FUTURE FORWARD

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

Maya Ajmera
President & CEO
Society for Science
Executive Publisher, Science News
Science Talent Search 1985
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 Hoglund 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
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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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 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
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
TÜBITAK: 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

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

HOPE SHIMABUKU
• Regional Director, Texas Regional USPTO

MAYA AJMERA
• President & CEO, Society for Science
• Executive Publisher, Science News
• STS 1985

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

CATHARINE 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

SHANNON NANGLE
• Co-founder & CEO, Circe
• ISEF 2004–2005

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

Moderated by

MAYA AJMERA
• President & CEO, Society for Science
• Executive Publisher, Science News
• STS 1985
WOMEN IN STEM PANEL

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

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

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

NICOLE SMALL
• CEO – LH Capital, Inc./Lyda Hill Philanthropies

ANJALI CHADHA
• Founder & CEO, Empowered, Inc.
• Undergraduate, MIT Biological Engineering

Moderated by
ANJALI CHADHA
• Founder & CEO, Empowered, Inc.
• Undergraduate, MIT Biological Engineering

Regeneron International Science and Engineering Fair 2023
In Recognition

Thank you to the dedicated committee members of Regeneron ISEF 2023

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Robert Reis
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Janet Vukotich
In Recognition

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Troy Shepherd
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Olivia Strader
Lynn Tam
Jeane Waggener
Elizabeth Wright
Brighton Yau
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
Nancy Besley
Cheryl Braun
John Chang
Andrea Clinkenbeard
Glen Cook
Andrew Cooksy
Dayani Davilla
Dena Deck
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Ken Hallinen
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Karen Kinsman
Laney Lane
Jennifer Lashley

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Will Murray
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Doreen Oswald
Tony Ortiz
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John Reuter
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Shelley Seagraves
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Brittany Waddell
Kay Yang

Dallas Local Arrangements Committee
Los Angeles Local Arrangements Committee
Core Volunteers
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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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Senior Vice President, Corporate Communications & Citizenship

Potoula Stavropoulos  
Senior Director, Social Impact

Jennifer Topiel  
Strategic Communications Consultant

Ali McDowell  
Senior Manager, Social Impact

Tina Tuttle  
Senior Director, Corporate Communications

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:**
REGENERON.COM
@REGENERON
COUNTRIES, REGIONS AND TERRITORIES PARTICIPATING IN REGENERON ISEF 2023

**AMERICAN SAMOA**
Pago Pago, American Samoa, TEAS01, American Samoa Science Fair

**ANIMO37**  
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

**BMED050**  
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
<table>
<thead>
<tr>
<th>PHYS054</th>
<th>Analysis of Elemental Abundances in Transition Disk Post-AGB Binary Systems for Planet Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yi Wei (William) Yang, 18, Senior, James Ruse Agricultural High School, Sydney, New South Wales, Australia, T: Carina Dennis</td>
<td></td>
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<tr>
<td>PHYS059</td>
<td>Measuring the Dark Matter Content of NGC5102 Using Combined Observations of Gas and Stars</td>
</tr>
<tr>
<td>Olivia Silcock, 19, Senior, William Clarke College, Kellyville, New South Wales, Australia, T: Dan Miller</td>
<td></td>
</tr>
<tr>
<td>ROBO057</td>
<td>Transmission-Line Assessment and Review System (TARS): An AI and Robotics Enabled Drone for the Inspection and Maintenance of High Voltage Transmission Lines</td>
</tr>
<tr>
<td>Kai Turner, 18, Senior, Northern Beaches Secondary College Manly Campus, Sydney, New South Wales, Australia, T: Kate Farrow</td>
<td></td>
</tr>
<tr>
<td>SOFT029</td>
<td>EmSafe: Investigating the Emergency Call Service in Australia and the Development of a Modern and Efficient Contact System</td>
</tr>
<tr>
<td>Rahul Kumar, 16, Junior, Brisbane Grammar School, Spring Hill, Qld, Australia, T: Tanya Neilsen</td>
<td></td>
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</tbody>
</table>

**AZERBAIJAN**

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

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<thead>
<tr>
<th>CHEM048</th>
<th>Optimization of the Synthesis of the Fluorescent Dye &quot;Nile Red&quot;</th>
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<tbody>
<tr>
<td>Meda Surdokaite, 20, Senior, Kauno r. Raudondvario gimnazija, Raudondvaris, Kauno, Lithuania, T: Marta Marciulionyte</td>
<td></td>
</tr>
<tr>
<td>MATH035T</td>
<td>A New Method of Solving the Bernoulli Quadrisection Problem and Its Application to Other Problems in Euclidean Geometry</td>
</tr>
<tr>
<td>Aditya Joshi, 16, Sophomore, Aditya Kumar, 16, Junior, Synge Street CBS, Dublin, Leinster, Ireland, T: John Davin</td>
<td></td>
</tr>
</tbody>
</table>

**BRAZIL**

<table>
<thead>
<tr>
<th>ANIM001</th>
<th>Use of an Artificial Intelligence Model for Drug Redirection Against Feline Rhinotracheitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naiara Pereira Martins, 17, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia do Maranhao – Unidade Imperatriz, Imperatriz, Maranhao, Brazil, T: Carlos Martins</td>
<td></td>
</tr>
</tbody>
</table>
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, Csienza 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, Sao 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 Apolinar Goulart, 17, Senior, Eloah Marvila Padrone, 18, Senior, Escola Tecnica Estadual Henrique Lage, Niteroi, Rio de Janeiro, Brazil, T: Altair Santos

ENEV002T 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: Lrena Vieira

TMED003 Development of Fluopxin C. Liposomal: A Bioactive Compound to Control Pathogenic Bacteria
Luiza Nabarro Ikeda Silva, 16, Junior, Colegio Integrativa, Londrina, Parana, Brazil, T: Leonardo Fernandez

Sao Paulo, Brazil, BRAO02, FEBRACE – Feira Brasileira de Ciencias e Engenharia

ANIMO36 Pharmacale: 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 Educaacao 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 Educaacao, 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
COME VISIT THE ISEF STORE

HALL B

SUNDAY: 9AM–4PM
MONDAY: 9AM–4PM
TUESDAY: 9AM–11AM
WEDNESDAY: 9AM–1PM
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
Gonçalo Ponte Leite, 16, Junior, Colegio Sao Francisco De Sales - Diocesano, Teresina – PI, Piauí, Brazil, T: Victor Carvalho

BULGARIA

Sofia, Bulgaria, BGRO01, 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 $x \rightarrow kx^n \mod P$
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
ENBM065 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
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

ENNE050  Detection of Harmful Microorganisms in Drinking Water Using Deep Learning  
Keerthan Kamala Krishnamoorthy, 16, Junior, Fort Richmond Collegiate, Winnipeg, Manitoba, Canada, T: Jennifer Piascecki

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 Corne

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
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 LiFePO4 Battery and Extending Its Life Span Through DMSO-SnF2 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, China, T: Ya Zhang

ETSD017 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, Meinuo 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
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

PLNT018 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

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, HKGO01, 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

**MATS005T**  
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: Cinderela 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

**MATS009T**  
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, TWNO01, 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
<table>
<thead>
<tr>
<th>Project Code</th>
<th>Title</th>
<th>Author</th>
<th>Affiliation</th>
<th>Advisor(s)</th>
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<tbody>
<tr>
<td>BEHA026</td>
<td>Investigate Cortical Activation During Motor Functions Using fNIRS in Healthy Adults</td>
<td>Pei-Yun Chen, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, Chinese Taipei</td>
<td>T: Yan-Ci Liu</td>
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<tr>
<td>BMED019</td>
<td>Eliminating Drug Resistance of Lung Cancer Through Inducing Autophagy by Targeting USP24</td>
<td>Sin-Wei Tang, 18, Senior, National Tainan First Senior High School, Tainan City, Chinese Taipei</td>
<td>T: Jan-Jong Hung</td>
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<tr>
<td>CELL020</td>
<td>Novel Function of Paxillin in Modulating RNA Splicing During Early Neuron Development</td>
<td>Guan-Zhu Pan, 17, Senior, The Affiliated Senior High School of National Taiwan Normal University, Taipei City, Chinese Taipei</td>
<td>T: Pei-Lin Cheng</td>
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<tr>
<td>CHEM018</td>
<td>Inorganic-Organic-Biological Hybrid Nanocomposite for Multifunctional Biomedical Engineering</td>
<td>Tzu Tien Hsieh, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, Chinese Taipei</td>
<td>T: Ming Chih Hsu</td>
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<tr>
<td>EAEV029</td>
<td>Physical Disturbances Affect Food Availability To Shape Benthic Community Structure in Submarine Canyons</td>
<td>Szu-Yun Ko, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, Chinese Taipei</td>
<td>T: Yu-Mei Lin</td>
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<tr>
<td>ENEV025T</td>
<td>Enhanced Electrocatalytic Selective CO₂ to Syngas Production: Road to the Carbon-Neutral Future</td>
<td>Huai Wen Chang, 18, Senior, Xi Chen, 18, Senior, Taipei First Girls High School, Taipei City, Chinese Taipei</td>
<td>T: Ming Chi Hsu; T: Ming Chih Hsu</td>
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<tr>
<td>ETSD021</td>
<td>The Fusion of Glazes Color in Random Forest</td>
<td>Jo-Ya Chen, 17, Senior, Kaohsiung Municipal Kaohsiung Girls' Senior High School, Kaohsiung, Taiwan, Chinese Taipei</td>
<td>T: Hsiao Cheng Lin</td>
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<tr>
<td>MATH016</td>
<td>Power Sum Identities From Zigzag Chords</td>
<td>Chun-Chi Chang, 17, Junior, Taichung First Senior High School, Taichung, Taiwan</td>
<td>T: Pei-Chun Lin</td>
<td></td>
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<tr>
<td>MATH017</td>
<td>On Indefinite Reflection of Light Beam Off of Convex Decreasing Curves</td>
<td>Da-Fu Chiu, 18, Senior, Taipei City Non-school-based Experimental Education at Senior High School Level, Taipei City, Taiwan, Chinese Taipei</td>
<td>T: Kuo-Chang Chen</td>
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<tr>
<td>PLNT031T</td>
<td>Identification of Novel Drought-Resistant Genes From Gene-Environment Association in Arabidopsis thaliana</td>
<td>Ying-Hsin Hsiao, 17, Senior, Wan-Hung Li, 18, Senior, Taipei First Girls High School, Taipei City, Chinese Taipei</td>
<td>T: Hung-Hsiang Lee</td>
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**CZECH REPUBLIC**

