FUTURE FORWARD

REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR
May 8–13, 2022
<table>
<thead>
<tr>
<th>Table of Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome from Regeneron</td>
<td>2</td>
</tr>
<tr>
<td>Welcome from Society for Science</td>
<td>3</td>
</tr>
<tr>
<td>About Regeneron ISEF</td>
<td>4</td>
</tr>
<tr>
<td>Social Media</td>
<td>5</td>
</tr>
<tr>
<td>Grand Awards</td>
<td>6</td>
</tr>
<tr>
<td>Special Award Organizations</td>
<td>10</td>
</tr>
<tr>
<td>Opening Ceremony Conversation</td>
<td>12</td>
</tr>
<tr>
<td>Excellence in Science and Technology Panel</td>
<td>13</td>
</tr>
<tr>
<td>Innovation and Entrepreneurship Panel</td>
<td>14</td>
</tr>
<tr>
<td>Women in STEM Panel</td>
<td>15</td>
</tr>
<tr>
<td>Finalist Directory</td>
<td>21</td>
</tr>
<tr>
<td>Society for Science Staff</td>
<td>186</td>
</tr>
<tr>
<td>In Recognition</td>
<td>187</td>
</tr>
<tr>
<td>ISEF College Fair Exhibitors</td>
<td>191</td>
</tr>
</tbody>
</table>
Dear Finalists,

Congratulations on being a 2022 Regeneron International Science and Engineering Fair (ISEF) finalist. We hope your experience lived 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, especially during these challenging few years.

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 (now known as the Regeneron Science Talent Search), 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 almost 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, COVID-19 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 enjoyed learning about your projects during ISEF and watching as you spent 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. The 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.
Scientific Founder, President & Chief Scientific Officer
Science Talent Search 1976

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

Congratulations on being a finalist at the Regeneron International Science and Engineering Fair 2022! Whether you competed in Atlanta or virtually, you have so much to be proud of. During a time when our world is being challenged by a pandemic and war, we were so impressed to see our finalists persevere.

Your research was tremendous, and I cannot wait to see what comes next for each and every one of you! ISEF alumni have gone on to win some of the most prestigious awards, including the Nobel Prize and MacArthur Fellowship, launched companies and joined academia to teach the next generation of scientists and engineers. You are all following in their footsteps.

Tens of millions of students compete in science fairs every year around the globe, with nearly 2,000 finalists this year competing for nearly $8 million in awards and scholarships! We had finalists competing from 63 different countries, regions and territories.

This year, the Society did not know what to expect when we decided to try something completely new to us—a hybrid science competition. How many students would come together in person? Would we be able to keep our finalists competing in-person safe?

I am so pleased to report that Regeneron ISEF 2022 was a resounding success! Our virtual programming enabled anyone from around the world to view our finalists’ research, and our streamed programming allowed a wide audience to hear from top scientists, engineers and entrepreneurs, including George Yancopoulos, Regeneron Scientific Founder, President & Chief Scientific Officer; Ángel Cabrera, President of Georgia Tech; Elizabeth Blackburn, winner of the 2009 Nobel Prize in Physiology or Medicine; Roderic Pettigrew, ISEF 1967 and Vannevar Bush Award winner; and Francis Collins, Science Advisor to President Biden.

Meanwhile, finalists who participated in Atlanta had an opportunity to connect with their fellow young scientists and engineers in person, tour the Georgia Aquarium and watch as cameras from National Geographic’s new TV series, SCIENCE FAIR: THE SERIES, recorded it all.

I hope you enjoyed Regeneron ISEF 2022 finals week and continue to celebrate your accomplishments. I also encourage you to thank the people who helped you get here—including your teachers, parents and mentors who supported you through the years. It takes a true community to develop talent like yours!

Thank you to all of our sponsors, volunteers, judges and interpreters who made this event possible. I hope to see some of you next year in Dallas for Regeneron ISEF 2023!

Sincerely,

Maya Ajmera
President & CEO
Society for Science
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 approximately $8 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 Broadcom Foundation, Johnson & Johnson, Gordon and Betty Moore Foundation, Akamai Foundation, Dow, Howmet Aerospace Foundation, Jacobs, King Abdulaziz & his Companions Foundation for Giftedness & Creativity, Microsoft, Microsoft Azure Sphere, National Geographic Society, Richard F. Caris Charitable Trust II, Rise, Siegel Family Endowment, Arconic Foundation, Cesco Linguistic Services, Georgia Institute of Technology and Insaco. Previously, ISEF was sponsored for 20 years by Intel.

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

You represent and warrant that you have all necessary permissions (including copyright and right of publicity) to grant us license to repost or reblog your post.
Grand Awards 2022 Winners

GRAND AWARDS AT REGENERON ISEF 2022

George D. Yancopoulos Innovator Award
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 was 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.

ETSD014: Investigating a Novel Electric Motor Design
- Robert Sansone, Fort Pierce Central High School, Fort Pierce, Florida, US

Regeneron Young Scientist Award
These finalists were selected for their commitment to innovation in tackling challenging scientific questions, using authentic research practices and creating solutions to the problems of tomorrow.

EGSD018: Bifunctional MOF for Hydrogen Production & Storage
- Abdullah Al-Ghamdi, Al-Hussan High School, Damman, Saudi Arabia

ENBM074: Synthetic DNA Engineering With ICOR
- Rishab Jain, Westview High School, Portland, Oregon, US

Gordon E. Moore Award for Positive Outcomes for Future Generations
This award was 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.

TMED010T: BiDEx – Liver Fluke Infection AI Screening System
- Napassorn Litchiowong, The Prince Royal's College, Chiang Mai, Thailand
- Chris Tidtijumreonpon, The Prince Royal's College, Chiang Mai, Thailand
- Wattanapong Utryot, The Prince Royal's College, Chiang Mai, Thailand

Craig R. Barrett Award for Innovation
This award was presented to the finalist who 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.

ETSD005: Small Radiosondes on a Great Mission
- Amon Schumann, Robert-Havemann-Gymnasium, Berlin, Germany

Peggy Scripps Award for Science Communication
This award was presented to the finalist who was best able to communicate their project to the lay public, explaining both the science and its potential impact on society.

EAEV066: ElSa: Wildlife Poacher Detection Solution
- Anika Puri, Horace Greeley High School, Chappaqua, New York, US

Robert Horvitz Prize for Fundamental Research
Given 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.

EAEV034: Reconstruction Modeling of Western North America
- Rebecca Cho, Jericho High School, Jericho, New York, US

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. This award is named for Dudley R. Herschbach, Harvard Professor 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.

BEHA001: FollowMe: Cortical Visual Impairment Therapy
- Asmi Kumar, Milton High School, Milton, Georgia, US

ENBM013: Deep Learning Based Cranial Surgery Planning
- Emirhan Kurtulus, Cagaloglu Anadolu Lisesi, Fatih, Turkey

ROBO0076: Neuron-Specific Dropout Regularization
- Joshua Shunk, Perry High School, Gilbert, Arizona, US

EU Contest for Young Scientists Award
This award was presented to two projects that will represent Regeneron ISEF at the EU Contest for Young Scientists to be held in Leiden, Netherlands September 12–18, 2022.

ANIM007: Optimizing Bee Gut Immunity With a Novel MLR Model
- Varun Madan, Lake Highland Preparatory School, Orlando, Florida, US

ROBO002T: Soft Origami-Inspired 3D Print-In-Place AI Robots
- Sheng Ze Yeoh, Sekolah Menengah Kebangsaan Katholik, Selangor, Malaysia
- Saan Cern Yong, Sekolah Menengah Kebangsaan Katholik, Selangor, Malaysia
Grand Awards 2022 Winners

**George D. Yancopoulos Innovator Award**
Robert Sansone

**Regeneron Young Scientist Award**
Abdullah Al-Ghamdi

**Gordon E. Moore Award for Positive Outcomes for Future Generations**
Chris Tidjunreomporn, Napassorn Litchiowong and Wattanapong Uttayota

**Robert Horvitz Prize for Fundamental Research**
Rebecca Cho

**Craig R. Barrett Award for Innovation**
Amon Schumann

**Dudley R. Herschbach SIYSS Award**
Asmi Kumar

**Regeneron Young Scientist Award**
Rishab Jain

**Gordon E. Moore Award for Positive Outcomes for Future Generations**
Chris Tidjunreomporn, Napassorn Litchiowong and Wattanapong Uttayota

**Robert Horvitz Prize for Fundamental Research**
Rebecca Cho

**Craig R. Barrett Award for Innovation**
Amon Schumann

**Peggy Scripps Award for Science Communication**
Anika Puri

**EU Contest for Young Scientists Award**
Sheng Ze Yeoh and Saan Cern Yong

**George D. Yancopoulos Innovator Award**
Robert Sansone

**Regeneron Young Scientist Award**
Abdullah Al-Ghamdi

**Gordon E. Moore Award for Positive Outcomes for Future Generations**
Chris Tidjunreomporn, Napassorn Litchiowong and Wattanapong Uttayota

**Robert Horvitz Prize for Fundamental Research**
Rebecca Cho

**Craig R. Barrett Award for Innovation**
Amon Schumann

**Peggy Scripps Award for Science Communication**
Anika Puri

**EU Contest for Young Scientists Award**
Sheng Ze Yeoh and Saan Cern Yong

**Dudley R. Herschbach SIYSS Award**
Asmi Kumar

**EU Contest for Young Scientists Award**
Varun Madan
Each year, Special Award Organizations (SAOs) representing a wide variety of scientific disciplines provide awards, scholarships, internships and other prizes to hundreds of ISEF finalists.

Thank you to these 2022 SAOs!

Acoustical Society of America
Air Force Research Laboratory on behalf of the United States Air Force
American Chemical Society
American Institute of Aeronautics & Astronautics
American Mathematical Society
American Meteorological Society
American Psychological Association
American Statistical Association
Arconic Foundation
Arizona State University
Association for Computing Machinery
Association for the Advancement of Artificial Intelligence
Central Intelligence Agency
China Association for Science and Technology
Drexel University
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
Missouri University of Science and Technology
Mu Alpha Theta, National High School and Two-Year College Mathematics Honor Society
National Anti-Vivisection Society
National Oceanic and Atmospheric Administration
National Security Agency Research Directorate
National Taiwan Science Education Center
NC State University College of Engineering
Office of Naval Research on behalf of the United States Navy and Marine Corps
Oracle Academy
Patent and Trademark Office Society
Potamkin Prize
Ricoh USA, Inc.
SAE International
Shanghai Youth Science Education Society
Sigma Xi, The Scientific Research Honor Society
U.S. Agency for International Development
United States Environmental Protection Agency
University of Arizona
Wolfram Research, Inc.
YM American Academy
During the Opening Ceremony, the Regeneron ISEF finalists joined the Society’s President & CEO, Maya Ajmera, in her conversation with President Ángel Cabrera, the 12th president of the Georgia Institute of Technology. Dr. Cabrera is a first-generation college graduate and earned his M.S. and Ph.D. in psychology and cognitive science from Georgia Tech, which he attended as a Fulbright Scholar.

Throughout the conversation, Dr. Cabrera shared his educational influences while growing up in Spain and why he is glad he switched to psychology. He also shared current STEM projects at Georgia Tech, why higher education is important and the need for diversity.

Cabrera came to Georgia Tech after serving as president of George Mason University (GMU) in Virginia. During his presidency, GMU joined the top tier of research universities in the Carnegie Classification and was the fastest growing institution in the state. Before leading GMU, Cabrera was president of the Thunderbird School of Global Management, now part of Arizona State University, and dean of IE Business School in Madrid.

As a business educator, Cabrera has played a key role in advancing professional ethics, internationalization and corporate social responsibility. While serving as a senior advisor to the United Nations Global Compact, he was the lead author of the “Principles for Responsible Management Education” (PRME). A United Nations–supported initiative that advances sustainable development through management education, PRME has been adopted by more than 800 schools around the world. Cabrera is also a co-founder of the University Global Coalition, a network of global universities working in partnership with the United Nations in support of its Sustainable Development Goals.

Cabrera has been named a “Young Global Leader” by the World Economic Forum, a “Star of Europe” by Bloomberg Businessweek, a “Henry Crown Fellow” by the Aspen Institute and a “Great Immigrant” by the Carnegie Corporation of New York. He has received honorary degrees from Miami Dade College and Universidad Politécnica de Madrid.

Cabrera serves on the boards of the National Geographic Society, Harvard College Visiting Committee, Atlanta Committee for Progress, Metro Atlanta Chamber and Bankinter Innovation Foundation in Spain. He has served on the board of the Federal Reserve Bank of Richmond, the advisory boards of Georgia Tech and Instituto Tecnológico de Monterrey, and three publicly traded companies.
INNOVATION, ENTREPRENEURSHIP AND IMPACT PANEL

May 11, 2022, 2:00 p.m.–3:00 p.m.  Sponsored by Rise

ULYANA HORODYSKYJ
- Scientist, Geologist, Mountaineer
- Founder, Science in the Wild
- Climate Communication Specialist, University of Colorado, Boulder
- National Geographic Grant awardee
- Semifinalist, NASA Astronaut Program

ASHLEY SARRACINO
- President, Native Ascension Community Development, LLC
- ISEF 1999–2000

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

MATTHEW TAMAYO-RIOS
- Founder & CEO, OpenLattice
- ISEF 2002

MO ZERBAN
- Founder, Tern Water
- ISEF 2010

Moderated by

JASZIANNE TOLBERT
- Senior Director, U.S. Clinical Development, Oncology, Janssen

CASSANDRA QUAVE
- Associate Professor, Department of Dermatology
- Associate Professor, Center for the Study of Human Health, Emory College of Arts and Sciences
- Curator, Emory University Herbarium
- ISEF 1994–1996

DAPO AJAYI
- Vice President, Technical Operations and Supply Chain Strategy, Johnson & Johnson

REBECCA BUNNELL
- Director of the Office of Science, Centers for Disease Control and Prevention

SEEMA KUMAR
- Vice President of Innovation, Global Health and Policy Communication, Johnson & Johnson

WOMEN IN STEM PANEL

May 11, 2022, 3:30 p.m.–4:30 p.m.  Sponsored by Johnson & Johnson

Moderated by
CONGRATULATIONS TO THE GEORGE D. YANCOPoulos INNOVATOR AWARD WINNER

In the Category of Engineering Technology: Statics and Dynamics

ROBERT SANSONE
Fort Pierce Central High School
Fort Pierce, Florida
Investigating a Novel Electric Motor Design
Booth ETSD014

Regeneron applauds the winner of the George D. Yancopoulos Innovator Award.

CONGRATULATIONS TO THE REGENERON YOUNG SCIENTIST AWARD WINNERS

ABDULLAH AL-GHAMDI
Damman, Saudi Arabia
Energy: Sustainable Materials and Design
Bifunctional MOF for Hydrogen Production & Storage
Booth EGSD018

RISHAB JAIN
Portland, Oregon
Biomedical Engineering
Synthetic DNA Engineering With ICOR
Booth ENBM074

Regeneron applauds the winners of the Regeneron Young Scientist Award.
CONGRATULATIONS TO OUR GORDON E. MOORE AWARD WINNERS

The Prince Royal’s College, Chiang Mai, Thailand
BiDEx–Liver Fluke Infection AI Screening System
Booth TMED010T

Gordon and Betty Moore Foundation applauds the winners of the Gordon E. Moore Award for Positive Outcomes for Future Generations.
Finalist Directory

COUNTRIES, REGIONS AND TERRITORIES PARTICIPATING IN REGENERON ISEF 2022

LEGEND
• Each # next to the finalist’s name indicates previous ISEF participation
• “T” precedes the name of a Teacher-Sponsor of the project
• “T” after the project ID indicates a team project

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

ANIMO59 Testing the Sinistral Bias of Pheidole megacephala, Tapinoma melanocephalum, and Paratrechina longicornis
Kelly Liang, 15, Freshman, Pacific Horizons School, Pago Pago, American Samoa,
T: Karen Dizon

BCHM017 Determining at What Stage Bananas (Musa acuminata) and Pineapples (Ananas comosus) Contain the Highest Amylolytic and Proteolytic Activity
# Princess Jazzelle Franco Viesca, 16, Sophomore, Fasaso Marist High School, Pago Pago,
American Samoa, T: Cassandra Garcia

BMED063 Bus Music Volume and Human Hearing
Matavai Marjorie Auapaau, 17, Senior, Tafuna High School, Pago Pago, American Samoa,
T: Claire Bacus

EAEV073 Skyglow in American Samoa
Georgia Renee Cox, 17, Senior, Pacific Horizons School, Pago Pago, American Samoa,
T: Karen Dizon

ARMENIA
Yerevan, Armenia, ARM002, Armenian School Science Festival

EGSD038T Walk-Move-Charge: Piezoelectric Shoes to Generate Electricity
Edvard Tovmasyan, 18, Senior, Anush Arakelyan, 17, Senior, High School 139 after Karen
Demirchian, Yerevan, Nor Nork, Armenia, T: Ruzanna Tamazyan

ENEV084T EcoProtein: 3 Problems, 1 Solution
Mger Harutyun Sarafyan, 17, Senior, Mane Gagik Kurghinyan, 18, Senior, Yerevan State
Medical University Heratsi High School, Yerevan, Armenia, T: Rubina Harutyunyan

AUSTRALIA
Oatlands, Australia, AUS002, Young Scientist

CHEM003 An Investigation Into the Concentration of Bisphenol A in Receipts from Major
Australian Supermarkets and Its Potential Dermal Transfer
Phoebe Marion Adam, 16, Junior, Presbyterian Ladies’ College, Sydney, NSW, Australia,
T: Maria-Luisa Gutierrez

CHEM004 The Perfect Crystal Is the Imperfect One: A Novel Approach for Utilizing Surface
Oxygen Vacancies on Crystalline Cerium (IV) Oxide to Promote Catalytic Ozonation
for the Removal of BPA in Wastewater
Kush Dewan, 17, Senior, Redeemer Baptist School, North Parramatta, NSW, Australia,
T: Stuart Garth

CONGRATULATIONS
TO THE 2022
REGENERON ISEF FINALISTS
AND WINNERS!

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
BCHM008  The Effect of Saffron on Reproductive Health
Nigul Mammadli, 16, Junior, School Lyceum Complex, Baku, Azerbaijan, T: Parvana Shukurova

EAEV011T  Accelerated Reconstruction of the Ecosystem of Karabakh Region Through Innovative Technologies
Samed Alizade, 15, Freshman, Ayaz Omarli, 15, Sophomore, Baku European Lyceum, Baku, Absheran, Azerbaijan, Young Talents High School, Baku, Azerbaijan, T: Firuz Sultanzadeh

ENEVO10T  Smart Water-Efficient System
Nigar Namazova, 17, Junior, Lale Huseynova, 17, Junior, Young Talents Lyceum, Baku, Azerbaijan, T: Murad Qurbanov

MATH007T  Solving Some Algebraic Problems with the Help of Vectors
Nigar Mirzali, 18, Sophomore, Leyla Abbasova, 16, Sophomore, The Modern Educational Complex in Honour of Heydar Aliyev, Baku, Nasimi region, Azerbaijan, T: Eldeniz Huseynov

PHYS012T  New Nano Dimensional Water Concept (Nano Water)
Solmaz Garibova, 16, Sophomore, Haver Nur Aslanova, 16, Sophomore, Baku European Lyceum, Baku, Absheran, Azerbaijan, T: Yulia Semyonova

SOFT010  Allover the Place: AI-Powered E-Commerce and Social Media Platform Makes Daily Business Fun and Easy
Javad Aslanov, 15, Freshman, Dnyu School, Baku, Azerbaijan, T: Ziya Gozalov

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

ANIM002  Application of Agroindustrial Residues in the Combat of the Arbovirus-Vector Mosquito (Aedes aegypti), Phase II
# Joao Pedro Silvestre Armani, 19, Junior, Colegio Alfa, Toledo, Parana, Brazil, T: Carlise Debastiani

BCHM003  Biotechnological Potential Analysis of Four Oleaginous Species from the Brazilian Cerrado Biome to Be Applied in the Regional Economic Context
Marcela Tobias de Araújo Romao, 17, Senior, Escola Santa Teresinha, Imperatriz, Maranhao, Brazil, T: Carlos Sampao

BCHM004  Tucum Mirim Oil (Astrocaryum acaule): Evaluation of Its Potential as Repellent Conveyed to an Experimental Model in vitro
Gustavo Botega Serra, 16, University, Escola Santa Teresinha, Imperatriz, Maranhao, Brazil, T: Carlos Sampao

BEHA004  Eco-Socioc: A Novel Approach Using Multivariate Analysis to Understand Youth Behavior ion Circular Economy
# Victora Leal Attmayer Silva, 18, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia do Rio Grande do Sul (IFRS) – Campus Osorio, Osorio, Rio Grande do Sul, Brazil, T: Flavia Twardowski

EGSD004  Seekwatch: Development of a Nano and Microtechnological Method for Constructing Wristwatch Systems Through Temperature Difference
Vincius Ribeiro de Moraes, 19, Senior, Matriz Educacao, Rio de Janeiro, RJ, Brazil, T: Michael Douglas da Silva Santos

ENBM003T  BIONIC STEP II: Biped Mechanical Device for the Locomotion of People with Spinal Cord Injury
Julia Isabel Niron da Rosa, 19, Senior, Julia Otton Bicca Vilela, 19, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Alexandre Giacomini
SOFT002 Development of Immersive Metaverses Applied to Astrobiology Teaching
Henrique Rodrigues Hissa Amorim, 17, Senior, Colegio Dante Alighieri, São Paulo, Brazil, T: Tiago Bode

SOFT003T NuAR: Technology and Creative Language Together to Tell the Great Stories of Women Who Did Science Around the World
Ariadne Nicoly Moro de Paula, 18, Senior, Blanca Fernandes Ribas, 18, Institute Federal de Mato Grosso do Sul - Campus Campo Grande, Campo Grande, Mato Grosso do Sul, Brazil, T: Marta Luzzi

Sao Paulo, Brazil, BRA002, FEBRACE – Feira Brasileira de Ciencias e Engenharia
BEHA037T Anti-Skeptical: Clusterization of the Hofstede Cultural Matrix via Machine Learning Methods Applied to the Analysis of Anti-Vax Behavior in Brazil
Pietro Andrade Quantzi, 16, Sophomore, João Pedro Sassi Sandre, 15, Sophomore, Colégio Visconde de Porto Seguro, São Paulo, Brazil, T: Francisco Correa

CHEM053 Study on Ultraviolet Protection in Cotton Fabric Dyed with Vegetable-Based Colorants
Ana Clara Machado Silva, 18, Senior, Centro Federal Tecnológico CEFET-MG Divinópolis, Divinópolis, Minas Gerais, Brazil, T: Fabio Silva

ENBM047T Digital Incentive Spirometer for the Treatment of Post-COVID Patients with Motivational Graphical Interface and Telemonitoring Support
Enso Matheus Carvalho, 14, Freshman, Oscar Cabral Parasaguassu, 14, Freshman, Escola Municipal de Ensino Fundamental Aristóteles Emiliano de Castro, Igarapé-Miri, Pará, Brazil, T: Raíson Santos

ROBO065 Detecting Cracks in Concrete Structures Using a Deep Learning Wall-Climbing Robot

BULGARIA
Sofia, Bulgaria, BGR001, Bulgarian Science and Innovation Fair
CBOO012 Exploring Machine Learning Interpretability by Analyzing Tumor Suppressor Genetic Sequence Data
Hristo Todorov Todorov, 19, Senior, High School of Mathematics and Natural Sciences “Professor Emanuil Ivanov”, Kyustendil, Bulgaria, T: Kamen Kotev

ENBM017 Image Analysis of Single DNA Molecules
Teodor Kirilov Kirilov, 18, Senior, Sofia High School of Mathematics, Sofia, Bulgaria, T: Detelina Doneva

MATH006 Minimal Number of Monochromatic Edges in Bicolored Graphs
Iliyas Bashir Noman, 17, Junior, Sofia High School of Mathematics, Sofia, Bulgaria, T: Iliya Kostov

ROBO017 The GatedTabTransformer: An Attention-Based Deep Learning Architecture for Tabular Modeling
Radostin Lozanov Cholakov, 16, Sophomore, Model High School of Mathematics “Akademik Kiril Popov”, Plovdiv, Bulgaria, T: Ergana Petrova
Finalist Directory

Regeneron International Science and Engineering Fair 2022

ENBM037 A Novel Bioinspired Skin Substitute for Accelerated Wound Healing

ENBM038 Speculo: A Comprehensive Teleophthalmology Platform for People
Centered Eyecare
Hardit Singh, 16, Sophomore, Cameron Heights Collegiate Institute, Kitchener, Ontario, Canada, T: Kevin Bell

ETSO43 An Investigation Into Active Control for Accessible Orbital Flight
Timothy Cai, 17, Senior, Fraser Heights Secondary, Surrey, British Columbia, Canada, T: John Struik

ROBO051 Low-Cost Quadruped Robot with Rough Terrain Traversal, Obstacle Avoidance, and Autonomous Navigation
Henry Zhao, 17, Junior, Collingwood School, West Vancouver, British Columbia, Canada, T: Edel Vo

TMED035 Nano-Antioxidants’ Effects on Oxidizing Agent Exposure
Catherine Diyakonov, 17, Senior, Lord Byng Secondary School, Vancouver, British Columbia, Canada, T: Lauren Anderson

Lachine, Canada, CANO04, Montreal Regional Science and Technology Fair

EBED032 OR in Focus: An Automatic Focusing Overhead Operating Room Light
Kayla Joy Salasidia, 15, Sophomore, Herzliah High School, Montreal, Quebec, Canada, T: Patrick Elbaz

ENBM049 Immunano: The Future of the Immune Response
Adam Elkaim, 18, Senior, Marianopolis College, Westmount, Quebec, Canada, T: Angela Keane

ETSD060T Solar-Powered Drone: Creating an Airplane That Is Solar Powered and Autonomous
Aziz Saoud Kitana, 16, Junior, Mohammadamin Tabari Nia, 16, Junior, Kells Academy, Montreal, Quebec, Canada, T: Raffaat Ghanem

CHINA
Beijing, China, CHNO01, China Adolescents Science and Technology Innovation Contest

ANIM024 Seventeen Minutes: The Time of Host Blood Protein Remaining in Anopheles Mosquitoes
Liyuan Zhu, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Shuqi Cai

BEHA013 The Competition Behavior of Bike-Sharing Companies and Industry Price Evolution: A Game Theory Approach
Tianshu Xu, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Wenjun Ying

BMED023 Ganoderma Spore Oil Induces the Apoptosis of Mammary Adenocarcinoma Cell by Regulating Apoptotic Genes
Chengfei Gao, 16, Junior, The High School Affiliated to Beijing Normal University, Beijing, China, T: Ya Zhang

CELLO12 Study on the Mechanism Underlying CENP-E Mediated Mitochondrial Movement in Mitosis
Tianqi Lu, 16, Junior, Hefei No. 8 Senior High School, Hefei, Anhui, China, T: Xuebiao Yao

CELLO13 Effect of Mammary Adenocarcinoma Supernatant on Hepatic Fibroblast Differentiation
Enze Wang, 17, Junior, Beijing No. 4 High School, Beijing, China, T: Liyan Kong

CELLO15 Optimized Expression Condition of SARS-CoV-2 Polymerase Nsp12
Yifei Liu, 15, Sophomore, The Experimental High School Attached to Beijing Normal University, Beijing, China, T: Wei Fang

CONGRATULATIONS TO OUR CATEGORY FINALISTS

Animal Sciences

Kellen Apuna
Collin Tajiro Horuchi
Dixie Lynne Miller
Mirjun Shin

Kirani Amruta
Yi-Shan Hung
Jack Oliver Morgan
Zaina Fatima Siddiqi

Marisa Arjananont
Hyunmoon Hwang
Soyoon Moon
Joao Pedro Silvestre Armani

Rama A. Bandekar
Yukiha Ishibashi
Irving Solomon Morris
Caleb Brennan Smith

Emma Christine Boget
Kaleb James Johnson
Natalia Trefohig Morrow
Sarah Stutsman

William Cameron Boyd
Luke Jow
Hannah Jordan Mulfis
Mckenna Sun

Matthew Edward Brownrigg
Abhinav Reddy Kann
Tyler Daniel Nagowski
Collin Luke Surabian

Gabriella Eleanor Cadery
Chikako Katayama
Abby Rose Nelson
Lila Carline Sverdrup

Jenna Nicole Cecelle
Hisaoi Kawahara
dDmytriy Omeldyanov
Gabriela Szczepanik

Panatas Chaipraikan
Junwoo Kim
Brooklyn Portell
Santa Rae Thoresen

Reagan Elizabeth Chambers
Serthi Kolomischuk
Chimneya
Maria Tomita

Sabine Lynn Close
Ana Nanil Kothandaram
Ramusubramanian
Harmony Grace Tracy

Kathlyn Nicole Culbert
Sririch Lokalalah
Rotem Rit
Sasha Turner

Natalya de la Plaza
Rama Sophia Lateef
Isabella Zoe
Lindsey Susan Vachal

Jonmejoy Agniva Dhar
Nicholas Eunsuk Lee
Rodriguez Ramos
Lauren Alexa Van

Sabrina Ludovica Di Biello
Ian Lentz
Janseep Sambhotha
Jrnsaat Vongkampong

Porawat Don tantam
Kathy Liang
Rika Sake moto
Sofia White

Noe Furagen
Emma Kathleen Lilly
Tanakon Sakhun
Regan Catherine Williams

Grant Gallagher
Sirawich Laoslapa
Alexes Schalluck
Ramasubramanian

Jacob Paul Gannon
Rania Sophia Lateef
Taylor Jean Schmitt
Liyuan Zhu

Claire Elizabeth Green
Nicholas Eunsuk Lee
Sarah Kathryn Schubel
Justine Jin Xu

Tianqi Lu
Ian Lentz
Taylor Jean Schmitt
Regan Catherine Williams

Yukiha Ishibashi
Kathy Liang
Sarah Kathryn Schubel
Society for Science

Society for Science applauds the finalists in Animal Sciences.
<table>
<thead>
<tr>
<th>Finalist Directory</th>
</tr>
</thead>
</table>
| **CHEM021** High Concentration Silver-Carrying Materials with Controlled Silver Dissolution and Efficiently Long-Acting Sterilization  
Lingyue Wang, 17, Junior, No. 2 High School of East China Normal University, Shanghai, China, T: Feng Qian |

| **CHEM022** An Innovative Method for Determination of Nitrite Content in Salted or Overnight Food by Paper-Based Microfluidic Device  
Yancheng Tao, 17, Junior, Hangzhou Foreign Languages School, Hangzhou, Zhejiang, China, T: Qiaohong He |

| **CHEM023** Immobilization of C@TiO₂ in Calcium Alginate Hydrogel for Photodegradation of Organic Pollutants  
Xiyuan You, 16, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, China, T: Bo Li |

| **CHEM024** Applicability of Textile Industry's Classification of Silk in the Engineering of Silk Protein Material  
Jintong Ding, 17, Junior, Shanghai East Foreign Language School, Shanghai, China, T: Zhengzhong Shao |

| **CHEM025** Research on the Microscopic Mechanism of CO₂ Capture Using TBAB Semi-Clathrate Hydrate Formation  
Guoxiang Lu, 16, Junior, Chongqing No 1 International Studies School, Chongqing, Sichuan, China, T: Xuefu Min |

| **EBED018** Automatic Monitoring System Based on Arduino  
Ziqian Liu, 16, Junior, Yongzhou No.4 Senior High School, Yongzhou, Hunan, China, T: Yao Qu |

| **EED016** Uniform Cu-Doped Carbon Inherited from Plant Growth for Electrocatalytic CO₂ Reduction to CH₄  
Qingyuan Zhu, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Tengfeng Zheng |

| **ENBM024** Posture Detection and Multi-Dimensional Feedback System for AIS Rehabilitation Training  
Zihan Wang, 16, Sophomore, Shanghai Pinghe Bilingual School, Shanghai, China, T: Lucheng Wang |

| **ENBM25** Ergonomic Finger Exoskeleton for Hand Muscle Rehabilitation and Protection: Four-Bar Linkage, Finger-Length Personalized, Low Cost  
Chenglin Guo, 16, Junior, Beijing 101 Middle School, Beijing, China, T: Lei Cai |

| **ENEV026** Saccharification and Degradation of Inedible Waste in Bioregenerative Life Support System  
Jingyuan Zhang, 17, Junior, Beijing No. 4 High School, Beijing, China, T: Hong Liu |

| **ENEV027** Design and Performance of a Plant-Microbial Fuel Cell To Treat Kitchen Wastewater  
Xinling Zhang, 17, Junior, No. 2 High School of East China Normal University, Shanghai, China, T: Yixi Li |

| **ENEV028** Improving the Degrading Rate of PETase and Developing Highly Efficient Enzyme Activity Screening Strategies  
Yanbing Jin, 17, Junior, Shanghai Pinghe Bilingual School, Shanghai, China, T: Jiang zhong |

| **ETSD017** A Multi-Joint Geometry-Like Spatial Wall-Climbing Robot with Vacuum Suction Used in Assisting High Altitude Tasks and Terrain Prospection  
Jiarong Sheng, 16, Junior, Shanghai Pinghe Bilingual School, Shanghai, China, T: Yinghe Lv |

| **ETSD018** Active Noise Control in Ventilation Ducts Using the LMS Algorithm  
Xinle Song, 17, Junior, YK Pao School, Shanghai, China, T: Xiaoyang Wang |

| **ETSD019** Soft Bionic Starfish Robot Based on Suckers  
Chengyue Jiang, 15, Sophomore, Shanghai Pinghe Bilingual School, Shanghai, China, T: Yinghe Lv |

| **ETSD020** Development and Experiments on a Kind of Small Dolphin Robot  
Zihan Wang, 16, Junior, Shanghai Xuhui High School, Shanghai, China, T: Yu Su |

| **MATH018** The Application of Grover Quantum Algorithm in Lifting Stage Restoration Problem  
Ziru Song, 17, Junior, Beijing Academy, Beijing, China, T: Lei Yue |

| **MATH019** Preliminary Exploration of Fractal Geometry and the Application of Fractal Measurement to Explore the Fractal of Rock Sugar and Hydroxide  
Bozhi Bai, 16, Junior, Hefei No.1 High School, Hefei, Anhui, China, T: Yu Yong Zhang |

| **MAT8014** Solving the Worldwide Mask Pollution Crisis: A Biodegradable High-Performance Low-Cost Mask Made from Natural Polymers  
Enshuo Zhang, 16, Sophomore, The High School Affiliated to Renmin University of China, Beijing, China, T: Dan Wan |

| **PHYS023** Investigate the Effects of Active Galactic Nucleus on Star Formation Rate Through Cavity Energetics and SED Fitting  
Yang Shen, 17, Junior, Shanghai United International School, Gubei, Shanghai, China, T: Haigang Xu |

| **PHYS024** Optimization and Application of Kelvin Water Dropper  
Haotian Sun, 17, Senior, Nanjing Foreign Language School, Nanjing, Jiangsu, China, T: Xiaoshan Wu |

| **PHYS025** Discovery of Superconductivity and Structural Phase Transition in Heusler Compound HfPd₂Sn  
Yuxuan Chen, 17, Junior, Hangzhou Xuejun High School, Hangzhou, Zhejiang, China, T: Huiqiu Yuan |

| **PHYS026** How Does Ring “Dance” in a Bowl?: Study on Chaos-Like Dynamic Behavior of Rigid Rings Using Lagrange Mechanical Analysis  
Ruiziq Zhang, 17, Junior, Shanghai Kongjiang Senior High School, Shanghai, China, T: Jian Shen |

| **PHYS027** The Deformation Analysis and Experimental Study of Chinese Brush Based on the Central Spine Model with Seven Segments  
Huuirui Dai, 18, Senior, Nanjing Foreign Language School, Nanjing, Jiangsu, China, T: Qiaohong He |

| **PLNT015** Study on Leaf Epidermal Hair Characteristics of Eggplant and Its Effects on Cold and Drought Resistance  
Hanyue Cao, 17, Junior, Shanghai Qibao High School, Shanghai, China, T: Jun Gao |

| **ROBO030** Research on Landscape Painting Colorization Based on Generative Adversarial Networks  
Yang Shen, 17, Junior, Beijing No. 4 High School, Beijing, China, T: Liyan Kong |

| **ROBO031** Intelligent Object Finding for the Elderly with Alzheimer's Disease Based on Neural-Symbolic Reasoning  
Yutang Lin, 17, Junior, Beijing 101 Middle School, Beijing, China, T: Wei Wang |

| **ROBO032** Single-Actuator Wave-Like Pipeline Robot  
Sicheng Dong, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Haoxin Zhu |

| **SOFT019** Indoor Ranging System for Athletic Discus Throwing  
Shijia Li, 18, Senior, Jinling High School, Nanjing, Jiangsu, China, T: Qijun Zhang |

| **SOFT020** The Hash Algorithm Based on Three-Body Chaotic Motion  
Huayi Zhang, 16, Junior, Shanghai Kongjiang Senior High School, Shanghai, China, T: Yunlei Zhao |
Finalist Directory

