, Veterans Memorial High School, Corpus Christi, Texas, T: Porfirio Zamora
- TMEDO04** **Translational Approach To Develop N-Acetylneuraminic Acid (Neu5Ac) as Biomarker for the Diagnosis of Alzheimer's Disease (AD), Year Two Project**  
Sharmada Palakurthi, 15, Freshman, W.B. Ray High School, Corpus Christit, Texas,  
T: Pedro Benavidez
- Burkburnett, USTX16, Red River Regional Science and Engineering Fair**
- TMEDO06** **Optimizing Machine Learning Models to Predict the Likelihood of Stroke With State-of-the-Art Accuracy**  
Saianiruddh Reddy Chada, 17, Junior, Rider High School, Wichita Falls, Texas,  
T: Bryce Henderson
- College Station, USTX50, Texas Science and Engineering Fair**
- BEHA041** **DSM Diagnosis Is Dead: Novel, AI-Powered Biopsychosocial Fingerprinting for Depressive, Anxiety, Trauma, and Stress Disorders**  
## Siddhu Pachipala, 18, Senior, College Park High School, The Woodlands, Texas,  
T: Susan Caffery
- BMEDO44** **Proliferous Metabolics: Targeting Nucleotide Metabolism in Cancer Chemotherapy**  
Jason Chris Xu, 18, Senior, Plano West Senior High School, Plano, Texas,  
T: Emily Sharma
- EAEV062** **Computational Modeling of CO<sub>2</sub> Migration and Trapping in Geologic Formations for Risk Assessment of Carbon Sequestration Impacting Carbon Footprint**  
Shaunak Pandey, 17, Junior, Vandegrift High School, Austin, Texas,  
T: Justyne Biddle
- EAEV065T** **Comprehensive Dataset Utilizing Meteorological and Topographical Feature Data for Next-Day Wildfire Spread Prediction**  
Aditya Singirikonda, 16, Junior, Anish Goel, 18, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez
- EBED035T** **ChroniSense: Developing a Wearable Device for the Dynamic Detection, Tracking, and Mitigation of Chronic Pain**  
Rohit Karthik Pillutla, 16, Sophomore, Inu Baek, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Joseph Ewbank
- EGSD051** **Engineered Phototropism: Improving the Energy Efficiency of Residential-Use Solar Tracking Using Soft-Bodied Thermal Expansion**  
# Ricardo Victorio, 16, Junior, College Park High School, The Woodlands, Texas,  
T: Joseph Ewbank

# Finalist Directory

- MATSO43** **Synthesis of a Sustainable Bio-Nanocomposite Coating to Reduce Post-Harvest Agriculture Losses**  
Raj Mhetar, 17, Junior, College Park High School, The Woodlands, Texas,  
T: Stephanie Marts
- MCRO046** **Combating *Pseudomonas* Resistance: Cloning of the ampC Gene Encoding for Beta-Lactamase and Development of a Non-Toxic Allosteric Inhibitory Cocktail Therapy to Eradicate *Pseudomonas aeruginosa***  
##  
Shriya Prakash Bhat, 18, Senior, Plano East Senior High School, Plano, Texas,  
T: Julie Baker
- PHYS046T** **A Deep Learning Based Hierarchical Labeling and Generative Sampling Framework for Classifying Particle Jets for Generalizable Tagging**  
Yash Semrani, 16, Junior, Mihir Lal Relan, 17, Junior, Michael E. DeBaKey High School for Health Professions, Houston, Texas, T: Cody Meng
- PLNT044** **Agro-Rhizoremediation: Rhizoremediation With Agro-Transformed *Oryza sativa* to Facilitate Arsenic Degradation *in situ* (Year III)**  
#  
Prisha Bhat, 15, Sophomore, Plano East Senior High School, Plano, Texas,  
T: Julie Baker
- ROBO049** **VisiAide: A Multifaceted Self-Learning AI Assistant for the Visually Impaired Using a Novel Context-Based Approach**  
Dhroov Veeral Bharatia, 14, Freshman, Vines High School, Plano, Texas,  
T: Susan Waldron
- SOFT032T** **AIM-AI: An AI-Based Natural Language Processing Approach To Reducing Fatal Risks of Medical Imaging in Patients Through Automated Imaging Order Selection**  
Rohan Dharua, 17, Junior, Videet Mehta, 16, Junior, William B. Travis High School, Richmond, Texas, T: Matthew Hindmarch