<table>
<thead>
<tr>
<th>Project Code</th>
<th>Title</th>
<th>Author</th>
<th>Affiliation</th>
<th>Advisor(s)</th>
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<tr>
<td>BMED002</td>
<td>Neuroinflammation in the Choroid Plexus During Alzheimer’s Disease</td>
<td>Karolina Jerabkova, 19, Junior, Gymnazium Brno-Reckovice, Brno, Jihomoravsky Kraj, Czech Republic, T: Michal Kunak</td>
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<tr>
<td>CELL002</td>
<td>Dinucleoside Polyphosphate RNAs as Substrates for Decapping Enzyme DXO</td>
<td>Zuzana Buchova, 18, Junior, Gymnazium Praha 6 Arabska 14, Prague, Czech Republic</td>
<td>T: Simon Hrozinka</td>
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<tr>
<td>CHEM004</td>
<td>Using Microfluidics in Metabolic Engineering for Environmental Protection</td>
<td>Lukas Drla, 19, Junior, Gymnazium Brno, Trida Kapitana Jarose, Prispevkova Organizace, Brno, South Moravian Region, Czech Republic, T: Veronika Kyasova</td>
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<td>PLNT001</td>
<td>Analysis of Gene Interaction Between the Transcription Factor and Genes That Regulates Flowering of Arabidopsis thaliana</td>
<td>Adela Uhrova, 18, Junior, Gymnazium Boticska, Praha 2, Prague, Czech Republic, T: Vlasta Cepelova</td>
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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 Dubsk, 19, Senior, Gymnazium Brno-Heckovic, 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 Lillebaelt, 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 Sjaelland, 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 Elmahlawy, 17, Senior, Mohamed Ahmed Mohamed Elsayed Elbarraz, 18, Senior, Glory American School, Mansoura, Dakahlia, Egypt, T: Mohamed Elghohary

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

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 Elsrag, 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 Kholfi

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
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, Noureldin 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 Truumaa

GERMANY
Hamburg, Germany, DEU001, Jugend Forscht
ANIM003  Land-based Aquaculture — Sustainable!
Tonya Avemarg, 16, Junior, Gymnasium Altenholz, Altenholz, Schleswig-Holstein, Germany, T: Annika Oeverdiek

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-Wurttemberg, 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
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 Christophorussschule 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 Germann, 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 Aba 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-Joseph Du Cap-Haitien, Cap-Haitien, Nord, Cap-Haitien, Haiti, T: Andralle Cherfilis

MATS054T  Optimum
Djessane (Annie) Dorothe Flygneau, 17, Senior, Wenshley Jn Baptiste, 18, Senior, Abigaelle Belizaire, 19, Senior, College Dominique Savio, Pétion-Ville, Port-au-Prince, Haiti, Collège Dominique Savio, Pétion-ville, Ouest, Haiti, T: Darnley Begin

HUNGARY
Budapest, Hungary, HUN001, Innovation Contest for Young Scientists
ENEVO05  Rusty: The Social Mirror Technology
Nora Anna Kovacs, 18, Senior, Janos Zsigmond Unitarian High School, Cluj-Napoca, Cluj, Romania, T: Ervin Gyenge
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| **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, INDO01, 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, 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 Rajashekar 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 CO₂ 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 |
| **ENEV065** | 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 |
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<tbody>
<tr>
<td>MATH020</td>
<td>On Enumeration of Semigroup Ideals</td>
<td>Parth Prashant Chavan, 18, Senior, Aditya English Medium School, Pune, Maharashtra, India</td>
<td>T: Jeffery Yu</td>
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<td>MATH023</td>
<td>Elementary Proofs of the Properties of the Sierpinski Gasket Graph</td>
<td>Anushka Tonapi, 14, Freshman, Sri Kumaran Children's Home - CBSE, Bangalore, Karnataka, India</td>
<td>T: Vishnupriya Giridharan</td>
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<tr>
<td>ROBO022</td>
<td>Gradient Boosting Based Optimization Algorithm Using Model Selection to Reduce Overfitting</td>
<td>Agnij Moitra, 15, Sophomore, Birla Vidya Niketan, New Delhi, Delhi, India, T: Deepika Pareek</td>
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<td>ROBO028</td>
<td>A Data-Driven Diagnosis and Prognosis Method for Machinery Tools Based on EMD and Dual-Task Deep Neural Networks</td>
<td>Nandika Auluck, 17, Senior, Sat Paul Mittal School, Ludhiana, Punjab, India, T: Seetaram Maurya</td>
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<td>TMED022</td>
<td>LCNN: Deep Convolutional Network (CNN) for Early Detection of Stage of Liver Disease</td>
<td>Aarna Shekhar, 15, Sophomore, Shri Ram School - DLF Campus, Gurugram, Haryana, India, T: Babita Chahal</td>
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<td>IRAQ</td>
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<td>Erbil, Iraq, IRQ001, INPO (Iraq National Project Olympiad)</td>
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<td>T: Ibrahim Mohammed</td>
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<td>BMED063T</td>
<td>Fever Care</td>
<td>Balla Peshtian Sedeeq#, 15, Sophomore, Ghandi Abdulrahman Mahmood#, 16, Sophomore, Kirkuk Cag Boys College, Kirkuk, Iraq</td>
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<td>EAEV079T</td>
<td>Smart Chilly Water Tank System</td>
<td>Liya Hawkar Askandar, 16, Junior, Nina Halgurd Jalal, 16, Junior, Slemani Girls' High School, Slemani, Iraq, T: Lanya Tofiq</td>
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<td>SOFT048</td>
<td>Shining Me</td>
<td>Nvar Nawrol Ali, 17, Junior, Halabjay Shaheed Communal Boys' College, Halabja, Iraq, T: Mabast Mohsin</td>
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<td>IRELAND</td>
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<td>Dublin, Ireland, IRL001, BT Young Scientist &amp; Technology Exhibition</td>
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<td>T: Avril Gaynor</td>
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<td>ENEV022T</td>
<td>Developing an Economically Viable Desalination Device for Individuals in Developing Countries</td>
<td>Oisin Patrick O'Neill, 16, Sophomore, Darragh James Henderson, 16, Sophomore, Oatlands College, Dublin, Leinster, Ireland</td>
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<td>Dublin 16, Ireland, IRL002, SciFest</td>
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<td>T: Maire Spillane</td>
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<td>MATH007T</td>
<td>A Group-Theoretic Generalization of Pythagoras' Theorem</td>
<td>Liam Timothy Waldron, 18, Senior, Luke O'Sullivan, 18, Senior, Rachel Brenda Griffin, 18, Senior, Killarney Community College, Killarney, Kerry, Ireland</td>
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<td>ISRAEL</td>
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<td>Jerusalem, Israel, ISR001, The Israeli Young Scientists Contest</td>
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<td>T: Dalia Gal</td>
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<td>BMED034</td>
<td>From Gene to Syndrome: Understanding the Relationship Between Alternative Splicing in Elastin and ASD Development</td>
<td>Tamar Tzohari, 17, Senior, Israel Arts and Science Academy, Jerusalem, Israel, T: Israel Rappaport</td>
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<td>CELLO32</td>
<td>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</td>
<td>Lior Lubek, 18, Senior, Ilan Ramon, Hod Hasharon, Central District, Israel</td>
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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 Shafrir, 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

CHEM040T  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

MATS033T  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, 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