**SOFT021** Predicting Structural Similarity Between Molecules Using Graph Neural Networks
Sichen Deng, 17, Junior, High School Affiliated to Shanghai Jiao Tong University, Shanghai, China, T: Qian Shao

**SOFT022** Face-Recognition Food Consumption Tracker
Mingyue Deng, 17, Senior, Guiyang No. 1 High School, Guiyang, Guizhou, China, T: Qin He

**TMED019** A Pneumatic Hand Muscle Rehabilitation Training Glove Based on the EMG Signal: AI-Powered, Improved Robustness, and High Durability
Zeyuan Wei, 17, Junior, Shanghai World Foreign Language Academy, Shanghai, China, T: Qiuing Zhang

**Chengdu, China, CHN008, Sichuan Science Fair**

**ETSD003** A Novel Design of W-Shaped Pipe-Climbing Robot
Xin Yu Ai, 16, Junior, Shanghai American School–Pudong Campus, Shanghai, China, T: Amanda Young

**MATS003T** Silver Nanowire On-Skin Flexible Electrodes for Electrophysiological Monitoring
Jonathan Lu, 16, Junior, Wooin Hong, 17, Junior, Concordia International School Shanghai, Pudong, China, T: Anne Love

**PLNT005T** A Sound Solution: An Innovative Application of Insects’ Bioacoustics Effect on Herbaceous Plants
Jessica Li, 17, Junior, Lena Wang, 16, Junior, Shanghai American School–Puxi Campus, Shanghai, China, T: Gregory Rose

**ROBO009** Research on CRNN-Based Piano Music Transcription Systems
Victor Yin, 16, Junior, Tsinghua University High School, Beijing, China, T: Fatima Hachem

**ROBO010** The Smartest Know Their Limits: A Novel Semi-Supervised Causal Inference Deep Learning Model for Open Set Recognition
Richard Xue, 17, Junior, Shanghai American School–Puxi Campus, Shanghai, China, T: Rui Feng

**CHINA, HONG KONG SPECIAL ADMINISTRATIVE REGION**

Hong Kong, China, Hong Kong Special Administrative Region, HKGO1, Hong Kong S&T Invention Contest

**EBED005** Driver Drowsiness Detection System
Lo Yi Tiffany Wong, 19, Senior, Ho Shun Louisa Louie, 17, Senior, Heung to Secondary School (Tseung Kwan O), Hong Kong, China, Hong Kong Special Administrative Region, T: Tung Shek Wong

**ENBM004T** Asthmeter: A System for Recording and Predicting Asthma Attacks
Evelyn Fung, 15, Sophomore, Hei Tung Christy Lee, 16, Sophomore, Diocesan Girls’ School, Hong Kong, China, Hong Kong Special Administrative Region, T: Michael Nip

**ENBM005T** Combating Antibiotic-Resistant Bacteria with Leptosperrum Honey- Incorporated Calcium Alginate Dressing
Tsz Ki Liu, 18, Senior, Ting Yan Chung, 17, Senior, St. Paul’s Convent School, Hong Kong, China, Hong Kong Special Administrative Region, T: Claudia Ng

**ENBM012T** EMG Rehab System: A Package for Stroke Self Rehabilitation
Wang Yu Chow, 16, Junior, Sau Nam Cheung, 16, Junior, Christian Alliance SW Chan Memorial College, Hong Kong, China, Hong Kong Special Administrative Region, T: Kin Long Lee

**MATH003** An Investigation on Non-Repetitive Coloring of Trees
Yuxiang Wu, 16, Junior, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Michael Nip

**MATH003** An Investigation on Non-Repetitive Coloring of Trees
Yuxiang Wu, 16, Junior, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Michael Nip

**SOFT025** SOFT025

**Society for Science** applauds the finalists in Behavioral and Social Sciences.
CHINA, MACAO SPECIAL ADMINISTRATIVE REGION

Macao, China, Macao Special Administrative Region, MACO001, Macao Region Science Fair

EGSD006T Novel Organic Electrode Material for LIBs
Ka Hei Chan, 17, Senior, San Chong Ng, 17, Senior, Janelle Camille Shi Chen, 19, Senior, Escola Choi Nong Chi Tai, Macao, China, Macao Special Administrative Region, T: Choi Nga Sou

EGSD013T High Capacity, High Stability and Low Corrosive Al-Treated Ionic Liquid Electrolyte with Al-Deposited Carbon Cloth Anode Used in Aluminum-Ion Battery
Chong Hin Tam, 17, Senior, Qi Wa Cheang, 16, Junior, Pui Ching Middle School, Pui Ching Middle School, Macau, China, Macao Special Administrative Region, T: Ka Kiong Chan

ENBM018T Portable Homemade Ventilators: Alleviating Global Medical Shortages
Evelyn Teng, 17, Junior, Hio Cheng Lam, 17, Senior, Weng Si Si Tou, 17, Junior, The Affiliated School of the University of Macao, China, Macao Special Administrative Region, T: Ka Man Wong

ETSD011T A Rotor Fault Detection System Based on Nonlinear and Dynamic Response
Un Man Wong, 17, Senior, Ka Wai Huang, 18, Senior, Jia Ning Weng, 17, Senior, The Workers’ Children High School, Macao, China, Macao Special Administrative Region, T: Yi Xing Liang

MATSO13T WO~: Preparation and Application of SERS Substrate Materials
Hio Cheng Ho, 16, Junior, Hoi Lei Song, 18, Junior, Ka I Lou, 17, Junior, Macau Pooito Middle School, Macao, China, Macao Special Administrative Region, T: Tak Seng Wong

ROBO019T Developing a Low-Cost Portable Electronic Nose for the Detection of Colorectal Cancer by Using Convolutional Neural Networks
Yuelong Wang, 16, Sophomore, Mei Fong Lei, 17, Sophomore, Jiahao Liang, 15, Sophomore, Escola Yip Macao, China, T: Chi Hon Ng

CZECH REPUBLIC

Prague, Czech Republic, CZE001, Students’ Professional Activities (SPA)

CHEM009 Rearrangements of N-Aryl Hydroxamic Acid Methanesulfonates: Towards Novel and Valuable Organic Substances
Veronika Martinkova, 18, Junior, Gymnazium Frantiska Palackeho Valasske Mezirici, Valasske Mezirici, Zlinsky Kraj, Czech Republic, T: Zuzana Halastova

CHEM010 Modification of Silica Surface with Supercritical Water as a Tool Indicating New Possibilities of Existing Separation Methods
Pavel Karasek, 18, Senior, Gymnazium Brno, Trida Kapitana Jarose, Brno, South Moravian Region, Czech Republic, T: Michal Roth

PHYS011 Preparation and Characterization of Spin Polarized Tips for Tunneling Microscopy
Petr Kahan, 19, Junior, Gymnazium Dr. Antona Randy, Jabloniec nad Nisou, prispievkova organizace, Jabloniec nad Nisou, Liberecky kraj, Czech Republic, T: Ales Cahlik

Prague 4, Czech Republic, CZE002, AMAVET Czech Republic Science Fair

CELL036 Cytoskeletal Remodelation in Brain Tissue Exposed to Lead Nanoparticles
Adriaen Jedlickova, 18, Junior, Gymnazium Brno, Trida Kapitana Jarose, Brno, South Moravian Region, Czech Republic, T: Iva Kubistova

PHYS062 Detecting Cosmic Rays by Self-Build Scintillation Detector and a Muon Telescope
Barbora Cabalkova, 19, Senior, Gymnazium Zamberk, Zamberk, South Moravian Region, Czech Republic, T: Jiri Hovorka

DENMARK

københavn, Denmark, DNK001, Ung Forsskere

MCRO020 The Influence of Sound Frequencies on Bacterial Growth: A New Perspective on a New Research Field
Nanna Elizabeth Rosa Kalmar, 18, Senior, Egaa Gymnasium, Aarhus, Midtjylland, Denmark, T: Pia Jensen

EGD048T The Influence of Sound Frequencies on Bacterial Growth: A New Perspective

EGD053T High Capacity, High Stability and Low Corrosive Al-Treated Ionic Liquid Electrolyte with Al-Deposited Carbon Cloth Anode Used in Aluminum-Ion Battery

ENBM009 Rearrangements of N-Aryl Hydroxamic Acid Methanesulfonates: Towards Novel and Valuable Organic Substances

ENBM018 Portable Homemade Ventilators: Alleviating Global Medical Shortages

ETSD011 A Rotor Fault Detection System Based on Nonlinear and Dynamic Response

MATS013 Developing a Low-Cost Portable Electronic Nose for the Detection of Colorectal Cancer by Using Convolutional Neural Networks

ROBO019 Developing a Low-Cost Portable Electronic Nose for the Detection of Colorectal Cancer by Using Convolutional Neural Networks
Regeneron International Science and Engineering Fair 2022

CONGRATULATIONS TO OUR CATEGORY WINNERS

Biochemistry

FIRST PLACE
Maya Sonal Butani

SECOND PLACE
Rohan Sandeep Adwankar
Rohan Prakash Bhosale
Aarya Morgaonkar
Andy Zhang

THIRD PLACE
Rajvi Rakesh Babaria
Halley Madyson Compuesto
Mehak Gaba
Matthew Noto
Sarvesh Prabhu

FOURTH PLACE
Chloe Chang
Helen Hauck
Archita Khaire
Nikola Ristic

Regeneron applauds the finalists in Biochemistry.

Regeneron®
**PLNT004T**  
*Silphium perfoliatum: A Newcomer for an Ecologically Sustainable Energy Agriculture*  
Isabell Seibel, 17, Senior, Melina Lisa Reckermann, 18, Senior, Immanuel-Kant-Gymnasium Tuttlingen, Baden-Wurttemberg, Germany, T: Katharina Kaltenbach

**GHANA**  
Accra, Ghana, GHA001, MISE Research Program

**CBIO004**  
*Predicting Future Mutations of COVID-19 Using Machine Learning*  
Keith Torpey, 18, Senior, East Airport International School, Accra, Greater Accra, Ghana, T: Matthew Sciulcuna

**GREECE**  
Chalandri, Greece, GRC001, Athens Science Festival

**ENEV055**  
*Eyes in the Water Can Save the World for Life: A Device Which Remotely Measures Water Quality Below the Surface of the Water*  
Dimitrios Panagiotis Deliakidis, 15, Sophomore, 4th Lyceum of Alexandroupolis, Alexandroupolis, Evros, Greece, T: Panagiotis Deliakidis

**PHYS063T**  
*A Design for an Affordable 2-Qubit Optical Quantum Computer*  
Konstantinos Pavlakis, 17, Junior, Dimitrios Tzounakis, 17, Senior, 1st General Lyceum of Thermi, Thermi, Thessaloniki, Greece, T: Evagelos Chatzistavrou

**GUAM**  
Piti, Guam, TEGU01, Guam Island-Wide Science Fair

**ANIM060**  
*Estimating the LC50 of 1-Naphthyl-N-methylcarbamate in an Insecticide Using Different Percentages of Concentration on Apis mellifera*  
Justine Jin Xu, 16, Junior, St. John’s School, Upper Tumon, Guam, T: Christine McCormic

**HAIITI**  
Port-au-Prince, Haiti, HTID01, Expo-Sciences Haiti

**ENBM007T**  
*Mouthscope: Autonomous Detection of Oral Precancerous Lesions Using Fluorescent-Imaging and Computer-Vision*  
Aditya Amit Mehta, 16, Junior, Maanav Jignesh Kothari, 17, Junior, Dhirubhai Ambani International School, Mumbai, Maharashtra, India, T: Reetu Jain

**HUNGAR**  
Budapest, Hungary, HUN001, Innovation Contest for Young Scientists

**EBED008**  
*PenAlone: Development of a Writing and Drawing Tool Compatible with Arbitrary Surface*  
Janos Rado, 16, Junior, Berzsenyi Daniel High School, Budapest, Hungary, T: Virag Groma

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

**ANIMO03**  
*Averting Human-Elephant Conflict Using Machine Learning on Elephant Vocalizations*  
Chinmayi Ramasubramanian, 16, Sophomore, Sri Kumaravan Children’s Home – CBSE, Bangalore, Karnataka, India, T: Seema Lokhandwala

**BCHM005**  
*A Novel Study of the Bio-insecticidal Properties of Annona reticulata L.*  
Satrav Prabhu, 16, Junior, FITJEE Junior College, Hyderabad, Telangana, India, T: Meera Nambar

**BEHA006**  
*UDAN: Unobtrusive Sentiment Alert Using Natural Language Processing*  
Anagha Sampathkumar, 15, Freshman, National Public School, Indiranagar, Bangalore, Karnataka, India, T: Prizilla Fernandez

**CHEM007**  
*Graphene Oxide-Based Nanoformulations: A Novel Solution to Manage Aedes aegypti*  
Devaj Gupta, 17, Senior, DPS International, New Delhi, Delhi, India, T: Sarita Kumar

**ENBM006**  
*XPGAN: A Novel Patch-Based Generative Adversarial Network Framework for Super-Resolution of X-Ray Images*  
Aria Narayan Vikram, 17, Senior, National Public School, Indiranagar, Bangalore, Karnataka, India, T: Gourav Sharma

**ENBM007T**  
*Mouthscope: Autonomous Detection of Oral Precancerous Lesions Using Fluorescent-Imaging and Computer-Vision*  
Aditya Amit Mehta, 16, Junior, Maanav Jignesh Kothari, 17, Junior, Dhirubhai Ambani International School, Mumbai, Maharashtra, India, T: Reetu Jain

**MATH004**  
*On Ramanujan's Identity for Odd Zeta Values and Its Generalization*  
Niranjan Baskaran, 17, Senior, Gateway International School, Chennai, Tamil Nadu, India, T: Christophe Vignat

**MATH005**  
*On Worker-Optimal Matchings in Many-to-Many Markets with Indifferences*  
Sara Varghese, 18, Senior, Devika Girish, 17, Senior, St.Peter's Senior Secondary School, Bangalore, Karnataka, India, T: Prizilla Fernandez

**MATH006**  
*Preparation of a Superhydrophobic and Oleophilic Membrane Inspired by Taro Leaves for Oil-Water Separation*  
Sara Varghese, 18, Senior, Devika Girish, 17, Senior, St. Peter’s Senior Secondary School, Kolencherry, Kerala, India, T: Sandhya N

**MCRO018**  
*Pseudomonas stutzeri VR2004 for Green Synthesis of ZnO Loaded Onto a Starch-Gelatine Biopolymer Matrix for Remediation of Xenobiotics in Aquatic Systems*  
Vishwadeep Balakrishnan, 17, Senior, Shiva Niketan School, Mangalam, Tamil Nadu, India, T: Ganga Vm

**PHYS33**  
*Hydrodynamic Analogues of Quantum Tunneling*  
Asthagiri Das, 17, Junior, Delhi Public School Siliguri, West Bengal, India, T: Rajib Ghosh Roy

**PLNT004**  
*Plantaer: Plant-Water Interactive Tool for Monitoring the Water Quality*  
Karni Gourav, 17, Junior, DPS International, New Delhi, Delhi, India, T: Prizilla Fernandez

**SOFT006**  
*Horizon Scan Vision*  
Balazs Szonyi, 18, Senior, TSZC Benki Donat - Pech Antal High Schools, Tatafamily, Komarno-Esztergom, Hungary, T: Istvan Varga
ROBO006 Neural Layer Bypassing Network: A Novel Neural Network Architecture to Increase the Speed of Forward Propagation Without Sacrificing Accuracy, Network Structure, or CPU Resources
Amogh Palasamudram, 18, Senior, The International School of Bangalore (TISB), Bangalore, Karnataka, India, T: Ronjon Nag

ROBO007 Pendem: Making the Internet More Accessible to the Blind
Abhiijit Chandran, 19, Senior, Mahindra United World College, Pune, Maharashtra, India, T: Andrew Teron

SOFT004 Novel AI-Powered Sign Language Translator
Nand Vinchhi, 17, Junior, National Public School—Koramangala, Bangalore, Karnataka, India, T: Chandita Mukhopadhyay

SOFT005 Enhancing the Security of Websites with Virtual Identification Code Steganography
Krish Yadav, 17, Junior, MKH Sancheti Public School, Nagpur, Maharashtra, India, T: Alka Saxena

TMED004T FlikcerAI: Resolution of Photosensitive Epileptic Visual Content with Spatio-Temporal Luminance Frequency Analysis
Rushank Goyal, 16, Junior, 7i World School, Gwalior, Madhya Pradesh, India, T: Rashmi Chowdhary

TMED005 A Quantum Machine Learning-Based Framework for Early Cancer Detection and Biomarker Identification Through Transcriptome Profiles
Vishnu Ram Sampathkumar, 18, Senior, National Public School, Indiranagar, Bangalore, Karnataka, India, T: Prizilla Fernandez

CONGRATULATIONS TO OUR CATEGORY WINNERS

Biomedical and Health Sciences

FIRST PLACE
Jonathan Crawford
Ambika Grover

SECOND PLACE
Kristi Biswas
Griffin Hon
Christine Song
Katelyn Kelly Wasilenko
Nicholas Wei

THIRD PLACE
Aditi Avinash
Tony Bright
Emily Dodd
Aaron Joel George
Alexander Lan
Ella Selina Lan
Hamza Arman Lateef
Gabriel BrianRalston
Adhvaith Sridhar

FOURTH PLACE
Samira B.F. Abdullah
Kulpatch Chananam
Helen Lucille Cupple
Kunat Khongtong
Justin Keonhyoung Kim
Pakitta Kriangasame
Saachi Anika Mody
Maria Isabel Morales-Quezada
Mayu Nakano
Labrina Panagopoulos
Shaswat Singh
Andres Muedano Sosa
Julia Zhu

Regeneron applauds the finalists in Biomedical and Health Sciences.
**IRAQ**

Erbil, Iraq, IRQ001, INPO (Iraq National Project Olympiad)

- **BMED065** Anti-Heart Attack Glove (AHG)
  - Mohammed Omer Hama Ali, 16, Junior, Dlin Nawsherwan Salih, 16, Junior, Private
  - Salahaddinn Ayyubi College, Sulaimania, Iraq, T: Mikail Ozturk

- **ENBM030** Automatic Body Temperature Measurement and Warner Device
  - Balla Peshtwan Sedeeq, 14, Freshman, Ghandi Abdulrahman Mahmood, 15, Freshman, Kirkuk Cag Boys College, Kirkuk, Iraq, T: Ibrahim Mohammed

**ITALY**

Milano, Italy, ITA001, I Giovani e le Scienze

- **BCHM036** EnoMed: The Power of Antioxidants from Grapes: A Green Perspective for Anti-Tumor Treatments
  - Letizia Mutti, 19, Senior, Luca Figazzolo, 17, Junior, Istituto Superiore Asciano Sobrero, Casale Monferrato, Italy, T: Anna Chiara Arecchi, T: Patrizia Cascio

**JAPAN**

Tokyo, Japan, JPN002, Japan Science & Engineering Challenge

- **ANIM005** Fantastic Role of Tiny "Second Wings," or Calypteres, in Facilitating Highly Complex Flying Patterns
  - Yukiharu Kiriu, 18, Senior, Notre Dame Seishin Gakuen Seishin Girl's High School, Nagasaki City, Nagasaki Prefecture, Japan, T: Shuhei Yamamoto

- **CHEM026** Energy Creation by Low-Voltage Electrolysis of Water Using Aqueous Solutions with Different pH Levels
  - Ayane Iwasa, 18, Senior, National Institute of Technology - Gunma College, Maebashi, Gunma, Japan, T: Masakazu Saito

**IRELAND**

Dublin 16, Ireland, IRL002, SciFest

- **PHYS006** Cosmic Radiation Protection Simulation
  - Claire Marie Reidy, 18, Senior, Our Lady's Bower, Athlone, Co. Westmeath, Ireland, T: Julie Greeney

- **SOFT011** An Investigation Into Worldwide Electoral Systems and the Development of a Novel Internet Voting System
  - Andrei Florian, 18, Junior, Saint Aidans C.B.S, Dublin, Ireland, T: Niamh O'Brien

**ISRAEL**

Jerusalem, Israel, ISR001, The Israeli Young Scientists Contest

- **BMED065** The Effect of Sleeve Gastrectomy on Progression of Alzheimer's Disease
  - Tamar Attali, 18, Senior, Israel Arts and Science Academy, Jerusalem, Israel, T: Yisrael Rappaport

- **CELLO25** CD160 in Cytotoxic T Cell Exhaustion and Its Effect on PD-1 Blockade Cancer Immunotherapy
  - Maya Ben Shalom, 17, Senior, Gymnasia HaRealit, Rishon Lezion, Israel, T: Rakefet Via

- **MAT033** Clay Polymer Nanocomposite for Efficient and Rapid Removal of Organic Matter from Water
  - Idan Zilcha, 16, Junior, Harel High School, Mevaseret Zion, Israel, T: Yael Abraham

- **PHYS046** Phase Noise Characterization in Optical Fiber-Based Sensors
  - Omer Ariyan, 17, Junior, Ort Ironi D, Modi'in, Israel, T: Idit Ron

**JUGENDWISSENSCHAFTLICHE OLYMPIADE**

- **CHEM049** From Leavened Products to Proteins Through Flours
  - Caterina Amichetti, 19, Senior, Istituto Istruzione Superiore Galileo Galilei, Jesi, Italy, T: Luigi Frati

- **ETS081** Measure Time with an Apple (Innovative Indicator to Determine the Duration of Consumable Goods, and Plant to Extract Raw Materials to Allow Its Industrial Production)
  - Viorel Ionut Bohotici, 19, Senior, Istituto Istruzione Superiore Galileo Galilei, Jesi, Italy, T: Luigi Frati

- **ROBO040** Wrong-Way Detector: Optoelectronic System to Detect Vehicles in the Wrong-Way Direction on Highways
  - Tommaso Caligari, 16, Sophomore, Marco Zecchin, 15, Sophomore, Istituto Tecnico Industriale G. Omar, Novara, Italy, T: Celestino Fontaneto

**KOREA, REPUBLIC OF**

- **ANIM021** The Mechanism of Female Parasitoid Wasps, That Do Not Oviposit in the Hosts, Interrupt the Oviposition of the Other Female Wasps
  - Hosiakwarda, 18, Junior, Mie Prefectural Ise High School, Ise City, Mie, Japan, T: Yoshiyuki Fujiwara

**ITALY**

Milano, Italy, ITA001, I Giovani e le Scienze

- **BCHM036** EnoMed: The Power of Antioxidants from Grapes: A Green Perspective for Anti-Tumor Treatments
  - Letizia Mutti, 19, Senior, Luca Figazzolo, 17, Junior, Istituto Superiore Asciano Sobrero, Casale Monferrato, Italy, T: Anna Chiara Arecchi, T: Patrizia Cascio

**JAPAN**

Tokyo, Japan, JPN001, Japan Students Science Awards

- **ANIM019** The Mechanism of Female Parasitoid Wasps, That Do Not Oviposit in the Hosts, Interrupt the Oviposition of the Other Female Wasps
  - Hosiakwarda, 18, Junior, Mie Prefectural Ise High School, Ise City, Mie, Japan, T: Yoshiyuki Fujiwara
CHEM018 Innovation of “Copper to Silver to Gold - The Alchemist’s Dream” Using Aluminum Foil and Anionic Surfactant
Yuka Kishi, 16, Sophomore, Otsumaranzen High School, Hiki-gun, Saitama, Japan, T: Takahiro Suzuki

CHEM019 An Environmentally Friendly Method for Preparation of Transparent Wood
Tomohiro Kato, 17, Junior, Miyazaki Nishi High School, Miyazaki, Miyazaki, Japan, T: Shigeiho Nakahara

EAEV023 Development of a Portable Sensor Using Soil Fluorescence as an Indicator of Fertility in Rice Paddies
Jun Kondo, 18, Sophomore, Kyoto Tachibana High School, Kyoto, Japan, T: Naoshi Kondo

EBED016 Instrumental Sound Separation Using Compressed Machine Learning Models
Ryo Muramatsu, 19, Senior, Tokyo Tech High School of Science and Technology, Minato-ku, Tokyo, Japan, T: Yoshiro Nishizawa

JORDAN
Amman, Jordan, JOR001, Science Fair of The Jordanian Ministry of Education
BEHA025 Screening for Autism Spectrum Disorder by Detecting a Pattern in the Eye Movement of Autistic Children by Using an Eye Tracking System
Salma Omar Saleh Al-Shaghnobi, 14, Freshman, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah

BMED045T The Anticancer Activity of Greenly Synthesized Silver Nanoparticles Using Ephedra aphylla Ethanolic Extract
Nagham Alaa a AlHourani, 18, Senior, Farah Fawwaz AlZaatreh, 18, Senior, King Abdullah II School for Excellence – Maddaba, Jordan, T: Wajdy Al Awaida

CHEM054T Effectiveness Test of a Low-Cost and High-Efficiency Jordanian Micro Bentonite Filter to Remove Oily Pollutants from Water
May Ahmad Suleiman Al-Manasra, 16, Junior, Mays Nidal Mohammad Al-Kassasbeh, 16, Junior, Al-Hasaad Al-Tarbawi School, Amman, Jordan, T: Rowaida Abushusheh

EBED025T Hypocapnia and Pediatric Vehicular Heatstroke: Prevention and Rescue
Ayah Mustafa Abdalkader Alkatib, 17, Junior, Areen Rami Fathi Alashmawi, 15, Sophomore, Sara Iyad Issa Altarawneh, 15, Sophomore, Jubilee School, King Abdullah II School For Excellence, Aqaba, Jordan, T: Rania Alfujara

ENEV039T Applications of Cellulose Acetate Extracted from Paper Waste for Wastewater Treatment
Mira Zakaria Faleh Khalil, 16, Junior, Sara Dirar Alqasem, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah

ENEV065 Ocean X: A Device That Cleans Ocean Oil Spills Without Harming the Environment
Leen Hamadeh Omar Alloouh, 15, Sophomore, Maysoon Al-Demashqia, Irbid, Jordan, T: Jehan Alnouti

MATS028 Increase the Conductivity and the Crystallinity of PP by CNPs
Rashed Saad Waleed Abu Saleh, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah

MATS029 Magnetic Brakes
Tameem Ahmad Mohahmmad Masadeh, 14, Freshman, Levant International School, Amman, Jordan, T: Sinaa Husenat

MCRO023T The Antimicrobial Effect of Heavy Metals Nanoparticles on Bacteria

PHYS037T Providing a Simulator for the N Body Problem Using Programming and Euler’s Method, After Basing It on Our Solar System

CONGRATULATIONS
TO OUR FIRST PLACE CATEGORY WINNERS
Biomedical Engineering

EMIRHAN KURTULUS
Deep Learning Based Cranial Surgery Planning
Istanbul, Turkey
Booth ENBM013

RISHAB KUMAR JAIN
Synthetic DNA Engineering With ICOR
Portland, Oregon
Booth ENBM074

Johnson & Johnson applauds the finalists in Biomedical Engineering.