## UTAH

- Farmington, USUT01, North Davis Area Science and Engineering Fair**
- BEHA013** **Gender Preferences in Character Archetypes of Western US High School Students**  
Grace M Gunn, 17, Senior, Farmington High School, Farmington, Utah,  
T: Jana Barrow
- CELL015** **Cancer and CRISPR: A Story of Two Assays**  
Neve Eliza Bawden, 14, Freshman, Millcreek Junior High School, Bountiful, Utah,  
T: Kristin Bates
- MCRO009** **Effects of Sound Exposure on the Phosphorus Uptake of Polyphosphate-Accumulating Organisms**  
##  
Thanaphone Glenn Shields, 17, Junior, Syracuse High School, Syracuse, Utah,  
T: Nannette Guntz
- MCRO012** **Carbonation vs. Bacterial Growth in Naturally Carbonated Springs**  
Kristina Marie McCammon, 18, Senior, Farmington High School, Farmington, Utah,  
T: Jana Barrow
- TMED016** **Colored LED Strip Lights vs. Blood Pressure**  
Zoe Alene Wayment, 15, Freshman, West Point Junior High School, West Point, Utah, T: Haylie Tracy
- Cedar City, USUT02, Southern Utah Science and Engineering Fair**
- BMED032** **The Correlation Between Physical Activity and Balance in the Elderly**  
June Alicia Bryant, 16, Junior, Success Academy DSU, St. George, Utah,  
T: Megan Liljenquist
- CHEM047** **Synthesis and Characterization of Manganese Desert Rose Nanoparticles: A Fourth Year Study**  
###  
Taytum Oakden Stratton, 18, Senior, SUCCESS Academy-SUU, Cedar City, Utah,  
T: Kimberly McCollum
- ETSD059** **Replica of an Acoustic Liner Simplified**  
Allison Munro, 16, Junior, SUCCESS Academy-SUU, Cedar City, Utah,  
T: Micah Jackson

# Finalist Directory

## Ogden, USUT03, Weber Area Science and Engineering Fair

- EAEV072** **The Use of Bio Plastics Made From Bio Materials in Connection to Deforested Ecosystem Viability**  
Lauren Paige Gorsline, 18, Senior, Weber High School, Pleasant View, Utah,  
T: Lareen Radle
- EGSD043T** **Geometric Structures Effect on the Aerodynamic Efficiency of Semi Fairings**  
Dakota Weston, 18, Senior, Matheus Jonathan Horton, 18, Senior, Fremont High School, Plain City, Utah, T: Robert Riley
- ETSD036** **The Effect of Carbon Fiber on the Shear Capacity of a Bolt Within a Lap Joint**  
Logan Scott Hancey, 17, Junior, Fremont High School, Plain City, Utah,  
T: Robert Riley
- PLNT038T** **New Development of Graft Between a Select Scion and Durable Weed Root Systems To Form a Productive Hybrid**  
Oakely Marriott##, 18, Senior, Keiley Mitchell#, 18, Senior, Fremont High School, Plain City, Utah, T: Robert Riley T: Robert Riley

## Provo, USUT04, Central Utah STEM Fair

- BMEDO42** **Assessing the Photoreceptor Expression in Retinal Organoids From a Patient With Rhodopsin Copy Number Variation**  
# Sarah Lee, 17, Junior, Timpview High School, Provo, Utah, T: Joy Petrucka
- EAEV055** **Biomechanical and Biological Accumulation of Lead in Ants at a Shooting Range**  
Talmage Wallace, 16, Sophomore, Salem Hills High School, Salem, Utah,  
T: Kellie Roberts
- EGSD029** **Electrifying Lake Mud, Part 4! More Power**  
# Fianna Jean Smith, 16, Sophomore, Herriman High School, Herriman, Utah,  
T: Jane Harward
- PHYS051** **Improvements on Schlieren Imaging**  
Matthew William Dolinar, 16, Sophomore, American Fork High School, American Fork, Utah, T: Robert Adamson

## Salt Lake City, USUT05, University of Utah Science and Engineering Fair

- ETSD027T** **A Novel Approach to Electric Aircraft Engines Using Thorium Dioxide Coated Tungsten Carbide Fins for Thrust Generation**  
Evan Skyler Weinstein#, 16, Sophomore, Aiden Shah Gandhi#, 16, Sophomore, Eli Daniel Hatton#, 16, Sophomore, Rowland Hall- Lincoln Street Campus, Salt Lake City, Utah, T: Padmashree Rida
- PHYS033** **Investigating the Origins of Hot Neptunes From Radial Velocity Data**  
Sophie Yinuo Zheng, 16, Junior, Rowland Hall- Lincoln Street Campus, Salt Lake City, Utah, T: Padmashree Rida
- ROBO032T** **Developing an LSTM-Based Model for Accurate Sign Language Recognition Through Hand Keypoint Detection**  
Cole NenLi Chu, 16, Junior, Alex Antonio Hernandez Juarez, 16, Junior, West High School, Salt Lake City, Utah, T: Enrique Arce-Larreta
- TMEDO33** **Identification and Analysis of Metabolic Inhibitors in Ctnnb1-Driven Hepatocellular Carcinoma (HCC)**  
Audrey Yimin Su, 16, Junior, Skyline High School, Salt Lake City, Utah, T: Kimberley Evason