MATS015T  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
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<th>PHYS010T</th>
<th>Ninja Had the Noise Canceling Technology: Mechanisms and Application of Saoto-Kikigane</th>
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<td>Michiru Tsurumaru, 17, Junior, Yamaguchi Prefectural Tokuyama Senior Highschool,</td>
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<td>Shunan, Yamaguchi, Japan, T: Takeshi Suetani</td>
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<td>PLNT015</td>
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<td>Discovery of Light-Induced Acquisition of Photosynthetic Capacity in Plant Roots and</td>
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<td>the Examination of Its Evolutionary Advantages</td>
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<td>Momoha Kono, 19, Senior, Secondary School attached to the Faculty of Education,</td>
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<td>the University of Tokyo, Tokyo, Japan, T: Haruka Mitsuohori</td>
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<td>PLNT016T</td>
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<td>Wouldn't Hurt a Fly: The Efficacy of Plant Latex as an Insect Repellent</td>
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<td>Reno Yokoyama, 17, Junior, Haruka Sakate, 18, Senior, Yuna Watari, 17, Junior, Shimane</td>
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<td>Prefectural Hamada High School, Hamada, Shimane, Japan, T: Susumu Fukumitsu</td>
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<td>JORDAN</td>
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<td>Amman, Jordan, JOR001, Science Fair of The Jordanian Ministry of Education</td>
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<td>BEHA005</td>
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<td>Developing a Non-Invasive Eye Tracking Screening Tool for Early Detection of</td>
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<td>Saher Aloran, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu-jama'ah</td>
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<td>BEHA006</td>
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<td>The Power of When: The Influence of Different Chronotypes on Students' Academic</td>
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<td># Leen Hamadeh Allouh, 16, Junior, Tabariah, Irbid, Jordan, Jordan, T: Rasha Zoubi</td>
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<td>CHEM010</td>
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<td>Adsorption of Dyes and Heavy Metals From Water Using a Mixture of Jordanian</td>
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<td>Sewar Sadi Alsalal, 16, Junior, Arwa Bint Abdul Muttalib School, Aqaba, Aqaba,</td>
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<td>Jordan, T: Rania Alfugara</td>
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<td>CHEM014T</td>
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<td>Designing an Approach for Recovering Energy From Waste Polyethylene</td>
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<td>Terephthalate (PET) Bottles and Fibers</td>
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<td>Rama Yousef Hodaib, 17, Junior, Lina Kamal Abd-Al Hafiz, 17, Junior, Jubilee School,</td>
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<td>Amman, Jordan, T: Sawsan Abujammah</td>
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<td>EGSD015T</td>
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<td>EVault: For the Advancement of Energy Storage Technology</td>
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<td>Adham Hesham Alqasem, 16, Junior, Ahmad Awni Al-Dalaal, 17, Junior, Hussein Awad</td>
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<td>Hussein Attia, 17, Junior, Al-Hassad Al-Tarbawi Schools, Amman, Jordan, Al-Hassad</td>
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<td>Al-Tarbawi Schools, Amman, Amman, Jordan, T: Abdallah Harb T: Abdallah Harb</td>
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<td>ENBM014T</td>
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<td>Using Analyzed Data From EEG Readings for Electrical Stimulation of Limb Muscles:</td>
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<td>An Innovative Approach to Neurorehabilitation</td>
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<td>Rashed Abdullah, 17, Junior, Rayyan Theeb, 16, Junior, Saleh Al-Hinti, 16, Junior,</td>
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<td>Islamic Educational College, Amman, Jubieha, Jordan, Islamic Educational College –</td>
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<td>Jubieha, Amman, Jordan, T: Ashraf Abu Khait</td>
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<td>ENEV015T</td>
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<td>A New Concept of ECO-Friendly Material That Can Replace Plastic</td>
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<td>Shahd Omar Daoud, 17, Junior, Mera Alkasassbeh, 16, Junior, Jubilee School, Amman,</td>
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<td>Jordan, T: Sawsan Abujammaha T: Sawsan Abujammaha</td>
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<td>ENEV016T</td>
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<td>Efficient Removal of Ca and Mg Ions From Water Using Jordanian Zeolite:</td>
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<td>A Low-Cost and Recyclable Environmental Solution</td>
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<td>Areen Rami Alashmawy#, 16, Junior, Sara Iyad Altarawne# , 17, Junior, King Abdullah</td>
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<td>MATS014</td>
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<td>Analyzing the Effects of Metal Oxides on the Electrical Properties of Polymers</td>
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<td>With and Without the Presence of Multi-Walled Carbon Nano-Tubes</td>
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<td>Firas Khalil, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu-jama’ah</td>
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<td>KAZAKHSTAN</td>
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<td>Astana City, Kazakhstan, KAZ001, DARYN National Junior Science Projects Competition</td>
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<td>CHEM061</td>
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<td>Study of the Processes of Purification of Aqueous Media From Arsenic Ions Using</td>
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<td>Membrane Sorbents</td>
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<td>Aldiyar Erlanovich Suleimbekov, 16, Sophomore, High School No. 60, Astana, Astana,</td>
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<td>Kazakhstan, T: Anastassiya Mashentseva</td>
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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, KENO01, Kenya Science and Engineering Fair
ENBM035T Biomarkers Based Technology for Detecting Respiratory Infections Using Resin-B-Testing Kit
Musa Latifa Juma, 17, Junior, Casandra 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 Mitchelle Odero, 18, Senior, Moi Girls School Nairobi, Nairobi, Nairobi, Kenya, T: Charles Odero

LATVIA

Riga, Latvia, LVA001, National Centre for Education of the Republic of Latvia
BMED060 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
CHEM026T 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

CHEM030T Solving a Menace to Rice? TCCE Repellent: An Effective and Eco-friendly Turmeric and Clove Combined Extract as Nilapavreta 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
EBED022T  **Blind Swimmer Sensory Device 2.0**
Nik Mifdzal Nik Nubhan, 16, Sophomore, Irfan Darwis Mat Suhaimi, 16, Sophomore, Sekolah Sultan Alam Shah, Putrajaya, Wilayah Persekutuan, Malaysia, T: Samsiah Radiman

ENEVO36T  **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, Nursyazdiziyana Syadzzlin Muhamadazlin, 17, Junior, Sekolah Menengah Kebangsaan Kampong Selamat, Sebrang Perai 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

ENEVO71T  **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 Zooxanthellae 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 Fair
BMED037T  **Antimicrobial Activity of Organic Herbal Extracts Infused With Ozone as a Combination Therapy on Helicobacter pylori**
Basma Khalid Al uwaisi, 17, Junior, Aalaa Yousuf AlAusi#, 16, Junior, Al Amal School, Muscat, Oman, T: Fakhria Al Shibani

CHEM038  **Natural-Based Post-Harvest Elongation**
Ahlam Salim Alhinai, 16, Sophomore, AL Wadi AL Alaa, Bahla, AD Dakhiliyah, Oman, T: Tahani AlShuaili

ENEVO52T  **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
**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, PSEO01, 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, 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, Osama 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, Palestine, T: Rana Khair

**ENEV080**
Investor of Greenhouse Gases
Leen Khalidoun 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 Cientifica 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
POLAND
Warsaw, Poland, PLDO01, E(x)plory Science Fair

EAEV021T Can Anthropogenic Pollutants (Microplastics and Fertilizers) Really Be Dangerous to Freshwater Zooplankton?
Karolina Markiewicz, 16, Junior, Oliwia Gorska, 16, Junior, XL Liceum Ogólnokształcących z Oddziałami Dwujęzycznymi im. Stefana Żeromskiego w Warszawie, Warsaw, Mazowieckie, Poland, T: Kamil Kwiecien

EBED019 ZHELTA: Contactless, Programmable Keyboards for People With Disabilities
Filip Wojciech Piekos, 16, Junior, Zespół Szkol Technicznych i Ogólnokształcących im. Stefanii Banach 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. Stefana Zeromskiego w Warszawie, Warsaw, Masovian voivodeship, Poland, T: Jolanta Nawrocka-Furmanek

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

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 Benvenutti

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 Benvenutti

Ponce, Puerto Rico, TEPR02, Arecibo Regional Science Fair

ANIMO35 The Effect of a Diet on the Life Span of the Danaus plexippus portoricensis Butterfly
Kamilia 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

ENEV051 Irrigation System for Tropical Climate
Angelica Alichea 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
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, TEPRO04, 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, TEPRO05, 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, TEPRO06, 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: Rocio 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

MATS046 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, TEPRO08, Mayaguez Regional Science Fair

ENEV063T Generating Energy From Ocean Waves  
Sofia Isabel Roman Garrasta, 17, Senior, Annabelle Marie Garcia, 18, Senior, Dr. Carlos Gonzalez 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, TEPRO09, San Juan Regional Science Fair

CBIO0035 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
Carolina, Puerto Rico, TEPR12, Puerto Rico Metropolitan Science Fair

**EBED040T**  
**SiOT-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 Abdulaziz 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
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, MDAA01, Moldova Science and Engineering Fair
CHEM065  New Semi-Synthetic Agents With Antibacterial and Antifungal Properties
Iulia Teleuca, 16, Junior, Theoretical High School " Orizont, Durlesti ", Chisinau, Republic
of Moldova, T: Vasili 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 Szedlacek
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
BMED045  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
BMED046  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 Cancereous 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, Ahssa, 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, Ahssa, Saudi Arabia, T: Aasif Helal

EAEV050  A New Approach for Optimizing a Light Scattering Coating Formulated With Different Sized BaSO₄ Particles for Energy Conservation Applications
Deema Mohammed Marwahi, 17, Senior, Al Hussan National Model School For Girls – Jubail, Al Jubaib, 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 Alkhulayfi, 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 Alsusami, 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 H2 Generation Using Novel Defect Engineered Catio3-x/Tio2-x Perovskite Nanostructures Synthesized by Pulsed Laser Processing
#  Leen Ahmed Al-Mulhim, 16, Junior, University Schools, Dhahran, Eastern Province, Saudi Arabia, T: Zozo Ahmed
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 Alarjaf, 17, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: William Roberts

ENEV048 Super Paramagnetic Nanoparticles as a Reusable Delivery System of Pesticides for Simultaneous Water Splitting and Wastewater Treatment
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 CO₂ 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 WO₃/Al₂O₃ 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 CoO.5Ni0.5Fe2-xO4 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 Laversen

PLNT035 The Effects of (Fe₂O₃) Nanoparticles on the Growth, Viability, and Toxicity of Triticum aestivum L. Plants
Layan Almalki, 16, Junior, Alfasialah Islamic Schools, AlKhobar, Saudi Arabia, T: Huseyin Tombologe

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
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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

TMED046  Development of Universal Multi-Target Antibody-Like Vaccines Against the Highly Pathogenic Coronavirus
Faris Alyami, 17, Senior, Sada Al-Ibdaa, Khamis Mushayt, Asir, Saudi Arabia, T: Mohamed Alfaleh

SINGAPORE
Singapore, Singapore, SGPO01, Singapore Science and Engineering Fair
EGSD024  Perfectly Flawed: Leveraging on Defects in AgSbTe2 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

MATS021  Computational Discovery of Highly Sustainable and Efficient Metal-Organic Frameworks for $\text{SO}_2$ Capture
Ruotong Bai, 18, Senior, Hwa Chong Institution, Singapore, Singapore, T: Kelvin Tan