Johnson & Johnson
EAEV003T  Chemistry 101: A Chemistry Guide and Simulation Mobile App  
Jenan Ayed Mohd Nafey Ghaith, 17, Junior, Mayar International Schools, Amman, Jordan; T: Amal Oudat

KAZAKHSTAN

EAEV071T  Biodegradable Container Made from Coconut Shells and Cane Husks  
Nebras Tawfiq Ahmad Alrawashdeh, 14, Freshman, Muaath Bin Jbal Primary School, Ma'an, Jordan; T: Tawfiq Alrawashdeh

SOFT030  Chemistry 101: A Chemistry Guide and Simulation Mobile App  
Jenan Ayed Mohd Nafey Ghaith, 17, Junior, Mayar International Schools, Amman, Jordan; T: Amal Oudat

KAZAKHSTAN

CHEM036  Phytochemical Research of Peganum harmala  
Ayaulym Amangeldieva, 17, Junior, School-Gymnasium No. 4 Named after Zhambul Zhabayev, Nur-Sultan, Kazakhstan; T: Akmaral Kozhantayeva

ENEV045  Designing the Installation for Cleaning the Tasotkel Reservoir from Fishing Nets  
Akadil Aitu, 15, Freshman, Nazarbayev Intellectual School of Physics and Math, Taraz City, Kazakhstan; T: Inna Axyonova

ROBO061T  Intelligent Driver Status Monitoring System  
Diana Aleksandrovna Melnikova, 16, Junior, Kamila Manarbekovna Utegenova, 17, Junior; Ozat Boarding School of Information Technology, Kostanay, Kazakhstan; T: Irina Khramey

LATVIA

CHEM062T  Evaluation of Chlorinated Paraffin Presence in Disposable Face Masks  
Liga Lapsina, 17, Junior, Sarfote Luize Oidzna, 17, Junior, Cesis State Gymnasium, Cesis, Latvia; T: Laura Valaite-Driksna

LUXEMBOURG

LUXEMBOURG, Luxembourg, LUX001, National contest “Jonk Fuerscher”

BMED085  An Exploration of the Effects of Diet on Liver Cancer and Angiogenesis  
Skye Beck, 17, Senior, International School of Luxembourg, Luxembourg; T: Tessa Charnaud

EAEV092  To What Extent Is There a Relationship Between Phosphorus and Nitrogen Concentrations and Excessive Cyanobacteria Growth in Simulated Upper Lake Conditions?  
Glenn Partsch, 17, Senior, International School of Luxembourg, Luxembourg; T: Tessa Charnaud

MALAYSIA

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

CHEM017T  Cassava Peel Powder: A Novel, Cost-Effective and Eco-Friendly Pharmaceutical Biosorbent  
Alden Kai Ray Goh, 16, Junior, Ze Wei Liew, 16, Junior, Chun Rui Tan, 16, Junior, Chung Ling High School Penang, Georgetown, Penang, Malaysia; T: Whey Cheng Heah

EAEV003T  ChaCO-Bam: The Revolutionary Eco-Charcoal  
Muhammad Fitri Hatim Zainuddin, 16, Junior, Nur Ain Dafina Muhammad Shukor, 17, Junior, Awatif Qistina Suhaimi, 16, Junior; Sekolah Menengah Kebangsaan Kubang Bemban, Pasir Mas, Kelantan, Malaysia; T: Nor Zahirah Shamsudin

PLNT003T  Innovative Farming of Edible Microgreens Indoors  
Yee Hern Cha, 16, Senior, Dong Tze Chan, 15, Sophomore, Heng Lee High School, George Town, Penang, Malaysia; T: Sze Hui Chung

PLNT013T  Zein Extract Tea Solution: Eco-Friendly and Cost-Effective Delayed Ripening Solution for Bananas  
Yan Yi Cheong, 17, Junior, Yi Fan Lee, 16, Junior, Zhan Hoong Alfred Chin, 17, Junior, Chung Ling High School Penang, Georgetown, Penang, Malaysia; T: Whey Cheng Heah

ROBO002T  Soft Origami-Inspired 3D Print-In-Place Artificial Intelligence Robots  
Saan Cern Yong, 16, Junior, Sheng Ze Yeoh, 15, Sophomore, Sekolah Menengah Kebangsaan Katholik, Petaling Jaya, Selangor, Malaysia; T: Voon Siew Yong

MEXICO

Puebla, Mexico, MEX003, Mexico National Science Cup

BMED044  In silico Transcriptomic Analysis of Microglial Cells: Towards a Global Understanding of Immune Activation in Alzheimer’s Disease  
Andres Muedano Sosa, 18, Junior, Colegio Suizo de Mexico, Mexico City, Benito Juárez, Mexico; T: Harpreet Kaur

EAEV070T  Preparation of a Waterproofing Based on Nopal Mucilage (Opuntia ficus-indica), Alum and Liquid Soap  
Jose Jesus Carretero Mendez, 17, Sophomore, Roxana Reyes Ramos, 16, Freshman, Colegio de Estudios Científicos y Tecnológicos del Estado de Puebla Plantel Cholula, Cholula, Estado, Mexico; T: Marco Ramirez Cruz

EAEV071T  Biodegradable Container Made from Coconut Shells and Cane Husks  
Diana Mejia Arellano, 17, Senior, Wendy Maldonado Franco, 16, Sophomore, Hany Nissi Esteban Perez, 16, Freshman, Colegio de Estudios Científicos y Tecnológicos del Estado de Puebla Plantel Cholula, Cholula, Estado, Mexico; T: Marco Ramirez Cruz

NORTHERN MARIANA ISLANDS

Saipan, Northern Mariana Islands, NMI001, Northern Mariana Islands Science & Engineering Fair

MATH028T  COVID-19: The Effect on the CNMI’s Visitors  
Brent Matthew Estacio Ortizo, 17, Junior, Vidal Hernandez Camacho, 16, Junior, Mount Carmel School, Saipan, Northern Mariana Islands; T: Evangeline Villar

NORWAY

Oslo, Norway, NOR001, Norwegian Contest for Young Scientists

CHEM042  To What Extent Do Different Sodium Silicate (Na2SiO3) to Sodium Hydroxide (NaOH) Ratios in Alkaline Solutions Influence the Durability of Fly Ash Based Geopolymer Concrete Measured Through a Sorptivity Test?  
Matthieu Raphael Bou, 18, Senior, International School of Stavanger, Stavanger, Rogaland, Norway; T: Marion Streukert

ETSD044  Finding the Optimal Combination of Touch, Color, and Infrared Sensors to Navigate a Robot Explorer Through Simulated Space-Like Conditions  
Nikolai Isidro Zemliansky, 17, Junior, Blindern VGS, Oslo, Norway; T: Karin Hovland

OMAN

Muscat, Oman, OMAN001, The Omani National Science Faire

EBED036T  Smart Heights  
Sajda Abdulaziz Al Balushi, 16, Junior, Aalaa Yusuf Al Aufi, 15, Sophomore, Al Amal School, Muscat, Oman; T: Fahkria Alshibli
**Finalist Directory**

**ENEV073** Treatment of Polluted Water from Wells and Aflaj Using Waste Materials From Date Palm Trees Enhanced With Carbon Nanoparticles Decorated With Activated Carbon
Abdullah Masoud Al-Azri, 15, Junior, Abo Obaida for Basic Education for Boys, Nizwa, Al Dakhiliyah Governorate, Oman, T: Badriya Alkharusi

**ENEV074** Environmental Engineering in the Manufacture of Technology-Enhanced Bioplastics and Its Impact Study
Neeam Zahran Al Harrasi, 15, Sophomore, Doa’a AL Hashmi, 15, Sophomore, Al Rustaq School, Rustaq, Batinah South, Oman, T: Dhikra Al Harrasi

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

**CHEM032** Reducing the Toxicity of Heavy Metals
Muhammad Shafique Shah, 15, Sophomore, Punjab Daanish School for Boys, Mianwali, Punjab, Pakistan, T: Muhammad Yasin

**EAEV051** Influence of Organic Liquid Fertilizer on Crops
Hiba Noor, 16, Junior, Aga Khan Higher Secondary School, Karachi, Sindh, Pakistan, T: Azra Asad

**EBED023** Virtual Human Health and Safety Integration System
Muhammad Ibrahim, 15, Sophomore, Muhammad Talha Waqar, 15, Freshman, Beaconhouse School System Valencia Town Campus, Lahore, Punjab, Pakistan, T: Asif Fayyaz

**EGSD021** Network-Based Piezoelectric System for Self Defense Shoe Mechanism
Muhammad Ayan Asim, 16, Sophomore, Scarsdale International School, Lahore, Punjab, Pakistan, T: Salma Afroz

**ETSD027** Applications of Fluid Mechanics on Cars and Wings

**MATS022** Vegan Leather Obtained from Cedrus deodara
Syeda Umm E Kulsoom Bukhari, 18, Senior, PakTurk Maarif International School and Colleges, Gulshan-e-Iqbal Girls Campus, PakTurk International Schools and Colleges, Gulshan-e-Iqbal Girls Campus, Karachi, Sindh, Pakistan, T: Hira Bashir

**PALESTINE**
Ramallah, Palestine, PSE001, Palestine Science and Technology Fair

**BEHA051** Type Independently
Tala A. I. Damery, 16, Junior, Mira M. M. Dheliieh, 17, Junior, Tulkarem Industrial School, Tulkarem, Palestine, T: Zaina Shtawie

**BEHA052** I See You
Mira A. R. Soradi, 16, Junior, Rahaf Naser Ahmad Abuzaid, 16, Junior, Nablus Secondary Vocational School, Nablus, Palestine, T: Walaa Shahriri

**ENEV077** Rationalize Water Consumption While Waiting for Hot Water To Reach the Tap by Returning It to the Cold Water Tank
Dana I. A. Eshtaya, 16, Sophomore, Talae’ Al-Amal Secondary Schools, Nablus, West Bank, Palestine, T: Ruba Dwekat

**ENEV081** The Smart Programmer for Rationalizing Water During Showering and Ablution

**SOFT050** Smart Shopping Cart App
Dania M. A. Smeeq, 17, Junior, Azad Hamdan, 15, Sophomore, Shaimaa Girls Secondary School, Qalqilya, Palestine, T: Laial Hamdan

**CONGRATULATIONS TO OUR CATEGORY WINNERS**

**Cellular and Molecular Biology**

**FIRST PLACE**
Shivani Ruk Babu

**SECOND PLACE**
Zehra Jaffery
Bhavana Sridharan

**THIRD PLACE**
Michael Ziqi Gao
Miah Christina Margiano
Benjamin Scott Persily

**FOURTH PLACE**
Thomas Coxe Commander
Angela Huang
Anna Monica Voia
Jean Yu

Regeneron applauds the finalists in Cellular and Molecular Biology.
Regeneron International Science and Engineering Fair 2022

Finalist Directory

PANAMA
Panama City, Panama, PAN001, Feria Cientifica del Ingenio Juvenil
BMED025 Assessment of Knowledge About Chronic Kidney Disease in the Panamanian Population
Missel De Los Angeles Camano, 14, Freshman, Centro Educativo Jose Santos Puga, Santiago, Veraguas, Panama, T: Karen Castrejo

PERU
Lima, Peru, PER001, Peru Science and Engineering Fair
BEHA011 In the Footsteps of Manuela Titito Condori—Memory and Forgetting: Participation of the Canchina Woman During the First Independence Movement in Peru
Yorch Efrain Quispe Condori, 16, Senior, Julio Alberto Ponce Antunuez De Mayolo, Canchis, Cusco, Peru, T: Adrian Poco Caceres
EGSD015 Peru 2.0: Electrical Energy Generator from Plant Photosynthesis and Water Generator From Air
Jheriko Sebastian Gomez Quilca, 17, Senior, Politecnico Regional Del Centro, Huancayo, Junin, Peru, T: Edith Chiri Huayta
ENEV022 Pollution or Reduction of Fragmentation of the Natural Habitat in the Wetlands of the Purrumpampa Grasslands, Huamachuco, Peru
Jhoana Melissa Ruiz Mendoza, 14, Sophomore, I.E. 80779 La Inmaculada, Huamachuco, La Libertad, Peru, T: Eduardo Ponce Zelada
ENEV023 Use of Bivalve Mollusc Residues as Aggregate for the Manufacture of Concrete
Joanna Ivette Galan Alvarez, 16, Senior, Maria Adele Garnier, Sechura, Piura, Peru, T: Franz Navarro Saavedra
EGSD029 Electric Energy Generation to Charge a Smartphone with the Bicycle Wheel

POLAND
Gdynia, Poland, PLDO01, (Ex)plory Science Fair
ANIMO13 The Characteristic of the Penetration Preference of the Field Related to Its Species Diversity by Selected Representatives of Hymenoptera, Flies, Beetles, and Butterfly for the Purpose of Revitalization Activities for Green Spaces in Cities and Farmlands
Gabriela Szczepanik, 18, Senior, XIV Liceum Ogolnoksztalcace im. Stanislawa Staszica, Warszaw, Voivodeship Mazowieckie, Poland, T: Agnieszka Szczepanik
ENEV014 Specialized Drone for Tropospheric Ozone Research with Precise Positioning and Wireless Data Transmission
Marek Rauchfleisz, 17, Junior, University High School, Torun, Kuyavian-Pomeranian, Poland, T: Mariusz Kaminski
PHYS007 Hurricane in the Cup: Vortices’ Trochoidal Motion and the Effects of Instability During Diffusion in Liquids
Nina Cielica, 18, Senior, III LO im. Adama Mickiewicza, Katowice, Slaskie, Poland, T: Nidia Salazar Trucios
ROBO028T Filament Extruder: A Free Manufacturer of Material for a 3D Printer
Adrian Przybylski, 19, Senior, Raymond Dejnak, 18, Sophomore, Zespół Szkol Technicznych i Ogólnokształcacych im. Stefana Banacha w Jarosławiu, Jaroslaw, Podkarpacie, Poland, T: Mariusz Skupien

PORTUGAL
Porto, Portugal, PRTO01, Portuguese Contest for Young Scientists
ENEV050T The Phytoproject: Ex situ Bioremediation of Water from Lagoa da Ervedeira: Use of the Microalgae Chlorophyllum vulgaris Immobilized in Calcium Alginate
Matilde Lagoa Tarenta, 17, Senior, Mariana Da Silva Simoes, 18, Senior, Escola Secundaria Engenheiro Acacio Calazans Duarte, Marinha Grande, Leiria, Portugal, T: Rui Fernandes

PUERTO RICO
Mayaguez, Puerto Rico, TEPR01, Puerto Rico Math Fair
MATH026 Finding Number Sequences Using the Pascal Triangle and the Newton Binomial
Karina Alanis Miranda, 15, Sophomore, CROEM HS, Mayaguez, Puerto Rico, T: Edwin Benvenuti
MATH027 The Perimeter of an Ellipse and New Suggested Formula K
Helen Karin Li, 17, Junior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Esperanza Soto Rivera
MATH036 Using Arithmetic to Determine a Future Time
Helen Karin Li, 17, Junior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Victor McDougall Rivera
Ponce, Puerto Rico, TEPR02, Arecibo Regional Science Fair
PHYS059 Modification of a Surfboard in Shape and Fin, for People with Balance Problems Due to Neuromuscular Disabilities
Noelz Sophia Cordero, 16, Junior, Abelardo Martinez Otero, Arecibo, Puerto Rico, T: Lilliam Reyes
Ponce, Puerto Rico, TEPR04, Caguas Regional Science Fair
BEHA030 The Studying Habits of Twelfth Grade Student of a School in the Southeast of Puerto Rico
Joryann Marielys Campos Ortiz, 18, Senior, Specialized School of Science and Mathematics Genaro Cautiño Vázquez, Guayama, Puerto Rico, T: Haydee Laporte Berrios
EAEO39 Microplastics in the Beaches of Western Puerto Rico
Edmarie Ramos Burgos, 18, Senior, Escuela Superior Juana Colón, Comerio, Puerto Rico, T: Jacqueline Colon Melendez
EGSD029 Electric Energy Generation to Charge a Smartphone with the Bicycle Wheel Movement
Alondra Nicole Ortiz Melendez, 18, Senior, Specialized School of Science and Mathematics Genaro Cautiño Vázquez, Guayama, Puerto Rico, T: Maria Medina Barbosa
Sabana Grande, Puerto Rico, TEPR05, Humacao Regional Science Fair
PLINT027 Comparative Analysis on the Effect of the Dosage of Hydrogen Peroxide in the Germination Process in Legumes Phaseolus vulgaris L. (Pink and Red Bean Variety) and Cicer arietinum (Chickpea)
Joel Sanchez-Medina, 18, Junior, Florencia Garcia High School, Las Piedras, Las Piedras, Puerto Rico, T: Mariana Da Silva Simoes
Ponce, Puerto Rico, TEPR06, Ponce Regional Science Fair
CHEM063 Synthesis of Cinnamic Acid for Use as a Natural Pesticide
Samuel Jose Cedeño, 17, Junior, Centro Residencial de Oportunitades Educativas de Villalba, Villalba, Puerto Rico, T: Rocio Hernandez
Finalist Directory

EGSD030  Sargassum fluitans as an Energy Source for Bioethanol Production
Fabiola Wah, 17, Senior, Centro Residencial de Oportunidades Educativas de Villalba, Villalba, Puerto Rico, T: Rocio Hernandez

ETSD036  Adaptation of “Roof Flaps” to Sedan Body Cars to Increase the Probability of Regaining Control at High Speeds
Abdiel Urayaan Saez Barcelo, 16, Junior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Jonatan Plaza

Sabana Grande, Puerto Rico, TEPR08, Mayaguez Regional Science Fair

ROBO070  Applying OpenCV and Machine Learning to the Enforcement of COVID-19 Prevention Guidelines
Hector Manuel Lugaro, 18, Senior, Centro Residencial de Oportunidades Educativas de Mayaguez, Mayaguez, Puerto Rico, T: Brenda Cabrera

Ponce, Puerto Rico, TEPR09, San Juan Regional Science Fair

ETSD067T  Glove-Shaped Hand Manipulative and Application Integration for Hearing People to Learn Basic American Sign Language (ASL)
Shanttale Aquino Lopez, 18, Senior, Charlotte Aquino Lopez, 16, Junior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez-Rivera

TEMED036  The Development of a Videogame That Serves as a Diagnostic Tool for Depression in Teenagers
Daniela Gonzalez -Romano, 17, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez-Rivera
**QATAR**

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

**BMED066**  Role of TEM-143 in Glucose Homeostasis-Implications in the Pathogenesis of Type-2 Diabetes  
Alyaa Eisa Al-Tamimi, 18, Senior, Al Bayan Secondary High School for Girls, Doha, Qatar, T: Hissa Al-Shamari

**CBIO067T**  Bioinformatics Analysis to Identify Potential Transcription Factors That Enhance Reprogramming of Somatic Cells Into Induced Pluripotent Stem Cells  
Saud Abdulaziz Al-Jaidi, 18, Senior, Khalifa Mohammed Aljanahi, 16, Junior, Hassan Ibn Thabit Secondary School for Boys, Doha, Qatar, T: Faisal Hassan

**EGSD049T**  Polymer Nanocomposites for Energy Harvesting Application  
Salwa Al-Kuwari, 17, Senior, Fajer Masl Al-Shamari, 17, Senior, Qatar Academy for Science and Technology, Education City, Doha, Qatar, T: Ruba Ali

**ENBM067T**  Novel Technique to Fabricate Ultraviolet Sensor Using Photopolymer Resin With 3D Printing Technology To Avoid Skin Cancer  
Ali Yusuf Shams, 17, Senior, Mohammed Nasir Redhwani, 16, Junior, Al-Jazeera Academy, Doha, Qatar, T: Azza Abouhashem

**ENEV098T**  Development of Efficient Catalyzers from Waste Shells for the Production of High Purity Biodiesel From the Household Cooking Waste Oil  
Norahhuda Almubarak, 17, Senior, Umm Ayman Secondary School for Girls, Doha, Al Rayyan, Qatar, T: Salma Al Tamimi

**MCR0063T**  Use of Zizphus Leaves Extract as a Safe Alternative Against Some Isolated Fungi from Soil  
Raghad Hassan Alkhuzaei, 16, Junior, Raghad Ali Abu Halawa, 18, Senior, Zubaida Secondary School for Girls, Al-Doha, Qatar, T: Yousra Abdelmawgood, T: Yousra Kamal

**REPUBLIC OF MOLDOVA**

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

**PLNT026T**  Broccoli: The Source of Obtaining Biologically Active Components  
Marina Rusnac, 17, Junior, Maria Ciocoi, 17, Junior, LTPR Mihai Marinciuc, Chisinau, Republic of Moldova, T: Alla Dvornina

**ROBO042T**  Autonomous Base Station for Drone Storage and Battery Swapping  
Cosmin Ciobor, 17, Junior, Andrei Copaci, 18, Senior, Theoretical Lyceum “Ion Creanga”, Chisinau, Republic of Moldova, Liceul de Creativitate si Inventivitate Prometeu-Prim, Chisinau, Republic of Moldova, T: Marius Dumitrascu

**ROMANIA**

**Bucharest, Romania, T: Marius Dumitrascu**

**EAEVO15**  Performance of Machine Learning Algorithms for Predicting Air Pollution Parameters  
Brianna Alexandra Stan, 17, Junior, Lauder-Reut Educational Complex, Bucharest, Romania, T: Ion Stan

**ENBM019**  Demyelination: A Research Into the Use of Electrical Models in the Study of Demyelinating Diseases  
Despina Iuliana Iuliana Gica, 18, Senior, Mihai Viteazul National College, Bucharest, Romania, T: Mircea Ignat

**ENBM020**  Applications of Electromagnetic Forces in Medicine  
Cristiana Andreea Murgoci, 19, Senior, International Computer High School of Bucharest, Bucharest, Romania, T: Mircea Ignat

**ENBM057T**  Guidance System for Visually Impaired People  
Mihai Dumitrescu, 16, Sophomore, Matei Andrei Iosip, 16, Sophomore, Mihai Razvan Varlan, 16, Sophomore, Liceul Teoretic International de Informatica Bucharest, Bucharest, Hermann Oberth German School, Colegiul National Mihai Viteazul, Bucharest, Romania, T: Mircea Ignat

**SAUDI ARABIA**

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

**BEHA017**  A Novel Application of Three-Dimensional Printing in Personalizing Drug Dosage  
Mawaddah Omar Ali, 17, Senior, Umm Salamah, Makkah, Saudi Arabia, T: Sharaf Sharaf

**BMED024**  The Roles of Activin-A and Its Antagonists in Early and Late Stages of Colon Cancer: In vitro Study  
Layan Zahid Shahrahali, 17, Senior, Umm Salamah, Makkah, Saudi Arabia, T: Bassem Refaat

**CBIO025**  Drug-Target Interactions Prediction Using Network Based Method and Machine Learning  
Lara Raed Monagal, 18, Senior, Dar Jana International School, Jeddah, Saudi Arabia, T: Maha Thafar

**CHEM027**  Development of a Novel, Hybrid Compound as a Single-Source Precursor for Nanocrystalline Manganese Oxide and Sulfide  
Areej Iyas Bajawi, 17, Senior, Smart Learning Schools, Riyadh, Saudi Arabia, T: Norah Tarash

**CHEM028**  Enhancing the Photoelectrocatalytic Performance of WO3 Decorated with CoO Using Electrodeposition for Water Splitting  
Maria Ghalib Al Ghamdi, 16, Junior, Al Shams National Schools, Riyadh, Saudi Arabia, T: Nawal Abass

**CHEM043**  Selective Dehydrogenation of Formic Acid Using an Efficient Cost-Effective Ruthenium-Based Catalyst for Generating Power in Automobiles  
Dana Ali Khafagi, 17, Senior, Al Ibdaa Private Girls’ Schools, Jeddah, Makkah, Saudi Arabia, T: Ahmed Mirza

**EAEV027**  Estimating the Capillary Pressure of Reservoir Rocks Using Nuclear Magnetic Resonance (NMR) Logging  
Lamar Alkaka, 17, Senior, Al-Anjal Private School, Al Hofuf, Eastern, Saudi Arabia, T: Kuo-Wei Huang

**EBED019**  Digital Upgrade of Analog Communication Systems Using Software-Defined Radio Techniques  
Yousef Khajah, 17, Senior, Al-Faisalia Secondary School, Jeddah, Makkah, Saudi Arabia, T: Talal Al-Attar

**EBED020**  A Novel, Fluorescent Nano-Based Sensor for Mercury in Seawater with High Sensitivity and Selectivity  
Ahmad Alrabiah, 18, Senior, Al Shams National Schools, Dammam, Eastern Province, Saudi Arabia, T: Muhammad Mansha

**EGSD018**  Engineering a Bifunctional Metal: Organic Framework for Efficient and Cost-Effective Hydrogen Production and Storage  
Abdullah Abdulalaziz Al-Ghamdi, 17, Senior, Al-Hussan High School, Dammam, Eastern, Saudi Arabia, T: Mahmoud Abdelnaby
CONGRATULATIONS TO OUR CATEGORY WINNERS

**Computational Biology and Bioinformatics**

**FIRST PLACE**
- Wutthipong Chongchareansanti
- Pawit Kaewnuratchadasorn
- Nattawin Yamprasert
- Kevin Zhu

**SECOND PLACE**
- Rithvik Ganesh
- Minnie Liang
- Khushi Parikh
- Ryan Samuel Park

**THIRD PLACE**
- Amogh Chaturvedi
- Satvik Dasariraju
- Caroline Huang
- Edward Wonyong Jung
- Alice Liu
- Amber Luo

**FOURTH PLACE**
- Ebru Ayyorgun
- Vikram Srinivas Goddla
- Hannah Guan
- Srinath Hariharan
- Theodore Tianqi Jiang
- Leo Shen
- Anjali Sreenivas
- Anirudh Venkatraman

Regeneron applauds the finalists in Computational Biology and Bioinformatics.
MATS018 Date Seeds Derived Phosphorus and Nitrogen Doped Graphene Oxide for Supercapacitor Applications
Naif Ali Al Qahtani, 18, Senior, Abha Private School, Abha, Aseer, Saudi Arabia, T: Abdullah Alqhamdi

MATS019 Enhancing the Photostability and Efficiency of Tin-Lead Perovskite Solar Cells Using Nickel Oxide and Self Assembled Monolayers
Muhand Bakr Alammar, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Darya Baran

PHYS032 Physical Properties Analysis of Double-Perovskite Oxide (La$_2$CoMnO$_6$) for Spintronics Devices: A First-Principles Density Functional Theory Study
Rala Abu Sulaim, 17, Senior, Manarat Al-Madinah National School, Madinah, Saudi Arabia, T: Udo Schwingerschlogl

PLNT016 Suicidal Germination of Striga hermonthica in Response to Various Cytokinins in Combination With Fluridine/1-Aminocyclopropane-1-Carboxylic Acid
Ahmed Marwan Behesi, 17, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Salim Al-Babili

PLNT017 Isolation and Characterization of Plant Growth Promoting Bacteria From Olive Tree Cultivated Under Desert Farming in Saudi Arabia
Faisal Abdullah Al Khwaier, 18, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Anas Rawas

PLNT018 A Heterologous System Examination of JACKDAW Mutant Variants’ Effects on Complex Formation With SHORT-ROOT and SCARECROW
Faisal Saad Alqhamdi, 18, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Fatimah Abdulhakim

TMED008 Mitigating Impaired Drug Absorption To Shorten Medical Treatment
Rala Abu Sualmi, 17, Senior, Manarat Al-Madinah National School, Madinah, Saudi Arabia, T: Abdullah AlGhamdi

SINGAPORE

Singapore, Singapore, SGPO01, Singapore Science and Engineering Fair

BMED076 Differentiating LATE from Alzheimer’s Disease in the Era of Anti-Amyloid Monoclonal Antibody Treatment: A Novel Machine-Learning Approach
Jun Kai Yeong, 17, Senior, NUS High School of Mathematics & Science, Singapore, Singapore, T: Crei Loong Ng

CELLO40T Turning the TCA Cycle Backwards To Repair Damaged DNA
Branden Kang Jun Zhao, 15, Sophomore, Anselmo Klement Chua, 16, Sophomore, Clementi Town Secondary School, Singapore, Singapore, T: Rachel Lehming-Teo

CHEM070 Go Mini or Go Home! Fabrication and Evaluation of Miniature Solid-State Ion-Selective Electrodes for pH Measurement
Annika Xian Tian Liu, 17, Senior, Raffles Institution, Singapore, Singapore, T: Guoxian Tan

MATS047 “Sotong”-Nidin: The Detection of Squid Freshness Using Red Cabbage Extract (RCE)
Rui Xuan Lee, 18, Senior, Nanyang Junior College, Singapore, Singapore, T: Qian Bing Toh

SLOVAKIA

Bratislava, Slovakia, SVK002, AMAVET-Slovak Association for Youth, Science & Technology

ETSD069 Open-Source DIY Unmanned Aerial System for Remote Sensing: Open Plane Project
Matej Gurnak, 18, Senior, High School of Jura Hronca, Bratislava, Slovakia, T: Lubica Letanovska

MCRO047T Comparison of Commercial and Natural Disinfectants and Their Effect on Microorganisms
Katarina Fabulova, 17, Junior, Laura Ivancova, 17, Junior, Saint Nicholas Grammar School, Pressov, Slovakia, T: Miriam Feretova

SOUTH AFRICA

Johannesburg, South Africa, ZAF001, Expo for Young Scientists – South Africa

EAEV009T A Comparison Between Two Rocky Shore Ecosystems on Two Different Coastlines
Audrey Kingswell Hunn, 16, Sophomore, Protea Heights Academy, Cape Town, Western Province, South Africa, T: Danielle van Eck

EBED009 Automated Energy-Saving Cleaning Systems for Central Heating and Ventilation: Healthy Air for Hospitals and Offices
Michael Grey Shepstone, 16, Junior, Somerset College, Cape Town, Western Cape, South Africa, T: Louise van Zyl

ENBM011 Diagnosis of Respiratory Diseases Through Physiological Sound Analysis
Sachin Mohan, 17, Senior, Horizon International High School, Johannesburg, Gauteng, South Africa, T: Huseyni Ackinci

PHYS010 Formula One Aerodynamics
Dashayin Gilbert, 17, Senior, Curro Hermanus Independent School, Hermanus, Western Cape, South Africa, T: Charmaine Matthee

ROBO013 Using Machine Learning To Diagnose Pneumonia and Skin Cancer: DoctorNet
Kutlwano Brian Tshatiwa, 16, Senior, Gabonewe High School, Madikwe Township, North West, South Africa, T: Gales Mekgwe

TMED008 Mitigating Impaired Drug Absorption To Shorten Medical Treatment and Enable Pharmaceutical Product Development: Critical Evaluation of Human Oral Bioavailability for Pharmaceutical Drug Paracetamol
Raaes De Witt, 18, Senior, Curro Durbanville High School, Cape Town, Western Province, South Africa, T: Marthele Theart
**SOUTH KOREA**

**Daegu, South Korea, KOR001, Korea Code Fair**

**EBED028T** CURE (Smart Check-In Service Using Palm Vein Authentication)
Seongbin Byun, 15, Sophomore, Youngtae Cho, 15, Sophomore, Seokho Lee, 16, Sophomore, Kyeongbuk High School, Daegu Joong-Ang High School, Daegu Software High School, Dalseong-gun, Daegu, South Korea, T: Jaegwon Kim

**ROBO056** Glasses for the Blind Using Finger Tracking and OCR
Du-go Park, 16, Junior, Korea Digital Media High School, Ansan-si, South Korea, T: Mi-Young Ha

**SOFT023** Program Development To Check Students’ Concentration During Online Class
Ju-Young Shim, 17, Junior, SeHyun High School, Seoul, Gangseo-gu, South Korea, T: Jungwoon Choi

**SOFT028T** A New Approach to Image-Based 3D Virtual Try-On Using Deep Learning
ChaeWon Huh, 16, Junior, Eun Woo Chang, 17, Senior, Chae Young Huh, 18, Senior, Kyeongbuk High School, Gyeonggi Girl’s High School, Nam-gu, Daegu NamSan High School, Daegu, South Korea, T: Sunhee Lee

**SOFT045** Internet Broadcast Management System: Post-Broadcast File Management and Editing Point Extraction
Shin Doyun, 17, Senior, Incheon Daegun High School, Incheon, Yeonsu-gu, South Korea, T: Kim Mingu

**Cheonan-si, South Korea, KOR003, Korea Science Fair**

**ANIM008T** Mosquito Surge: Global Warming and Geographical Factors
Junwoo Kim, 18, Senior, Hyunmoon Hwang, 18, Senior, Youngueun Seo, 17, Senior, Incheon Academy of Science and Arts, Incheon, Incheon, South Korea, T: Hangseol Cho

**ANIM015** What You Eat, What You Are: Diet-induced Epigenetic Alteration of *Tenebrio molitor’s* Pigmentation
Minjun Shin, 17, Senior, Hankuk Academy of Foreign Studies, Yongin, Gyeonggi-do, South Korea, T: Yoo Soyeun

**BCHM016T** Exploring Ecofriendly Way To Recycle Wasted Part of *Flammulina velutipes*: Through Proving Bioactivity of Its Subcritical Water Extract
Myeongjin Kang, 16, Junior, Seungmin Lee, 17, Senior, Donghyeon Gwak, 17, Junior, Changwon Science High School, Changwon-si, Gyeongsangnam-do, South Korea, T: EunKyong Yoon

**CBIO011** Pharmacodynamic Prediction Model Using Physicochemical Properties of Antidepressant
Guhyun Chung, 17, Junior, Saint Paul Preparatory Seoul, Seocho, Seoul, South Korea, T: Michael Kim

**EAEV014T** Please Embedding Roundabout on the City!: Roundabout Planning Program for Reducing Air Pollution in the Urban Planning Stage
Gaon Han, 15, Sophomore, Jiho Hwang, 15, Sophomore, Hui Gwan Yang, 15, Sophomore, Haemil High School, Sejong-si, Haemil, South Korea, T: Kim So yeon

**ENBM016T** A New Paradigm of Ankle CPM Machine: A Portable Two Axes Ankle CPM Machine Using Linear Actuators
Gyu Jin Kim, 18, Senior, Seogyun Yim, 17, Senior, Gyeongmin Kwon, 18, Senior, Incheon Academy of Science and Arts, Incheon, Incheon, South Korea, T: Daeki Cho

**MATH010T** Study on the Solution Set of Knot Colorings
Dongin Kim, 18, Senior, Sihyeong Yang, 18, Senior, Seokyoung Yoon, 18, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Hun Kim

**MATS006T** A Novel Type of Piezoelectric Device: Development and Utilization of Bio Piezoelectric Device Using Jellyfish Collagen
Minseo Jo, 16, Junior, Seonwoo Kang, 16, Junior, Chungnam Science High School, Gongju Si, Chungcheongnamdo, South Korea, T: Guntaek Lee

---

**CONGRATULATIONS TO OUR CATEGORY WINNERS**

**Earth & Environmental Sciences**

**FIRST PLACE**
Rebecca Cho
Anika Puri

**SECOND PLACE**
Rishita Ghosh
Eyrin Kim
Thitipong Larndate
Artash Nath
Taruika Sasikumar
Jirapon Sengnongbhan

**THIRD PLACE**
Maria Chzhen
Cameron Dunn
Arjun Gupta
Eliana Kai Juarez
Ashton Timothy Ryan
Suraj Vaddi
Sunny You

**FOURTH PLACE**
Lamar Alkaka
Druhin Bhowal
Desmen Andrew Boykin
Angela Chen
Jun Kondo
Ellery Alice Barrgrove McQuilkin
Julie Inutsuka Sieg
Arihant Singh
Kayla J. Sohn
Brianna Alexandra Stan
Lu-Heng Wang
Po-Kai Yang

---

*National Geographic* applauds the finalists in Earth & Environmental Sciences.
**Finalist Directory**

**SOFT033T** Abstract Image Search Algorithm Based on Color Histogram

**ROLBO016** 3D AttnGAN for Text to Voxel Generation

**ROBO038** Development and Construction of a Low-Cost Six-Axis Robot Arm

**SWITZERLAND**

**BCHM018** Application and Comparison of Deep Learning Methods in the Prediction of RNA Sequence Degradation and Stability

**SOFT044T** Auto Accident Report System

**Spain**

**ETS061T** The Three-Body Problem: A Stability Analysis of Multiple Star Systems

**ETSD068** Automated Greenhouse: Is Its Use a Good Way To Boost the Plants’ Growth?

**SWEDEN**

**CHEM030T** Degradation of rPLA With the Non-Metal Catalyst (PLADEG) and Its Application

**CHEM035T** Novel Protein Quantification With Metal-Organic Framework (MOF)-Coated Quartz Crystal Microbalance (QCM)

**CHEN008T** Novel Plant Growth Promoting Rhizobacteria (PGPR) on Native Korean Wheat

**CHEN009T** Novel Peptide Synthesis With Modified Ester Linker for Vitrimer Synthesis

**TAIWAN**

**AMINO06** Mechanisms of High-Salt Diet-Induced Learning Deficit in Drosophila

**CRO0006T** Gene Expression Mechanism of Alternative Sigma Factors SigE and SigB Inducing Rifampicin Resistance in Mycobacterium Smegmatis