## Ogden, USUT07, Harold W. & Helen M. Ritchey Science and Engineering Fair of Utah

- BMEDO35** **Proteoglycans and Their Effects on Cancer Cell Migration**  
# Denali Emilie Isaacs-Perman, 16, Sophomore, Northern Utah Academy for Math, Engineering and Science, Layton, Utah, T: Debbie Titmus
- ENEV045** **Building an Attachable Device to Capture Carbon Dioxide Emissions From a Lawnmower**  
Christina Zhang, 17, Junior, InTech Collegiate High School, North Logan, Utah,  
T: Tracy Davidson
- MCRO040** **Fighting the Emerging Antibiotic Resistance in Wastewater**  
# Angela Zhan, 15, Sophomore, Logan High School, Logan, Utah, T: Christina Howell

# Finalist Directory

**MCRO041** **Antimicrobial Effects of Tris (Ethylenediamine) Cobalt(III) Chloride - Cobalt Complex**  
Addison Leigh Cook, 14, Sophomore, Northern Utah Academy for Math, Engineering and Science, Layton, Utah, T: Debra Titmus

## VERMONT

**Northfield, USVT50, Vermont Science, Technology, Engineering and Mathematics Fair**  
**PHYS047** **Investigating the Role of Excitonic Quantum Coherence in the Light-Harvesting Process of Photosynthesis**  
Elias Leventhal, 17, Junior, Champlain Valley Union High School, Hinesburg, Vermont, T: David Punihaole

## VIRGINIA

**Arlington, USVA01, Northern Virginia Science and Engineering Fair**  
**BCHM011** **Analysis of Anti-Inflammatory Compounds in Drug Absorption and Calculated Transdermal Permeability Utilizing the Parallel Artificial Membrane Permeability Assay (PAMPA)**  
Olivia Grace Bartrum, 17, Junior, Wakefield High School, Arlington, Virginia, T: Dan Harris

**MCRO021** **Characterization and Genomic Analysis of Novel *Acinetobacter baumannii* Phages EAb3 and EAb7 for the Treatment of Multidrug-Resistant Infections**  
# Julia Rose Brodsky, 17, Senior, H-B Woodlawn Secondary Program, Arlington, Virginia, T: Eric Young

**Charlottesville, USVA02, Virginia Piedmont Regional Science Fair**  
**ENBMO29** **Tracking Essential Tremors**  
Aditya Ranjit Biswas, 16, Junior, Colonial Forge High School, Stafford, Virginia, T: Susan Easter

**TMEDO29** **Haloperidol Inhibits Inflammasome Activation via LAMTOR1 and Reduces the Risk of Rheumatoid Arthritis**  
Vidya Ambati, 16, Sophomore, Albemarle High School, Charlottesville, Virginia, T: Brian Werner

**Fairfax, USVA03, Fairfax County Regional Science and Engineering Fair**  
**ANIM032** **Effect of Larval Crowding of the *Zophobas morio* Beetle on Consumption of Polystyrene Foam**  
Elizaveta Igorevna Plis, 15, Sophomore, Falls Church High School, Falls Church, Virginia, T: Tina Masciangioli

**EGSD025** **Investigating the Efficacy of Dye-Sensitized Solar Cells Utilizing Multiple Sources of Anthocyanin**  
Danial Jawad Syed, 16, Sophomore, Hayfield Secondary School, Alexandria, Virginia, T: Julie Riley

**ENEV040T** **ARM: Streamlining Recyclable Waste Identification With Highly Scalable Deep Learning Algorithms**  
Frank Chang, 17, Junior, Jason Yoo, 16, Junior, Stephen Tsai, 16, Junior, Chantilly High School, Chantilly, Virginia, T: Allison Maher T: Tom Usry

**PHYS034** **Implementing a Hybrid Quantum-Classical Neural Network by Utilizing a Variational Quantum Circuit for Detection of Dementia**  
Ryan Kim, 16, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Mark Hannum

**PHYS035** **Gravity-Darkened Atmospheric Modeling of Exoplanets: Insights From KELL-9b**  
Ronit Kapur, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Whitney Louchen

**PLNT032** **The Effect of Chlorine (ppm) on the Lead Phytoremediation Rate in *Lemna minor***  
Aayush Shivashankar, 16, Sophomore, Chantilly High School, Chantilly, Virginia, T: Latha Shankar