MATS022T  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

PHYS027  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, SVKO02, AMAVET-Slovak Association for Youth, Science & Technology
MATS030  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
PHYS021T  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, ZAFO01, Expo for Young Scientists – South Africa
CHEM008  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
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| **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, Austria Media High School, Ansan-si, South Korea, T: Hyojin Choi |
| **SOFT025** Improving Road Safety With Artificial Intelligence: A Low-Cost AI-CCTV Intervention for Detecting Vehicular Danger  
Jeongtaek Lim, 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, Chungcheongbuk-do, South Korea, T: Myeong Hee Kim T: Myeong Hee Kim |
| **CBIO034** Modeling Viral Evolution and Epidemic Simulation Using Genetic Algorithms  
Dain Kyung, 17, Junior, Chunghnam Science High School, Gongju Si, Chungcheongnam-do, 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 |
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

ETSO07T  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

MATS016  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, Exporecercar 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
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, Utstallningen 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 Naji 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 Erikssonsgymnasiet, Boras, Vastra Gotaland, Sweden, T: Mats Hillensjo

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
BMED047T  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, 17, 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, Nopparuj Sodsri, 17, Junior, Benjamarchutit 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 Kosolpattanadurom, 17, Junior, Chutinun Sukpongjirakul, 17, Senior, Mahidol Wittayanusorn School, Nakhon Pathom, Thailand, T: Kiattipoom Rodpun

TMED073T  A Game-Changing Idea for Rapid Cancer Screening: Detection of Circulating Tumor DNA on the Surface of Red Blood Cells
Matina Boontem, 17, Senior, Kasidech Aewsrisakul, 17, Junior, Pakanan Tussanapirom, 17, Junior, Triam Udom Suksa, Pathumwan, Bangkok, Thailand, T: Kobchai Duangrattanalert
THAILAND

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

ANIMO24T 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

ANIMO25T A Sustainable Approach to Control the Destructive Red Palm Weevil Pests
Sunnyapat Akkarajeerawat, 15, Freshman, Thanatkorn Chauvanasmith, 15, Freshman, Bangkok Christian College, Bangkok, Thailand, T: Wanida Bhu-iam

ANIMO26T 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 Sritchay, 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

ENBM063T 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, June, The Prince Royal's College, Mueang Chiang Mai, Chiang Mai, Thailand, T: Rungkan Wangboon

MATS028T 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 Phiromkaew, 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

TMED066T 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, TURO02, 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 Tirkali 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: Mabkule 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: PÅžnar 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, Gaziantep, Turkey, T: Ozgul Guner
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  

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 Gidirsiiofglu, 18, Senior, Ataturk High School of Science, Istanbul, Istanbul, Turkey, T: Aykut Turunc

TMED024  Personalized Neurooncology Radiogenomic Classification and Recommendation Model With AI and MRI  
Cagan Koska, 16, Sophomore, Izmir Atakent Anadolu Lisesi, Izmir, Turkey, T: Ilker Koska

TMED025T  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

BMED038T  Expansion of Cord Blood Hematopoietic Progenitor Cells in Long-Term Culture on a Hydrogel Substrate in vitro  
Iryna Toporova, 17, Junior, Valerii Holod, 16, Junior, Specialized school No 194 "Perspective", 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 Sydorchuk, 15, Freshman, Zhytomyr City Center of Scientific and Technical Creativity of Student Youth, Zhytomyr, Ukraine, T: Anatoli Shubin

SOFT036  Quick Autonomous Pointer With Local Positioning  
Denys Yuriyovych Hromovyi, 15, Sophomore, Cherkasy Gymnasium #31, Cherkasy, Cherkasy Oblast, Ukraine, T: Yuri 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
MATS011T  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

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  
ENBM025  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  
Joselyn 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 Dijajalie, 17, Junior, Thunder Mountain High School, Juneau, Alaska,  
T: Carol May
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

BMED051  Hypothalamic EZH2: A Key Regulator of Leptin Sensitivity in Obesity
   Baocan 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 Lipid-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
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

ROBOO62  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
Ahona Ghosh, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas,
T: Patrick Foley

ENEV070 A Smart Sponge to Control Oil and Chemical Spills
Olya Sophia Tryndyak, 15, Sophomore, Little Rock Central High School, Little Rock, Arkansas,
T: Beth Maris

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
Regeneron International Science and Engineering Fair 2023

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

**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

**CHEM052**  The Effect of Superabsorbant 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 Aabled
#  Rishabh Vijay Ambavanekar, 17, Junior, Vista del Lago High School, Folsom, California, T: Jessica Abulencia

**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

**ENEVO86**  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

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

**ANIM042** 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

**ANIM028** 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  
Krisha 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
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  
Anwesha 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 Degradate in an Aerobic Home Compost?  
Hazel Campbell, 14, Freshman, Pacific Collegiate School, Santa Cruz, California, T: Elliott Campbell
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
BMED041 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  

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

**MCRO011**  
Am I Effective?  

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 CO₂ 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
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

ENEV043 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

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

EAEV023 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 Combatting Retinal Diseases
Aum Jaykumar Dhruv, 18, Senior, Fort Myers High School, Fort Myers, Florida, T: Anthony Sangermano
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,  
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 CO₂ Sequestration System (A 3rd Year Study)  
###  Amaya Jennifer Etcheverry, 16, Junior, Community School of Naples, Naples, Florida,  
ENEV041  Using *Chlorella vulgaris* and *Spirulina major* To Create an Open System Bioreactor Generating Electricity While Running an Air Purification and CO₂ Sequestration System (A 3rd Year Study)  
###  Amaya Jennifer Etcheverry, 16, Junior, Community School of Naples, Naples, Florida,  
T: Kelly Percivall

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,  
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
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: Brittnee McDole

TMED078  The Effect of Nicotinamide on the II-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

BCHMO35  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
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 Fucoidan 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
<table>
<thead>
<tr>
<th>Project Number</th>
<th>Title</th>
<th>Author(s)</th>
<th>School/Location</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAEV008</td>
<td>Hurricane Rapid Intensification Convolutional Neural Network: A Novel Deep Learning Model for Predicting Tropical Cyclone Rapid Intensification Using 20 Years of Satellite Rainfall Data</td>
<td>Sunny You, 16, Junior, Miami Palmetto Senior High School, Pinecrest, Florida, T: Pamela Shlachtman</td>
<td>Miami Palmetto Senior High School, Pinecrest, Florida</td>
<td>T: Pamela Shlachtman</td>
</tr>
<tr>
<td>EAEV084T</td>
<td>The Resilience of <em>Daphnia</em> to Liquid Household Products</td>
<td>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</td>
<td>Downtown Doral Charter Upper School, Doral, Florida</td>
<td>T: Merly Ovares; T: Merly Ovares</td>
</tr>
<tr>
<td>MATH008</td>
<td>A Logistic Regression Model Representing the Genetic Landscape Differences Between Bipolar Disorder 1 and Bipolar Disorder 2</td>
<td>Lucas Gutman, 17, Junior, iPrep Academy North, Miami, Florida, T: David Buncher</td>
<td>iPrep Academy North, Miami, Florida</td>
<td>T: David Buncher</td>
</tr>
<tr>
<td>TMED008</td>
<td>Leveraging AI to Assist Cardiovascular Disease Diagnosis</td>
<td>Ethan Thomas, 16, Sophomore, Ransom Everglades School, Miami, Florida, T: Susan Mactye</td>
<td>Ransom Everglades School, Miami, Florida</td>
<td>T: Susan Mactye</td>
</tr>
<tr>
<td>CHEM005T</td>
<td>Design of Experiment Optimisation of the Suzuki Cross-Coupling: A Synthesis of Biphenyl, Catalysed by Palladium Tetrakis, from Phenylboronic Acid and Bromobenzene</td>
<td>Diana Gegaj#, 17, Senior, Litian Zheng, 18, Senior, Vanguard High School, Ocala, Florida, T: Eddy Rey-Castellanos</td>
<td>Vanguard High School, Ocala, Florida</td>
<td>T: Eddy Rey-Castellanos</td>
</tr>
<tr>
<td>MCRO002</td>
<td>Bi-Directional Hygiene: Using the Microbiome to Combat Nosocomial Infection</td>
<td>Kritik Seela, 17, Senior, Lake Highland Preparatory School, Orlando, Florida, T: Lisa Davenport</td>
<td>Lake Highland Preparatory School, Orlando, Florida</td>
<td>T: Lisa Davenport</td>
</tr>
<tr>
<td>CBIO017</td>
<td>Using Artificial Intelligence Neural Networks to Repurpose Pre-Existing Drugs and Analyze Drug Relationships, Year 3</td>
<td>Genesis Angelyne Cely, 17, Senior, Trinity Preparatory School, Winter Park, Florida, T: Romina Jannotti</td>
<td>Trinity Preparatory School, Winter Park, Florida</td>
<td>T: Romina Jannotti</td>
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<tr>
<td>MATS052</td>
<td>The Novel Development of a Bio-Based Smart Material for Pharmaceutical Packaging and Temperature Insulation</td>
<td>Ashna Mathur, 16, Sophomore, Lake Highland Preparatory School, Orlando, Florida, T: Lisa Davenport</td>
<td>Lake Highland Preparatory School, Orlando, Florida</td>
<td>T: Lisa Davenport</td>
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<tr>
<td>PHYS066</td>
<td>Extending the Analysis of TNO Data to Longer Wavelengths in Advance of James Webb Space Telescope Data</td>
<td>Aryan Pathak, 17, Junior, Lake Highland Preparatory School, Orlando, Florida, T: Lisa Davenport</td>
<td>Lake Highland Preparatory School, Orlando, Florida</td>
<td>T: Lisa Davenport</td>
</tr>
<tr>
<td>Wildwood, USFL18</td>
<td>Aloe...Is It Me You're Looking for? A Clinical Trial to Determine the Effect of Aloe Vera on Dogs' Skin Allergies</td>
<td>Kadie Mariano, 17, Junior, Wildwood High School, Wildwood, Florida, T: Emily Keeler</td>
<td>Wildwood High School, Wildwood, Florida</td>
<td>T: Emily Keeler</td>
</tr>
<tr>
<td>EAEV007</td>
<td>Are Growth Rates of Pine Trees Affected by Depth to Groundwater?</td>
<td>Alynza Isabella McBride, 16, Sophomore, South Sumter High School, Bushnell, Florida, T: Stephanie Yarbough</td>
<td>South Sumter High School, Bushnell, Florida</td>
<td>T: Stephanie Yarbough</td>
</tr>
<tr>
<td>ENBM010</td>
<td>A Method for Papnicolaou Tests Utilizing a Novel Cytobrush To Reduce Acute Pain and Increase Effective Sample Collection</td>
<td>Hannah Grace Kennedy, 18, Senior, The Villages Charter High School, The Villages, Florida, T: Monica Vinas</td>
<td>The Villages Charter High School, The Villages, Florida</td>
<td>T: Monica Vinas</td>
</tr>
</tbody>
</table>
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