**CRO104T** Is Quantum Mechanics Wrong?: Verification of Bell-Type Inequality Violation and Suggestion of the Improved Form Inequality

**EAE004T** Effects of Changes in Precipitation on Marine Ecosystems Due to Overstraining

**ETEV074** Evaluation and Comparison of the Effectiveness and Safety of Fecal Microbiota Transplantation, Anti-Inflammatory Drugs, and Biologics for the Treatment of Inflammatory Bowel Disease
CONGRATULATIONS TO OUR CATEGORY WINNERS

Embedded Systems

FIRST PLACE
James Nagler

SECOND PLACE
Nishu Yogesh Anekere
Yike Chen
Dawn Winston Cheng
Harrison Taylor Gover
Sahil Naresh Krishnani
Yiming Xiong

THIRD PLACE
Aditi Bhaskar
Sarang Goel
Eric Zou

FOURTH PLACE
Mihai Crisan
Kayla Joy Salasidis
Vivek Sandrapaty
Emily Kathleen Troutman

Microsoft Azure Sphere applauds the finalists in Embedded Systems.
**Finalist Directory**

**ETSD010T**  
**Effect of Magnetic Field on Frequency Generated From an Active Magnetic Buzzer**  
Settasit Settgaroon, 18, Senior, Pojchara Ounjaroen, 18, Senior, Wachirawit Nisaprukasach, 18, Senior, Karnnuevitya Science Academy, Rayong, Thailand, T: Kriangsakam Sawangsri

**MATH015T**  
**The Relationship Between Colletotrichum gloeosporioides Distribution Area on the Skin and the Flesh of Nam Dok Mai Mangos**  
Kulanya Lopradit, 18, Senior, Puntra Bunkokua, 18, Senior, Thanchanok Nuenin, 18, Senior, Princess Chulabhorn Science High School Phetchaburi, Cha-Am, Phetchaburi, Thailand, T: Pitsinee Kong sukun

**PHYS015**  
**Age Determination and Comparison of Open and Globular Star Clusters by HR-Diagram**  
Chalisa Srikum, 17, Junior, Varee Chiang Mai School, Muang, Chiang Mai, Thailand, T: Sarawut Pudmale

**PLNTO21T**  
**Prevention of Guava Fruit Flies Using New Trap From Combination of Baits With Methyl Eugenol Extract From Local Plants**  
Seksan Aphai, 18, Senior, Suthin Thoebitb, 18, Senior, Mekhim Panchasin, 18, Senior, Huynamhomm Wittayaikan School, Nakhon Sawan, Thailand, T: Niramol Rodpud

**TMED010T**  
**BiDEx - A Screening System for Rapid Proactive Detection of Patients With Liver Fluke Infection Using a CNN Model To Detect Opisthorchis viverrini Eggs From Microscopic Fecal Images and a NN Model for Infection Risk Assessment**  
Napassorn Litchowong, 17, Junior, Wannappong Uttayota, 17, Junior, The Prince Royalâ€™s College, Mueang Chiang Mai, Chiang Mai, Thailand, T: Khampol Kantakaew

**THAILAND**

Pathum Thani, Thailand, THA002, Young Scientists Competition

**BMED071T**  
**Sawasdee-AMP: Highly Efficient, Portable and Low-Cost Point of Care Test Kit for Future Emerging RNA/DNA Diseases Diagnosis**  
Pakitta Kriangsame, 17, Junior, Kulpatch Chananan, 18, Junior, Kunat Khongtong, 17, Junior, Mahidol Wittayanusorn School, Nakorn Pathom, Nakorn Pathom, Thailand, T: Kiattipoom Rodpun

**CBOO068T**  
**PLCAI: Systematic Pipeline for Protein-Ligand Binding Prediction via Multi-Scale Convolution Neural Network With Applications in Interpretable Drug Design Process**  
Koravit Litchowong, 17, Junior, Chris Tidsjumreeporn, 16, Junior, Wattanapong Uttayota, 17, Junior, The Prince Royalâ€™s College, Mueang Chiang Mai, Chiang Mai, Thailand, T: Khampol Kantakaew

**CBIO069T**  
**CANDragAT: A Hybrid Fragment-Based Graph Attention Network To Improve Cancer Drug Response Prediction**  
Pawit Kaewrunratdachorn, 17, Senior, Nattawin Yamprasert, 18, Senior, Wuttipong Chongchareansanti, 18, Senior, Mahidol Wittayanusorn School, Nakorn Pathom, Nakorn Pathom, Thailand, T: Kiattipoom Rodpun

**EAEV076T**  
**A Novel Floating Planting Material for Inner Mangrove Forest Inspired by Barringtonia asiatica**  
Thitphon Larndate, 17, Junior, Jirapon Sengnongban, 17, Junior, Princess Chulabhorn Science High School Phetchaburi, Cha-Am, Phetchaburi, Thailand, T: Khuthongkhr Lamhong

**ENBM068T**  
**WaveNet: A Novel Multi-Scale Convolutional Neural Network for Generalized Bio-Signal Applications**  
Thee Mateepithaktham, 17, Junior, Punnawise Phuphan, 17, Senior, Suan Kularb Wittayalai School, Phra Nakhon, Bangkok, Thailand, T: Theerawut Wilaiprasitporn

**ENBM069T**  
**Microneedles for Creatinine Detection: Novel Prototype of Non-Invasive Portable Tool Towards Chronic Kidney Disease Risk Assessment**  
Preeraphat Lapanrongchag, 17, Junior, Thanapatree Reechwa, 17, Junior, Mahidol Wittayanusorn School, Nakorn Pathom, Nakorn Pathom, Thailand, T: Kiattipoom Rodpun

**PHYS064**  
**Bob Pendulum Oscillation Under Air Flow: An Experimental and Numerical Investigation**  
Witchayoot Nakasoon, 18, Senior, Benjamarchutt School, Muang Nakorn Si Thammarat, Nakorn Si Thammarat, Thailand, T: Salwane Jemamad

**TURKEY**

Ankara, Turkey, TUR002, Tubitak Fair

**CBIO005**  
**Diagnosing COVID-19 and Prioritizing Treatment via Fuzzy Parameterized Fuzzy Soft Matrices**  
Zeynep Parla Parmaksiz, 17, Junior, Besiktas Bilim Ve Sanat Merkezi, Besiktas, Istanbul, Turkey, T: Serdar Enginoglu

**CHEM008**  
**Novel Antibody-like Targeting Ligand Assays for the Detecting Volatile Pollutants**  
Mehmet Sertac Cekuc, 20, Senior, Istanbul Fuat Sezgin Bilim ve Sanat Merkezi, Istanbul, Atasehir, Turkey, T: Ismail Ates

**ENBM008**  
**Boric Acid Added Composite Hydrogel Synthesis, Characterization and Investigation of Usage as Soft Contact Lens Material**  
Ayuuke Sener, 18, Senior, Kayseri Cetin Sen Bilim ve Sanat Merkezi, Kayseri, Turkey, T: Burhan Ates

**ENBM013**  
**A Novel End-to-End Deep Learning Pipeline for Stereotactic Cranial Surgery Planning**  
Emirhan Kurtulus, 18, Senior, Cagaloglu Anadolu Lisesi, Istanbul, Fatih, Turkey, T: Yonca Bozkurt

**ENEV008**  
**3 in 1: A Novel Method for Microplastic, Industrial Die and Biological Pollutant Removal From Wastewater**  
Yusuf Efe Kivilcim, 18, Senior, Ankara Fen Lisesi, Ankara, Turkey, T: Baran Dadakoglu

**ENEV009**  
**A Novel Magnetic System With Carbon Nanotubes To Remove Microplastics From Water**  
Ayse Pelin Dedeler, 17, Junior, Cakabey Schools, Izmir, Turkey, T: Hilal Senay Tekesin

**ETSD006**  
**Ultrasonic Soundbar**  
Ali Orsel, 18, Senior, Meligiz Mustafa Eminoglu Anatolian High School, Kayseri, Turkey, T: Ferhat Cekim

**ETSD007T**  
**Airless Terrain Wheel With Adjustable Articulating Arms Enclosing Multi-Suspension System**  
Eypup Alper Saglig, 18, Senior, Eyup Tank Engin, 18, Senior, Samsun Bahcesehir College Atakum Science And Technology High School, Samsun, Atakum, Turkey, Ozel Final Anadolu Lisesi, Denizli, Merkezefendi, Turkey, T: Deniz Azen, T: Serap Seckin

**MATH008**  
**Investigation of the Cryptographic Applications of a Recurrence Relation Through Elliptic Curves and Collatz Conjecture**  
Huseyin Sahin, 18, Senior, Uskudar American Academy, Istanbul, Turkey, T: Turker Teker

**MATH009**  
**A Circular Approach to the Broken Pick-Up Sticks Problem**  
Yazuv Bulent Yurduseven, 19, Senior, Amasya Sehit Ferhat Unelli Bilim Ve Sanat Merkezi, Amasya, Turkey, T: Nursen Yilmaz

**MATSO04**  
**A New Polysiloxane/Ceramic Composite for Space and Nuclear Fusion Applications**  
Feridun Balaban, 19, Senior, Yusuf Efdal Yilmaz, 17, Junior, Malatya Bilim ve Sanat Merkezi, Malatya, Turkey, T: Savas Zafir Guler

**MATSO12T**  
**A Novel Herd Reinforced Auxetic Structure To Develop Sustainable Wind Turbine**  
Mehmet Sertac Cekuc, 20, Senior, Istanbul Fuat Sezgin Bilim ve Sanat Merkezi, Istanbul, Atasehir, Turkey, T: Deniz Azen, T: Serap Seckin

**SOFT012T**  
**Mind Plateau: A Collaborative Mobile Application and Procedural Puzzle Generation for Mind Games Education**  
Safva Merve Zehiroglu, 18, Senior, Iclal Seker, 19, Senior, Atakum Anadolu Imam Hatip High School, Istanbul, Turkey, T: Ersin Erturk

**TMED007**  
**Determination of Therapeutic Potential of Apigenin on Philadelphia Negative Acute Lymphoblastic Leukemia**  
Ayse Serra Kosger, 17, Senior, Izmir Fen Lisesi, Izmir, Bornova, Turkey, T: Meryem Yazici
Finalist Directory

UKRAINE

Kyiv, Ukraine, UKRO01, Eco-TechnoUkraine

ANIM051T Potential Use of Synthetic and Natural Aromatic Mixtures in Prevention from Cockroaches of Shelfordella lateralis Genus
Dmytriy Omelyanov, 17, Junior, Serhii Kolomiichuk, 17, Junior, Dnipro Financial and Economic Lyceum, Dnipro, Ukraine, T: Victor Brigadyrenko

CHEM046 Synthesis of Layered Double Hydroxides, Intercalated by Anionic Forms of Active Chlorine as a New Type of Antibiotic-Free Solid Disinfectant With Prolonged Activity for Wound Dressings and Other Application
Sofia Timofieieva, 16, Sophomore, Chemical Ecological Lyceum, Dnipro, Dnipropetrovsk Region, Ukraine, T: Oxana Kobzar

CHEM055 Synthesis of Optically Active Dimethylphosphinoyl Analogues of Fotemustine
Sofiia Smovzh, 17, Junior, Kyiv-Pechersk Lyceum No. 171 Leader, Kyiv, Kyiv, Ukraine, T: Oleksii Holovan

ENBM041 Method of Spatial Information Transmission Through Acoustic Channel
Yuri Sahaidak, 17, Junior, Lviv Physics and Mathematics Lyceum, Lviv, Lviv Oblast, Ukraine, T: Koldun Viktor

SOFT040 Waycat–Scratch-Like Code Editor That Can Translate Blocks To Code and Vice Versa
Mykhailo Shynder, 17, Junior, Richelieu Scientific Lyceum, Odesa, Odes'ka, Ukraine, T: Oleh Pustovoi

UNITED STATES OF AMERICA

ALABAMA

Auburn, USA01, Greater East Alabama Regional Science and Engineering Fair

CBIO019 Evaluation of Patient-Derived Xenograft Model Accuracy Using Differential Gene Expression Analysis for Cancer Modeling Optimization
Leo Shen, 16, Junior, Auburn High School, Auburn, Alabama, T: Sarah Sharman

CELL010 Attenuation of Adipocyte Hypertrophy in a Palmitic Acid-Induced 3T3 Cell Model Through Lupeol Treatment
Shivani Ruk Babu, 16, Junior, Auburn High School, Auburn, Alabama, T: Jacque Middleton

EGSD010 Generating Energy From Wheel Motion by Designing a Hybrid 3D-Printed Triboelectric Nanogenerator
Naeim Mahjouri, 17, Junior, Auburn High School, Auburn, Alabama, T: Sarah Sharman

Birmingham, USA02, Central Alabama Regional Science and Engineering Fair

BEHA014 The Local and Global Factors of the Generalized Poggendorff Illusions
Trisha Bheemanathini, 17, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Anton Spraul

BMED018 Evolution of Oncogenic Signatures Within Glioblastoma Along a Spatiotemporal Axis
Mayu Nakano, 17, Junior, Indian Springs School, Indian Springs, Alabama, T: Tessa Magnuson

CBIO023 Estimating Particulate Matter Exposure Across Populations in Alabama
Elizabeth Grace Lancaster, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Rebecca Thrash

ROBO034 Recognition of American Sign Language (ASL) Trigger Words Using RF Sensors in Combination with Deep Neural Networks
Catherine Kung, 17, Senior, Indian Springs School, Indian Springs, Alabama, T: Christina Tetzlaff

Huntsville, USA03, North Alabama Regional Science and Engineering Fair

EBED039 Portable and Modular Spectral System for Material Characterization
Ashwin Prabhakar, 17, Junior, Bob Jones High School, Madison, Alabama, T: Jessye Gaines

CONGRATULATIONS TO OUR FIRST PLACE CATEGORY WINNER

King Abdulaziz & his Companions Foundation for Giftedness & Creativity applauds the finalists in Energy: Sustainable Materials and Design.

ABDULLAH ABDULAZIZ AL-GHAMDI
Bifunctional MOF for Hydrogen Production & Storage
Dammam, Saudi Arabia
Booth EGSD018
ENBM062  The Future of Organ Replacement: Using Bioinformatics To Determine the Best Protein Environment To Bioengineer the Optimum Renal Vasculature System Using hiPSCs
Shreyaa Sunil, 16, Junior, James Clemens High School, Madison, Alabama, T: Leah McRae

Mobile, USA

ALABAMA

EVEO37  A Mechanism Utilizing Renewable Energy for Eliminating Aquatic Trash in Waterways That Does Not Contribute to Global Warming and Air Pollution
# Dakota Katlyn Perry, 15, Sophomore, WP Davidson High School, Mobile, Alabama, T: Ryan Moody

MATS050  Synthesis of 2D Tin-Sulfide Nanosheets Through Liquid Phase Exfoliation
Sanjana Mupparaju, 17, Senior, The Alabama School of Math and Science, Mobile, Alabama, T: Durga Paudel

Auburn, USA

ALABAMA

BEHA056  Putting Music Theory to the Test: Emotional Effects of Scales and Intervals
Jakub Filip Hel, 15, Sophomore, Hoover High School, Hoover, Alabama, T: Connor Franklin

CHEM056  Glowing Gumballs: Can Gumballs Be Used as an Additive to Reduce Paint’s Flammability?
Julian Robert Vilardi, 18, Senior, Wetumpka High School, Wetumpka, Alabama, T: Virginia Vilardi

ROBO074  Lan-DLE: Uncertainty-Aware Autonomous Landing of Fixed-Wing Aircraft With Deep Learning Ensembles
Daniel Zhao, 17, Junior, Alabama School of Fine Arts, Birmingham, Alabama, T: Vincent Spraul

ARIZONA

Sierra Vista, USA

SSVEC’s Youth Engineering and Science Fair

MATS009T  Rebuilding the Zeppelin: The Power and Purity of Hydrogen
Robert Houge Gavin, 18, Senior, Cameron Miles Tinney, 17, Senior, Veritas Christian Community School, Sierra Vista, Arizona, T: Melissa Bravenec

MCRO008  The Bacteria Between Us: The Exploration of Different HVAC Air Filters in Relation to the Spread of Airborne Bacteria in Classrooms
# Zoe Elizabeth Lynn, 18, Senior, Veritas Christian Community School, Sierra Vista, Arizona, T: Melissa Bravenec

Tucson, USA

AZ

CELL016  Rare Immune Cells Significantly Associated With Severe COVID-19 Cases
Karah Michelle Mayer, 18, Senior, Tanque Verde High School, Tucson, Arizona, T: Grazyna Zreda

EAEV024  Nouveau-Al-Plastic-Degen: A Novel Approach Using AI-Based Enzyme Engineering To Design New and Highly Efficient Marine Plastic Degrading Enzymes
Arjun Gupta, 17, Junior, Quest for Education and Arts, Tucson, Arizona, T: Rebecca Thai

CALIFORNIA

Santa Ana, USA

SCA001, Orange County Science and Engineering Fair

ANIMO48  Robotic Microinjection of Embryos for Producing Transgenic Mosquitoes
Grant Gallagher, 17, Junior, Sage Hill School, Newport Beach, California, T: Derek Shapiro

ANIMO50  Uncovering the Origin and Evolution of the Firefly Bioluminescence Storage Protein
Lauren Alexa Van, 17, Junior, Portola High School, Irvine, California, T: Brittany Kang

CBIO043  Exploring the Effects of Supervised Contrastive Learning on Alzheimer’s Disease Classification With the F-18 AV45 PET Modality
Edward Wonyong Jung, 17, Junior, University High School, Irvine, California, T: David Knight

CBIO052  COVID-19 Mortality Drivers in Brazil: Prioritizing Patients With COVID Symptoms To Reduce Mortality
Zara Hommez, 15, Sophomore, Portola High School, Irvine, California, T: Jeralyn Newton

ETSD054  The Design and Creation of a Solar Powered Trail Water System That Uses a Turbidity Sensor
Tarin Neeladaran, 14, Freshman, El Toro High School, Lake Forest, California, T: Nicole Mullenburg

MCRO027  Characterizing HBV Viral Particles Propagated by 5 Different Host Methods
Annabel Tiong, 16, Junior, Northwood High School, Irvine, California, T: David Monge

MCRO031  Evaluating the Carbon Degradation Potential of Marine Plasmas
# Pranav Sudarshan Moudgalya, 18, Senior, University High School, Irvine, California, T: Tim Smaay

TMED039  AURA: A Novel ResNet50 Approach to Predicting Karnofsky Performance Score and Survival Time of Glioblastoma Patients
Divya Sreedhar, 15, Freshman, Troy High School, Fullerton, California, T: David Kim

South Pasadena, USA

CA

SCA002, Los Angeles County Science and Engineering Fair

ANIMO45  Can Jellyfish Smell? Aurelia aurita Exhibit a Pulse Response to Food Stimuli
William Cameron Boyd, 16, Sophomore, Flintridge Preparatory School, La Cañada Flintridge, California, T: Shane Frewen

CBIO044  Mutformer-Deciphering the Language of Genetic Variants: Using a Transformer-Based Language Model To Identify Pathogenic Missense Mutations Associated With Human Inherited Diseases and Cancer
Theodore Tianqi Jiang, 18, Senior, Palisades Charter High School, Pacific Palisades, California, T: Jane Curren

CHEM047  Improving the Ductility and Overall Usability of Casein Plastic Through the Addition of a Plasticizer
Sana Rajesh, 16, Sophomore, Gretchen Whitney High School, Cerritos, California, T: Nitta Song

EAEV055  Dissolved-Solid Filtering Efficacy of Varied Landfill Liners
# Marta Pambukchyan, 16, Junior, Crescenda Valley High School, La Crescenta, California, T: Orenda Tuason

ENBM042  Designing and Constructing an Automatic, Electrical Independent, Pneumatic-Based, Cardiopulmonary Resuscitation Machine to Eliminate Human Error in the Medical Field
Andreas John Tempereau, 16, Junior, Palos Verdes High School, Palos Verdes Estates, California, T: Julie Munoz

MCRO032  A Solid State: Growing Chlorella vulgaris in Different Media
Mark Y. Lin, 16, Sophomore, Palos Verdes High School, Palos Verdes Estates, California, T: Julie Munoz
Finalist Directory

**EAEV025T** Contemporary and Projected Climate Change Across the Southwestern United States Relative to the Last 24,000 Years
Lily E. Wood, 16, Junior, Nathaniel Adam van der Leeuw, 17, Junior, University High School, Tucson, Arizona, T: Elyse Wexler

**EGSD017** Exogenous Niacin and Zeaxanthin Treatment To Increase the Stress Tolerance and Light Absorbance Capacity of Microalgae Chlorella vulgaris Under an Engineered Martian Environment
Christopher Alexander Miranda, 15, Sophomore, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

**MATS024** Engineering of Antimicrobial Bioplastics From Invasive Algae Caulerpa prolifera, Undaria pinnatifida, and Waste Corn Cobs
Julianna Serna-Ortiz, 15, Sophomore, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

**MCRO016** Improving the Dental Health in Developing Countries With a Toothpaste Infused With Psidium guajava and Acmella oleracea Extracts Against Tooth Decay Causing Bacteria Streptococcus mutans
Ashley Valencia, 15, Sophomore, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

**PHYS030** Exploration of Chaotic Orbits Using the Lyapunov Exponent in the Restricted Three-Body Problem
Yaritza Durazo, 18, Senior, Sunnyside High School, Tucson, Arizona, T: Cindy Bujanda

**PLNT014** Analysis of Pollen-Pistil Interactions To Model Reproductive Thermotolerance in Tomato
Alexander Clinton Nelson, 18, Senior, Nelson Home School, Tucson, Arizona, T: Sandra Nelson

Phoenix, USAZ50, Arizona Science and Engineering Fair

**BCHM037T** Natural Termite Control: A Novel Biomolecular Approach

**BMED072T** Alternative for Formaldehyde-Based Embalming
McKinley Jae Pasiakos, 15, Freshman, Surbhi Chandak, 15, Freshman, Paradise Valley High School, Phoenix, Arizona, T: Amanda Cherry

**CBIO076** Machine Learning To Detect Fusarium Wilt of Banana
Khushi Parikh, 17, Senior, Gilbert Classical Academy, Gilbert, Arizona, T: Marcia Kalkman

**CELLO33** Hedgehog Signaling Mediates the Dysregulation of Adrenocorticotropic Hormone Secretion and Somatostatin Receptor Expression in Cushing’s Disease
Saptarshi Mallick, 18, Senior, University High School, Tucson, Arizona, T: Elyse Wexler

**CHEM065** Comparison of Struvite and Chlorella vulgaris Solution to Phosphorus Water Pollution
Savannah Botello, 17, Junior, Cibola High School, Yuma, Arizona, T: Patricia Garcia

**EGSD052** The Use of Alternative Non-Solid Chemicals To Create an Advanced Energy Storage System With a Machine Learning Charging System
Mars Kapadia, 18, Senior, Gilbert Classical Academy, Gilbert, Arizona, T: Erik Gillman

**ENEV086** A Novel Model-Based Constrained-Optimization Approach To Maximize Water Productivity Under Deficit Irrigation
Chloe Feiyang Zhan, 15, Sophomore, Hamilton High School, Chandler, Arizona, T: Debbie Nipar

**ETSD072** AWSOM: Designing an Active Wrist Mechanism Utilizing Spherical-Gears and a One-Drive Mechanism
Alexander Yicheng Huang, 15, Sophomore, Hamilton High School, Chandler, Arizona, T: Debbie Nipar

---

CONGRATULATIONS TO OUR CATEGORY WINNERS

### Environmental Engineering

**FIRST PLACE**
Yanbing Jin
Vedant Srinivas

**SECOND PLACE**
Mansour Al Marzooqi
Varun Hariprasad
Jaden Luna
Naomi Park
Sam Rogers

**THIRD PLACE**
Johan DeMessie
Chloe Hindes
Emily Kim
Sasha Masson
Marek Rauchfleisz
Aseel Rawashdeh
Haoyu Wang
Xinning Zhang

**FOURTH PLACE**
Adam Ahmed
Neeam AL Harrasi
Doo’a AL Hashmi
Anna Armstrong
Josephine Barber
Tanaka Chirara
Abdullah Elafifi El-Ehwany
Najah Halabiya
Vedant Janapaty
Najwa Ariena Mohamad
Shrirhari Nagarajan
Anushka Rawat
Mason Sufnarsi
Marah Zeer
Chloe Zhan

Jacobs applauds the finalists in Environmental Engineering.
Regeneron International Science and Engineering Fair 2022

Finalist Directory

<table>
<thead>
<tr>
<th>Finalist Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS065 Towards the Exploration of the Exoplanets: Studying Key Physical Parameters for the Habitability of Primitive Earth Using Climate Models</td>
</tr>
<tr>
<td>ROBO076 Neon-Specific Dropout: A Deterministic Regularization Technique To Prevent Neural Networks From Overfitting and Reduce Dependence on Large Training Samples</td>
</tr>
<tr>
<td>SOFT053 qSimulator: A Novel Method for Rapid Quantum Simulation of Molecules Using Cliques</td>
</tr>
<tr>
<td>SOFT054 A Functional Programming Language for Scripting in Data-Driven JVM Applications</td>
</tr>
<tr>
<td>TMED054 Azcare: A Novel Data-Centric AI Approach for Early Detection of Alzheimer’s Disease With Multi-Modal Data and Multi-Model Ensemble</td>
</tr>
<tr>
<td>TMED057 DermaTech: A Novel, Non-Invasive Technology To Detect Skin Cancer</td>
</tr>
<tr>
<td>ARKANSAS</td>
</tr>
<tr>
<td>Little Rock, USAR01, Ouachita Mountains Regional Science &amp; Engineering Fair</td>
</tr>
<tr>
<td>ENBM081 Mask Collecting Aerosol Droplets</td>
</tr>
<tr>
<td>ETS0056 Boats vs. Waves</td>
</tr>
<tr>
<td>FAYETTEVILLE, USAR03, Northwest Arkansas Regional Science and Engineering Fair</td>
</tr>
<tr>
<td>BCHM025 To What Extent Do Silver Nanoparticles Affect the Growth of Hornwort Plants?</td>
</tr>
<tr>
<td>MATS043 Growth and Characterization of 2D Magnetic Materials</td>
</tr>
<tr>
<td>ROBO075 Early Detection of Acromegaly Using a Novel Convolutional Neural Network</td>
</tr>
<tr>
<td>Jonesboro, USAR04, Northeast Arkansas Regional Science Fair</td>
</tr>
<tr>
<td>BEHA031 Psychological Effects of Absent Fathers</td>
</tr>
<tr>
<td>ETS039 Motion in Motion</td>
</tr>
<tr>
<td>Little Rock, USAR05, Central Arkansas Regional Science and Engineering Fair</td>
</tr>
<tr>
<td>BCHM015 The Effect of Amino Acid Mutagenesis on the Binding Affinity of SARS-CoV-2 Monoclonal Antibodies</td>
</tr>
<tr>
<td>EAEE029 The Surveillance of SARS-CoV-2 in Wastewater</td>
</tr>
<tr>
<td>MATH022 Analyzing the Value of a Lego Investment Based on the Set’s Factors</td>
</tr>
<tr>
<td>Hot Springs, USAR07, West Central Regional Science Fair</td>
</tr>
<tr>
<td>ANIM016 Mushroom Medicine for Bees: A Look Into the Benefits of the Trametes versicolor Extract on Aphis mellifera Colony Health for Backyard Beekeepers</td>
</tr>
<tr>
<td>EBED007 Smart Sole: A Technological Approach to Accessible Gait Analysis</td>
</tr>
<tr>
<td>PLNT012 The Potential of Forage Soybeans as a Grazing Source for Cattle</td>
</tr>
<tr>
<td>Conway, USAR50, Arkansas State Science Fair</td>
</tr>
<tr>
<td>BEHA057 COVID-19’s Effect on States’ Economies</td>
</tr>
<tr>
<td>CHEM064 FRET-Based Combination Drug With Enhanced Photothermal Therapy</td>
</tr>
<tr>
<td>EVAE068 A Direct Comparison of the Acute Toxicity of Zinc Oxide Nanoparticles and Avobenzone to Daphnia magna</td>
</tr>
<tr>
<td>Jonesboro, USAR04, Northeast Arkansas Regional Science Fair</td>
</tr>
<tr>
<td>BEHA031 Psychological Effects of Absent Fathers</td>
</tr>
<tr>
<td>ETS039 Motion in Motion</td>
</tr>
<tr>
<td>Finalist Directory</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
</tbody>
</table>

### TMED040

**In silico High-Throughput Identification of Novel Dual Amyloid Beta and Tau Aggregation Inhibitors for Alzheimer’s Disease Treatments**

# Amrutha Srivatsav, 17, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

Fresno, USCA03, Fresno County Science Fair

### ANIM035

**Parkinson’s Disease: Assessing the Effect of a Polyphenolic Compound on Alpha-Synuclein Aggregation in Lab Afflicted Drosophila melanogaster**

Jaspreet Sahota, 14, Freshman, Sanger High School, Sanger, California, T: Joel Orellana

### ENEV044

**Engineering and Testing of Metakaolin Al2Si2O7 and Calcium Bentonite Al12H2O12Si4 Concretion-Spheres: A Novel Composite for the Remediation of Hydrocarbons and Heavy Metals**

Jaden Luna, 18, Senior, Sanger High School, Sanger, California, T: Davin Aalto

### MCRO024

**Evaluation of Three Naturally Occurring Phytochemicals as Alternatives to Aminoglycosides on the Inhibition of Escherichia coli in vitro**

Niveditha Sukesh, 18, Senior, Floyd B. Buchanan High School, Clovis, California, T: Kendia Herrington

Sacramento, USCA04, Sacramento Regional Science and Engineering Fair

### PLNT025

**Early Detection of Drought Stress Through a Novel AI Drought Assessment (AIDA) Model in Field Grown Tomato (Solanium lycopersicum) Plants Using a Custom-Built “Spectra-Rover”**

# John Benedict Allasas Estrada*, 17, Junior, Pauline Victoria Estrada, 15, Freshman, Clovis North High School, Fresno, California, T: Kay Barrie

### EGSD039

**Pura Aer: A Low-Cost, Energy-Efficient Portable Air Purifier System Using Disposable Face Mask for Emergency and Daily Uses**

Jordan Prawira, 15, Sophomore, Mountain House High School, Mountain House, California, T: Steve Guess

### ENBM054

**Enabling Oral Communication and Accelerating Recovery: The Creation of a Novel Low-Cost Electroencephalography-Based Brain-Computer Interface for the Differently Abled**

Rishab Vijay Ambavanekar, 15, Sophomore, Vista del Lago High School, Folsom, California, T: Lisa Moore

### MATS040

**Cyclo.Cloud: Development of Fish Scale Waste-Derived Materials for Adsorbance of Aquatic Pollutants**

Jacqueline Prawira, 17, Senior, Mountain House High School, Mountain House, California, T: Emily Jeng

Bonita, USCA05, Greater San Diego Science and Engineering Fair

### BCHM019

**Novel Inhibitors for Conserved Regions of RecA To Slow Bacterial Antibiotic Resistance**

Matthew Noto, 17, Junior, Canyon Crest Academy, San Diego, California, T: Alex Siegel

### CBIO035

**DIANE: A Novel Multi-Omics Data Integration Framework Using Attributed Network Embedding Paired With Machine Learning for More Accurate Biomedical Classification**

Amogh Chaturvedi, 17, Junior, Canyon Crest Academy, San Diego, California, T: Evan Fisher

### CBIO036

**Deep Learning-Aided Diagnosis of Autoimmune Blistering Diseases**

Daniel Cai, 18, Senior, Torrey Pines High School, San Diego, California, T: Brinn Belyea

### MATH031

**A Heuristic Solution to the Closest String Problem Using Wave Function Collapse Techniques**

Shirley Xu, 16, Junior, The Bishop’s School, La Jolla, California, T: Marcus Jaiclin

### PHYS041

**Utilizing InSb/Si Quantum Dots for the Development of Next-Generation Multivalued High-Mobility Transistor Technology**

Ayush Nayak, 17, Junior, Westview High School, San Diego, California, T: Scott Halander

---

CONGRATULATIONS TO OUR CATEGORY WINNERS

**Materials Science**

**FIRST PLACE**

Sohi Sanjay Patel

**SECOND PLACE**

Devika Girish
Jacqueline Prawira
Neel Redkar
Sara Varghese

**THIRD PLACE**

Tahani Adel Ahmed
Evan Eunjoo Kim
Marianne Feng Liu
Elaf Abdullah Muayqil
Malcolm Sow

**FOURTH PLACE**

Hsin Chang
Giovanny Klyd Exilus
Daraille Ismael
Libby Knipper
Christopher Laguerre
Rui Xuan Lee
Kai Ting Lin
Varun Nathan
Alan Wang

Howmet Aerospace Foundation applauds the finalists in Materials Science.
ROBO047 PathFinder: Novel Inverse Kinematic Path Tracking for Autonomous Vehicles Using Pure Pursuit and Bezier Curves
Rohan Bosworth, 16, Junior, Poway High School, Poway, California, T: Kelly Woldseth

Novato, USCA06, Golden Gate STEM Fair

ANIMO41T Analysis of Coupled Nonlinear Dynamic Phenomena Using Sensors To Detect Abnormal Motion in Quadrupeds
Sabine Lynn Close, 16, Sophomore, Natala Trefogi Morrow, 15, Sophomore, Sequoia High School, Redwood City, California, Notre Dame High School Belmont, Belmont, California, T: Nicolas Lee