# Finalist Directory

- ROBO033**    **Hybrid Plasticity: Adaptive, Brain-Like Artificial Intelligence via Prefrontal Cortex Inspired Meta-Learning**  
Rohan Kalahasty, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Katherine Phillips
- SOFT023**    **Simulated Brokerage for Novice Investors**  
Samuel Hyrum Stankiewicz, 15, Freshman, West Springfield High School, Springfield, Virginia, T: Yaara Crane
- TMEDO37T**    **Predicting Monkeypox via Deep Learning-Driven Primary Morphology Analysis**  
Sara Angela Becker, 16, Sophomore, Kyan Yang, 16, Sophomore, James Madison High School, Vienna, Virginia, T: Jyosthna Vallampati
- TMEDO42T**    **OtoScan: A Novel, Inexpensive System for Comprehensive Diagnosis of Middle Ear Infections With an Intelligent Mobile Otoscope**  
Sritani Motati, 17, Junior, Omkar Kovvali, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Jennifer James
- Crozet, USVA04, Shenandoah Valley Regional Science and Engineering Fair**
- PHYS043**    **Mid-Infrared Variability of Active Galactic Nuclei in Cosmic Voids**  
# Anish Sachin Aradhey, 18, Senior, Harrisonburg High School, Harrisonburg, Virginia, T: Myron Blosser
- PLNT042**    **The Effects of Gravitropism on Seed Germination**  
Tyler Jenkins, 17, Junior, Shenandoah Valley Governor's School, Fishersville, Virginia, T: Andrew Flick
- Lynchburg, USVA05, Central Virginia Regional Science Fair**
- ETSD020**    **The Effect of Degradation on a Full Synthetic vs. Conventional Motor Lubricant's Tribological Performance**  
Micajah Cole Mason, 17, Junior, Central Virginia Governor's School for Science and Technology, Lynchburg, Virginia, T: Michele Chamot
- MCRO020**    **Got Milk? Comparing the Acid Production of Bifidobacterium infantis When Grown in Different Milks**  
Jason Chen, 17, Junior, Central Virginia Governor's School for Science and Technology, Lynchburg, Virginia, T: Michele Chamot
- Manassas, USVA06, Prince William-Manassas Regional Science and Engineering Fair**
- BEHA028**    **Food for Thought: Can Intermittent Fasting and Ketosis Ameliorate Dementia by Decreasing Tau Hyperphosphorylation and Neuroinflammation in *Drosophila melanogaster*?**  
# Rania Sophia Lateef, 16, Sophomore, Charles J. Colgan Sr. High School, Manassas, Virginia, T: Loriann Pawlik
- BMEDO56T**    **Modeling the Effect of Hyperglycemia on the Fertility of *Caenorhabditis elegans***  
Layla Moussavi, 17, Junior, Raeanne Ferrer, 16, Sophomore, Lyla Bianca Browne, 17, Junior, Governor's School at Innovation Park, Manassas, Virginia, T: Elizabeth Romano
- ENBM052**    **NephroNet: A Novel Program for Identifying Renal Cell Carcinoma and Generating Synthetic Training Images With Convolutional Neural Networks and Diffusion Models**  
Yashvir Sabharwal, 16, Sophomore, Battlefield High School, Haymarket, Virginia, T: Julia Renberg
- ETSD031**    **The Effect of Propeller Design on Underwater Remotely Operated Vehicle Speed**  
Hannah Brooke Jansen, 16, Sophomore, Patriot High School, Nokesville, Virginia, T: Faren Ahrens
- MATS038T**    **The Creation of Longer Lasting Concrete: An Analysis on the Infusion of Bacteria and Aggregates Into Cement Concrete to Increase Durability at Varying Temperatures by Examining the Substances Following Water Absorption**  
Lani Kari Lin-Kissick, 16, Junior, Hanna Marina Aklil, 16, Junior, Governor's School at Innovation Park, Manassas, Virginia, T: Elizabeth Romano

# Finalist Directory

## Ashburn, USVA07, Loudoun County Science and Engineering Fair

- BEHA035** **Determining the Impact of *Hericium erinaceus* on Aggression in Socially Isolated *Drosophila melanogaster***  
Zoe DeWitt, 17, Junior, Stone Bridge High School/The Academy of Science, Ashburn, Virginia, T: Andrew Allshouse
- EBED026** **Creating a Light Speed Linear Algebra Accelerator With Silicon Photonics**  
Jagadeepm Maddipatla, 17, Junior, Rock Ridge High School, Ashburn, Virginia, T: Dylan Cashman
- EGSD027** **Evaluating the Effectiveness of Plant-Microbial Fuel Cell Energy Derived From Traditional House Plants**  
Samantha Brown, 18, Senior, Academies of Loudoun, Leesburg, Virginia, T: Trevor Barry
- ETSD035** **Production and Comparison of Re-Extruded Filament From Recycled PET Plastic Bottles for Use in 3D Printing**  
Tyler Matthew Smith, 17, Senior, Academies of Loudoun, Leesburg, Virginia, T: Michael Croly
- TMED043** **The Antihypertensive Effect of L-Ergothioneine (ET) on Angiotensin I-Converting Enzyme (ACE) Inhibitory Activity and Nitric Oxide (NO) Production to Effectively Prevent and Treat Cardiovascular Diseases**  
Aryaa Agarwal, 17, Senior, Academies of Loudoun, Leesburg, Virginia, T: Zachary Minchow-Proffitt