CELL026 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

CELL026 Pollution Tracker
Shrinithi Sridhar, 15, Freshman, Pensacola High School, Pensacola, Florida, T: Suzanne Ryals

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 Macrophoma 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 Kiros, 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 Concias, 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
Howey In The Hills, USFL34, Lake County Regional Science & Engineering Fair

**BMED005**  
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

**MATS024**  
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 Derousie

**ROBO010**  
Motion Profiling Algorithm for Improved Intelligent Machine Target Correction  
Alexander James Gordon, 17, Junior, Ridgeview High School, Orange Park, Florida,  
T: Bethany Derousie

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

**BMED058**  
Utilizing *Caulobacter crescentus* To Target the Bcl-2 Gene and NF-kB 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

**BMED015**  
Identification of Environmental Risk Factors Triggering Amyotrophic Lateral Sclerosis in Veterans  
Ella Grace Sipe, 15, Sophomore, North Atlanta High School, Atlanta, Georgia,  
T: Dana Peeples
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

TMED005 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

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

ANIMO50 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

BMED016 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
**MCRO018T** 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

**MCRO019** 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

**ENBM023** 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**

**MATS001** 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

**Athens, USGA50, Georgia State Science and Engineering Fair**

**EBED043T** Micro-Q: A Low-Cost, Portable, IoT-Based Fluorometer  
Vineeth Sendilraj, 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
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

EAEV076 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

Lihue, USHI04, Kauai Regional Science & Engineering Fair

ANIMO43 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

ANIMO07 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
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

MATS008  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: Sana 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: Whitney Aragaki

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: Pat Blount

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  
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
PLNT039  Inhibiting Fungi Growth With Iodine, Sodium Thiosulfate, and Vitamin C  
Savannah Kaylee Curtis, 15, Freshman, Northwestern High School, Kokomo, Indiana, T: Linda Wilson

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

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

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

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

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
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 Cu2+, Pb2+, and Cd2+ 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

MATS047  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: Katherine Cail

**ENBM041**  
**A Non-Invasive and Novel Method for the Early Detection of Pancreatic Cancer**  
Kritik Varma Nadimpally, 16, Junior, Ballard High School, Louisville, Kentucky,  
T: Glenda Jones

**PHYS014**  
**Quarkonium Dynamics in Phase Space**  
Gabriel Ayden Nowakie, 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 Mohrman, 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**

**BMED026**  
**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

**TMED034**  
**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
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

MATS042  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
ENBM003  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

MATS004  The Removal of Lead(II) and Chromium(VI) Ions From Water Using UV-C Light and Immobilized TiO₂ Nanoparticles
# Keanna Luo, 18, Senior, Baton Rouge Magnet High School, Baton Rouge, Louisiana, T: Lai Cao

TMED002  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

TMED038  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
CHEM003 Preserving Aquatic Life From the Harmful Effects of Ocean Acidification
Suinnamon 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

PLNT026 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
Frederick, USMD02, Frederick County Science and Engineering Fair
ENBM060T 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
CHEM042 Highly Electrically Conductive Biomass-Derived Carbon Fibers
Julia Artemis Gelfond, 18, Senior, Montgomery Blair High School, Silver Spring, Maryland, T: Angelique Bosse
ENBM055 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
MATS041 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
Aliana 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
TMED041 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
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 dorotocephala 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

EAEVO66T 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 Mudenur, 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

MATS048 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
Nagamitesh Nagamuralee, 17, Senior, Lexington High School, Lexington, Massachusetts, T: Cheryl Zurbrick

ROBO076 A Novel Pneumatically-Actuated Soft Robotic Hand With 3D Vision-Based Telegoperation
Hanna Matusik, 16, Junior, Lexington High School, Lexington, Massachusetts, T: Reginald Hobbs

MICHIGAN

Farmington, USMIO2, 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
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

TMED036  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, USMI03, 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

TMED039  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, USMI07, 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

TMED040  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
MINNESOTA

Duluth, USMN02, Northeast Minnesota Regional Science Fair
BMED001 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
### 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 Krægtorp
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 Dage, 17, Junior, Eden Prairie High School, Eden Prairie, Minnesota, T: Princesa 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 Nihar 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

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

BMED018 Metheuristics 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

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, USMS05, 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, USMOO1, 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, USMOO3, 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, USMOO4, 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
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

ENEVO66 Novel Application of Oidiodendron 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

EAEVO83T Investigation of Fecal Indicator Bacteria in the Baker Lake via Monitoring of Fecal Coliforms and Genomic Analysis
Cheyanne 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

CELLO31 The Impact of Gut-Brain Neurotransmitter Signaling on Reproductive Success
Faith Vyn You, 16, Sophomore, Hellgate High School, Missoula, Montana,
T: Willow Affleck

CELLO58 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
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

BMED012  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

BMED033  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

BMED031  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

ENEVO35  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
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

MATS045  GLASS: A Geometric Local Attention-Based Model to Design Superconducting Structures
Andy Xu, 17, Senior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni

MATS049  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
NEW MEXICO

Albuquerque, USAISO, National American Indian Science and Engineering Fair

ENEV064 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

TMED062 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

EAEV080 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

ANIM040 A Fault Management System for Deep-Space CubeSats
Landon Flemming, 18, Senior, Explore Academy, Albuquerque, New Mexico, T: Melissa Chouinard-Jahant

TMED055 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 Tsaile 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

ENEV033 Engineered Underwater Vehicle for Ocean Litter Mapping
Daniel Kim, 17, Junior, Los Alamos High School, Los Alamos, New Mexico, T: Michela Ombelli

ENEV034 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

ENEV084T 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
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 Deterring 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

BMED065  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
---
Naflah Farid Mohammed, 16, Junior, John Jay Senior High School, Hopewell Junction, New York, T: Leah Miller

Halesite, USNY02, Long Island Science and Engineering Fair

ANIMO21  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

BMED021  Investigating the Anti-Inflammatory Effects of Famotidine
---
Jake Ethan Konigsberg, 17, Senior, Roslyn High School, Roslyn Heights, New York, T: Allyson Weseley

BMED028  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
<table>
<thead>
<tr>
<th>Entry Code</th>
<th>Title</th>
<th>Student Names and Schools</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAEV039</td>
<td>Cost-Effective Air Quality Monitoring Using Readily Available Programming Interfaces</td>
<td>Kevin Mauricio Leal, 17, Senior, Brentwood High School, Brentwood, New York, T: Rebecca Grella</td>
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<tr>
<td>EGSD021</td>
<td>Production of Plasma-Enhanced SiO, Films for Optimizing Photovoltaic Cells</td>
<td>Emily Gloria Theodosopoulos, 18, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger</td>
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<td>ENEV024T</td>
<td>Developing a Hydroponic System With the Incorporation of an Arduino Uno Powered pH Sensor</td>
<td>Sofia Eliza Maciel-Seidman, 16, Junior, Joy Kim, 17, Junior, Riya Saha, 16, Junior, Bethpage High School, Bethpage, New York, T: Nicole Dulaney</td>
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<tr>
<td>MCRO022</td>
<td>Pioneering Microbial Communities and Biofilm Succession on Plastic in a New York City Waterway</td>
<td>Sammer Soliman, 18, Senior, John F. Kennedy High School, Bellmore, New York, T: Barb Frank</td>
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<td>PLNT023</td>
<td>Alteration in Concentration and Spatial Distribution of Selenium, Copper, and Essential Physiological Micronutrients in Saccharina latissima in a Dose Response to Carbon Dioxide</td>
<td>Jack Charles Schultz, 18, Senior, Westhampton Beach High School, Westhampton Beach, New York, T: Dianna Gobler</td>
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<td>SOFT020</td>
<td>Fusing ConvNeXt and Histogram of Oriented Gradients (CNHOG) for Modular and Efficient Driver Distraction Detection</td>
<td>Samay Lakhan, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla</td>
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<td>New York, USNY03, Terra New York City STEM Fair</td>
<td>Can SLEAP be Used to Track and Quantify Octopus Arm Movement?</td>
<td>Tara Isabel Lago, 17, Senior, Mariella Reynoso, 18, Senior, Staten Island Technical High School, Staten Island, New York, T: John Davis</td>
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<td>ANIM047T</td>
<td>Development of a Short Peptide to Prevent Non-Thrombogenic Clot Formation on Hydrophobic Surfaces</td>
<td>Rommy Sasson, 18, Senior, Brooklyn Technical High School, Brooklyn, New York, T: Michael Estrella</td>
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<tr>
<td>BEHA056</td>
<td>Auditory Acuity and Auditory Feedback Response in Children With and Without Residual Speech Sound Disorder</td>
<td>Asuka Koda, 18, Senior, The Bronx High School of Science, Bronx, New York, T: Max Chomet</td>
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<td>BMED061</td>
<td>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</td>
<td>Kun-Hyung Roh, 18, Junior, The Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov</td>
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</tbody>
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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
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