BCHM020 So Li @ Designing a Novel Approach for Rapid Lithium Detection: Investigating Enzymatic Coupling to Produce Hydrogen Peroxide for the Development of Colorimetric and Fluorescent Sensors and Testing the Efficacy of Horseradish Peroxidase, 3,3',5,5' Tetramethylbenzidine, and Amplex Red
Katie Sun, 16, Sophomore, Crystal Springs Uplands School, Hillsborough, California, T: Justin Thompson

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

BMED051 Investigating Epigenetic Modifications in Chromosome Structure in Cardiomyocyte Differentiation Mechanisms for Heart Disease Treatment
Nicholas Wei, 17, Junior, The Harker School, San Jose, California, T: Matthew Harley

BMED052 Variant Effect Prediction Using Deep Neural Networks for Alzheimer’s Disease
Alexander Lan, 17, Junior, The Harker School, San Jose, California, T: Eric Nelson

BMED054 Performer: A Novel PPG to ECG Reconstruction Transformer for a Digital Biomarker of Cardiovascular Disease Detection
Ella Selina Lan, 15, Sophomore, The Harker School, San Jose, California, T: Eric Nelson

CBIO037 Single-Cell Transcriptomic Analysis Reveals Genetic Drivers of Slow/Fast Motor Neuron Identity
Luke Yuchen Zhao, 17, Senior, Lynbrook High School, San Jose, California, T: Isaac Pallone

CBIO053 De Novo Nanobody Design With Neural Networks, AlphaFold, and Docking Algorithms
Aniruddh Venkatraman, 16, Junior, Homestead High School, Cupertino, California, T: Samuel Fung

ENVE064 A West Coast Estuarine Case Study: A Novel, Predictive Approach to Monitor Estuarine Eutrophication
# Vedant Venkatasai Janapati, 16, Sophomore, Silver Creek High School, San Jose, California, T: Bich Nguyen

PHYS042 The Study of Globular Cluster Systems in Virgo Cluster Dwarf Galaxies
Nicole Tian, 17, Senior, The Harker School, San Jose, California, T: Mark Brada

PHYS051 27th Compact Hierarchical Trinary System Discovered Using Machine Learning
Allina Yuan, 18, Senior, The Harker School, San Jose, California, T: Chris Spennner

ROBO059 Neural Networks Learn Lazily: Improving Generalization and Adversarial Robustness via Learning Capacity-Complexity Constraints
# Andy Phung, 17, Junior, Independence High School, San Jose, California, T: Joanna Shea

SOFT043 Explore-and-Fuse: A Physarum-Inspired Approach to the Steiner Tree Problem
Sheryl Hsu, 16, Senior, Valley Christian High School, San Jose, California, T: Scott Vander Veen

TMED031 Enabling Ankle-Brachial Index Prediction From Dopplers Using Deep Learning for Peripheral Arterial Disease Diagnosis
Adrit Rao, 14, Freshman, Palo Alto Senior High School, Palo Alto, California, T: Oliver Aalami

TMED042 Novel Prediction of Five-Year Survival and Recurrence Rates and Discovery of Cancer Biomarkers Using MIBI Scans in the Tumor-Immune Microenvironment
# Snikitha Banda, 16, Junior, Notre Dame High School San Jose, San Jose, California, T: Natasha Fazeli

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

CBIO028 Prediction of Genetic Predispisition to Ionizaid-Induced Hepatic Steatosis via Computational Analysis of Genetic Biomarkers
Shikha Kismat Kathrani, 16, Junior, Dougherty Valley High School, San Ramon, California, T: Andrew Bramante

ETSD028 Food Deserts: Developing a Self-Sustaining Greenhouse
Jill Allison Seater, 16, Sophomore, Campolindo High School, Moraga, California, T: Jennifer Frugaletti

ROBO041 A Deep Learning Approach to Detection of Metastasis in H&E-Stained Lymph Node Sections
Neel Krish Kondapalli, 16, Sophomore, Dougherty Valley High School, San Ramon, California, T: Sheida Otomish

Pleasanton, USCA09, The Synopsys Outreach Foundation Alameda County Science and Engineering Fair

BCHM029T Computational Design, Docking, and Analysis of Novel Aryl Sulfone Compounds as Potential NNRTIs
Aarya Moraonkar, 16, Junior, Andy Zhang, 16, Junior, Rohan Sandeep Adwankar, 17, Junior, Irvington High School, Fremont, California, T: Justin Choi

CBIO059 Creation of a Novel Machine Learning Model To Predict MGMT Promoter Methylation Status Using Multimodal MRI Images
Ananya Anand, 16, Sophomore, Mission San Jose High School, Fremont, California, T: Ling Kuei

CBIO060 Synthesis and Motif Discovery of Novel Antibacterial Molecules and Orally Active Drugs via Sequence-Based Machine Learning
Tony Wang, 16, Junior, Amador Valley High School, Pleasanton, California, T: Drew Melby

CHEM060 The Effect of Carbon Quantum Dots Derived From Yucca filamentosa on the Photosensitivity of a Dye-Sensitized Solar Cell
Aditi Bharadhwaj Kiran, 14, Freshman, BASIS Independent Fremont, Fremont, California, T: Zeynep Araci

ENVE076 WAL-SEA: Development of a Homebuilt, Multifunctional Remotely Operated Vehicle for the Study of the Near-Shore Ocean Ecosystems
Faye Lin, 16, Sophomore, Mission San Jose High School, Fremont, California, T: Sarah Mueller

ENVE078 Testing the Effectiveness of a Polyvinyl Alcohol Polymer Layer Bonded to Lead-Chelating Agents versus a Phosphate Salt Layer on the Minimization of Lead Iodide Leaching in Perovskite Solar Cells
Sasha Masson, 16, Sophomore, The Harker School, San Jose, California, T: Casey Brown

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

EAVE004 Qube Network: A Low-Cost, High-Sensitivity Consumer Seismic Network for Earthquake Early Warning
# Vivien He, 18, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

PHYS003 Optimization of Distributed Phased Arrays
# Akash Anand, 18, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose
Finalist Directory

SOFT014  Argus III: A Novel Image Optimization and Augmentation Framework To Enable an Improved Patient Experience for the Next Generation Epiretinal Prosthesis
  William Huang, 17, Junior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

Salinas, USCA12, Monterey County Science and Engineering Fair

BCHM033  Enzyme Inhibition: Combating Cardiovascular Diseases, Diabetes, and Obesity Using Phytochemicals Found in Indian Spices
  Sneha Gokaraju, 16, Sophomore, Monterey High School, Monterey, California, T: Jason Nicholson

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

BMED061  Why Can’t Grandma See? It’s Probably AMD: The Effects of A2E and Zeaxanthin on Age-Related Macular Degeneration
  Elizabeth (Snow) Cameron, 15, Sophomore, Upland High School, Upland, California, T: Elizabeth Salazar

EAEV062  The Effects of Varying Nitrogen: Phosphorus: Potassium (NPK) Ratios on Algal Growth in Wetland Water
  Kyra Tasanont Phayachanpheng, 16, Sophomore, Makena Bailey, 15, Sophomore, Chino Hills High School, Chino Hills, California, T: Chirichan Tasanont

EAEV063  Projecting Disappearance of the Dana Glacier Using Observed Melt Rate and 3D Modeling
  Ellery Alice Barngrove McQuilkin, 17, Senior, Lee Vining High School, Lee Vining, California, T: Andrew Sindel

TMED052  Predicting Onset of Depressive Disorder Using Machine Learning
  Varun Srivastava, 16, Junior, Redlands High School, Redlands, California, T: Paea LePendu

Riverside, USCA15, Riverside County Science and Engineering Fair

ANIM034  Auto-Dissemination: Analyzing the Function of a Novel Tool in Mosquito Control
  Sarah Stutsman, 16, Junior, Corona High School, Corona, California, T: Alleen Porter

PLNT023  Simulate To Innovate: Cell Signaling Simulations of Stem Cell Mutants With Enhanced Transcription Factor Binding To Optimize Crop Productivity
  Ishan Reddy Gonehal, 15, Freshman, Martin Luther King High School, Riverside, California, T: Michelle Hampton

SOFT034  Evaluating Machine Learning-Based Static Malware Classifiers
  Andrew Yin, 17, Junior, Daniel Tong Link, 16, Junior, Martin Luther King High School, Riverside, California, T: Michele Hampton

Bakersfield, USCA16, Kern County Regional Science Fair

CHEM051  Green Mechanochemical One-Pot Isoxazoline Synthesis With TPGS-750-M Micelle
  Alor Sahoo, 18, Senior, Stockdale High School, Bakersfield, California, T: Jill Reynolds

ENBM045  Designing, Prototyping, and Testing a Novel, Portable, Energy Efficient, 3D Printed Ventilator With a Diaphragm Mimicking Membrane and an Intuitive User Interface
  Harjaisal Singh Brar, 16, Sophomore, Stockdale High School, Bakersfield, California, T: Jill Reynolds

Los Angeles, USCA50, California Science & Engineering Fair

EBED042  Geolocation of Wireless and Radio Emitters in Real Time
  Peter Radic, 16, Junior, Canyon Crest Academy, San Diego, California, T: Alex Siegel

CONGRATULATIONS TO OUR CATEGORY WINNERS

Akamai Foundation applauds the finalists in Mathematics.

Mathematics

FIRST PLACE
Akilan Sankaran

SECOND PLACE
Jiahui Li
Shirley Xu

THIRD PLACE
Ram Krishna Goel
Donald James Liveoak
Daniel Salkinder

FOURTH PLACE
Sarth Prashant Chavan
Edward Stuart Garth
Yavuz Bulent Yurduseven
Sophie Zhu

Akamai Foundation
Finalist Directory

MATS055  CarbNN: A Novel Active Transfer Learning Neural Network to Build De Novo Metal Organic Frameworks (MOFs) for Carbon Capture  
Neel Redkar, 17, Junior, Dougherty Valley High School, San Ramon, California, T: Sanjeev Redkar

MCRO064T  Eukaryotic Algicide: Environmental Remediation of Harmful Algal Blooms via Microencapsulation for Bioactivation of Programmed Cell Death  
Christopher Sammy Kwok#, 17, Junior, Nicholas Sammy Kwok#, 17, Junior, Sequoia High School, Redwood City, California, T: Sarah Chu

COLORADO

Alamosa, USCO01, San Luis Valley Regional Science Fair, Inc.  
BEHA010  Is a Pandemic Academic?  
Claire Andrea Seger, 15, Freshman, Monte Vista High School, Monte Vista, Colorado, T: Loree Harvey

ENEV093  Reduce, Reuse, Digest? Optimizing pETase Function Within k-12 E. coli  
Chloe Rebecca Hindes, 18, Senior, Monte Vista High School, Monte Vista, Colorado, T: Loree Harvey

Durango, USCO02, San Juan Basin Regional Science Fair  
MATSO32  Moon-opoly: Utilizing in situ Resources (ISRU) for the Construction of Lunar Concrete  
Nathaniel Ellis, 15, Sophomore, Durango High School, Durango, Colorado, T: Erik Skaggs

Brush, USCO03, Morgan-Washington Bi-County Science Fair  
EAEV021  LSDO Investigation With Brine Shrimp: Comparing the Effects of COVID Disinfectants With Water Dilution and Brine Shrimp  
Benjamin Wells, 15, Freshman, Weldon Valley High School, Weldon, Colorado, T: Danny Thistle

PHYS035T  Comparing the Leidenfrost Effect on Distilled Water and Ethanol  
Bailey Terese Link, 17, Junior, Giulia Roccasalva, 17, Junior, Brush High School, Brush, Colorado, T: David Miner

Colorado Springs, USCO04, Pikes Peak Regional Science Fair  
CHEM020  Isolation, Extraction, and Identification of Fluorescent Unknown in Friedel-Crafts Acylation of Biphenyl  
Nicholai Hagemann, 18, Senior, Sand Creek High School, Colorado Springs, Colorado, T: Kristin Rowan

EGSD025  Electrify Your Step: Converting Foot Traffic Into Renewable Energy Using Piezoelectric Transducers  
Shrey Rohilla, 15, Freshman, The Classical Academy, Colorado Springs, Colorado, T: Candus Murr

ROBO026  Binary Synthesis: Applying Philosophical Principles to Artificial Neural Networks  
Gryphon Rhys Patlin, 18, Senior, The Classical Academy, Colorado Springs, Colorado, T: Darren Wilson

Joes, USCO08, Northeast Colorado Regional Science Fair  
MATS010  Shining Lights: How Curing Lights Polymerize Different Thicknesses of Pigmented Dental Filings  
Fatima Duran, 18, Senior, Yuma High School, Yuma, Colorado, T: Amy Melby

Boulder, USCO09, Corden Pharma Colorado Regional Science Fair  
CBIO072  Discovering Biomarkers for Breast Cancer Subtypes With Gene Expression Data Using Machine Learning  
Daniel Lin, 16, Junior, Fairview High School, Boulder, Colorado, T: Paul Strode

MATH017  Attempting To Define Tetration of Non-Integer Heights  
Morgan Arthur Holien, 17, Senior, Monarch High School, Louisville, Colorado, T: Katharine Ellis

PHYS031T  Characterizing the Altitude and Variability of the Martian Mesopause  
Allison Inge, 17, Senior, Langley Nakari, 18, Senior, Monarch High School, Louisville, Colorado, T: Katharine Ellis

Denver, USCO10, Denver Regional Science and Engineering Fair  
BMED033  Quantitative Methods To Analyze the Synergism of Digestive Enzymes for Gluten Breakdown: A Step Closer to Making Glu-Relief Pills  
Aditi Avinash, 15, Sophomore, Rock Canyon High School, Littleton, Colorado, T: Susanne Petri

EGSD028  Analyzing Non-Chemical Storage Solutions for the Grid-Scale Energy Problem  
Wilson Bolton Moyer, 17, Junior, Lakewood High School, Lakewood, Colorado, T: James Megdrichian

ROBO043  Analyzing the Effects of Non-Generative Augmentation on MRI-Based Classification of Brain Tumors Using Convolutional Neural Networks  
Adam Rolander, 15, Sophomore, Prospect Ridge Academy, Broomfield, Colorado, T: Vernon Caswell

Fort Collins, USCO50, Colorado Science and Engineering Fair  
ANIMO17  A Habitat Assessment Protocol To Determine Suitability for Southwestern Willow Flycatcher Occupancy in the Northern Rio Grande Watershed  
Marissa Liliana Martinez, 17, Junior, Monte Vista High School, Monte Vista, Colorado, T: Loree’ Harvey

BEHA015  Polarization in Social Networks: Investigating Opinion Dynamics Through Human Experiments and Agent-Based Simulation  
Henry Westfall, 17, Junior, Fairview High School, Boulder, Colorado, T: Paul Strode

ENBM070  A Novel Approach to Early Directional Diagnosis of Prescription Opioid Addiction  
Gitanjali Adhikarla Rao, 16, Junior, STEM School Highlands Ranch, Highlands Ranch, Colorado, T: Benjamin Johnston

ETSD073  To Apogee and Beyond: A Home-Grown Space Program  
Rhys Christian Hanson, 17, Junior, Conifer High School, Conifer, Colorado, T: Eric Halinstdad

PHYS066  Modeling Triton’s Seasonal Atmospheric Change: Applications of the VT3D Model to Triton  
Natalie Claire Pujet, 16, Junior, Fairview High School, Boulder, Colorado, T: Paul Strode

CONNECTICUT

Cromwell, USCT50, Connecticut Science & Engineering Fair  
ANIMO44  Real-Time Motion Tracking and Data Analytics for Live Insects Using Three-Wheeled Servosphere Robot  
Nicholas Eunsuk Lee, 16, Junior, Hopkins School, New Haven, Connecticut, T: Phillip Stewart

BMED046  Design of a Novel, Dual-Functioning, Tissue Plasminogen Activator and Anticoagulant Therapeutic for Rapid Ischemic Stroke Treatment  
Ambika Grover, 16, Junior, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

CELL026  The Use of Prime Editing To Induce and Correct the CFTR-F508del Mutation in Induced Pluripotent Stem Cells  
Benjamin Scott Persily, 16, Junior, King School, Stamford, Connecticut, T: Victoria Schulman

ENEV054  Implementing Nontoxic Modified Biochar Enhanced Filtration for the Efficient Removal of Emerging Contaminants in an Aqueous Solution  
Snigtha Mohanraj, 14, Freshman, Engineering and Science University Magnet School, West Haven, Connecticut, T: Alyssa Anderson
Finalist Directory

ENEV060  Biomimetic Removal of Microsphere Water Contaminants, via Calcite-Infused, Coral-Like Melamine Sponges
Naomi Park, 16, Sophomore, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

TMED038  Development of a Readily Accessible Machine Learning Diagnostic for Early-Stage Mild TBI Using Eye Tracking Methods
Ashley Taylor Malkin, 15, Freshman, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

TMED051  Development of a Home N-Terminal Pro-Brain Natriuretic Peptide Assay for Early Detection of Congestive Heart Failure
Maya Rose Chiravuri, 17, Junior, Choate Rosemary Hall, Wallingford, Connecticut, T: Selena Gell

FLORIDA

Okeechobee, USFL01, Heartland Regional Science and Engineering Fair

CELL017  Fusobacterium nucleatum as a Marker for Epithelial to Mesenchymal Transition in Colorectal Cancer
#  Angela Huang, 16, Junior, Sebring High School, Sebring, Florida, T: Amy Bubb

CHEM012  The Effects of Dissolving Polystyrene With D-Limonene on the pH of Seawater: A Fifth Year Study
Anna Rose Velten, 17, Senior, Okeechobee High School, Okeechobee, Florida, T: Wendy Reister

Deland, USFL04, Tomoka Region Science and Engineering Fair

PLNT007  Examining the Effect of a Simulation of Varied Microplastic Types on Rhizophora mangle
Jacob Harry Friedman, 16, Sophomore, Spruce Creek High School, Port Orange, Florida, T: Anne Cooney

Fort Myers, USFL05, Thomas Alva Edison Kiwanis Science and Engineering Fair

CBIO032  Developing an Algorithm To Analyze Structural Characteristics of Alzheimer’s Disease in Different Stages of Mild Cognitive Impairment and Validate White Matter Atrophy as an Early Predictor of Mild Cognitive Impairment (A Novel Second Year Study)
Maya Sruti Chandar, 18, Senior, Canterbury School, Fort Myers, Florida, T: Katherine Morris

EAEV077  Engineering a Biomimetic System That Maximizes Surface Area Exposure to Water Flow Thus Increasing the Rate of Bioremediation in an in vitro Hypereutrophic System (A Novel Fourth Year Study)
Morgan Taylor Barnes, 17, Senior, Canterbury School, Fort Myers, Florida, T: Jeffery Carstens

EGSD037  An Investigation on the Use of “Tradescantia pallida” as a Sensitizer for the Dye-Sensitized Solar Cell
Isabel Tia Liu, 15, Freshman, Dunbar High School, Fort Myers, Florida, T: Catherine Griffin

MATS023  Generating Bioplastics From Banana Peels: An Innovative Approach To Reduce Artificial Plastic Pollution
Caroline Guerra, 17, Junior, Community School of Naples, Naples, Florida, T: Kelly Percivall

CONGRATULATIONS TO OUR CATEGORY WINNERS

FIRST PLACE
Shriya Prakash Bhat

SECOND PLACE
Yujia Ji
Nanna Elizabeth Rosa Kalmar
Pinyu Liao
Shloke Nirav Patel

THIRD PLACE
Rayan Rai Jawa
Jungho Kim
Minjae Kim
Christopher Sammy Kwok

THIRD PLACE (continued)
Nicholas Sammy Kwok
Tahlia Martignago
Sanghyun Park
Lakshanna Raveendran

FOURTH PLACE
Maryam Abdel-Azim
Julia Rose Brodsky
Calvin Kirtley Harold Carpenter
Fiona Anne Dreesbach
Mark Y. Lin
Emerson Reese Morris
Raven Jade Pascua

Regeneron applauds the finalists in Microbiology.

Regeneron International Science and Engineering Fair 2022
BEHA002  The Effect of Celebrity Endorsements on the Impact of Social Media on Product Consumption
#  Bryce M. Krohnfeld, 17, Junior, Estero High School, Estero, Florida, T: Anthony Sangermano

PORT ST LUCIE, USFL06, St. Lucie County Regional Science and Engineering Fair

MATS054  Developing Novel Plant Waste-Based Hydrogels for Skin Regeneration
#  Madison Nicha Adkins, 17, Junior, Lincoln Park Academy, Fort Pierce, Florida, T: Deborah Lookabill

GAINESVILLE, USFL08, Alachua Region Science and Engineering Fair

CHEM028  Assessing the Influence of TOMM40-523’ Enhancer Length on APOE Expression in Alzheimer’s Disease
#  Nicholas Shea Harty, 16, Junior, Aum Jaykumar Dhruv, 17, Junior, Fort Myers High School, Fort Myers, Florida, T: Anthony Sangermano

JACKSONVILLE, USFL10, Northeast Florida Regional Science and Engineering Fair

PLNT054  The Creation and Sustainability of a Symbiotic Atmosphere in Relation to Surface Area
#  Bryce M. Krohnfeld, 17, Junior, Estero High School, Estero, Florida, T: Cody Rimes

SOFT02ST  Comparing the Efficiency of Novel Point-Of-Care, Low-Cost Neural Networks in Identifying Specific Stages of Diabetic Retinopathy Across a Limited Retinal Dataset
Nicholas Shea Harty, 16, Junior, Aum Jaykumar Dhruv, 17, Junior, Fort Myers High School, Fort Myers, Florida, T: Anthony Sangermano

Port St. Lucie, USFL06, St. Lucie County Regional Science and Engineering Fair

MCRO028  How Do Endophytic Bacteria From Mango Affect the Growth of Fungus Botrytis cinerea and the Use of 16S rDNA Sequence To Identify Bacteria?
#  Madison Nicha Adkins, 17, Junior, Lincoln Park Academy, Fort Pierce, Florida, T: Deborah Lookabill

Shalimar, USFL07, Panhandle Regional Science and Engineering Fair

CHEM005  The Effect of Pectin Levels on Fruit-Based Superabsorbent Polymers
Annalise Thompson, 17, Senior, Niceville High School, Niceville, Florida, T: Jennifer Cook

Enev004  Not Your Average Soil: A Modern Solution to the Predicted 2050 Soil Crisis That Is Applicable to All Types of Plant and Crop Types
Zoe Orange, 16, Sophomore, Paxton High School, Paxton, Florida, T: Brande Stephenson

Gainesville, USFL08, Alachua Region Science and Engineering Fair

CBIO003  COVID-19 Detection on Chest X-Ray Using an Enhanced Neural Network Model: Impact of Network Architecture Complexity, Data Augmentation, and Transfer Learning on Model
Himal Bambai-Wokhu, 16, Junior, F. W. Buchholz High School, Gainesville, Florida, T: Marc Moody

Ft. Lauderdale, USFL09, Broward Regional Science & Engineering Fair

BEHA064  The Transgenerational Effects of the Synergy of Nicotine, Atomoxetine, and Buspirone on Egg Laying Habits, Gene Expression, and Oxidative Stress Levels in C. elegans
Malcolm Ernest Owusu, 16, Sophomore, American Heritage School, Plantation, Florida, T: Leya Joykutty

CHEM061  A Novel Approach for Wastewater Treatment Utilizing Adsorbent Enhanced Biosand Filtration
Sanjana Umesh Bhatt, 16, Junior, Cypress Bay High School, Weston, Florida, T: Clara Russo

MATSO01  An Evaluation of the Performance of Post-Use Firefighter Turnout Gear Using NFPA Standards
Zane Jacob Carter, 17, Junior, Haines City IB East, Lake Wales, Florida, T: April Blaze

Miami, USFL15, South Florida Science and Engineering Fair

BMED002  Associations of Genetic SNPs With AD, Neuropathology, and Gene Expression Offers Novel Insight Into AD
#  Kristi Biswas, 17, Junior, Paxon School for Advanced Studies, Jacksonville, Florida, T: Emma Gallagher

CELO001  Analyzing the CD44-Targeting Capabilities of Chitosan-Coated Iron Oxide Nanoparticles in Glioblastoma Multiforme
Thomas Coxe Commander, 17, Junior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

EBED003  Simulating Astronautic Information Transfer Through the Implementation of Optical Laser Technology
Emma Christine Lee, 15, Freshman, Eric Lee, 17, Senior, Stanton College Preparatory School, Jacksonville, Florida, T: Marion Zeiner

EGSD001  The Energy Generation Efficiency and Storage Capability of a Novel Dye-Sensitized Solar Cell
Claire Marie Huang, 17, Junior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

Winter Haven, USFL12, Polk Region Science and Engineering Fair

EAEV005  The Effects of Increasing Iron Concentration on the Biomass and Fluorescence of Chlorella sp.
Carmela Victoria Fetherlin, 17, Senior, Haines City IB East, Lake Wales, Florida, T: April Blaze

MATSO01  An Evaluation of the Performance of Post-Use Firefighter Turnout Gear Using NFPA Standards
Zane Jacob Carter, 17, Junior, Haines City IB East, Lake Wales, Florida, T: April Blaze

Satellite Beach, USFL13, Brevard South Science and Engineering Fair

BEHA009  Understanding and Creating an Equation on the Impact of Celebrity Endorsements and Their Numerous Factors on the Growth of Alt-Coins
Rushil Shah, 16, Sophomore, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp

CHEM016  The Effectiveness of Porous Photothermal Sepioida Ink Nanoparticles for Osteosarcoma Treatment
Laya Damaraju, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp

ROBO069  Detection of Benign and Malignant Lung Nodules in 3D Volumes Generated From Thoracic Computed Tomography Scans Leveraging Artificial Intelligence, Year 2
Brian Ania Albert, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp

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

CELL005  Customized Cancer Cell Weapons: Using CRISPR Cas9 Genetic Engineering and Human Adipose-Derived Mesenchymal Stem Cells To Overcome Platinum-Based Chemotherapy Resistance in OVCAR-3 Human Ovarian Cancer Cells, Year 4
Neil Reddy, 18, Senior, Satellite High School, Satellite Beach, Florida, T: Magdalena Molledo

ROBO018  Constructing a Neural Network To Classify Lung Cancer
Bisrat Kassahun, 16, Junior, Edgewood Junior Senior High School, Merritt Island, Florida, T: Meredith Reninger

Miami, USFL15, South Florida Science and Engineering Fair

BMED011  The Effect of Varying Concentrations of Artemisinin, Berberine, and Sulfurophane Upon Ocular Tumor Formation in Drosophila melanogaster
Wildwood, USFL18, Sumter County Regional Science Fair

ANIM001 Testing Effectiveness of Surfactants on Stable Foam Involved in Primary Ruminal Tympany
Emma Christine Bogue, 16, Sophomore, South Sumter High School, Bushnell, Florida, T: Shellbie Wiley

BCHM002T Lactate! Lactate! Lactate!
Ty Carson Kadur, 16, Sophomore, Johanna Rebekah Heijkoop, 16, Sophomore, South Sumter High School, Bushnell, Florida, T: Shellbie Wiley

CHEM006 Effectiveness of Using Worms To Biodegrade Plastic
Jordan Kanye Riche, 18, Senior, Wildwood High School, Wildwood, Florida, T: Emily Keeler

PLNT001 Hydroponics: What Method of Hydroponics Would Increase the Growth Rate of a Lettuce Plant?
Ariana Zarauza-Benitez, 17, Senior, Wildwood High School, Wildwood, Florida, T: Emily Keeler

TMED002 To What Extent Does the L Form of Beta-Hydroxybutyrate (BHB) Have Unique Anti-Cancer Effects Compared to the D Form, on U87 Brain Cancer Cells in vitro?
Cheyenne Rashelle Shirley, 17, Senior, South Sumter High School, Bushnell, Florida, T: Shellbie Wiley

PLNT020 The Production of Tumor Suppressor Protein TP53 and the Relative Homologous Properties Identified Using Gorilla Genome To Account the Absence of Cancer
Colby Kenneth Rinsberger, 16, Sophomore, Avery Gail Andrei, 16, Senior, South Sumter High School, Bushnell, Florida, T: Shellbie Wiley

Pensacola, USFL20, West Panhandle Regional Science and Engineering Fair

ROBO001T Al Surgery Robot
Charles Benson Pratt, 17, Junior, Danish - Edupuganti, 16, Junior, Pensacola High School, Pensacola, Florida, T: Karen Bruening

St. Augustine, USFL21, St. Johns County STEM Fair

BMED009 Developing CLL-1 and MSLN Immunogens for Dual CAR-T Cell Therapy for AML
Andrew Y. Lui, 17, Junior, Ponte Vedra High School, Ponte Vedra, Florida, T: Marna Fox

BMED017 Altering Metabolic Pathways To Override Drug Resistance in Cancer
Emma Alexandra Chirila, 18, Senior, Ponte Vedra High School, Ponte Vedra, Florida, T: Kathryn Kehoe

Sanford, USFL23, Seminole County Regional Science, Mathematics & Engineering Fair

CELL009 A Novel Approach to Bone Implant Infection Therapeutics Leveraging Proteins Derived From Lactobacillus acidophilus and Modulating Anti-Inflammatory Gene Expression
Anouska Seal, 16, Sophomore, Paul J. Hagerty High School, Oviedo, Florida, T: Angela Campbell

CHEM074 Investigating the Binding Interactions of Small-Molecule Inhibitors to PLKs Using Molecular Dynamics Simulations
Sarita Rae Thosteson, 18, Senior, Satellite High School, Satellite Beach, Florida, T: Maggie Molledo

Tallahassee, USFL26, Capital Regional Science and Engineering Fair

CELL003 Characterization of Lung Cancer Mechanosensation
Shiv Pareshkumar Patel, 15, Sophomore, Maclay School, Tallahassee, Florida, T: Ariel Evans

ROBO008 An Eco-Friendly Deep Learning Tool for Disrupting Insect Mating Behavior of Diaphorina citri Supporting the Mitigation of Unwarranted Pesticide Usage in Citrus Greening Control
Sruthi Sentil, 17, Junior, James Rickards High School, Tallahassee, Florida, T: Paula Hall

Tampa, USFL27, Hillsborough Regional Science Fair

CBIO031 A Novel Approach to Analyzing Alzheimer's Disease in MRI Scans Using a Convolutional Neural Network
Rudra Patel, 15, Freshman, Middleton High School, Tampa, Florida, T: Bhagyashree Kulkarni

BEHA042 The Effect of Virtual Learning on Student Long Term Self-Esteem
Sarah Rose Garfield, 18, Senior, Palm Beach Central High School, Wellington, Florida, T: William Bartenslager

BMED057 Testing the Effects of Anti-DLL4 Monoclonal Antibody in Conjunction With Tamoxifen Hormone Therapy Treated Ovarian Cancer
Sarah Rose Garfield, 18, Senior, Palm Beach Central High School, Wellington, Florida, T: Jennifer Krill

BMED075 The Effect of Heat Shock Proteins on Drosophila With Malignant Tumors
Saachi Anika Mody, 17, Junior, Florida Atlantic University High School, Boca Raton, Florida, T: Jennifer Krill

CHEM074 Investigating the Binding Interactions of Small-Molecule Inhibitors to PLKs Using Molecular Dynamics Simulations
Sarita Rae Thosteson, 18, Senior, Satellite High School, Satellite Beach, Florida, T: Maggie Molledo

ETSD055 Creation of an Artificial Atmospheric Ocean at Orbital Altitudes To Combat Space Debris
Cooper Weisman, 16, Junior, Alexander W. Dreyfoos School of the Arts, West Palm Beach, Florida, T: Stephen Anand

MATS039 Biodegradable Chitosan-Silver Hydrogel as a Delivery Mechanism for Cyclic Lipopeptide-4
Satviki Singh, 18, Senior, Florida Atlantic University High School, Boca Raton, Florida, T: Kendra Palumbo
Finalist Directory

Land O’ Lakes, USFL30, Pasco Regional Science and Engineering Showcase

CELL004  BMP4 Prevents Thrombin Induced Inflammation and Vascular Damage in Endothelial Cells
# Cemre Su Kayisli, 18, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

EAEV008  Study on the Effects of Polyvinyl Chloride (PVC) Water Contamination on the Oxygen Production Levels of Elodea densa (Aquatic Elodea Plant)
Katelynn Helena Paciorek, 18, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

MCRO004  The Development of an Effective Antibiotic Treatment To Limit the Bacterial Growth of Staphylococcus epidermidis on Total Joint Arthroplasties
Raven Jade Pascua, 18, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

Sarasota, USFL32, Sarasota County STEM Fair

EAEV081  The Effect of Consuming Polyethylene on the Function and Consumption Rate of the Zophobas atratus Superworm
Anja Kristin Schwarzauer, 16, Junior, Sarasota High School, Sarasota, Florida, T: Andrew Harshman

EAEV082T How Do Different Concentrations of Glyphosate Affect Phytoplankton Populations and How Effective Will a Granular Activated Carbon (GAC) Absorption Filtration Test Be at Removing Glyphosate From an Herbicide to Protect Phytoplankton Populations?
Nicholas Wright Cox, 16, Junior, Rylee Lynn Mulhollen, 17, Junior, Sarasota High School, Sarasota, Florida, T: Andrew Harshman

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

TMED011  Assessment of the Neurological Effects of Withania somnifera and Resveratrol Using a Drosophila Model
Roshna Mannuthoduvil, 17, Senior, Tavares High School, Tavares, Florida, T: Courtney Stokes

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

EGSD047  Enzymatically Treated Cellulosic Packaging Waste Utilized to Release Fermentable Sugars for the Production of Bioethanol: A Third Year Study
Serenity Renee Derousie, 18, Senior, Ridgeview High School, Orange Park, Florida, T: Bethany Derousie