## Roanoke, USVA08, Western Virginia Regional Science Fair

- BMED024** **Collagen XIX Point Mutant Leads to Schizophrenia Related Behaviors Due to Synapse Impairment in Mice**  
Claire Wei, 18, Senior, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia, T: Mark Levy
- CELL029** **Effect of AGX-51 on Human Lung Fibroblasts**  
Aanandi Parashar, 16, Junior, Hidden Valley High School, Roanoke, Virginia, T: Sandra Reedy
- EAEV032** **Measuring the Effects of Climate Change on Arctic Rivers**  
Franziska Borneff, 17, Junior, Hidden Valley High School, Roanoke, Virginia, T: Neha Karandikar

## Yorktown, USVA09, Tidewater Science and Engineering Fair

- BED033** **Designing and Prototyping and LIDAR Based Haptic Navigation Vest for the Visually Impaired and Special Forces**  
Joshua Steven Bryant, 18, Senior, Ocean Lakes High School, Virginia Beach, Virginia, T: Allison Graves
- MATH036** **A Mathematical Model for Traffic Flow Risk Management Applied to Hampton Roads Emergency Evacuation**  
Kevin Hou, 15, Sophomore, Princess Anne High School, Virginia Beach, Virginia, T: Jana Eggleston

## Radford, USVA10, Blue Ridge Highlands Regional Science Fair

- ETSD012** **Anti-Lock Brakes Applied to a Bicycle**  
Jesse William Dulaney, 17, Junior, Southwest Virginia Governor's School, Pulaski, Virginia, T: Matthew Frazier
- MATH018** **Exploring Collatz Conjecture**  
Davis Allen Reitzel, 17, Junior, Southwest Virginia Governor's School, Pulaski, Virginia, T: Greg Riffe

## Richmond, USVA13, Metro Richmond Science and Engineering Fair

- ENBM032** **Development of Novel Stimulator To Reduce Electromagnetic Interference During Transcranial Magnetic Stimulation**  
Aryan Mhaskar, 17, Junior, Mills E. Godwin High School, Henrico, Virginia, T: Kelly Ostrom
- MATH026** **Optimizing Quantum Annealing to Advance Graph Coloring Algorithms**  
Anooshka Pendyal, 17, Junior, Deep Run High School, Glen Allen, Virginia, T: Thang Dinh

# Finalist Directory

## Roanoke, USVA50, Virginia State Science and Engineering Fair

- ANIM054T** **Feasting Fruit Flies: Evaluating the Effect of Selected Ayurvedic Plant Extracts on the Mood, Memory, and Fertility of *Drosophila melanogaster***  
Fayza Mehrin, 17, Junior, Madison Shae Nally, 18, Senior, Ellie Minchae Kim, 17, Junior, Governor's School at Innovation Park, Manassas, Virginia,  
T: Elizabeth Romano
- ETSD066T** **HypeFL: A Novel Blockchain-Based Architecture Using Federated Learning and Cooperative Perception for a Fully-Connected Autonomous Vehicle System**  
Mihika Amit Dusad, 16, Junior, Aryaman Khanna, 16, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Selma Yilmaz
- ROBO068** **Brain Tumor Segmentation and Classification Based on Deep Learning, Attention Mechanisms, and Energy-Based Uncertainty Predictions**  
Zachary Schwehr, 16, Sophomore, Mills E. Godwin High School, Henrico, Virginia,  
T: Dana Delano
- SOFT049** **MoodBox: Vocal Screening for Depression and Gamified Relief**  
Shinyoung Jeon, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Katherine Phillips

## WASHINGTON

### USWA01, Mid-Columbia Regional Science and Engineering Fair

- ENBMO30** **AmEyeDrunk? The Future of Intoxication Detection**  
Advaita Motkuri, 15, Sophomore, Richland High School, Richland, Washington,  
T: Krystal Bass
- PHYS028** **Controlled Triangular Edge-Asymmetries as Means of Increasing Diode Efficiency in a Single Layer Superconductor**  
#  
Ourania-Maria Glezakou-Elbert, 17, Senior, Hanford High School, Richland, Washington, T: Brian Palmer
- SOFT021** **CamVisors: Cost-Effective Real-Time Object Detection Using Contrastive Captioners for the Blind**  
Matthew Yao, 15, Sophomore, Walla Walla High School, Walla Walla, Washington,  
T: Korrie Beemer

### Orting, USWA02, Discovery Regional Science and Engineering Fair

- ETSD053** **Wind-Powered Flight: Exploring the Potential of Dynamic Soaring for Unmanned Aerial Vehicles**  
#  
Kevin Shen, 16, Sophomore, Olympia High School, Olympia, Washington,  
T: Brian Wright