MATS029  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  
Alissa 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

TMED044  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

TMED045  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

TMED048  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

TMED049  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
Syracuse, USNY06, Central New York Science and Engineering Fair

**BMED052** Process of Developing MccJ25 as Universal Antimicrobial Drug
Manya Kukkar, 14, Freshman, Vestal Senior High School, Vestal, New York, T: Vinita Kukkar

**BMED055T** 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

Syracuse, 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

**TMED054** 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 Mallar, 17, Senior, William A. Shine Great Neck South High School, Great Neck, New York, T: Nicole Spinelli

**BMED048** 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
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 ionicornis Ticks in New York Schoolyards: Implications for Spread of Tick-Borne Disease
Audrey Erin Schnecker, 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 × 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 CO₂ and CH₄ 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
BMED011  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
BMED043  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

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

ENBM057  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 Gotwalls

ENBM061T  ARAID: 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 CRYSICALS-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

TMED047  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

TMED052  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
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<th>Project Title</th>
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<th>Regional Fair</th>
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<tr>
<td>TMED069</td>
<td>Is It Worse Than Nicotine?</td>
<td>James Gessey, 16, Sophomore, Flasher High School, Flasher, North Dakota,</td>
<td>Flasher High School</td>
<td>Southeast North Dakota Regional Science and Engineering Fair</td>
<td>Tana Schafer</td>
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<td>BEHA037</td>
<td>Examining the Effects of Media-Related Confirmation Bias on Adults</td>
<td>Kardelen Joy Hanson, 17, Junior, Hankinson Public School, Hankinson, North Dakota,</td>
<td>Hankinson Public School</td>
<td>Southeast North Dakota Regional Science and Engineering Fair</td>
<td>Patty Kratcha</td>
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<tr>
<td>MCRO042</td>
<td>Brush Up!</td>
<td>Kenadi Marie David, 16, Sophomore, Hankinson Public School, Hankinson, North Dakota,</td>
<td>Hankinson Public School</td>
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<td>Patty Kratcha</td>
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<tr>
<td>Tioga, USND06, Northwest North Dakota Regional Science Fair</td>
<td>Brand vs. Natural</td>
<td>Madison Evelyn Mock, 15, Freshman, Trenton High School, Trenton, North Dakota,</td>
<td>Trenton High School</td>
<td>North Dakota State Science and Engineering Fair</td>
<td>Robert Turcotte</td>
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<td>MCRO049</td>
<td>Sporty Bacteria</td>
<td>Jada Rose Turcotte, 17, Junior, Trenton High School, Trenton, North Dakota,</td>
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<td>ROBO050</td>
<td>Paramount Power Plow</td>
<td>Gracie Nutt, 18, Senior, Tioga High School, Tioga, North Dakota,</td>
<td>Tioga High School</td>
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<td>Deb Moe</td>
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<td>Watford City, USND50, North Dakota State Science and Engineering Fair</td>
<td>Water Daphnia vs. Marine Pollutants</td>
<td>Karlee Rose Hoyt, 17, Junior, Trenton High School, Trenton, North Dakota,</td>
<td>Trenton High School</td>
<td>North Dakota State Science and Engineering Fair</td>
<td>Robert Turcotte</td>
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<td>ENEV057</td>
<td>Sustainable Hydroponic Production Using Automated Agricultural Nutrient Reclamation</td>
<td>Gavin Donald Kratcha, 17, Junior, Hankinson Public School, Hankinson, North Dakota,</td>
<td>Hankinson Public School</td>
<td>North Dakota State Science and Engineering Fair</td>
<td>Patty Kratcha</td>
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<td>MCRO044</td>
<td>Antimicrobial Resistance of a Biofilm-Forming Pathogen Probed With Antipyretic Pharmaceuticals and Antibiotics</td>
<td>Jada Rose Bonogofsky, 18, Senior, Flasher High School, Flasher, North Dakota,</td>
<td>Flasher High School</td>
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<td>Tana Schafer</td>
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<td>Athens, USOH01, Southeastern Ohio Regional Science and Engineering Fair</td>
<td>A Human Ultrasonic Echolocation Device for Assisting the Visually Impaired</td>
<td>Macy Long, 18, Senior, Zane Trace High School, Chillicothe, Ohio,</td>
<td>Zane Trace High School</td>
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<td>John Scott</td>
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<td>Clevelan Heights, USOH02, Northeastern Ohio Science and Engineering Fair</td>
<td>Comparing the Effectiveness of Verbal and Visual Prompting on Verbal and Nonverbal Students With Autism</td>
<td>Taylor Schindley, 17, Senior, Mentor High School, Mentor, Ohio,</td>
<td>Mentor High School</td>
<td>Northeastern Ohio Science and Engineering Fair</td>
<td>Lori Cohen</td>
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<td>BMED030</td>
<td>Role of CRMP2 Interaction With Kinase CDK5 in Forming the Neurofibrillary Tangles of Alzheimer's Disease</td>
<td>Samyuktha Krishna Iyer, 17, Junior, Laurel School, Shaker Heights, Ohio,</td>
<td>Laurel School</td>
<td>Northeastern Ohio Science and Engineering Fair</td>
<td>Kimberly Corrigan</td>
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<td>EAEV038</td>
<td>Examination of the Differences in Physiological Responses of Daphnia to Different Chemical Pollutants</td>
<td>Madeleine M Bender, 18, Senior, Mentor High School, Mentor, Ohio,</td>
<td>Mentor High School</td>
<td>Northeastern Ohio Science and Engineering Fair</td>
<td>Lori Cohen</td>
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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
BMED023  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

ENBM024  Real-Time Microfluidic Evaluation of Hemostatic Properties of Procoagulant Synthetic Platelets
#  Neha Sangani, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio,
T: Andrew Clifford