PLNTO51 How Does Nitrate Absorption Differ Between the Rhizophora mangle, Laguncularia racemosa, and Avicennia germinans Over a 48 Hour Period?
Mary Christine Reed, 18, Senior, Ridgeview High School, Orange Park, Florida, T: Jacey Skrzypczak

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

BEHA070  Addressing Barriers to Classroom Communication by Automating Student to Educator Feedback Loops Through a Novel Software-Based Approach
Junwei Tan, 18, Senior, Lee Virtual Instruction Program, Fort Myers, Florida, T: Eric Arsenneau

ENEV007 Development of an Engineered Face Mask With Optimized Nanoparticle Layering for Filtration of Air Pollutants and Viral Pathogens
Ishika Nag, 16, Junior, Oviedo High School, Oviedo, Florida, T: William Furiosi

ETS001 First Insights Into a Novel Synchronous Reluctance Electric Motor Design
Robert Nicholas Sansone, 17, Junior, Fort Pierce Central High School, Fort Pierce, Florida, T: Steven Sholtola

CONGRATULATIONS TO OUR CATEGORY FINALISTS

Plant Sciences

Naman Agarwal Magnolia Andra Garbarino Saumitra Suyog Prabhu
Faisal Abdullah Al Khwaiter Erin Katherine Gaydar Melina Lisa Reckermann
Faisal Saad AlGhamdi Ishan Reddy Gonehal Mary Christine Reed
Nebras Tawfiq Ahmad Alrawashdeh Nira Goyal Marina Rusnak
Seksan Aphai Ashika Bhavani Guillapalli Joel Sanchez-Medina
Jack William Bailey Grace Frances Helle Isabell Seibel
Ahmed Marwan Behisi Rachel Hoffman Siddhartha Shah
Abby Claire Berger Alexander Jungik Hong Tammay Shekhar
Prisha Bhat Ayumi Ishihara Dhruv Sheeth
Ariella Maia Blackman Grace Johnson Chea-Yeon Shin
Hanyue Cao Gwendeth Jamison Keith-Powell Aaron Min Song
Yee Hern Cha Emma Pearl Kratcha Julie Madison Sundheim
Dong Tze Chan Bryce M. Krohnfeldt Suthine Theebtip
Julia Chen Ishani Kulkami Aiden Vilo
Yan Yi Cheong Yi Fan Lee Eric Wang
Zhan Hoong Alfred Chin Jessica Li Lena Wang
Maria Cicoci Shreya Nair Rachel Catherine Warner
Sheridan Isabella Dethrow Rishi Nautiyal Sydney Rae Wolf
John Benedict Allasas Estrada Alexander Clinton Nelson Ariana Zarazua-Benitez
Pauline Victoria Estrada Katherine Ann Opria Sadie Grace Zehner
Grace Margaret Finnerty Meikhisi Panchasrin Ava Zhang
Daniel Charles Fletcher Aarushi Pandey
Jacob Harry Friedman Ngoc H. Pham

Society for Science applauds the finalists in Plant Sciences.
MATS045  Development and Characterization of a Novel Laponite-Enhanced Tannic Acid-Based Hydrogel
Nolan Wen, 17, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Iris Thompson

MCRO017  Developing a Monomolecular Model To Describe the Disease Progress Curve for Early Blight in Tomato (Solanum lycopersicum), Potato (Solanum tuberosum), and Bell Pepper (Capsicum annuum), Treated With Novel Microbial Formulations
Shloke Nirav Patel, 16, Junior, Hillsborough High School, Tampa, Florida, T: Mishell Thomas-King

PLNT035  Abolition of Unfurling Nutrients Is the Solution for Elimination of Microalgae in the Indian River Lagoon (Year III)
Erin Katherine Gaydar, 18, Senior, Edgewood Junior Senior High School, Merritt Island, Florida, T: Robert Cilscik

ROBO066  Designing a LiDAR Topographic Navigation System: A Novel Approach To Aid the Visually Impaired
Tiffani Rai Gay, 15, Freshman, Orlando Science Schools, Orlando, Florida, T: Judith Bright

TMED025  Analyzing the Viability of Pure Mushroom-Derived Chitosan as an Alternative to Pure Crustacean-Derived Chitosan in Hemostatic Agents
Lara Jean Kendall, 17, Junior, Canterbury School, Fort Myers, Florida, T: Kati Morris

GEORGIA
Atlanta, USGA03, Atlanta City Science & Engineering Fair

ANIM039T  Do Relatives in Families Have Similar Fingerprints?
Sophia White, 15, Freshman, Emma Katherine Lilly, 15, Freshman, North Atlanta High School, Atlanta, Georgia, T: Usha Patke

EAEV001  Project Titan-Phyto: The Effects of Titanium Dioxide Nanoparticles on Marine Phytoplankton
Ali Phan, 15, Sophomore, Atlanta Girls' School, Atlanta, Georgia, T: Melissa Hankinson

MCRO026T  Determining Which Acne Medications Prevent the Growth of Staphylococcus epidermis Most Successfully
Solunne Fedovskiy, 15, Sophomore, Avi Crosby, 16, Sophomore, Lily Harper Reilly, 16, Sophomore, Henry W. Grady High School, Atlanta, Georgia, T: Jormell Cofield

Stone Mtn, USGA04, Dekalb Science & Engineering Fair

MATS036  Designing 3D Printed Diatom-Biomimicking Materials Using Unsupervised Machine Learning
Aaditya Saha, 16, Senior, Chamblee Charter High School, Chamblee, Georgia, T: Jacqueline Stephens

McDonough, USGA06, Henry County Science and Engineering Fair

EBED002  Novel Application of Lock-In Amplifiers With 2-bit FSK

ETSD001  Arduino Controlled Robotic Arm Utilizing Flux Pinning
Cason Alexavier Allen, 18, Senior, Luella High School, Locust Grove, Georgia, T: Renuka Rajasekaran

Milledgeville, USGA07, Georgia College & State University Regional Science and Engineering Fair

CBI0016  NeuroXNet: A Novel Hierarchical Based, Blood Biomarker Driven, Deep Learning Model With miRNA Drug Discovery Pipeline for Neurological Disease Diagnosis and Treatment Using in silico Modeling, MRI Imaging and Genomic Data
Vaibhav Mishra, 17, Senior, West Laurens High School, Dexter, Georgia, T: Meredith Lawhorn

Griffin, USGA09, Griffin RESA Regional Science Fair

EBED001T  COVID Prevention: More Precise Contact Tracing
Nathaly Rangel-Gonzalez, 15, Freshman, Jenesa Santhosh Thomas, 15, Freshman, Fayette County High School, Fayetteville, Georgia, T: Laura Rogers, T: Laura Rogers

ENBM002  Redesigned Carbon Monoxide Detectors for Industrial Environments
Alyssa JoNaykathleen Reed, 15, Freshman, Fayette County High School, Fayetteville, Georgia, T: Laura Rogers

ENVE001  Sustainable Habitats for Crassostrea virginica
Emily Elizabeth White, 16, Junior, McIntosh High School, Peachtree City, Georgia, T: Seth Bishop

Perry, USGA10, Houston Regional Science and Engineering Fair

ANIM014  Hay, Hay, Which Is Better?
Dixie Lynne Miller, 16, Junior, Warner Robins High School, Warner Robins, Georgia, T: Veronica Sanders

EAEV017  Superabsorbent Hydrogels for Water Conservation and Plant Growth
Jaabili Sai Gosukonda, 15, Sophomore, Houston County High School, Warner Robins, Georgia, T: Jenny Gutshall

Suwanee, USGA11, Gwinnett Regional Fair

CELL007  The Role of Ribosomal RNA Modifications in Ribosome Biogenesis
Jean Yu, 17, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry

CHEM014  The Effect of Powdered Orange Peels on the Removal of Textile Dye
Dua Bashir, 16, Sophomore, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry

ENBM021  Brain-Computer Interface: Ambient Environment Control for the Paralyzed
Eesh Trivedi, 17, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry

ETSD012T  Small Satellite and Launch Vehicle for Climate Change Research
Jonathan M. Gutknecht, 18, Senior, Joey Gorman, 18, Senior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Joanne Shaw

ROBO023  Search and Rescue System Using Omni-Orientation Mapping Robot
Matthew Hansol Jabez Kim, 17, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry

ROBO039  Optimizing Machine Learning Algorithms for Multiclass Neuroimaging Segmentation
Arjan Kohli, 18, Senior, Peachtree Ridge High School, Suwanee, Georgia, T: Corey Wellmaker

Conyers, USGA12, Rockdale Regional Science & Engineering Fair

CELL008  Evaluating the Effects of Resveratrol on the Lysis of Skin Melanoma Cells
Kaya Andreia Holland, 15, Sophomore, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Shelley Seagraves

ESG0009  Solar-Wind Charger
Camila Moreno, 16, Sophomore, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Tyrone Huebsch

ETSD013T  Biomimicry: The Effect of Mother Nature on the Automotive Industry
William Bradford Brumback, 18, Junior, Jorge Luis Escalera, 17, Junior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Scott Bolen, T: Tyrone Huebsch

Atlanta, USGA13, Fulton County Regional Science & Engineering Fair

BEHA001  FollowMe: AI To Revolutionize Cortical Visual Impairment
Asmi Kumar, 18, Senior, Milton High School, Milton, Georgia, T: Catherine Riley
**Finalist Directory**

- **MATS048** Rapid Detection and Inactivation of SARS-CoV-2 with Bio-Conjugated Nanomaterial
  Vinod Ruppa-Kasani, 17, Junior, Chattahoochee High School, Johns Creek, Georgia, T: Matthew Mihordea

- **TMED001T** Using Fluorescent Imaging To Make Cancer Detection More Accurate
  Sahil Paras Hemrajani, 16, Sophomore, Ibrahim Mohammad, 15, Sophomore, Chattahoochee High School, Johns Creek, Georgia, T: Matthew Mihordea

- **Marietta Ga 30060, USGA14, Cobb/Paulding Regional Science Fair**

- **BCHM001** Phase VII: Inhibiting Cancer Metastasis by Using EGG To Target the 67 kDa Laminin Receptor
  Stephen Robert Litt, 17, Senior, Kennesaw Mountain High School Academy of Mathematics, Science and Technology, Kennesaw, Georgia, T: Angela Wood

- **BMED001** Nanoparticle-Mediated Drug Delivery as a Therapeutic for Aortic Aneurysms
  Misha Niles Patel, 16, Sophomore, Wheeler High School, Marietta, Georgia, T: Joel Howell

- **SOFT024** Detecting Glaucoma From Retinal Fundus Images Using Machine Learning
  Rohan Kalia, 15, Freshman, Wheeler High School, Marietta, Georgia, T: Joel Howell

- **Jonesboro, USGA15, Clayton County Regional Science & Engineering Fair**

- **CHEM002** A Green Method of Removing Immiscible Pollutants From Waterways Using Vitamin E and a Magnetic Suspension
  Amy Pham, 16, Junior, Elite Scholars Academy, Jonesboro, Georgia, T: Andrew Hoang

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

- **ENBM073T** Low-Cost 3D Printed Modular and Adjustable Pediatric Prosthesis Leg
  Hakimuddin Huzefa Kitabwalla, 16, Sophomore, Chattahoochee High School, Johns Creek, Georgia, T: Jennifer Berry

- **ETSD076** Designing and Fabricating a Vortex Aerospike Rocket Engine
  Cosmin Ciorba, 17, Senior, Chattahoochee High School, Johns Creek, Georgia, T: Tanya Cobbin

- **ETSD077** The Update of the Outdated Mosquito Collection Device
  Atena Mori, 17, Junior, Iolani School, Honolulu, Hawaii, T: Dawn Shin

- **PHYS074** Calculating Transition Amplitudes of an Observable Using the Rodeo Algorithm for Quantum Computing
  Max Bee-Lindgren, 18, Senior, Decatur High School, Decatur, Georgia, T: Jennifer Gonzalez

- **HAWAII**

- **Waipahu, USHI01, Hawaii Association of Independent Schools Science and Engineering Fair**

- **BCHM012** Luxl/LuxR-Type Quorum Sensing System in K61, Dickeya Species Novel: Growth and AHL Production in MgSO4-Rich Brine
  Jingjing Wang, 18, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan

- **TMED058** Protective Effect of Bromelain and Pineapple Extracts on UV-Induced Damage in Human Skin Cell
  Max Bee-Lindgren, 18, Senior, Decatur High School, Decatur, Georgia, T: Jennifer Gonzalez

- **Waipahu, USHI02, Leeward District Science and Engineering Fair**

- **CBIO014** Identification of Target IVF Preimplantation Screening Regions via Developmental Pathway and RNA-Seq Expression Analysis
  Emily Phanphongsa, 18, Senior, Waipahu High School, Waipahu, Hawaii, T: Tanya Cobbin

- **ETSD031** Engineering a New Foundation For Buildings To Withstand Seismic Disruptions and Soil Liquefaction
  Harold Cacal, 16, Junior, Waipahu High School, Waipahu, Hawaii, T: Dawn Shin

---

**CONGRATULATIONS TO OUR CATEGORY FINALISTS.**

**Robotics and Intelligent Machines**


---

**The Siegel Family Endowment**

applauds the finalists in Robotics and Intelligent Machines.

---

94
Regeneron International Science and Engineering Fair 2022
SOFT015 Watershed Computer Game
Benjamin Whithurst, 17, Senior, Pearl City High School, Pearl City, Hawaii, T: Jessica Stoeger

Puunene, USHI03, Maui County Regional Science and Engineering Fair

PHYS016 Habitable Zones of Galaxies: Finding Metal-Rich Zones in Various Galaxies and Their Relation to Color
Anica Jihae Ancheta, 15, Sophomore, Henry Perrine Baldwin High School, Wailuku, Hawaii, T: Amy Ancheta

Lihue, USHI04, Kauai Regional Science & Engineering Fair

ROBO007 Electronic Breaking System
Kylan Takakusagi, 18, Senior, Waimea High School, Waimea, Hawaii, T: Kawika Wellington

Hilo, USHI05, Hawaii District Science and Engineering Fair

ETSD030 Modification of Squirrel Cage and Slip Ring Induction Motors for a Higher Efficiency and Starting Torque
Paul Watson Varricatt, 17, Junior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki

TMED012 Understanding the Molecular Mechanisms Underlying the Anticancer Pathway of a Traditional Hawaiian Herb
Rachel Z. Tao, 16, Junior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki

Kaneohe, USHI06, Windward District Science and Engineering Fair

SOFT001 Gamifying Learning by Repetition
Alicia Christine Daraban, 18, Senior, James B. Castle High School, Kaneohe, Hawaii, T: Malia Vaughn

SOFT008 Building Silent Activation and Improved Location Accuracy Into the Current 911 System
Roen Wainscoat, 18, Senior, Kalaheo High School, Kailua, Hawaii, T: Crystal Stafford

Aiea, USHI07, Central Oahu District Science and Engineering Fair

ANIMO04 Analyzing the Ease of Digestion in Dogs Through the Absorbency of Different Types of Dog Foods
Collin Tajiro Horiuchi, 17, Senior, Mililani High School, Mililani, Hawaii, T: Nel Venzon

BMED005 Comparing Neural Network Strategies to Label Tricuspid Valve on MRI Images
Belise Swartwood, 16, Sophomore, Mililani High School, Mililani, Hawaii, T: Nel Venzon

Honolulu, USHI08, Honolulu District Science & Engineering Fair

BMED006 Serological Characterization of Drosophila S2 Cells-Expressed SARS-CoV-2 Spike Proteins
Hinano Tsuchiya, 18, Senior, Kalani High School, Honolulu, Hawaii, T: Kenneth Okawa

PHYS008 Analyzing Earth’s Bow Shock Compression Ratio With Magnetohydrodynamic Limits
Kenta Milton Sakamoto, 17, Senior, President Theodore Roosevelt High School, Honolulu, Hawaii, T: Jennifer Williams

ROBO0012 Using Hand Tracking and Server Architecture to Allow Online Control of a Robotic Hand
Jaxon Kawika Poentis, 17, Junior, President Theodore Roosevelt High School, Honolulu, Hawaii, T: Jennifer Williams

Kailua-Kona, USHI09, West Hawaii District Fair

BEHA038 BREATH Analysis: Improving Community Readiness Outcomes for Native Hawaiian Students in K–12 Education
Carolyn Elizabeth Clebsch, 17, Senior, Kealakehe High School, Kailua-Kona, Hawaii, T: Justin Brown

Honolulu, USHI05, Hawaii State Science and Engineering Fair

ANIMO056 Population Status and Monitoring of the Red-Crowned Parrot (Amazona viridigenalis) on O‘ahu, Hawai‘i
Kellen Apuna, 17, Senior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Grant Yamashita

CHEM058 A Sustainable Alternative to Textile Dyes: Synthesizing and Applying PMMA Nanoparticles To Create Structural Coloration
Yumi Hannah Mizobuchi, 17, Junior, Iolani School, Honolulu, Hawaii, T: Jessica Saylors

CHEM059 Evaluation of Natural Products in Mamaki Tea Using Untargeted Metabolomics
Alanna Sun, 16, Junior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki

EAEV078 Effectiveness of a Fire-Fighting Foam as an Eco-Friendly Replacement
Ethan Abraham, 16, Sophomore, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Grant Yamashita

EGSD044 Harnessing the Energy in Waves To Generate Electricity
Landon Choy, 17, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Grant Yamashita

MCRO058 Identifying the Role of Alternative Ribosomes in Inducing Biofilm Formation
Ayana Dorothy Sakamoto, 18, Senior, President Theodore Roosevelt High School, Honolulu, Hawaii, T: Jennifer Williams

ROBO085 The Creation of a Convolutional Neural Network To Classify Chronic Ulcer Infection
Avi Anand Gupta, 16, Junior, Iolani School, Honolulu, Hawaii, T: Yvoone Chan

IDAHO

CRAIGMONT, USID01, Northern Idaho Science & Engineering Fair

ETSD040 Increasing Drone Flight Times Without Sacrificing FPV Flight Capability
Caden Joel Perry, 17, Junior, Moscow High School, Moscow, Idaho, T: Pat Blount

ETSD041 Electromagnetic Braking System: A Rotary Design Which Applies Electromagnetism To Achieve Reduced-Friction/Frictionless Braking
Jesse James St. Onge, 18, Senior, Lewiston Senior High School, Lewiston, Idaho, T: Terri Varnado

Crainmont, USID02, Western Idaho Science & Engineering Fair

CBIO039 Identification of Potential Inhibitors of Severe Acute Respiratory Syndrome Coronavirus 2 Envelope Protein Ion Channel Activity Using Machine Learning Techniques
Wency Suo, 17, Junior, Boise High School, Boise, Idaho, T: Reid Spain-Strombom

SOFT026T Novel Search Algorithms To Efficiently Solve the Shortest Vector Problem in Post-Quantum Cryptography
James Liu, 18, Senior, Luke Bousfield, 17, Junior, Timberline High School, Boise, Idaho, T: Heidi Pluska

Craigmont, USID03, Eastern Idaho Science & Engineering Fair

BEHA032T Is There a Correlation Between Higher Scores on an Autism Spectrum Test and the Ability To Taste PTC Paper?
Saree Lydia Hillstead, 15, Freshman, Danica Sue Knapp, 15, Freshman, Hagerman Junior-Senior High School, Hagerman, Idaho, T: Daniel Knapp

BEHA033T Is There a Difference Between Higher Scores on an Autism Spectrum Test and the Ability to Taste PTC Paper?
Saree Lydia Hillstead, 15, Freshman, Danica Sue Knapp, 15, Freshman, Hagerman Junior-Senior High School, Hagerman, Idaho, T: Daniel Knapp

EAEV041T Is True Glacier Water Really More Pure?
Nathan Elison, 17, Junior, Brecken Allegood, 15, Sophomore, Hillcrest High School, Ammon, Idaho, T: Barbara Nelson
Finalist Directory

ILLINOIS

Chicago, USIL01, Chicago Public Schools Student Science Fair

CBIO046 Novel 3D Convolutional Neural Network for Age-At-Death Estimation From Cranial CT Scans
# Maya Joshi, 17, Junior, Walter Payton College Preparatory High School, Chicago, Illinois, T: Walter Kinderman

CELL024 A Novel RNAi-Based Drug for the Treatment of Hepatocellular Carcinoma Ritvik Vinik, 17, Junior, Walter Payton College Preparatory High School, Chicago, Illinois, T: Walter Kinderman

PLNT031 Using Computers To Optimize Crop Yield Rachel Hoffman, 18, Senior, Lane Technical College Prep High School, Chicago, Illinois, T: Lucy Young

Cell024 Quantum Bogosort George Huebner, 18, Senior, Walter Payton College Preparatory High School, Chicago, Illinois, T: Michael Caines

Edwardsville, USIL02, STEM Science and Engineering Research Challenge

EAEV083 Evaluating Ultraviolet Rays as a Method To Increase the Efficiency of Methods Used To Clean Up Oil Spills Brenton Obadebo-Goyea, 16, Junior, The Governor French Academy, Belleville, Illinois, T: Christine Stewart

Springfield, USIL04, Illinois Junior Academy of Science Region X Science Fair

EAEV090 Zooplankton Studies in Lentic Ecosystems – Phase VI: Vertical Migration Ashton Timothy Ryan, 17, Senior, Rochester High School, Rochester, Illinois, T: Lyndell Robinson

PHYS044 Identifying the Source of a Hydroxyl Outflow in a Region of High-Mass Star Formation Cade Evan Rigg, 17, Junior, 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


CHEM048 Creation of a Predictive MOF Performance Indication System Utilizing Synthesis Criteria and Machine Learning Zahra Zumfig Nathani, 17, Junior, Niles Township West High School, Skokie, Illinois, T: Parin Patel

INDIANA

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

ANIM070 Strengthening Eggshells Using a Natural Calcium Supplement Kaleb James Johnson, 15, Freshman, Marian High School, Mishawaka, Indiana, T: Ken Andrzejewski

BCHM030 Spin Doctor: Determining the Capacity for a Circulatory Supplement To Mitigate the Negative Effects of Placing an Unexpected Rotational G-Force Upon Vanessa cardui Larvae During Metamorphosis Lexy Foust, 16, Junior, Frankfort High School, Frankfort, Indiana, T: Bret Rhea

CONGRATULATIONS TO OUR CATEGORY WINNERS

Systems Software

FIRST PLACE
Andrei Florian

SECOND PLACE
William Huang
Elliott James Krzeminski
Navya Ramakrishnan

THIRD PLACE
Aiden Yutong Bai
Ritika Candadi Brahmadesam
Raahi Reddy Chada
Landon Penn Colaresi
Henrique Rodrigues
Hissa Amorim

FOURTH PLACE
Rohan Kalia
Muhammed Yusuf Kartal
Moltas Lindell
Jay Omkar Nimbalkar
Mykhailo Shynder
Andreas Tornkvist
Thomas Marshall Vielmetti
Yusuf Efdal Yilmaz

Microsoft applauds the finalists in Systems Software.
Terre Haute, USIN21, Hoosier Science and Engineering Fair Region 2

BMED078 The Effect of Antepartum Maternal Position Changes on Labor and Delivery Outcomes
Grace Elizabeth Harrison Weaver, 18, Senior, Marian High School, Mishawaka, Indiana, T: Kenneth Andrzejewski

EGSD051 Effects of Nutrient Deprivation on the Production of Algal Biodiesel
Sneha Yelamanchili, 17, Senior, Signature School, Evansville, Indiana, T: Cynthia Ahmed

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

CBOO058T Identification of X-Linked Candidate Disease Genes Through Trio Family Analysis of Family Pedigree #
James Yang#, 16, Junior, Bolong Xia Huang, 16, Sophomore, Carmel High School, Carmel, Indiana, T: Yongsheng Bai

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

BCHM034 Accelerated Bio-Chemical Depolymerization of Plastics From Surgical Face Masks: A Proactive Solution to the Impending Environmental Pandemic
Rohan Prakash Bhosale, 15, Freshman, Carmel High School, Carmel, Indiana, T: Jennifer Drudge

BCHM034 Accelerated Bio-Chemical Depolymerization of Plastics From Surgical Face Masks: A Proactive Solution to the Impending Environmental Pandemic
Rohan Prakash Bhosale, 15, Freshman, Carmel High School, Carmel, Indiana, T: Jennifer Drudge

ROBO086 Explore the Protein Folding Problem Using Reinforcement Learning
Jiachen Lu, 17, Sophomore, Valley Academy, Valley, Indiana, T: David Lawrence

Terre Haute, USIN24, Hoosier Science and Engineering Fair Region 5

ANIMO07 Vitamin D Impacts on Chicken Eggs
Taylor Jean Schmitt, 15, Freshman, Northwestern High School, Kokomo, Indiana, T: Linda Wilson

CBOO061 Machine Learning-Based Identification of Cognitive Engagement States in EEG Data Driven by Visual Stimulation
Sean Borneman, 13, Freshman, Bloomington High School South, Bloomington, Indiana, T: Joshua Borneman

Terre Haute, USIN25, Hoosier Science and Engineering Fair Region 6

ETSD063 Reduction of Internal Parasites Through Improved Feeder Design
Matthew David Hefty, 16, Sophomore, DeKalb High School, Waterloo, Indiana, T: Chris Refner

MATS046 Development of a Magneto-Optical Kerr Effect System To Study Magnetic Molecules
Jonathan Yang, 15, Sophomore, Carmel High School, Carmel, Indiana, T: Jennifer Drudge

Terre Haute, USIN26, Hoosier Science and Engineering Fair Region 7

BCHM041 Developing Potential Phosphoprotein Biomarkers for Kidney Cancer From Urinary Extracellular Vesicles
Zheng-Chi Lee, 16, Sophomore, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Cray

CBIO062 Identification of Pancreatic Cancer Driver Genes With a Novel Machine Learning Approach
Minnie Liang, 17, Junior, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Cray

TMED059 The Evasion of Cell Death by Cancer Cells Detached From the Extracellular Matrix
Luke Electious Reynolds, 17, Junior, Marian High School, Mishawaka, Indiana, T: Kenneth Andrzejewski

Terre Haute, USIN27, Hoosier Science and Engineering Fair Region 8

BEHA048 The Trends in Music and Technology: Prospectives and Approaches for Early Childhood Development
Sneha Vashistha, 17, Junior, Carmel High School, Carmel, Indiana, T: Mangilal Agarwal

CBOO073 NucleoDepot: A Novel Approach to Genetic Depositories for the Novice Researcher
Aaron Slomovitch, 19, Senior, Raunak Dani, 15, Sophomore, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Cray

Terre Haute, USIN050, Hoosier Science and Engineering Fair

BMED073 Establishing Macrophage-Neuron Co-Culture Systems To Assess Neuronal Dynamics
Maxx Martinez, 17, Senior, Delta High School, Muncie, Indiana, T: Lance Brand

BMED079 What Is the Role of PRPF39 in Cisplatin Treated Cancer Cells? #
May Elizabeth Weston, 16, Junior, Marian High School, Mishawaka, Indiana, T: Kenneth Andrzejewski

MCRO050 Real-Time Imaging Reveals the Antimicrobial Effectiveness of Natural Bromelain on Bacteria
Madeley Grace Cerney, 18, Senior, Marian High School, Mishawaka, Indiana, T: Kenneth Andrzejewski

IOWA

Cedar Rapids, UISA01, Eastern Iowa Science and Engineering Fair

CHEM038 Biofuel: Testing Oils for Energy Efficacy
Kelly Ako Takoribisong, 15, Freshman, Keokuk High School, Keokuk, Iowa, T: Arie Schiller

ENBM048 A Thermoreversible Gel for Delivery of Immunostimulant
Jayden Shin, 17, Junior, West High School, Iowa City, Iowa, T: Carolyn Walling

PLNT034 Analysis of Chelated Minerals on Brassica rapa and Raphanus sativus as a Post-Germination Fertilizer #
Grace Frances Helle, 17, Junior, Beckman Catholic High School, Dyersville, Iowa, T: Cheryl Kluessner

Sheldon, UISA02, Western Iowa Science and Engineering Fair

ANIMO40 Secret Sounds of Bees: Analysis of Honey Bee Vibroacoustics Using Hidden Markov Models #
Amara Jean Orth, 18, Senior, Lewis Central High School, Council Bluffs, Iowa, T: Carol Fassbinder-Orth

ENEV047 Turbid or Not Turbid? That Is the Question: Creating a Water Filtration and Sanitation Method for Developing Countries #
Kiersten Jean Knobbe, 17, Junior, Guthrie Center High School, Guthrie Center, Iowa, T: Jennifer Reed

Ames, UISA050, State Science and Technology Fair of Iowa

MATS035 Mechanical Properties of Antimicrobial Starch-Based Plastic Food Storage Films Phase II #
Libby Knipper, 17, Junior, Beckman Catholic High School, Dyersville, Iowa, T: Cheryl Kluessner

MCRO038 Turmeric Bandage: A Natural and Sustainable Way for Faster Wound Healing
Ishita Mukadam, 16, Sophomore, Maharishi School of the Age of Enlightenment, Fairfield, Iowa, T: Aria Sharma

ROBO049 Forecasting Beach Safety in Iowa’s Recreational Lakes Using Machine Learning Models #
Claire Gu, 17, Junior, Valley High School, West Des Moines, Iowa, T: Karen Downing

SOFT042 A Novel Deep Learning-Based Symptom Recognition System for Effective Physician Decision-Making
Jonathan Samuel Xu Fan, 16, Junior, West High School, Iowa City, Iowa, T: Carolyn Walling

TMED037 A Looming Epidemic: Personal Music Player Use in a Young Adult Sample and Its Implications for Future Noise-Induced Hearing Loss
Kelly Ako Takoribisong, 15, Freshman, Keokuk High School, Keokuk, Iowa, T: Arie Schiller

May Elizabeth Weston, 16, Junior, Marian High School, Mishawaka, Indiana, T: Kenneth Andrzejewski

Madelyn Grace Cerney, 18, Senior, Marian High School, Mishawaka, Indiana, T: Kenneth Andrzejewski

Iowa City, Iowa, T: Yongsheng Bai

Grace Frances Helle, 17, Junior, Beckman Catholic High School, Dyersville, Iowa, T: Cheryl Kluessner

Kiersten Jean Knobbe, 17, Junior, Guthrie Center High School, Guthrie Center, Iowa, T: Jennifer Reed

Carolyn Walling
KANSAS
Eureka, USKS50, Kansas State Science and Engineering Fair

BEHA058  The Effects of Trauma Manipulation in Rats Through a Social Exploration Task
Ashi Sachinda Wickramasundara, 18, Senior, Manhattan High School, Manhattan, Kansas, T: Janet Hanson

MATS051  Creating a Unique Floating Concrete
Jesse Felix Kemper, 15, Freshman, Pratt High School, Pratt, Kansas, T: Luana Bitter

KENTUCKY
Louisville, USKY02, Louisville Regional Science and Engineering Fair

BEHA016  Now You See, Now You Don’t...
Suchita Tipirneni, 16, Sophomore, Ballard High School, Louisville, Kentucky, T: Glenda Jones

CBIO024T  Predicting Mycobacteriophage Gene Start Sites Using Artificial Intelligence
Bella Norman, 17, Senior, Sarisha Lohano, 18, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Cheryl Kirby-Stokes

CELLO19  The Sensory Potential of Synaptopodin: An Analysis of Synaptopodin within the Dorsal Root Ganglion
Veenasravani Pandyalla, 18, Senior, North Oldham High School, Goshen, Kentucky, T: Cristine McMahan

EBED024T  Water Pollution Detection Using Autonomous Drone Hardware and Software
Sahil Naresh Krishnani, 17, Senior, Nishu Yogesh Anekere, 17, Junior, Harrison Taylor Gover, 17, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Cheryl Kirby-Stokes

ROBO036  Using Multivariate Time Series Forecasting Neural Networks With Sentimental Analysis To Determine Future Stock Prices
Karthik Varma Nadimpally, 16, Junior, Ballard High School, Louisville, Kentucky, T: Glenda Jones

Jeffersonville, USKY03, DuPont Manual High School Regional Fair

BMED060  Role of Quaternary Ammonium Compounds on Inducing Cancer Progression Using a Melanoma Cell-line
Gokul Achatithkoot, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

CBIO040  An Application of Machine Learning on Predicting the Presence of Retinopathy Among Diabetic Patients
Spandana Pavuluri, 16, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

EBED031  A Wearable Device To Measure and Correct Unhealthy Back Posture
Amy Chen, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

ENBM036T  The Development of a Low-Cost Holistic System for the Stratified Screening of Pancreatic Ductal Adenocarcinoma Utilizing Urinary miRNA Biomarkers
Rishabh Ranjan, 16, Sophomore, Gopalaniruddh Saisantosh Tadinada, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

ROBO050  Designing a Robotic Arm Prosthesis With the Integration of FDM 3D Printing, Haptic Feedback, FSRs, and Machine Vision
Jilly Abraham Choi, 15, Freshman, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

CONGRATULATIONS TO OUR CATEGORY WINNERS

Translational Medical Science

FIRST PLACE
Napassorn Litchiowong
Chris Tidtijumreonpon
Wattanapong Uttayota

SECOND PLACE
Jaisal Kothari
Darsh S. Mandera
Mercedes Randhahn
Amrutha Srivatsav
Ashay Srivastava

THIRD PLACE
Adrit Rao
Dheepthi Mohanraj
Ron Nachum
Janice Kirti Rateshwar
Vishnu Ram Sampathkumar

FOURTH PLACE
Maryam Ali Al Abdulbaqi
Snikitha Banda
Maya Rose Chiravuri
William Jinliang Gao
Rushank Goyal
Ashley Taylor Malkin
Patryk Wekwejt

Regeneron applauds the finalists in Translational Medical Science.
**Regeneron International Science and Engineering Fair 2022**