### Dallas, USWA03, Central Sound Regional Science & Engineering Fair

- BMEDO25** **Deciphering a Sleeping Pathogen: Uncovering Novel Transcriptional Regulators of Hypoxia-Induced Dormancy in *Mycobacterium Tuberculosis***  
#  
Rohak Jain, 16, Junior, Interlake High School, Bellevue, Washington, T: Pankaj Jain
- ENEV039** **Biomimicry of the Boxfish: A Computational Analysis and Wind Tunnel Study of Aerodynamic Drag Reduction of Class 8 Heavy Vehicle Trailers**  
#  
Vedant Srinivas, 16, Junior, Eastlake High School, Sammamish, Washington,  
T: John Stratton
- MATS027** **Carbon Dot and Cyanoacrylate Fuming Method for Latent Fingerprint Detection**  
Nikki Taleghani, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington,  
T: Kate Allender
- SOFT027** **MemSpark: Artificially Intelligent Virtual Reality System for Non-Intrusive Therapy and Evaluation of Dementia**  
###  
Kosha Upadhyay, 16, Junior, Bellevue Senior High School, Bellevue, Washington,  
T: Snehal Upadhyay
- TMEDO32** **Uncovering the Epileptogenic Brain Networks With Independent Component Analysis and Deep Learning: A Novel and Comprehensive Framework for Scalable and Generalizable Seizure Prediction With Unimodal Neuroimaging Data in Pediatric Patients**  
Bliss Singhal, 16, Junior, Issaquah High School, Issaquah, Washington,  
T: Sylvia Law

# Finalist Directory

## Vancouver, USWA04, Southwest Washington Science and Engineering Fair

**EGSD039T** **Tesla Turbine: Outdated or Modern Innovation?**  
Alexandria McNutt, 16, Sophomore, Jenny Wang, 16, Sophomore, Camas High School, Camas, Washington, T: Brianna Abraham

## Spokane, USWA05, Eastern Washington Regional Science and Engineering Fair

**ANIM033** **The Potential Use of the *Hydra vulgaris* Toxin Hydrumycin-1 as an Antibiotic Agent Against the Coral Bacterium *Vibrio coralliilyticus***  
Jessica Joy Palmer, 18, Senior, Joel E. Ferris High School, Spokane, Washington, T: Darci Hastings

**CBIO023** **Structural Basis for the Allosteric Modulation of GABAA Receptors by Diazepam**  
Padmaja Senthil Kumar, 17, Junior, Lewis & Clark High School, Spokane, Washington, T: Eric Strate

**EAEV036** **The Application of Mycorrhizal Inoculation to Increase Agricultural Productivity and Carbon Sequestration in Hugelkultur Systems**  
Kaia Olson, 18, Senior, Joel E. Ferris High School, Spokane, Washington, T: Darci Hastings

## Silverdale, USWA50, Washington State Science and Engineering Fair

**BEHA047** **Quantifying Depression: An Art-Based Approach to Reducing the Self-Report Bias in Diagnosing Depression Using Koch's Baum Test and Color Psychology**  
Saachi Sharma, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

**CBIO054** **Uncovering the Benefits of Ultrasound: Effects on Colocalization of Microglia and Amyloid-Beta Plaque in Alzheimer Mouse Models**  
Jamie Claudia Kwon, 16, Sophomore, Forest Ridge School of the Sacred Heart, Bellevue, Washington, T: Corina Rahmig

**CBIO055** **Early Detection of Cancer Using Microbial Taxonomic and Functional Information**  
Yue Ding, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

**CBIO056** **HeLU-DTI: Drug Target Interaction Prediction via Heterogeneous Graph Neural Networks and Large Language Models**  
Andy Ye, 17, Junior, Eastside Preparatory School, Kirkland, Washington, T: Ted Scott

**ENBM078** **The Sweet Spot: Non-Invasive Blood Glucose Monitoring Using Spectroscopy and Machine Learning**  
Tanaya Sharma, 16, Junior, North Creek High School, Bothell, Washington, T: Sunil Sharma

**SOFT044** **Dimensionality Reduction and Optimization of the GloVe Words Database Using Principal Component Analysis and Birch Clustering**  
Nishka Kacheria, 16, Junior, Interlake High School, Bellevue, Washington, T: Phillip Allen

**TMED068** **Identification of Novel Diagnostic Neuroimaging Biomarkers for Autism Spectrum Disorder Through Convolutional Neural Network-Based Analysis of Functional, Structural, and Diffusion Tensor Imaging Data Towards Enhanced Autism Diagnosis**  
Annie Adhikary, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

## WEST VIRGINIA

### Keyser, USWV01, Eastern Panhandle Science and Engineering Fair

**ENEV002** **Mealworms and Polystyrene Foam: If Mealworms Are Fed Only Polystyrene Foam, Does Their Frass Contain Styrene and Benzene?**  
Andrew Stone, 16, Sophomore, Washington High School, Charles Town, West Virginia, T: Jessica Russler

# Finalist Directory

**ROBO002** **Ophidia Vision: Inside the Terrarium Lab**  
# Sydney Renee Bostic, 15, Sophomore, Spring Mills High School, Martinsburg, West Virginia, T: Jana Woofter