ENBM027  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

BMED057  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

TMED072  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 Pehmoeller, 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 Ghori, 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, Styring 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 dorotocephala
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
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<th>Symposium</th>
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<th>City, State</th>
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<td>USOR05</td>
<td>Enbm016 Spatiotemporal-Aware Glioblastoma Multiforme Tumor Growth Modeling With Deep Encoder-Decoder Networks</td>
<td>Rishab Kumar Jain, 18, Senior, Westview High School, Portland, Oregon</td>
<td>Taylor Kauffman</td>
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<td>MATS013 Novel Small Scale Carbon Dioxide Capture Polymer Membrane for Sudden Infant Death Syndrome Prevention</td>
<td>Autri Aparajita Das, 16, Sophomore, Sunset High School, Portland, Oregon</td>
<td>Korin Riske</td>
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<td>SOFT014 CompaCT: Fractal-Based Heuristic Pixel Segmentation for Enhanced Lossless Compression of High-Color DICOM Medical Images</td>
<td>Taaha Khan, 16, Sophomore, Sunset High School, Portland, Oregon</td>
<td>Korin Riske</td>
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<td>Portland,</td>
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<td>ANIM010 The Effect of Circulating ACTH and Insulin Hormones on Equine Temperament</td>
<td>Lauren Raine Tittel, 16, Sophomore, Oregon Episcopal School, Portland, Oregon</td>
<td>Bettina Gregg</td>
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<td>EAEV009 The Effect of Rainwater Origin on the Heavy Metal Content, pH, and Ion Percentage</td>
<td>Jiaming Zhang, 15, Sophomore, Oregon Episcopal School, Portland, Oregon</td>
<td>Bettina Gregg</td>
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<td>EGSD004 Urea Concentration on Microbial Fuel Cell Power Output for Applications in Waste Management</td>
<td>Nina Kaiser, 16, Sophomore, Oregon Episcopal School, Portland, Oregon</td>
<td>Peter Kimball</td>
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<td>Wilsonville,</td>
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<td>SOFT007 Engineering a Component-Based Programming Language</td>
<td>Diego Zhen-Yi Frias, 16, Sophomore, Oregon Episcopal School, Portland, Oregon</td>
<td>Bettina Gregg</td>
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<td>Wilsonville, USOR06, CREST-Jane Goodall Science Symposium</td>
<td>Annamika Konkola, 15, Sophomore, West Linn High School, West Linn, Oregon</td>
<td>Brian Delfatti</td>
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<td>EAEV015 T Microscopic Menace: What Are the Effects of Cyanobacteria Blooms on Primary Productivity, Toxicity, and Microorganisms?</td>
<td>Melinda Lin#, 17, Senior, Uma Aditi Grover#, 17, Senior, West Linn High School, West Linn, Oregon</td>
<td>Julie McDevitt</td>
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<td>EBED012 ASCEND: Aqueous Spectrometric Copper-Electrolytic Nutrient Detector</td>
<td>Aditi Bhaskar, 18, Senior, Wilsonville High School, Wilsonville, Oregon</td>
<td>CJ Koll</td>
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<td>TMED028 T Identifying Relationships Between the Gut Microbiome and Melanoma Patients' Responses to Immunotherapy Using Machine Learning Techniques</td>
<td>Arush Goswami, 15, Freshman, Anish Goswami##, 18, Senior, Wilsonville High School, Wilsonville, Oregon, West Linn High School, West Linn, Oregon</td>
<td>Harold Collier</td>
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<td>Salem, USOR07, Central Western Oregon Science Expo</td>
<td>PHYS008 Simulating the Dynamics, Collisions, and Morphology of Galactic Ultralight Dark Matter Haloes</td>
<td>Leon Garcia, 18, Senior, Corvallis High School, Corvallis, Oregon</td>
<td>Matthew Kirby</td>
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<td>Bend, USOR08, Central Oregon Community College Regional Science Expo</td>
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<td>CHEM032 Efficiently Screening the Most Abundant Bioactive Molecular Moiety: In silico Structure Property Relationships of Primary Amide Bioisosteres</td>
<td>Curran Robert Jacobus, 16, Junior, Bend Senior High School, Bend, Oregon</td>
<td>Casie Bullock</td>
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<td><strong>TMED018</strong> DermaSkan: Using Convolutional Neural Networks to Detect and Prevent Skin Cancer in Underrepresented Communities by Using an Android App&lt;br&gt;Emma Johl Nordstrom, 17, Junior, Trinity Lutheran School, Bend, Oregon, T: Thomas Stueve</td>
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<td><strong>Banks, USOR50, Northwest Science Expo</strong></td>
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<td><strong>ENEV083</strong> Smart Wildlife Sentinel (SWS): Preventing Wildlife-Vehicle Collisions and Monitoring Road Ecology With Embedded IoT Systems and Deep Learning&lt;br&gt;Alan Peijun Ma, 18, Senior, Jesuit High School, Portland, Oregon, T: Lara Shamieh</td>
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<td><strong>MCRO062</strong> Mush-Room for Improvement&lt;br&gt;Yuankai Alex Gao, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg</td>
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<td><strong>PHYS062</strong> Skew-Axis Cylinder Lens Optical System: Novel Method of Clinical Optometry of Astigmatism, Characterization, Theoretical Modelling, and Implementation&lt;br&gt;Alexander Plekhanov, 17, Junior, Beaverton Academy of Science and Engineering, Hillsboro, Oregon, T: Melissa Shell</td>
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<td><strong>PLNT050</strong> Seed Morphology and Dispersal of Achyrachaena mollis&lt;br&gt;Rachel Catherine Warner, 18, Senior, Oregon City High School, Oregon City, Oregon, T: Elizabeth Scott</td>
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<td><strong>PLNT051T</strong> Modeling the Impacts of Daikon Cover Crop Water Storage in Dry Farming&lt;br&gt;Grace Sato, 18, Senior, Alan James Kolesnikov, 17, Senior, West Linn High School, West Linn, Oregon, T: Geoff Bingham</td>
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<td><strong>ROBO069</strong> NeuroMotus: An Intelligent Exoskeleton System to Improve Cerebral Palsy Patient Mobility Using Brain Computer Interface&lt;br&gt;Ishan Ahluwalia, 17, Junior, Jesuit High School, Portland, Oregon, T: Lara Shamieh</td>
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<td><strong>PENNSYLVANIA</strong></td>
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<td><strong>Harrisburg, USPA01, Capital Area Science and Engineering Fair</strong></td>
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<td><strong>ENBM084</strong> Wearable Memory Assistive Device for Dementia and Alzheimer’s Patients Using Machine Learning Facial Recognition&lt;br&gt;Anshi Paul, 15, Sophomore, Hershey High School, Hershey, Pennsylvania, T: Jason Sibbach</td>
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<td><strong>ROBO074</strong> A Novel Convolutional Neural Network Random Forest Hybrid Model to Aid in the Identification of Tree Species Using Multispectral and LiDAR Data&lt;br&gt;Isaiah Antoine Houssou, 15, Sophomore, Camp Hill High School, Camp Hill, Pennsylvania, T: Amy Diehl</td>
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<td><strong>Lancaster, USPA02, North Museum Science and Engineering Fair</strong></td>
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<td><strong>BMED020</strong> Immune Checkpoint Regulation in Molecular Subtypes of Endometrial Cancer: Expression of PD-L1 and PD-1&lt;br&gt;Dominick Baksh, 16, Sophomore, Lancaster Catholic High School, Lancaster, Pennsylvania, T: Anne Bleistine</td>
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<td><strong>Exton, USPA03, Delaware Valley Science Fairs</strong></td>
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<td><strong>BCHM032</strong> Determining Most Effective Method of Inhibiting Breast Cancer Inducing Protein RAD52, Year 2&lt;br&gt;Dhaval Tantry, 18, Senior, Central Bucks High School East, Doylestown, Pennsylvania, T: Mark Hayden</td>
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<td><strong>CBIO051</strong> CAPCODRE: A Computational Systems Biology and Machine Learning-Based Approach to Predict Cognitive Disorder Risk in the Elderly&lt;br&gt;Srilkeha Mamidala, 17, Junior, Garnet Valley High School, Glen Mills, Pennsylvania, T: Brenda Frost</td>
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<td><strong>CBIO052</strong> Machine Learning Identification of Potential PARP-1 Inhibitors for Alzheimer’s Disease Treatment&lt;br&gt;Yueyi Bao, 16, Sophomore, The Hill School, Pottstown, Pennsylvania, T: Jared Courtney</td>
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<td>CBIO061 MicroScan: A Computer Vision Tool To Assist Malaria Microscopy Diagnosis</td>
<td>Anish Kishor Pallod, 15, Freshman, Parkland High School, Allentown, Pennsylvania, T: Kaitlin Heintzelman</td>
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<td>ENBM076 Stroke Rehabilitation Crutch Robot With Auto-Follow and Fall Alarming System</td>
<td>Zeshen Chen, 17, Sophomore, The Hill School, Pottstown, Pennsylvania, T: Hoda Ehsan</td>
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<td>MCRO066 Targeting Signaling Molecules of <em>P. aeruginosa</em> by Using Mucin as an Anti-Quorum Sensing Drug: A Novel Design To Evaluate Efficacy in the Context of Multidrug Resistance</td>
<td>Maryam Abdel-Azim, 16, Junior, Central Bucks High School East, Doylestown, Pennsylvania, T: Judith Elinow</td>
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<td>PHYS064 Adding Kepler Data to a TESS Exoplanet Classification Model: A Novel Approach in Exoplanet Classification Utilizing Deep Learning</td>
<td>Jerry Lu Wang, 14, Freshman, Parkland High School, Allentown, Pennsylvania, T: Kaitlin Heintzelman</td>
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<td>PLNT055 Correlation Between Various Methods of Fertilizer and Development of <em>Salicornia europaea</em></td>
<td>Sarah Nicole Taylor, 18, Senior, The Marine Academy of Science and Technology, Highlands, New Jersey, T: Liza Baskin</td>
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<td>ROBO072 Rapid Cardiac Screening Using Deep Learning: A Novel Interpretable AI Model for Cardiovascular Health Assessment</td>
<td>Samuel Wang, 17, Senior, Germantown Academy, Fort Washington, Pennsylvania, T: Sarah Kesten</td>
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<tr>
<td>SOFT043 Low-Cost Real-Time Silent Communicator for Complete Quadriplegia (Paralyzed) Patients</td>
<td>Sonia Leo, 14, Freshman, Moorestown High School, Moorestown, New Jersey, T: Sean Watson</td>
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<tr>
<td>TMED064 Mesenchymal Stem Cell Therapy for Celiac Disease</td>
<td>Grace S. Yacobe, 16, Sophomore, Academy of Notre Dame de Namur, Villanova, Pennsylvania, T: Jessica Reid</td>
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<tr>
<td>Pittsburgh, USPA04, Pittsburgh Regional Science &amp; Engineering Fair</td>
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<tr>
<td>CBIO044 An Iterative Neural Network Based Approach to Automated IFT-20 Sensory Neuron Identification in <em>Caenorhabditis elegans</em></td>
<td>Arvind Seshan, 18, Senior, Fox Chapel Area High School, Pittsburgh, Pennsylvania, T: Justin Patterson</td>
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<tr>
<td>CHEM050 Photopolymerized Superabsorbent Polymers Prepared From Bio-Resources</td>
<td>Grace Li Wang, 18, Senior, Franklin Regional Senior High School, Murrysville, Pennsylvania, T: Todd Binng</td>
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<td>ENBM067 An Empirical Evaluation of Textiles for Reusable Menstrual Pads</td>
<td>Nina Cranor, 17, Junior, Pittsburgh Science and Technology Academy, Pittsburgh, Pennsylvania, T: Brian Rose</td>
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<tr>
<td>MCRO050 Biosynthetic Engineering of Novel Multifunctioning Electroactive Bacterial Cellulose-Carbon Nanotube Therapeutic Bandages for Rapid Clearance of Vancomycin-Intermediate <em>Staphylococcus aureus</em></td>
<td>Daniel Levin, 18, Senior, Pittsburgh Allderdice High School, Pittsburgh, Pennsylvania, T: Janet Waldeck</td>
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<tr>
<td>PHYS052 Application of Luminosity Modulus in Exoplanet Transits</td>
<td>James Terrell, 17, Junior, Sewickley Academy, Sewickley, Pennsylvania, T: Benjamin Spicer</td>
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<tr>
<td>SOFT038 Finding JavaScript Vulnerabilities With Concolic Execution Using Switched MUS Reduction on Quivers</td>
<td>Landon Penn Colaresi, 17, Senior, Pittsburgh Allderdice High School, Pittsburgh, Pennsylvania, T: Janet Waldeck</td>
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Reading, USPA05, Reading and Berks Science and Engineering Fair

ANIM031  Visible Light and Its Influence on the Embryonic Viability of the Cricket Acheta domesticus  
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
Regeneron International Science and Engineering Fair 2023

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
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

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

TMED001 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
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

CHEMO31T  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
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

MATSO03  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: Lindsi 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
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

## 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
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Authors</th>
<th>Schools/Institutions</th>
<th>Mentors</th>
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<tbody>
<tr>
<td>MATS010</td>
<td>Carbon Dioxide Capture and Storage Utilizing Metal Hydroxides and Biochar</td>
<td>Grace J. Huh, 16, Sophomore, Westwood High School, Austin, Texas,</td>
<td>T: William Davis</td>
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<td>ROBO013</td>
<td>REPNET: A Reproductive Training Architecture for Reinforcement Learning Neural Networks</td>
<td>Tiernan Lindauer, 18, Senior, Vista Ridge High School, Cedar Park, Texas,</td>
<td>T: Jacob Hoffman</td>
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<td>TMED010</td>
<td>The Cross-Application of Oxidative Stress Conceptualizations to Inflammatory Microglia’s Role in Neurological Diseases for Candidate Drug Discovery</td>
<td>Amna Siddiqui, 16, Sophomore, Austin Peace Academy, Austin, Texas,</td>
<td>T: Nahed Abougalala</td>
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<td>Laredo</td>
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<td>EAEV014</td>
<td>Cognitive Regeneration of Planaria</td>
<td>Giselle Luna, 16, Sophomore, Dr. Dennis D. Cantu Early College High School, Laredo, Texas,</td>
<td>T: Lorena Castaneda</td>
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<td>Corpus Christi</td>
<td>Heat Screen: A Novel Approach to Monitoring Heat Stress</td>
<td>Cuauhtemoc Zamora, 16, Sophomore, Veterans Memorial High School, Corpus Christi, Texas,</td>
<td>T: Porfirio Zamora</td>
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<tr>
<td>ENBM001</td>
<td>Translational Approach To Develop N-Acetylneuraminic Acid (Neu5Ac) as Biomarker for the Diagnosis of Alzheimer's Disease (AD), Year Two Project</td>
<td>Sharmada Palakurthi, 15, Freshman, W.B. Ray High School, Corpus Christi, Texas,</td>
<td>T: Pedro Benavidez</td>
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<td>TMED006</td>
<td>Optimizing Machine Learning Models to Predict the Likelihood of Stroke With State-of-the-Art Accuracy</td>
<td>Saainiruddh Reddy Chada, 17, Junior, Rider High School, Wichita Falls, Texas,</td>
<td>T: Bryce Henderson</td>
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<tr>
<td>Corpus Christi</td>
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<tr>
<td>BEHA041</td>
<td>DSM Diagnosis Is Dead: Novel, AI-Powered Biopsychosocial Fingerprinting for Depressive, Anxiety, Trauma, and Stress Disorders</td>
<td>Siddhu Pachipala, 18, Senior, College Park High School, The Woodlands, Texas,</td>
<td>T: Susan Caffery</td>
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<td>BMED044</td>
<td>Proliferous Metabolics: Targeting Nucleotide Metabolism in Cancer Chemotherapy</td>
<td>Jason Chris Xu, 18, Senior, Plano West Senior High School, Plano, Texas,</td>
<td>T: Emily Sharma</td>
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<td>EAEV062</td>
<td>Computational Modeling of CO2 Migration and Trapping in Geologic Formations for Risk Assessment of Carbon Sequestration Impacting Carbon Footprint</td>
<td>Shaunak Pandey, 17, Junior, Vandegrift High School, Austin, Texas,</td>
<td>T: Justyne Biddle</td>
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<td>EAEV065T</td>
<td>Comprehensive Dataset Utilizing Meteorological and Topographical Feature Data for Next-Day Wildfire Spread Prediction</td>
<td>Aditya Singirikonda, 16, Junior, Anish Goel, 18, Senior, Texas Academy of Mathematics and Science, Denton, Texas,</td>
<td>T: Alyssa Rodriguez</td>
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Laredo, USTX14, Laredo Independent School District Science Fair  
Corpus Christi, USTX15, Coastal Bend Regional Science Fair  
Burkburnett, USTX16, Red River Regional Science and Engineering Fair  
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  
BMED044  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 CO2 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 Pillutlia, 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
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

MCROO46 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

PHYSO46T A Deep Learning Based Hierarchical Labeling and Generative Sampling Framework for Classifying Particle Jets for Generalizable Tagging
Yash Semlani, 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

ROBOO49 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 Dharia, 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 Gunty

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

Provo, USUT04, Central Utah STEM Fair

**BMED042**  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  
Talimgale 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

**TMED033**  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 Evasion

Ogden, USUT07, Harold W. & Helen M. Ritchey Science and Engineering Fair of Utah

**BMED035**  Proteoglycans and Their Effects on Cancer Cell Migration  
Denali Emile 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
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  
ENBM029  Tracking Essential Tremors  
Aditya Ranjit Biswas, 16, Junior, Colonial Forge High School, Stafford, Virginia, T: Susan Easter

TMED029  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 Masciiangioi

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 KELT-9b  

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
ROBO033 Hybrid Plasticity: Adaptive, Brain-Like Artificial Intelligence via Prefrontal Cortex Inspired Meta-Learning

SOFT023 Simulated Brokerage for Novice Investors
Samuel Hyrum Stankiewicz, 15, Freshman, West Springfield High School, Springfield, Virginia, T: Yaara Crane

TMED037T 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

TMED042T OtoScan: A Novel, Inexpensive System for Comprehensive Diagnosis of Middle Ear Infections With an Intelligent Mobile Otoscope
Sritan 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: Lioranni Pawlik

BMED056T 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
<table>
<thead>
<tr>
<th>Location</th>
<th>Project Title</th>
<th>Author(s)</th>
<th>School/Institution</th>
<th>Contact Person</th>
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<tbody>
<tr>
<td>Ashburn, USVA07, Loudoun County Science and Engineering Fair</td>
<td>Determining the Impact of <em>Hericium erinaceus</em> on Aggression in Socially Isolated <em>Drosophila melanogaster</em></td>
<td>Zoe DeWitt, 17, Junior, Stone Bridge High School/The Academy of Science, Ashburn, Virginia</td>
<td>T: Andrew Allshouse</td>
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<td>Creating a Light Speed Linear Algebra Accelerator With Silicon Photonics</td>
<td>Jagadeepram Maddipatla, 17, Junior, Rock Ridge High School, Ashburn, Virginia</td>
<td>T: Dylan Cashman</td>
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<td>Evaluating the Effectiveness of Plant-Microbial Fuel Cell Energy Derived From Traditional House Plants</td>
<td>Samantha Brown, 18, Senior, Academies of Loudoun, Leesburg, Virginia</td>
<td>T: Trevor Barry</td>
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<td>Production and Comparison of Re-Extruded Filament From Recycled PET Plastic Bottles for Use in 3D Printing</td>
<td>Tyler Matthew Smith, 17, Senior, Academies of Loudoun, Leesburg, Virginia</td>
<td>T: Michael Croly</td>
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<td>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</td>
<td>Aryaa Agarwal, 17, Senior, Academies of Loudoun, Leesburg, Virginia</td>
<td>T: Zachary Minchow-Proffitt</td>
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<td>Roanoke, USVA08, Western Virginia Regional Science Fair</td>
<td>Collagen XIX Point Mutant Leads to Schizophrenia Related Behaviors Due to Synapse Impairment in Mice</td>
<td>Claire Wei, 18, Senior, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia</td>
<td>T: Mark Levy</td>
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<td>Effect of AGX-51 on Human Lung Fibroblasts</td>
<td>Aanandi Parashar, 16, Junior, Hidden Valley High School, Roanoke, Virginia</td>
<td>T: Sandra Reedy</td>
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<td>Measuring the Effects of Climate Change on Arctic Rivers</td>
<td>Franziska Bornoff, 17, Junior, Hidden Valley High School, Roanoke, Virginia</td>
<td>T: Neha Karandikar</td>
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<td>Yorktown, USVA09, Tidewater Science and Engineering Fair</td>
<td>Designing and Prototyping and LIDAR Based Haptic Navigation Vest for the Visually Impaired and Special Forces</td>
<td>Joshua Steven Bryant, 18, Senior, Ocean Lakes High School, Virginia Beach, Virginia</td>
<td>T: Allison Graves</td>
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<td>A Mathematical Model for Traffic Flow Risk Management Applied to Hampton Roads Emergency Evacuation</td>
<td>Kevin Hou, 15, Sophomore, Princess Anne High School, Virginia Beach, Virginia</td>
<td>T: Jana Eggleston</td>
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<td>Radford, USVA10, Blue Ridge Highlands Regional Science Fair</td>
<td>Anti-Lock Brakes Applied to a Bicycle</td>
<td>Jesse William Dulaney, 17, Junior, Southwest Virginia Governor's School, Pulaski, Virginia</td>
<td>T: Matthew Frazier</td>
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<td>Exploring Collatz Conjecture</td>
<td>Davis Allen Reitzel, 17, Junior, Southwest Virginia Governor's School, Pulaski, Virginia</td>
<td>T: Greg Riffe</td>
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<td>Richmond, USVA13, Metro Richmond Science and Engineering Fair</td>
<td>Development of Novel Stimulator To Reduce Electromagnetic Interference During Transcranial Magnetic Stimulation</td>
<td>Aryan Mhaskar, 17, Junior, Mills E. Godwin High School, Henrico, Virginia</td>
<td>T: Kelly Ostrom</td>
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<td>Optimizing Quantum Annealing to Advance Graph Coloring Algorithms</td>
<td>Anooshka Pendyal, 17, Junior, Deep Run High School, Glen Allen, Virginia</td>
<td>T: Thang Dinh</td>
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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  

**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**

**ENBM030** AmEyeDrunk? The Future of Intoxication Detection  
Advaitha 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  
Oura-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

**BMED025** 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

**ENEVO39** 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 Upadhay, 16, Junior, Bellevue Senior High School, Bellevue, Washington, T: Snehal Upadhay

Bliss Singhal, 16, Junior, Issaquah High School, Issaquah, Washington, T: Sylvia Law
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 Hydramacin-1 as an Antibiotic Agent Against the Coral Bacterium Vibrio corallilimiticus
Jessica Joy Palmer, 18, Senior, Joel E. Ferris 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

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
ENEVO02 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
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

#  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 LiFePO4 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

TMED030  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

ENBM047  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

ETSD009  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/Zeolite 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 Gi, 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 Application 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
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 Manhare, 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

SOFT010 Education for All Through Low-Cost Mobile Technology: Using an Automated SMS Chatbot to Send Educational Content Through Text Messages and Text Modules
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
Makanaka Dzvurumi, 17, Senior, Peterhouse Girls School, Marondera, Mashonaland East, Zimbabwe, T: Sam Satumba
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