**Charleston, USWV50, West Virginia State Science and Engineering Fair**  
**CELL018** **Consequences of a DOT-1.1 Deletion on Germ Cell Components in *Caenorhabditis elegans***

Jeeya Patel, 17, Senior, George Washington High School, Charleston, West Virginia, T: Alla Grishok

**CHEM009** **Assessing the Habitability of Exoplanets: An Integrated Framework Incorporating Similarity Evaluation and Kinetic Theory of Atmospheric Gases**  
# Lauren Shen, 17, Junior, Morgantown High School, Morgantown, West Virginia, T: William Gibson

## WISCONSIN

**Glendale, USWI02, Nicolet Science and Engineering Fair**

**MCRO029** **Gut-Skin Axis Theory: A Novel Approach to Alleviating Eczema Symptoms by Identifying Direct Relationships Between the Gut and Skin Bacteria**

Jason Shao, 17, Junior, Nicolet High School, Glendale, Wisconsin, T: Stephanie Rasmussen

**Milwaukee, USWI03, University School of Milwaukee - Science Fair**

**CBIO007** **SARS-CoV-2 Variant Analysis Using Discrete Fourier Transform**

# Aidan Wang, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

**CELL008** **Transcriptomic Profiles of NK Cells in Patients With Hepatocellular Carcinoma: An Exploratory Framework to Unlock Their Therapeutic Potential**

Anjali George, 16, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

**ENEV014** **Innovative Ion-Exchange Method for Recycling Used LiFePO<sub>4</sub> Battery Cell Cathodes**

# Aditya Pillai, 18, Senior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

**Madison, USWI04, Capital Science and Engineering Fair**

**CHEM029** **How Does Dissolved Oxygen Content in PPM as Measured by the Winkler Titration Method and Temperature Measured in Celsius Vary Throughout the Summer at Different Depths Measured in Meters in Lake Mendota?**

Ella Marie Whiffen, 17, Senior, Madison Country Day School, Waunakee, Wisconsin, T: Michelle Kramer

**TMEDO30** **BaymaxGPT: Employing Speech for Early and Automated Diagnosis of Neurodegenerative Disorders (Parkinson's Disease) Using a ChatGPT-Based Deep Learning Architecture**

# Jonathan Crawford, 18, Senior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

**Fond du Lac, USWI50, Badger State Science and Engineering Fair**

**BCHM036** **MAPing Out the Road for Preserving Donor Liver Viability from Ischemia-Reperfusion Injury: Unlocking the Secrets of the MAP Kinase Pathway in a Rat Model**

Krish Vasudev, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

**ENBMO47** **Low-Field MRI Super-Resolution With Densely Engineered U-Net++ Network: Improving Resolution and Contrast of Portable MRI With Nested U-Net Architecture, Enabling Low-Cost Bedside Neurological Imaging on a Global Scale**

Aryan Kalluvila, 18, Senior, Hartford Union High School, Hubertus, Wisconsin, T: Matthew Rosen

# Finalist Directory

**ETS0009**      **Design, Construction, and Testing of a Passenger-Capable eVTOL Hexacopter**  
#      Ethan Mark Zentner, 18, Senior, Nicolet High School, Glendale, Wisconsin,  
T: Stephanie Rasmussen

## WYOMING

**Greybull, USWY01, Northern Wyoming District Science Fair**

**EAEV003**      **Reducing Potential Groundwater Contamination From Coal Fly Ash:  
Developing a Unique Bentonite/Zelite Matrix Barrier**  
Riley Elizabeth Thomas, 18, Senior, Greybull High School, Greybull, Wyoming,  
T: Joel Kuper

**Laramie, USWY50, Wyoming State Science Fair**

**TMED031**      **Non-Invasive microRNA-based Diagnostics for the Detection  
of Multiple Cancers**  
Grace Zhou, 16, Junior, Laramie High School, Laramie, Wyoming, T: Hai Hu

## UNITED STATES VIRGIN ISLANDS

**Frederiksted, United States Virgin Islands, TEVI02, Good Hope Country Day School  
Science Fair**

**EGSD057**      **Sustainable Gutter Water Energy**  
Cai Gwilliam, 15, Freshman, Good Hope Country Day School, Kingshill, United States  
Virgin Islands, T: Maranda Wood

**ENEV069**      **Testing the Tensile Strength of Cordage Made of Fibers From Plants Found  
on St. Croix**  
Anil Prasad, 17, Senior, Good Hope Country Day School, Kingshill, United States Virgin  
Islands, T: Maranda Wood

## VIETNAM

**Ha Noi City, Vietnam, VNM001, Ha Noi Science Fair**

**BCHM030**      **Injectable Multifunctional Hydrogel Dressing Composed of Alginate  
and *Rhodomyrtus tomentosa* Herbal for Chronic Wound Treatment**  
Thanh Khoa Nguyen, 17, Junior, Huynh Man Dat Upper Secondary for the Gifted,  
Rach Gia, Kien Giang, Vietnam, T: Thi Phuong Le

**BMED059T**      **Biocompatibility and Radioprotective Activity of Squid Ink-Derived Nanomelanin  
on Human Umbilical Cord-Derived Mesenchymal Stem Cells**  
Trong Phuc Nguyen, 18, Senior, Duc Manh Vu, 18, Senior, Le Hong Phong High School  
for the Gifted, Nam Dinh, Nam Dinh, Vietnam, T: Thanh Xuan Tran

**CBIO066T**      **The Neuropharmacological Effects of Leaves and Fruits Essential Oils  
From *Litsea cubeba* Based on Network Pharmacology**  
Thi Mai Anh Nguyen, 18, Senior, Binh Giang Binh Nguyen, 18, Senior, HUS High School  
for Gifted Student, Hanoi, Vietnam, T: Son Hoang

**ETSD057T**      **CEREPAD: Assistive Device for Neurological and Musculoskeletal for Spastic  
Cerebral Palsy Children**  
Hoang Ha Anh Le, 18, Senior, Duc Dung Vu, 15, Sophomore, Tran Phu Gifted High  
School, Hai Phong, Vietnam, T: Thi Hai Ly Nguyen

**MATS051T**      **Research on the Synthesis of Super Absorbent Polymer Materials From Tapioca  
Starch and the Applicational Production of Flame-Retardant Hydrogel**  
Thao Uyen Le, 17, Junior, Le Viet Hoang Nguyen, 16, Junior, Tuyen Quang Upper  
Secondary for the Gifted, Tuyen Quang, Tuyen Quang, Vietnam,  
T: Chau Thien Hoang

**ROBO064T**      **I-Krobs: Robot That Dispenses Oral Sodium Iodine i-131 Radiotherapy Capsules  
for Patients With Thyroid Diseases**  
Trung Kien Do, 15, Sophomore, Duc Soat Nguyen, 15, Sophomore, Tran Phu Gifted  
High School, Hai Phong, Vietnam, T: Thi Hai Ly Nguyen

**ROBO065T**      **Quadruped Robot Model Assisting With Searching and Rescuing People  
in Landslide-Stricken Areas**  
Minh Duc Le, 17, Junior, Le Trung Kien Nguyen, 17, Junior, Le Hong Phong High School  
for the Gifted, Ho Chi Minh, Vietnam, T: Thinh Le

# Finalist Directory

## ZIMBABWE

Harare, Zimbabwe, ZWE001, Zimbabwe National Science Fair

- EAEV013** **Development of a Novel AI Last-Minute Flood Forecasting and Warning Gadget Using IOT and Deep Learning**  
Tinevimbo Musingadi, 18, Senior, Mabvuku High School, Harare, Harare, Zimbabwe, T: Brighton Mawakise
- EGSD005** **A High-Performance Polyaniline Brick Supercapacitor: A Novel Approach to the Electrical Energy Crisis**  
# Ruvarashe Moyo, 17, Junior, USAP Community School, Harare, Mashonaland East, Zimbabwe, T: Neil Wary
- EGSD006** **The Great Azolla Event II: Harnessing Electrical Energy From Oxidative Phosphorylation During Respiration in Aquatic Flora, *Azolla filiculoides***  
Tatenda Shamiso Mazambani, 18, Senior, Princeton Institute, Mutare, Manicaland, Zimbabwe, T: Monica Chikwangwani
- EGSD007** **Solar Energy Number 1: The Best Solution to Zimbabwe's Electricity Problems**  
Lionel Takudzwa Mawoneke, 18, Senior, Saint Dominic's High School Mutare, Mutare, Manicaland, Zimbabwe, T: Milton Magobeya
- EGSD008T** **Hydrogen Production by Artificial Photosynthesis Through the Photocatalytic Splitting of Water in the Presents of Sunlight and a Photo Catalyst**  
Tanyaradzwa Tracy Manhara, 18, Senior, Audrey Chimimba, 18, Senior, Tanatswa Mhiti, 18, Senior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Memory Mutema
- ENEV020** **A Low-Cost Soil Moisture-Based Automated Irrigation Control System With Web Application**  
Tinotenda Mawera, 14, Freshman, Millenial Academy, Harare, Zimbabwe, T: Gilbert Mawera
- ROBO011** **Sign Language Interpreter With Built in Translator**  
Joanette Bubuya Bugalo Ngwenya, 17, Senior, Dominican Convent High School, Bulawayo, Zimbabwe, T: Phathisa Mlotshwa
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Cosmas Tadiwanashe Mandikonza, 18, Senior, Marist Brothers Nyanga High School, Mutare, Manicaland, Zimbabwe, T: Stephen Sowa
- SOFT016** **UScore App: Creating an Easy, Efficient and Effective Record Management System for Underserved Schools**  
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