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

**ANIMO25**  Analysis of Magnetoreception and the Foraging Behavior of Pogonomyrmex Using an Altered Magnetic Field  
Ana Nalini Koithandam, 17, Senior, Notre Dame Academy, Park Hills, Kentucky,  
T: William Stamm

Lexington, USKY05, Central Kentucky Regional Science and Engineering Fair

**ANIMO33**  Investigating Differences in Regeneration Across Species of Planarian Flatworms  
Irving Solomon Morris, 17, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

**BCHM014**  Single Amino Acid Polymorphism at Position 1709 Alters Integrin Beta 4 Function in BT-S49 Breast Cancer Cell Growth  
Saadhavi Maskey, 17, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

**CELL011**  Sex Chromosomal Differences and Increased Leukemia Rates in Males  
Sireesha Priya Gutt, 17, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

Prestonsburg, USKY06, Eastern Kentucky Regional Science and Engineering Fair

**CBIO063**  Computational Method of Analyzing Genetic and Epigenetic Information for Predicting Mutations in Colorectal and Pancreatic Ductal Adenocarcinoma Cancers  
Hannah Ashton Long, 17, Junior, Magoffin County High School, Salyersville, Kentucky,  
T: Kelsey Salyer

Richmond, USKY05, Kentucky Science and Engineering Fair

**ANIMO58**  The Role of Dietary Inulin in Mitigating Brain Injury  
McKenna Sun, 17, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

**ENEV068**  Developing a Novel Autonomous Swarm-Based Beach Cleaning Robot  
# Varun Hariprasad, 16, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

**ETSD064**  Structural Dynamic Simulation: Mathematical Modeling of Bridge Deformations Using Analytical Methods  
Emily Yang Hu, 17, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky,  
T: Karen Young

**MATH034**  Gauss Circle Primes  
Thomas Richard Ehrenborg, 16, Junior, Henry Clay High School, Lexington, Kentucky,  
T: Renee Goin

**MCRO051**  Genome Engineering of Bacteriophage MooMoo  
Sahil Chhabra, 17, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky,  
T: Cheryl Kirby-Stokes

**PLNT053T**  The Effect of Lonicera maackii on Kentucky's Understory  
Ishani Kulkarni, 15, Sophomore, Aiden Vilo, 16, Sophomore, duPont Manual High School, Louisville, Kentucky,  
T: Jacqueline Savoia

Baton Rouge, USLA01, Louisiana Region VII-Science and Engineering Fair

**CBIO015**  Statistical Analysis of Infant Mortality and Social Contributions  
Camille Julie Kleinpeter, 17, Junior, Paul Laurence Dunbar High School, Baton Rouge, Louisiana,  
T: Jacqueline Savoia

**ENBM022**  Engineered 3D Cellular Co-Culture to Study How Fibroblasts Alter Extracellular Matrix Composition Estrogen Receptor Positive Breast Cancer  
Margaret Catherine Moe, 16, Junior, St. Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia

**ENBM029**  Gastro-tastic: Using Stomach Acid To Power Smart Pills  
Josie Freedom Billett, 18, Senior, Arundel High School, Gambrills, Maryland,  
T: Victoria Romanoski

Frederick, USMD02, Frederick County Science and Engineering Fair

**ENBM050**  Creating a Low-Cost Non-Invasive Blood Glucose Monitoring and Automatic Insulin Injection System With an Artificial Neural Network and Raspberry Pi  
Cuthbert Carmentt Henninger Steadman, 15, Junior, Bangor High School, Bangor, Maine,  
T: Barbara Stewart

**TMED047**  A Novel Approach for Early Detection of Alzheimer’s Disease: Developing an AlexNet Convolutional Neural Network Enhanced by Class Activation Mapping  
William Xu, 16, Junior, Bangor High School, Bangor, Maine,  
T: Barbara Stewart

**BAR001**  The Brain and an Impact: Real-Time Detection of Concussions Among Athletes in Contact Sports Using Sensor Fusion and Convolutional Neural Networks  
Cuthbert Carmentt Henninger Steadman, 15, Junior, Bangor High School, Bangor, Maine,  
T: Barbara Stewart

**EBED037**  The Brain and an Impact: Real-Time Detection of Concussions Among Athletes in Contact Sports Using Sensor Fusion and Convolutional Neural Networks  
Cuthbert Carmentt Henninger Steadman, 15, Junior, Bangor High School, Bangor, Maine,  
T: Barbara Stewart

**ENBM022**  Engineered 3D Cellular Co-Culture to Study How Fibroblasts Alter Extracellular Matrix Composition Estrogen Receptor Positive Breast Cancer  
Margaret Catherine Moe, 16, Junior, St. Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia

**ENBM029**  Gastro-tastic: Using Stomach Acid To Power Smart Pills  
Josie Freedom Billett, 18, Senior, Arundel High School, Gambrills, Maryland,  
T: Victoria Romanoski

Maryland

**CBIO026**  Comparing the Genomic and Functional Properties of Phage BangNhom and Other Phages To Test Medical Capabilities for Tuberculosis  
Laiba Farooq, 17, Senior, Annapolis High School, Annapolis, Maryland,  
T: Kathleen Cochran

**EAEV030**  Tides, Pollution, and Human Health: Exploring the Relationship Between Tidal Phases and Water Contamination in a Coastal Inlet  
Emily Ruth Ernst, 17, Junior, Broadneck High School, Annapolis, Maryland,  
T: Vikki Romanoski

**EGSD022**  Improving the Performance of Solar Cells Using Thermal Cooling  
Megan Reyna Yeager, 15, Freshman, Chesapeake Science Point Public Charter School, Hanover, Maryland,  
T: Robert Woener

**ENBM029**  Gastro-tastic: Using Stomach Acid To Power Smart Pills  
Josie Freedom Billett, 18, Senior, Arundel High School, Gambrills, Maryland,  
T: Victoria Romanoski

**EBED037**  The Brain and an Impact: Real-Time Detection of Concussions Among Athletes in Contact Sports Using Sensor Fusion and Convolutional Neural Networks  
Cuthbert Carmentt Henninger Steadman, 15, Junior, Bangor High School, Bangor, Maine,  
T: Barbara Stewart

**ENBM022**  Engineered 3D Cellular Co-Culture to Study How Fibroblasts Alter Extracellular Matrix Composition Estrogen Receptor Positive Breast Cancer  
Margaret Catherine Moe, 16, Junior, St. Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia

**ENBM029**  Gastro-tastic: Using Stomach Acid To Power Smart Pills  
Josie Freedom Billett, 18, Senior, Arundel High School, Gambrills, Maryland,  
T: Victoria Romanoski

Rockville, USMD03, ScienceMontgomery

**ENBM080**  Making Removal of Chemical Contaminants in Drinking Water Affordable and Available Anywhere and Everywhere  
Muhil A. Thendral, 16, Sophomore, Thomas S Wootton High School, Rockville, Maryland,  
T: Angelique Bosse

**PHYS055**  Powerful Quasar-Driven Outflows in the Local Universe From the Cosmic Origins Spectrograph Hubble Space Telescope Far-Ultraviolet Spectroscopic Archive  
Orion Chuanyi Foo, 17, Senior, Montclair State University, Montclair, New Jersey,  
T: Zachary Kingman

**TMED053**  Representation and Deep Learning on Brain Surface Data for Transcranial Magnetic Stimulation  
Dhruv B. Pai, 18, Senior, Montgomery Blair High School, Silver Spring, Maryland,  
T: Angelique Bosse
PHYS017 The Effects of Cymatics on Artificially Auditory-Impaired Hearing Individuals’ Ability To Learn Music
Isabelle Ann Gruner, 17, Junior, St. Joseph’s Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia

Bossier City, USLA02, Bossier Parish Community College Louisiana Region I Science and Engineering Fair

MATH024 Functional Analysis of Parameterized Torus Knots
Nhi Dao, 17, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements

PHYS021 Modeling the Atmospheric Evolution of Exoplanets in the Habitable Zone of M-Dwarfs
Ashini Modi, 18, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements

ROBO021 Applying Deep Learning in Recognizing Endometrial Carcinoma
Sophie Chen, 15, Sophomore, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements

Lake Charles, USLA05, Louisiana Region V Science and Engineering Fair

BEHA007 Perspective vs. Emotional Intelligence
Susanna Angel Chiruguru, 14, Freshman, LaGrange Senior High School, Lake Charles, Louisiana, T: Suresh Chiruguru

SOFT007 Overcoming the Air Gap: Experimentation on Data Transfer
Joy Dong, 17, Junior, Louisiana School for Math, Science, and the Arts, Natchitoches, Louisiana, T: Robert Dalling

New Orleans, USLA08, Greater New Orleans Science and Engineering Fair

ENBM031 Incorporating an Articulating Facemask Into a Multi-Directional Self-Centering Linear Damping Football Helmet System
Rachel Michelle Pizzolato, 18, Senior, Elearning Academy, Metairie, Louisiana, T: Cathy Boucvalt

ENEV019 Hydrokinetic Power in the Mississippi Riverbed
Caitlin Parker Estrada, 16, Junior, Isidore Newman School, New Orleans, Louisiana, T: Victoria Mercouris

ETSD015 The Buoy: A Novel Pool Alarm To Save Lives
Grayson Barron, 18, Senior, John Curtis Christian School, River Ridge, Louisiana, T: Cathy Boucvalt

SOFT017T WatchfuLock
Dylan Daves Bracey#, 18, Senior, Joshua Robert Burk, 19, Senior, Jesuit High School, New Orleans, Louisiana, T: Helen Swan

Baton Rouge, USLA50, Louisiana Science and Engineering Fair

EGSD031 Increasing Efficiency of Electrolysis
Gabriela Maria Journee, 17, Junior, St. Joseph’s Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia

ENEV048 Capacitive Deionization With Bipolar Membranes
Sophia Manuel, 17, Junior, Saint Joseph’s Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia

MATS030T The Degradation of H2S Through the Utilization of UV-C Light and a TiO2 Quartz Felt Photocatalyst
Alexander Wu, 17, Junior, Keanna Minkai Luo, 17, Junior, Baton Rouge Magnet High School, Baton Rouge, Louisiana, T: Lai Cao
Capitol Heights, USMD05, Prince George's Area Science Fair

BMED038 Investigation of CD47 Dependent miRNAs as Early Cancer Detection Biomarker Using Liquid Biopsy Database
Morelle Meegane Konchou, 17, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland; T: Sean Brady

EGSD032 Design of a Low-Cost Weather Station for Photovoltaic Modeling
Chad Fe Bo, 18, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland; T: David Eisenberg

ETSD032 Fire, Smoke and Evacuation Modeling: The Ideal Theater
George Jamil Jamaldinian, 18, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland; T: Sean Brady

MCRO025 The Resistance of Bacteria
Carter Annnmarie Brotherton, 16, Sophomore, Great Mills High School, Great Mills, Maryland; T: Charles Skinner

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

CBIO054 Identifying Small Molecule Inhibitors of Programmed Cell Death 1 for Cancer Immunotherapy Using Pharmacophore-Based Virtual Screening
Nicole Liang, 17, Junior, River Hill High School, Clarksville, Maryland; T: Moustafa Gabr

TMED044 Designing a Deep Learning-Based Resource-Efficient Diagnostic System for Metastatic Breast Cancer: Reducing Long Delays of Clinical Diagnosis and Improving Patient Survival in Developing Countries
William Jiniqiang Gao, 16, Sophomore, Centennial High School, Ellicott City, Maryland; T: Julia Bakhru

MASSACHUSETTS

Bridgewater, USMA01, Massachusetts Region V Science Fair

ENEV082 Effect of Isopropyl Alcohol on the Prolongation of Surgical Mask's Lifespan During COVID-19
Hsiang-En Liu, 18, Junior, Tabor Academy, Marion, Massachusetts; T: David Wellstead

ETSD049 Design and Fabrication of a Flapping-Wing Robot Based on Slider-Crank Mechanism
Jue Wang, 17, Junior, Milton Academy, Milton, Massachusetts; T: Gabrielle Holman

PLNT046 The Effect of Fertilizers on the Germination of Vigna radiata Seeds
Julia Chen, 16, Sophomore, North Quincy High School, Quincy, Massachusetts; T: Patrick Kessler

Medford, USMA02, Massachusetts Region IV Science Fair

ENBM043 A Robotic Hand Orthosis and Novel Automatic Brunnstrom Evaluation for Stroke Patients
Eric Jaikai Ge, 16, Sophomore, Groton School, Groton, Massachusetts; T: Stephen Belsky

ENEV096 Printing Our Future
Kiley Catherine Conlon, 17, Junior, Lowell High School, Lowell, Massachusetts; T: Emily Steinberg

Fall River, USMA03, Massachusetts Region III Science Fair

ETSD065 Design and Optimization of Toroidal Aerospike Nozzle
Aparemaya Pandit, 16, Junior, North Attleboro High School, North Attleboro, Massachusetts; T: Alexander Hatzberger

ETSD070 The Wheelchair Project
Ary Va Tyagi, 16, Junior, Antonio Edgardo Marzoratti, 17, Junior, Franklin High School, Franklin, Massachusetts; T: William Bobrowsky

CHEM072 An “Artificial Leaf” That Can Generate Oxygen and Electricity
Sheng-Chun Chang, 16, Junior, Northfield Mount Hermon School, Gill, Massachusetts; T: Jolene Schuster

CHEM076 Mobile Carbon Capture – Phase 3
Mays Sushkin, 14, Freshman, South High Community School, Worcester, Massachusetts; T: Emillie Richmond

EAEV089 Effects of Copper Sulfate Exposure on the Nervous System of the Hirudo verbana Leech
Cameron Dunn, 16, Sophomore, Boston College High School, Boston, Massachusetts; T: John Sullivan

PHYS068 Discovering Extremely Rare Carbon Absorbers in Intergalactic Medium Using Machine Learning
Ashley Xu, 17, Junior, The Winsor School, Boston, Massachusetts; T: Mark Brooks

TMED065 A Novel Approach to Burn Wound Assessment: Analysis of Cell Packing Behavior in Wound Healing and Regeneration
Erin Kim, 17, Junior, Phillips Academy, Andover, Massachusetts; T: Jeremiah Hagler

MICHIGAN

Farmington, USMI02, Science and Engineering Fair of Metropolitan Detroit

BMED042 Dietary Impact on Memory T Cells
Annabelle Ye, 16, Junior, Huron High School, Ann Arbor, Michigan; T: Andrew Collins

CBIO041 Artificial Intelligence Solution for Effective Treatment Planning for Brain Tumor Patients
Vikram Srinivas Goddla, 16, Sophomore, Detroit Country Day School, Beverly Hills, Michigan; T: Patricia Hanlan

EAEV048 Arsenic Metabolism in the Mushroom Agaricus bisporus
Owen Dong, 16, Junior, Rochester Adams High School, Rochester Hills, Michigan; T: Eric Lohr

EAEV050 Daphnia magna in Surface Runoffs
Kiera Washington, 16, Junior, Davis Aerospace, Detroit, Michigan; T: Sharon Holloway

EGSD035 Engineering Compositionally Uniform Whole-Cell Biocatalyst for Biofuel
Margaret Yang, 17, Senior, Cranbrook Kingswood School, Bloomfield Hills, Michigan; T: Stephanie Kokoszka

MATH032 Schrodinger Bridges on Discrete Domains
Donald James Liveook, 18, Senior, Allen Park High School, Allen Park, Michigan; T: Lawrence Dunlap

ROBO064 Novel Multipurpose Air-Handling Robot With AI-Based Anomaly Detection
Mikul Saravanan, 17, Junior, Cranbrook Kingswood School, Bloomfield Hills, Michigan; T: Stephanie Kokoszka

SOFT036 Versatile and Customizable Gesture Recognition-Based Computer Control Using Open Source, Inexpensive Computer Vision Technology
Glen Russell Warren, 17, Senior, Dearborn Center for Math, Science, and Technology, Dearborn Heights, Michigan; T: Jennifer Gorsline

Bloomfield Hills, USMI03, Flint Regional Science & Engineering Fair

BEHA033 A Quantitative Graphic Study and Wilcoxon Signed Rank Analysis To Determine if There Is a Significant Gender Difference in Summer Olympic Uniforms
Olivia Jean Wagner, 14, Freshman, H.H. Dow High School, Midland, Michigan; T: Claire Fries
Westfield, USMA04, Massachusetts Region I Science Fair

BMED068 Exploring the Use of Face Masks for Social Pathogen Detection and Personal Medical Diagnosis
Harene Kim, 16, Junior, Northfield Mount Hermon School, Gill, Massachusetts, T: Ellena Bethea

ETSD066 The Application of Hybrid Prediction Models in Investigating Sources of Railway Interior Noise and Achieving Noise Reduction
Kaiqing Dai, 17, Junior, Northfield Mount Hermon School, Gill, Massachusetts, T: Dominic Zhang

Worcester, USMA05, Massachusetts Region II State Science Fair

CELLO30 JNK Signaling as a Mediator for Gene Differentiation in Human Umbilical Vein Endothelial Cells Exposed to High Glucose
Jaclyn Michele Zatsiorsky, 19, Senior, Saint Mark's School, Southborough, Massachusetts, T: Lindsey Lohwater

ETSD059 Reducing the Impact of Wingtip Vortices on Aircraft Through the Use of a Novel Winglet Design
Nevin Antony Thinagar, 16, Sophomore, Shrewsbury High School, Shrewsbury, Massachusetts, T: Catherine Phillips

MCRO040 Bacteriophage Resistance in E. coli Impacts Sensitivity to Antibiotics
Maya Zheng, 17, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

Boston, USMA06, Massachusetts Region VI Science Fair

ENBM071 IR Thermometers: Optimizing the Degree of Accuracy Through the Inspection of Energy Transfer
Alexander Ajouri, 16, Junior, Zachary Chen, 16, Sophomore, Boston Latin School, Boston, Massachusetts, T: Scott Balicki

PHYS067 Are You Experiencing a Muffled Voice, or Having Trouble Hearing? What Mask Is the Most Effective for Sound Projection?
Lena Tran, 17, Junior, Mathena Nhu Nguyen, 16, Junior, Boston Latin School, Boston, Massachusetts, T: Scott Balicki

Dudley, USMA50, Massachusetts State Science & Engineering Fair

BEHA067 Adolescent Perspectives on Stereotypes of Girls in Math
Alivia Jacqueline Hennessey, 15, Freshman, Ellie Schlichtmann, 15, Freshman, Newton Country Day School of the Sacred Heart, Newton, Massachusetts, T: Sarah Webster, T: Sarah Webster

BMED081 Autism From Mars?: Decoding the Genetic Underpinning of Sex Bias in Autism Through Big Data Analysis
Junu Lee, 16, Sophomore, Lexington High School, Lexington, Massachusetts, T: Elliot Gimble

CBIO074 Novel Reinforcement Learning Framework for Synthesizable Drug Optimization
Aaron Tian, 17, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

CBIO075 Quantum Support Vector Machines (QSVMs) for Breast Cancer Detection on IBM's Hardware
Alice Liu, 18, Senior, Boston Latin School, Boston, Massachusetts, T: Scott Balicki

CONGRATULATIONS
ISEF 2022 FINALISTS

Your hard work, creativity and dedication to furthering the fields of science, technology, engineering and math is inspiring.
EAEV042 Assessing Genotoxicity and Coliform Contamination of Rivers and Lakes in the Saginaw Watershed Area
Anthony Daoud, 15, Sophomore, Saginaw Arts and Sciences Academy, Saginaw, Michigan, T: Matthew Miller

EAEV043 The Effect of Fracking on Thermal Conductivity and Seismic Wave Transmission
Jett Miller, 16, Sophomore, Saginaw Arts and Sciences Academy, Saginaw, Michigan, T: Matthew Miller

EGSD033 Hydrogen and Oxygen Gas Production From Water for a Marine Engine as a Function of Voltage and Electrolyte Concentration
Andrew Joseph Wagner, 17, Junior, Nouvel Catholic Central High School, Saginaw, Michigan, T: Clara Wagner

Kalamazoo, USMI07, Southwest Michigan Science & Engineering Fair
MATS042T MXene Synthesis Using Lewis Acidic Etching for Li-Ion Battery Applications
Salena Zhu, 16, Junior, Samadhi Lavanya Attanayaka, 17, Junior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Jennifer Richardson

PLNT043T Effects of Perfluorooctane Sulfonic Acids (PFOS) on the Growth and Development of Plants
Katherine Ann Opria#, 17, Senior, Ashika Bhavani Gullapalli, 17, Junior, Tanmay Shekhar, 18, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Jennifer Richardson

Farmington, USMISO, Michigan Science and Engineering Fair
ROBO052T COVision: A Novel Convolutional Neural Network for the Differentiation of COVID-19 From Common Pulmonary Conditions
Kush Parkh, 16, Sophomore, Timothy Josh Mathew, 16, Sophomore, Troy High School, Troy, Michigan, T: Rebecca Brewer

ROBO053T Geometric Consistency-Based Self-Supervised Neural Network: A Novel Deep Learning Framework for 3D Human Shape and Motion Reconstruction
Michelle Hua, 17, Junior, Cranbrook Kingswood School, Bloomfield Hills, Michigan, T: Stephanie Kokoszka

MINNESOTA
Duluth, USMN02, Northeast Minnesota Regional Science Fair
ANIM018 Tough Turkeys, Year 2: What Habitat Type Do Turkeys Now Associate With in Northeast Minnesota?
Harmony Grace Tracy, 18, Senior, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh

BMED014 Disinfectant Properties of Nuphar advena: An Ethnopharmaceutical Approach
Johanna Bernu, 15, Freshman, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh

EAEV018 Effects of the Line 3 Oil Pipeline on Gray Wolves (Canis lupus) on the Fond du Lac Reservation
Grace Kathryn Lavan, 15, Sophomore, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh

ENEV016 Wastewater Treatment: The Use of Mealworm Gut Bacteria (Tenebrio molitor) To Isolate and Identify Bacteria That Can Biodegrade Polystyrene
Rowan Rock, 17, Junior, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh

Mankato, USMN03, Southern Minnesota Regional Science and Engineering Fair
BEHA012 Investigating Psychological Determinants of Efficient Behavioral Changes by Community Members To Pursue a Common Interest Using the Drosophila Model
Seungmin Han, 19, Senior, Shattuck-St. Mary’s School, Faribault, Minnesota, T: Craig Peck

Your hard work, creativity and dedication to furthering the fields of science, technology, engineering and math is inspiring.
Offering undergraduate and graduate degrees in:
Biomaterials Engineering
Ceramic Engineering
Glass Engineering Science
Materials Science and Engineering
Mechanical Engineering
Renewable Energy Engineering

We are one of only two institutions in the country that offer a BS in Ceramic Engineering & the only one in the US offering degrees in Glass Engineering Science.

Let’s change the world.

Office of Admission
One Saxon Drive
Alfred, NY 14802
607-871-2115
www.alfred.edu

Bright minds.
Innovative tools.
Creative solutions.

admissions.caltech.edu
apply.caltech.edu/register/learnmore
EAEV047  The Effects of Natural and Artificial Dyes on Water Quality
     Grace Eileen Moeller, 18, Senior, Lake Crystal Wellcome Memorial, Lake Crystal, Minnesota, T: Kelly Moeller
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
CBIO018  Tumor Targeting: Utilizing Spatial Data Science Techniques To Decode the Enigmatic Immune Response With the Goal of Informing Further Efforts to Develop Immunotherapies for Tumor Treatment
     Srinath Hariharan, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Princesa Hansen
     Plymouth, USMN04, Twin Cities Regional Science Fair
BMED015  The Electromyographic Evaluation of the Bilateral Muscle Asymmetry of the Latissimus Dorsi in Martial Arts and the Effect of Real-Time Biofeedback on Technique Improvement
     Karen Claire Nakamura, 17, Junior, Math and Science Academy, Woodbury, Minnesota, T: Jeana Albers
**Finalist Directory**

- **MCRO010** A Look into the Tiny Earth: Finding Antibiotic Producing Bacteria in Yellowstone Soil
  - Elizabeth Pamela Levinshteyn, 15, Freshman, Spring Lake Park High School, Blaine, Minnesota, T: Irina Makarevitch

- **ROBO0024** Medical Device Recall Prediction Using MAUDE Reports
  - Krish Inra Rajashekar, 16, Junior, Minnetonka High School, Minnetonka, Minnesota, T: Kimberly Hothene

- **TMED099T** Essential Protection: Using UV-Sensitive Yeast To Evaluate Essential Oils as an Alternative to Sunscreen
  - Amrit Menon, 18, Senior, Ava Noelle Jaffe, 17, Junior, Breck School, Golden Valley, Minnesota, T: Kati Kragtorp

- **Saint Paul, USMN50, Minnesota Academy of Science State Science & Engineering Fair**
  - #  Hiren Parekh, 18, Senior, Saxony Lutheran High School, Jackson, Missouri, T: Brenda Etzold
  - #  Dia Kher, 16, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Leanne Thele
  - #  Andrew Yu, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

- **Hattiesburg, USMS50, Mississippi Science and Engineering State Fair**
  - **ANIMO06** Harms and Benefits of Oral Sucrose To Reduce Adverse Events, Pain and Distress During Veterinary Needle Prick Procedures in Domestic Rabbits: Random Control Trial
    - Caleb Brennan Smith, 17, Junior, Southwest Metro High School, Chaska, Minnesota, T: Sarah Schurmann

- **Cape Girardeau, USMO01, Southeast Missouri Regional Science Fair**
  - **BCHM021** Using Micrococcus luteus, Lactococcus lactis and Bacillus cereus Bacteria and the Breaking Down of Microplastics
    - Kaden Dane Luker, 16, Junior, Jackson Senior High School, Jackson, Missouri, T: Leanne Thele

- **Hattiesburg, USMS04, University of Southern Mississippi Region I Science and Engineering Fair**
  - **BEHA059** Assessing Racial Determinants of Wellbeing
    - Rheed Ayman Kabir, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

- **Mississippi State, USMS06, Mississippi Region V Science and Engineering Fair**
  - **BMED049** Complex Combination of Diabetes and Covid-19: Role of Glycolytic Inhibitors in the Treatment
    - Rishi Nautiyal, 15, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson

- **Missouri**
  - **CHEM033** Improving Rice Nutrition
    - Vivian Peng, 15, Sophomore, Starkville High School, Starkville, Mississippi, T: Tina Gibson

- **Mississippi**
  - **BEHA060** An Analysis of the Impact of Food Insecurity and Education on the Economy
    - Dia Kher, 16, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

- **Cleveland, USMS03, Mississippi Region III Science and Engineering Fair**
  - **ETSD016** Under the RADAR: Modeling the RADAR Cross-Section of Aircraft To Enhance Stealth Capabilities
    - Rushyendranath Reddy Nalamalapu, 16, Sophomore, Cleveland Central High School, Cleveland, Mississippi, T: Jody McIntosh

- **Missouri State, USMS07, Missouri Region VII Science and Engineering Fair**
  - **CBIO020** Assessing the Effect of Traveling on COVID at the County Level Using Machine Learning
    - Andrew Yu, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

- **Oxford, USMS07, Mississippi Region VII Science and Engineering Fair**
  - **PLNT033** Bitter Melon, a Miracle Fruit To Control Diabetes: Its Cultivation and Selection of the High Yielding Varieties
    - Rishi Nautiyal, 15, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson

- **Regeneron International Science and Engineering Fair 2022**
  - **BMED074** An Analysis of the Effects of Nicotine on Characteristics of Drosophila melanogaster
    - Madison Grace Echols, 17, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson
  - **Jackson, USMS05, Mississippi Region II Science and Engineering Fair**
  - **ANIMO02** Examining the Effects of Sodium Propionate on Heart Rate Using Daphnia magna as a Model Organism
    - Jonnejoy Agniva Dhar, 17, Junior, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Marks McWhorter
  - **CBIO042** Identifying Genetic Biomarkers for Essential Tremor Using Bioinformatics and Machine Learning
    - Nicholas Le Djedjos, 18, Senior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

- **Regeneron International Science and Engineering Fair 2022**
  - **BMED058** The Effects of Different pH levels of Chlorine on the Tooth Enamel
    - Madelyn Abraham, 18, Senior, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Price Chadwick
  - **CBIO020** Assessing the Effect of Traveling on COVID at the County Level Using Machine Learning
    - Andrew Yu, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson
  - **CHEM033** Improving Rice Nutrition
    - Vivian Peng, 15, Sophomore, Starkville High School, Starkville, Mississippi, T: Tina Gibson
  - **Oxford, USMS07, Mississippi Region VII Science and Engineering Fair**
  - **BMED049** Complex Combination of Diabetes and Covid-19: Role of Glycolytic Inhibitors in the Treatment
    - Kereith Karthikeyan, 17, Junior, Oxford High School, Oxford, Mississippi, T: Sarah Robinson
  - **PLNT033** Bitter Melon, a Miracle Fruit To Control Diabetes: Its Cultivation and Selection of the High Yielding Varieties
    - Rishi Nautiyal, 15, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson
Joplin, USMO03, Missouri Southern Regional Science Fair
ENEV083 The Utilization of Biochar and Bacillus subtilis To Remove Regionally Prevalent Heavy Metals From Wastewater
Shrihari Nagarajan, 18, Senior, Thomas Jefferson Independent Day School, Joplin, Missouri, T: Christopher Rupar

Kansas City, USMO04, Greater Kansas City Science & Engineering Fair
ENEV067 The Efficiency of Wetland Plants on Absorbing Contaminated Runoff
Lily Marie Anderson, 18, Senior, Olathe North High School, Olathe, Kansas, T: Marsha Skoczek
ETSD048 Designing an Efficient Propeller by Prototyping With 3D Printing
Logan Honors, 18, Senior, Olathe North High School, Olathe, Kansas, T: Amy Clement
PLNT039 The Impact of Compost Composition on Plant Growth
Jack William Bailey, 18, Senior, Olathe North High School, Olathe, Kansas, T: Marsha Skoczek
TMED066 The Effect of Polymer Coating on Taste-Masking Ability of AZT (HIV Drug) for Pediatric Oral Delivery
Maggie Zhang, 18, Senior, Blue Valley Center for Advanced Professional Studies, Overland Park, Kansas, T: Eric Kessler

St. Louis, USMO07, Academy of Science–Greater St. Louis Science Fair
BMED019 The Effect of Metabolite Glucose 6-Phosphate on Apoptosis of Breast Cancer Cells
Emily Shaw, 17, Junior, Ladue Horton Watkins High School, St. Louis, Missouri, T: Allen Weltig
ENEV041 A Novel Biodegradable Device To Combat and Prevent Water Eutrophication
Anushka Rawat, 17, Junior, Parkway South High School, Manchester, Missouri, T: Kathy Erhardt

Greenfield, USMO08, Ozarks Science and Engineering Fair
ENBM063 The Utilization of Biomimetic and Mechanical Designs To Engineer a More Efficient Surgical Laparoscopic Grasper
Carter Isaiah Smith, 16, Sophomore, Camdenton High School, Camdenton, Missouri, T: Chris Reeves
PLNT040 The Biofortification of Raphanus sativus With Calcium Through Irrigation With Ca2+ Solutions
Grace Johnson, 18, Senior, Lebanon High School, Lebanon, Missouri, T: Ryne Emerick

Hillsboro, USMO09, Mastodon Art/Science Regional Fair
ANIM061 The Effect of Anthropogenic Noise on Bumblebee Foraging Patterns
Lila Cartene Sverdrup, 17, Junior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess
ETSD042 The Relative Seismic Resistance of Different Structural Aspects of the Pantheon
Clare Michelle Tyson, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess

Saint Charles, USMO05, Missouri Tri-County Regional Science and Engineering Fair
ANIM061 The Effect of Anthropogenic Noise on Bumblebee Foraging Patterns
Lila Cartene Sverdrup, 17, Junior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess
ETSD042 The Relative Seismic Resistance of Different Structural Aspects of the Pantheon
Clare Michelle Tyson, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess

Hillsboro, USMO09, Mastodon Art/Science Regional Fair
ANIM061 The Effect of Anthropogenic Noise on Bumblebee Foraging Patterns
Lila Cartene Sverdrup, 17, Junior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess
ETSD042 The Relative Seismic Resistance of Different Structural Aspects of the Pantheon
Clare Michelle Tyson, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess
MONTANA
Butte, USMT02, Montana Tech Regional Science and Engineering Fair
ANIMO28 Genetic Analysis of Brown Trout To Understand Population Declines in Southwestern Montana
Pilar Hope Sieelstad, 18, Senior, Big Sky High School, Missoula, Montana, T: Brandon Honzel
ENBM027 Silk Fiber-Controlled Drug-Eluting Sutures
Mila McKay, 17, Junior, Hellgate High School, Missoula, Montana, T: Willow Affleck
Great Falls, USMT04, Great Falls College MSU Regional Science & Engineering Fair
EAEV031 Assessing Microplastic Pervasiveness in Bark
Claire Yvonne Bucklin, 16, Sophomore, North Toole County High School, Sunburst, Montana, T: Amanda Nix
MATD025 “Weather” Leather Will Withstand
Audrey Ann Rumney, 15, Freshman, Cascade Public Schools, Cascade, Montana, T: Kendra Lane
Missoula, USMT50, Montana Science Fair
ANIM071 The Role of Developmental Plasticity in Adaptation to High Altitude and Lowland Deer Mice
Natayla de la Plaza, 17, Junior, Hellgate High School, Missoula, Montana, T: Willow Affleck
EAEV079 The Effect of Ocean Acidification on Carbon Sequestration by Nannochloropsis
Kenna Renee Anderson, 16, Junior, Flathead High School, Kalispell, Montana, T: Renee Cordes
NEBRASKA
Kearney, USNE01, Central Nebraska Science and Engineering Fair
ANIMO22 Impact of Prednisone on the Body Length, InR, and ILP2 Expression in Drosophila melanogaster
Jenna Nicole Cecrle, 17, Junior, Adams Central Jr.-Sr. High School, Hastings, Nebraska, T: Jay Cecrle
ANIMO23 Investigation of the Movements of Western Painted Turtles Into Brumation
Gabriella Eleanor Caskey, 18, Senior, Ogallala High School, Ogallala, Nebraska, T: Jennifer Jones
BMED201T The Effects of E-Cigarettes on Drosophila melanogaster
Hannah Lynn Gengenbach, 16, Sophomore, Irellyn Samuelson, 16, Sophomore, Adams Central Jr.-Sr. High School, Hastings, Nebraska, T: Jay Cecrle T: Jay Cecrle
Nebraska City, USNE02, Greater Nebraska Science and Engineering Fair
ANIMO47 The Effects of Clothianidin, Propiconazole, and Amitraz on Apis mellifera Behavior
Lauren Marie Sitzman, 18, Senior, Omaha North High Magnet School, Omaha, Nebraska, T: Eric Wang
MCRO043 Cross-Species Transmission of Drosophila melanogaster Nora Virus in Other Species of Insect and the Prevalence of Nora Virus in Insect Populations in Central Nebraska
Ella Grace Buhlke, 17, Senior, Southwest High School, Central City, Nebraska, T: Chelle Gillan
NEVADA
Spring Creek, USNV01, Elko County STEM Fair
BMED029 Medicinal Properties of Lomatium dissectum and Sambucus caerulea
Tziav Brynn Melendez, 17, Junior, Owyhee High School, Owyhee, Nevada, T: Dietlinde Beneder-Dann
SOFT027 Coding for STEM Education
Marlea Martens, 17, Senior, Elko High School, Elko, Nevada, T: Thomas Wallek
Las Vegas, USNV02, Beal Bank USA Southern Nevada Regional Science & Engineering Fair
TMED061 Investigating Daphnia magna Response to Sleep Aids as an Indirect Correlation With Humans
Jacqueline Alexa Springer, 16, Junior, Coral Academy of Science Las Vegas, Henderson, Nevada, T: Khurmet Ayapanov
NEW HAMPSHIRE
Lebanon, USNJ01, Nokia Bell Labs North Jersey Regional Science Fair
ANIMO49 Exploring E-Cigarette Condensates Toxicity of Menthol and Nicotine in PCLS
Jeffrey Ho, 18, Senior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni
CBIO049 ARIEL: Adversarial Neural Evolution for Unified Variant Forecasting and Proactive Therapeutic Design
Ryan Samuel Park, 17, Senior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni
CELLO41 Homologous Histone Acetyltransferases KAT2A (GCN5) and KAT2B (PCAF) Roles in the Intestinal Epithelium
Sean Woo, 16, Junior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni
ENBM044 Design of Oxygen-Carrying Autonomous Following and Health Monitoring Robot for Pulmonary Rehabilitation
Yuxuan Tian, 18, Junior, Rutgers Preparatory School, Somerset, New Jersey, T: Pablito Lake
ETSD050 Novel Magnetic Levitation Train Using a Triple-Dipole-Line Track System
Nathanael Timothy Gunawan, 16, Junior, Westwood Regional High School, Township, New Jersey, T: Henry Chen
PLNT036 Effects of Various Soil Microbiomes on Native and Invasive Plants
Eric Wang, 17, Junior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni
Spring Lake, USNJ02, Jersey City Medical Center/Barnabas Health STEM Showcase
EDEV058 Year 4: Small-Scale Multilevel Bioremediated Water Filtration System (Prototyping)
Sania Naik, 17, Senior, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey, T: Maria Osoria
PHYS049 The Effect of Dimples on a Mid-Sized Automobile’s Aerodynamics
Adithya Punichchityaya, 16, Sophomore, Bedford High School, Bedford, New Hampshire, T: Alyson Michael
PLNT037 Application of Indigenous Technical Knowledge (ITK) in the Geographic Context of Mid-Atlantic/North-Eastern American Agriculture
Natalya de la Plaza, 17, Junior, Hellgate High School, Kalispell, Montana, T: Renee Cordes
NEW JERSEY
Jersey City, New Jersey, T: Maria Osoria
ANIMO25 Investigation of the Movements of Western Painted Turtles Into Brumation
Gabriella Eleanor Caskey, 18, Senior, Ogallala High School, Ogallala, Nebraska, T: Jay Cecrle
NEBN025 Great Falls, USMT02, Montana Tech Regional Science and Engineering Fair
CBIO031 Assessing Microplastic Pervasiveness in Bark
Claire Yvonne Bucklin, 16, Sophomore, North Toole County High School, Sunburst, Montana, T: Amanda Nix
ATLANTIC/SOUTH-CENTERED US
Nashua, USNH07, New Hampshire Science & Engineering Expo
CBIO033 Computational Analysis of SARS-CoV-2 Variants’ Binding With Vertebrate ACE2
Adithya Punichchityaya, 16, Sophomore, Bedford High School, Bedford, New Hampshire, T: Alyson Michael
EBED027 An Economical Approach To Detect Vaping, Preventing a Vaping Epidemic Among Adolescents
Abhinav Avvaru, 15, Sophomore, Nashua High School South, Nashua, New Hampshire, T: Alyson Hobbs
TMED030 NeuraHealth: An Automated Screening Pipeline To Detect Undiagnosed Cognitive Impairment in Electronic Health Records Using Deep Learning and Natural Language Processing
Tanish Tyagi, 17, Junior, Phillips Exeter Academy, Exeter, New Hampshire, T: Sudeshsna Das
Nashua, USNH05, New Hampshire Science & Engineering Expo
CBIO033 Computational Analysis of SARS-CoV-2 Variants’ Binding With Vertebrate ACE2
Adithya Punichchityaya, 16, Sophomore, Bedford High School, Bedford, New Hampshire, T: Alyson Michael
EBED027 An Economical Approach To Detect Vaping, Preventing a Vaping Epidemic Among Adolescents
Abhinav Avvaru, 15, Sophomore, Nashua High School South, Nashua, New Hampshire, T: Alyson Hobbs
TMED030 NeuraHealth: An Automated Screening Pipeline To Detect Undiagnosed Cognitive Impairment in Electronic Health Records Using Deep Learning and Natural Language Processing
Tanish Tyagi, 17, Junior, Phillips Exeter Academy, Exeter, New Hampshire, T: Sudeshsna Das
Finalist Directory

Hackensack, USNJ04, BCA Research Expo

BMED034  **Glutamine Transporter ASCT2’s Novel Antioxidant Role in Parkinson’s Disease**  
Rohit Varma Mantena, 18, Senior, Bergen County Academies, Hackensack, New Jersey,  
T: Donna Leonardi

BMED039  **Fisetin in an in vitro Model of the Diabetic Eye**  
Neha Vazarkar, 17, Senior, Bergen County Academies, Hackensack, New Jersey,  
T: German Sabio

PHYS045T  **Efficient Computation of Interference Between Pathways in Quantum Control Systems**  
Erez Moshe Israeli Miller, 18, Senior, Michael Kasprzak, 17, Senior, Bergen County Academies, Hackensack, New Jersey,  
T: Ozgur Dogru

NEW MEXICO

Albuquerque, USAI50, National American Indian Science and Engineering Fair

EAEV033  **The Effect of Casein Polymers on the Filtration of Heavy Metals and Contaminants in Well Water**  
Desmen Andrew Boykin, 17, Junior, Governor’s School at Innovation Park, Manassas, Virginia,  
T: Alexis Patanarut

Albuquerque, USNM01, Central New Mexico Regional Science and Engineering Challenge

CBIO055  **CIRCA - CircularRNA for Cancer Active Immunotherapy: A Machine Learning Model To Predict Liver Cancer and Top Genes for Cancer Vaccine**  
Aditya Koushik, 15, Sophomore, La Cueva High School, Albuquerque, New Mexico,  
T: Lena Eddings

ENBM052  **Low-Cost Artificial Pancreas System With Integrated Machine Inference**  
Landon Flemming, 17, Junior, Explore Academy, Albuquerque, New Mexico,  
T: Matthew Steinkraus

MATH033  **Modifying the ABCs of Number Theory**  
Akilan Sankaran, 14, Freshman, Albuquerque Academy, Albuquerque, New Mexico,  
T: David Metzler

SOFT046  **Using Logistic Regression Markov Chain-Based Machine Learning Models To Predict Basketball Using NBA Data**  
Sherwin Thiagarajan, 18, Senior, Albuquerque School of Excellence, Albuquerque, New Mexico,  
T: Suzanne Zamora

Farmington, USNM02, San Juan New Mexico Regional Science and Engineering Fair

CBIO022  **Bioinformatics Applied to the Y-DNA Haplogroup Q-M242: Male Navajo Genetic Marker**  
Jordyn Begay, 16, Sophomore, Navajo Preparatory School, Farmington, New Mexico,  
T: Yolanda Flores

EGSD023  **Synthesizing Biomorphic Batteries Using Porous Plant Stems Using Zinc (Zn) and Copper (Cu) Electroplating Technique**  
Lia K. Wilford, 18, Senior, Navajo Preparatory School, Farmington, New Mexico,  
T: Yolanda Flores

Grants, USNM03, Four Corners Regional Science and Engineering Fair

ENEV042  **Biodigestion: Turning Nothing Into Something**  
Alexia Lynn Munson, 16, Sophomore, Grants High School, Grants, New Mexico,  
T: Cody Hayes

MCRO022  **What’s Lurking in Your Mask?**  
Chloe Starr Rychener, 17, Junior, Grants High School, Grants, New Mexico,  
T: Cody Hayes
Las Vegas, USNM05, Northeastern New Mexico Regional Science and Engineering Fair

BMED064 Construction of Oxygen Permeable Veins From Biogel
Katherine Shoulla, 16, Sophomore, Academy for Technology and the Classics, Santa Fe, New Mexico, T: David Kriegshauser

ROBO044 Soft Bio-Mimetic Caterpillar Robot
Dajun Yuan, 17, Junior, Armand Hammer United World College, Montezuma, New Mexico, T: Jason Booker

Peralta, USNM07, Southwest/New Mexico Regional Science Challenge
ENEV034 Clean Hydrogen Production From photocatalytic Degradation of Plastic Wastes
Haoyu Bradley Wang, 16, Junior, Centennial High School, Las Cruces, New Mexico, T: Lisa Weinbaum

ENEV043T Using Machine Learning To Dynamically Filter Nanopore DNA Sequencing Data
# Natalie Pahlavan, 16, Junior, Jericho High School, Jericho, New York, T: Serena McCalla

SOCORRO, USNM50, New Mexico Science and Engineering Fair

CHEM066 Effects of Different Combinations of Halogen Additions to Anti-B18H22 Molecule on Absorption and Emission Wavelength
Melody Yeh, 18, Senior, La Cueva High School, Albuquerque, New Mexico, T: Creighton Edington

EAEV085 Urban Ozone Forecasting and Policy Recommendations Through Photochemical Modeling and Machine Learning
# Eliana Kai Juarez, 17, Junior, V. Sue Cleveland High School, Rio Rancho, New Mexico, T: Leah Felty

EVED035T Using Machine Learning To Dynamically Filter Nanopore DNA Sequencing Data
Aaron Matthew Philip, 18, Senior, Leonid Syvatsky, 17, Junior, Los Alamos High School, Los Alamos, New Mexico, T: Michela Ombelli

PLNT052T Using the Kirby Bauer Method To Test the Effectiveness of Phenols Extract From Pecan Shells and Saponin Extract From Prickly Pear Cactus in Inhibiting the Growth of E. coli
Ivan Stanislavovich Belyaev, 17, Junior, Ngoc H. Pham, 17, Junior, New Mexico Military Institute, Roswell, New Mexico, T: Demvia Maslain

NEW YORK

Poughkeepsie, USNY01, Dutchess County Regional Science Fair
ENEV089 The Development of Recyclable Wind Turbine Blades Using Autodesk 3D Simulations
Paige Elizabeth DeMino, 15, Sophomore, Our Lady of Lourdes High School, Poughkeepsie, New York, T: John Herles

PLNT049 Molecular, Physiological, and Ecological Evaluation of Latvian Genetic Resources of Valuable Wild Legume Species Trifolium fragiferum in the Context of Sustainable Agriculture
Magnolia Andra Garbarino, 16, Junior, Pawling High School, Pawling, New York, T: Gillian Rinaldo

Halesite, USNY02, Long Island Science and Engineering Fair

ANIM029 Loss of NMDA Receptor Signaling Results in Excess Proliferation of CNS and Neural Crest-Derived Cells
Sarah Kathryn Schubel, 18, Senior, Smithtown High School East, St. James, New York, T: Maria Zeilitz

ANIM030 Exploring Sexual Dimorphism and Sex Hormone Receptor Expression in the Bed Nucleus of the Stria Terminalis (BNST) in the Monogamous Prairie Vole
Soyoun Moon, 18, Senior, Commack High School, Commack, New York, T: Jeanette Collette

BEHA019 Why We Vote: How Positive Descriptive Norms and Holding a Minority Political Viewpoint Increase Citizens’ Intention and Responsibility to Vote
Han Byur Youn, 17, Senior, Roslyn High School, Roslyn Heights, New York, T: Allyson Wesley

BEHA020 Music and Emotion: The Interventricular Fallacy of the Major-Minor Dichotomy
Jacob Aaron Leshnower, 16, Junior, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

BEHA024 American Dream or American Myth? A Linear Regression Analysis of American Attitudes as a Factor of Race and Ideology
Kyle Arjun Kavuly, 18, Senior, Plainedge High School, N Massapequa, New York, T: William Bertolotti

BMED031 Repurposed Cephalexin Causes Multifaceted Pro-Cancer Effects by Way of Wnt Signaling Pathway
Griffin Hon, 16, Sophomore, Syosset High School, Syosset, New York, T: Mary Hendrickson

CBIO027 Recurrent Repeat Contractions: Investigating a Novel Genomic Factor of Polymorphism in 10 Human Cancers
Kevin Zhu, 17, Junior, Jericho High School, Jericho, New York, T: Serena McCalla

CBIO029 RiboyBayes: Assessing the Transcriptome-Wide Expression of Ribosome Pause Sites in Ribosome Profiling Data With Bayesian Wavelet Thresholding
Amber Luo, 18, Senior, Ward Melville High School, East Setauket, New York, T: Marnie Kula

CELLO22 LncRNAs Influence on NK Cells: Potential Therapeutic Target for Neuroblastoma
Miah Christina Margiano, 17, Junior, Saint Anthony’s High School, Melville, New York, T: Paul Paino

CHEM031 Computational Assessment of Macrocyclic Host-Guest Ion-Dipole Interactions With Negative Pores
Alex Lin Wang, 17, Junior, Syosset High School, Syosset, New York, T: Mary Louise Hendrickson

EAEV034 Reconstruction Modeling Using Tectonics and Climate of Western North America
Rebecca Cho, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

EAEV035 Assessing the Efficacy of the U.S. Endangered Species Act Through the Novel Quantification of Species Charisma and Respective Population Trends
Tarunika Sasikumar, 17, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Raymond Tesar

EVED021 Project Vision: Virtual Environment Through Artificial Intelligence Recognition
James Nagler, 15, Sophomore, Garden City High School, Garden City, New York, T: Steven Gordon

ENBM028 Automatic Diagnosis of Cardiovascular Disease: 12-Lead Electrocardiogram and Elucidating Sex Differences via Deep Learning
# Natalie Pahlavan, 16, Junior, Jericho High School, Jericho, New York, T: Serena McCalla

ENEV032 Electrocoagulation With Aluminum, Copper, and Zinc for Aqueous Methylen Blue Remediation and Sustainable Energy Production
Ava Malya, 17, Junior, Samantha Palmadessa, 16, Junior, Manhasset High School, Manhasset, New York, T: Alison Huenger

ENEV035 RBS Dye Removal Using Activated Carbon Under UV Irradiation
Emily Kim, 16, Junior, Jericho High School, Jericho, New York, T: Serena McCalla
Finalist Directory

TMED060T  Breast Cancer Detection in Mammographic Images Using an Ensemble Deep Learning Model
Harshitha Jasti, 16, Sophomore, Eesha Amit Patel, 15, Sophomore, Ardrey Kell High School, Charlotte, North Carolina, T: Manjusha Pavuluri

NORTH DAKOTA
Mandan, USND01, Southwest Central North Dakota Regional Science and Engineering Fair
MCRO044  Antibiotic Resistance
Jada Rose Bonogofsky, 17, Junior, Flasher High School, Flasher, North Dakota, T: Tana Schafer
MCRO061  Antibiotics vs. Essential Oils
Allivia Geffre, 16, Sophomore, Flasher High School, Flasher, North Dakota, T: Tana Schafer

Hankinson, USND03, Southeast North Dakota Regional Science and Engineering Fair
ANIM072  Monitoring Honeybee Hive Health With Computer Vision
Reagan Elizabeth Chambers, 17, Senior, Woodhaven Academy, Fargo, North Dakota, T: Victoria Chambers
BEHA071  Social Confidence
Brayden Marie Sutherland, 14, Freshman, Lisbon High School, Lisbon, North Dakota, T: Tina Pierce
MCRO041  Antibacterial Effectiveness of Hand Soaps
Elise Michelle Elliot, 16, Sophomore, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha

Grand Forks, USND05, Northeast North Dakota Regional Science and Engineering Fair
BMED080  The Physical Effects of Sound; the Unconscious Impact of Sound Waves on Adolescent Heart Rates
Sudiksha Singhal, 17, Junior, Red River High School, Grand Forks, North Dakota, T: Lucas Moldenhauer

Grenora, USND06, Northwest North Dakota Regional Science Fair
ANIMO64  Effectiveness of Cattle Dewormers
Lindsey Susan Vachal, 18, Senior, Tioga High School, Tioga, North Dakota, T: Debra Moe
MCRO052  Animals vs. Human Bacteria
Abrianna Lou Volz, 15, Freshman, Tioga High School, Tioga, North Dakota, T: Debra Moe
ROBO078  A.I. T.A.
Gracie Nutt, 17, Junior, Tioga High School, Tioga, North Dakota, T: Sarah Skarphol

Langdon, USND50, North Dakota State Science and Engineering Fair
EAEV088  An Innovative Approach To Manage the Environmental Impact of Agricultural Drainage Water
Gavin Donald Kratcha, 16, Sophomore, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha
ENEV095  Bringing Contaminated Soils Back to Life, Remediating Brine Contaminated and Alkaline Soils Using Phytoremediation and Engineered Drainage Techniques
Benjamin Tate Ellingson, 18, Senior, Maddock High School, Maddock, North Dakota, T: Jonathan Ellingson
PLNT044  Soil Farms II: Optimizing Cropland Soil Conditions for Microbiological Supplementation
Emma Pearl Kratcha, 18, Senior, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha

Have a great ISEF project and need money for college?
Apply for the Davidson Fellows Scholarship!

Application deadline is February 15, 2023!

The Davidson Fellows program has awarded more than $9 million in college scholarships, could you be next?

DavidsonFellows.org
**Finalist Directory**

**MATH021**  
Nxxnx Rubik’s Cubes and God’s Number  
Daniel Salkinder, 17, Senior, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

**MCR0019**  
Characterizing the Secretion of the Francisella tularensis Protein FTL, 1123  
Lakshanna Raveendran, 17, Senior, Commack High School, Commack, New York, T: Jeanette Collette

**MED024**  
SmartClick: A Novel Automated Segmentation Tool for Medical Images With Interactive Optimization Capabilities Designed for Liver Cysts  
Collin Li, 18, Senior, William A. Shine Great Neck South High School, Great Neck, New York, T: Nicole Spinelli

**MED027**  
Development of a Polydiacetylene-Based Paper Biosensor for Naked-Eye Detection of COVID-19 in Saliva  
Christopher Prainito, 17, Senior, John F. Kennedy High School, Bellmore, New York, T: Barbi Frank

**New York City, USNY03, Terra New York City STEM Fair**

**ANIM075**  
Caste Plasticity in the H. saltator Ant - Social Context Influences Dominance and Reproduction Related Gene Expression  
Luke Jow, 17, Senior, Bronx High School of Science, Bronx, New York, T: Richard Lee

**BEHA055**  
Detecting, Dismantling, and Defeating Environmental Racism Through the Lens of Urban Flooding  
Skye Lam, 17, Senior, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

**BEHA066**  
A Pharmacological Approach for Studying Alcohol Use Disorder: Using Calcium Imaging on hiPSC-Derived Glutamatergic Neurons to Dissect the Glutamate Response in the Context of Chronic Ethanol Treatment  
Arthur Liang, 17, Senior, Stuyvesant High School, New York, New York, T: Isabel Ganeiro-Ros

**CBIO065**  
CBIO: An Automated and Variant-Aware Deep Learning Framework for Predicting CRISPR/Cas9 Genome Editing Outcomes  
Victoria Robin Li, 17, Senior, Hunter College High School, New York, New York, T: Brian Park

**CBIO070**  
Two Novel Single-cell Algorithms Elucidate the Therapeutic Potential of Clinically-relevant Small-molecule Inhibitors for Targeting Cancer Metastasis  
Akshay Shvidasan, 17, Senior, Columbia Grammar and Preparatory School, New York City, New York, T: Ilya Yashin

**CBIO077**  
Predicting Nucleolin Interactions in DNA Repair: An in silico Approach  
Laura Fan, 17, Senior, Sukaina Sarah Shivy, 17, Senior, Staten Island Technical High School, Staten Island, New York, T: John Davis

**EAEV072**  
The Implicaive Comparisons of 90th Percentile Lead and Copper Compliance Calculations on Historic NYC Public Water System Data  
Alvin Chen, 17, Junior, Stuyvesant High School, New York, New York, T: Jason Econome

**ENBM065**  
Adaptive Multi Sigmoid Contrast Enhancement  
Samuel Ishchakov, 17, Senior, The Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

**ETS070**  
Design and Control of a Three-DoF Ball Joint With Applications in Robotic COVID-19 Swabbing and Surgery  
Samuel Rossberg, 17, Senior, The Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

**MATH035**  
On Lucas Sequences of the First Kind With Finitely Many Primes  
Aaron Kim, 17, Sophomore, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

**PHYS069T**  
Learning From the Shadows: Exploring North Pole Impact Craters in Mercury’s Permanently Shadowed Regions  
Jasmine Palfm#, 17, Senior, Michelle Wu#, 17, Senior, Townsend Harris High School, Flushing, New York, T: Katherine Cooper

**PLNT045**  
Sollization of Sand Indicated by Photosynthetic Rate, Water Retention Rate, and Health of Plants  
Ava Zhang, 18, Senior, Brooklyn Technical High School, Brooklyn, New York, T: MacRae Maxfield

**ROBO079**  
Coding a Goniometer Robot To Replicate Human Eye Movements as Tool for Improved Disease Research  
Sree Kolla, 17, Junior, Staten Island Technical High School, Staten Island, New York, T: John Davis

**Mahopac, USNY05, Regeneron-Westchester Science and Engineering Fair**

**BEHA034**  
Assessing the Distribution of Excessive Noise Exposure and the Risk of Tinnitus Onset in Opera, Orchestra, and High School Musicians  
Orlando Ray Osgood, 18, Senior, Ossining High School, Ossining, New York, T: Angelo Piccirillo

**BEHA040**  
Quantifying Linguistic Polarization for Congressional Representatives Facing Primary Challenger: A Random Effects Logit Regression Approach  
Jack Aidan Kelly, 18, Senior, Harrison High School, Harrison, New York, T: Alliston Blunt

**BEHA041**  
Tell Me a Story: The Effects of Storytelling vs. Story-Reading on the Executive Functions of Fourth Graders  
Edith Elizabeth Bachmann, 18, Senior, Byram Hills High School, Armonk, New York, T: Caroline Matthew

**BEHA054**  
“Keep Your Eye on the Ball”: A Comparative Study of the Visual Tracking Accuracy of Baseball Batters and Non-Athletes During Knuckleball Tracking  
Jack Blackmar, 18, Senior, Byram Hills High School, Armonk, New York, T: Stephanie Greenwal

**BMD041**  
Pediatric BMSC Exosome Treatment Requires Interaction With Bone Tissue Defect Environment To Improve Bone Repair  
Katelyn Kelly Wasilenko, 18, Senior, Ossining High School, Ossining, New York, T: Angelo Piccirillo

**BMD050**  
Post-SARS-CoV-2 Symptoms and Conditions in Patients Aged 18 and Older  
Blake Daniel Rappaport, 16, Junior, Ardsley High School, Ardsley, New York, T: James Dowd

**BMD055**  
Assessing the Role of Constitutive JAK/STAT Signaling in Jak2V617F-p53 Post-MPN Leukemia Using a Novel Knock-in/Knock-out Mouse Model of Jak2V617F  
Benjamin Zachary Wang, 17, Senior, Horace Greeley High School, Chappaqua, New York, T: Lisa Papernik

**BMD056**  
Altered Homer1b/c Volumes and mGlur1/5-Homer1b/c Colocalization in Parkinson’s Disease-Linked LRRK2 G2019S Mice  
Emily Dodd, 18, Senior, Somers High School, Lincolndale, New York, T: William Maelia

**CELLO28**  
A Novel Investigation of the Effects of EphA4 on Axon Regeneration in the Spinal Cord  
Christina Rose Kelly, 17, Junior, Westlake High School, Thornwood, New York, T: Allison Blunt

**CELLO29**  
Investigating the Unexplored Genome: Evaluating the Role of the Long Non-Coding RNA (IncRNA) Morbid in the Development of Inflammatory Bowel Disease (IBD)  
Gabriella Francesca Colabello, 17, Senior, Byram Hills High School, Armonk, New York, T: Caroline Mattheu

**CELLO34**  
The Effect of N-methyl D-aspartate Receptor Shutdown on Neural Stem Cell Proliferation in Zebrafish Larvae  
Charlotte Rubin, 17, Senior, Hastings High School, Hastings-on-Hudson, New York, T: Melissa Shandoff
Finalist Directory

CHEM050 Identification of Chemical Contaminants in Spiked Beverages With the Use of Infrared Spectroscopy Through Development of Inexpensive and Inconspicuous Device To Identify Date-Rape Drugs
Mai Blaustein, 18, Senior, Harrison High School, Harrison, New York, T: Allison Blunt

EAEV059 The Effect of Hordeum vulgare I. Extract and Phragmites australis Extract on the Growth of Algae in a Freshwater Environment
Maxwel Wilcoln Lee, 18, Senior, Hackley School, Tarrytown, New York, T: Andrew Ying

EAEV064 Evaluating the Efficacy of Organic Management Methods on Japanese Stiltgrass (Microstegium vimineum)
Michael Eugene Clarke, 17, Junior, Westlake High School, Thornwood, New York, T: Lawrence McIntyre

ENEV059 Developing and Assessing Fucose-Based Water-Soluble Bioplastics
Olivia Reiff Pollock, 17, Senior, Pelham Memorial High School, Pelham, New York, T: Steven Beltecas

ETSD051 Autonomous UGV Inspection and Monitoring of Electrical Substations
Julia Meryl Meyerson, 17, Junior, Pelham Memorial High School, Pelham, New York, T: Steven Beltecas

PHYS050 Designing a Quantum Teleportation Circuit on Novel Qubits
Anisha Musti, 17, Junior, Edgemont High School, Scarsdale, New York, T: Talia Dardis

PLNT030 Elucidating Terrestrial Optical Refrigeration Through Transpiration in Rhizophora mangle and Chlorophyll A Fluorescence in Low-Polarity Mediums
Aaron Min Song, 17, Senior, Ossining High School, Ossining, New York, T: Angelo Piccirillo

TMED045 SMART-Screen: A Point-of-Care COVID-19 Active Replication Detection System
Tista Goswami, 17, Senior, Mamaroneck High School, Mamaroneck, New York, T: Guido Garbarino

TMED046 Diagnostic Accuracy of Deep Learning’s Computational Photography in the Morphology of Acute Myeloid Leukemia
Leah Sherbansky, 16, Junior, Pelham Memorial High School, Pelham, New York, T: Steven Beltecas

Syracuse, USNY06, Central New York Science and Engineering Fair
EGSD046T Sustainable Electricity From Dirt: Microbial Fuel Cell
Miguel Mathis, 16, Sophomore, Makayla Love McMullen, 15, Sophomore, Syracuse Academy of Science, Syracuse, New York, T: Amy Ay

ETSD058 Cubesat Propulsion With Magnets
Caoimhe Dudgeon, 15, Sophomore, Homer Senior High School, Homer, New York, T: Miles Dudgeon

PHYS057 Consumer-Grade Virtual Reality as a Tool and Methodology for Mars and Other Off-World 3D Immersive Experiential and Scientific Exploratory Research
Theresa Audry White, 14, Freshman, Fayetteville-Manlius High School, Manlius, New York, T: Christian Tate

Lake Placid, USNY07, Greater Capital Region Science and Engineering Fair, Inc.
ANIMO73 Efficacy of Copper Oxide Wire Particles and Albendazole Against Gastrointestinal Nematodes in Goats
Jack Olivier Mongan, 18, Senior, Burnt Hills-Ballston Lake High School, Burnt Hills, New York, T: Regina Reals

MATH030 From the Manhattan Project to Statistics of Zeros of L-Functions
Jahui Li, 17, Junior, Emma Willard School, Troy, New York, T: Alexandra Schmidt

MCRO035 Investigating the Effectiveness of the Eradication of Microcystis aeruginosa Using Sonication and Magnetic Filtration
Ashlyn Nicole Hutchinson, 18, Senior, Hudson Falls High School, Hudson Falls, New York, T: Thomas Vartuli
Utica, USNY08, Utica College Regional Science Fair

ENEV075 Microfibers, a Macropробlem: Optimizing Washing Machine Filters To Reduce Microfiber Emissions
Dennis Van Hoesele, 17, Junior, Rome Free Academy, Rome, New York, T: Melissa Downs

Syracuse, USNY09, Terra Rochester Finger Lakes Science & Engineering Fair

CHEM067 Polyethyleneimine Impregnated Adsorbents for a Community-Based Carbon Capture and Sequestration Approach
Nisbant Lahiri, 17, Junior, Corning-Painted Post High School, Corning, New York, T: Susanna Seip

ROBO087T Screen CXR: A Novel Deep Learning-Based Multi-Model Pipeline for Detection of Any Lung Tissue Disease Through Automatic Chest X-Ray Image Analysis
Rudranish Agnihotri, 17, Senior, Utkaish Mittal, 17, Senior, Ayush Biswal, 14, Freshman, Birla Vidya Niketan, New Delhi, Delhi, India, Coppell High School, Coppell, Texas, T: Naveen Rajput

Syracuse, USNY11, Western New York Regional Science and Engineering Fair

CELL037 ST6GAL1 May Play a Role in Preventing Death by Irradiation After Chemotherapy
Amelia Winslow Colder, 16, Junior, City Honors School, Buffalo, New York, T: Kelly Cal

MATH037 Factorizations in Evaluation Monoids of Laurent Semirings
Sophie Zhu, 15, Junior, Williamsville East High School, East Amherst, New York, T: Felix Gotti

Potsdam, USNY13, Terra North East Regional Science and Engineering Fair

BEHA061T What Do You See?
Emily Rose Pinheiro, 14, Freshman, Amelia Louise Kazlo, 14, Freshman, Moriah Central School, Port Henry, New York, T: Tiffany Pinheiro

Glen Cove, USNY50, New York State Science and Engineering Fair

ANIM045 Using Cnidarian Nerve Nets To Visualize the Excitotoxic Effects of BMAA
Tyler Daniel Nagosky, 17, Senior, Smithtown High School West, Smithtown, New York, T: Joanne Figueiredo

BCHM026 Investigating the Therapeutic Potential of Epigallocatechin Gallate and Theaflavin-3,3’- digallate on Inhibiting ACE2-Spike Protein Binding and Mitigating Induced-Cellular Death by SARS-CoV-2
Chloe Chang, 17, Senior, Herricks High School, New Hyde Park, New York, T: Caitlin Etri

BEHA046 A Novel Evaluation of Current Psychiatric Treatment Paradigms Involving Polypharmacy via Resting-State Functional Magnetic Resonance Imaging (fMRI) in a Sample of Patients With Bipolar I Disorder
Dara Lisa Neumann, 18, Senior, Jericho High School, Jericho, New York, T: Mason Brandt Sufnarski

BEHA047 Neurocognitive Tasks: Novel Markers To Predict and Prevent Adolescent Suicidal Behavior
Natasha Kuliviat, 15, Sophomore, Jericho High School, Jericho, New York, T: Serena McCalla

BMED059 Implementation of Land Cover Data in a Neural Network To Forecast West Nile Virus Around the Gulf Coast
Noah Nager, 17, Junior, Hackley School, Tarrytown, New York, T: Andrew Ying

BMED084 Natural Is Not Neutral: Dangers of Natural Compounds Found in Produce and Dietary Supplements and Therapeutic Mechanisms of Flavone Luteolin on Neuroblastoma and Lymphoma
Jessie Dong, 17, Junior, Roslyn High School, Roslyn Heights, New York, T: Allyson Welsey

CBO0056 Improved Visualization of Dimensionality Reduction Plots With Controlled Downsampling
Ashley Jashing Hsu, 17, Senior, Commack High School, Commack, New York, T: Andrea Beatty

Anika Puri, 17, Senior, Horace Greeley High School, Chappaqua, New York, T: Lisa Papernik

EAEV067 Biologically Inspired Material Design for Selective Removal of Estradiol Water Contaminants
Kayla J. Sohn, 17, Senior, Herricks High School, New Hyde Park, New York, T: Caitlin Etri

EGSD040T Simultaneous Azo Dye Removal and Bioelectricity Generation by an Up-Flow Constructed Wetland-Microbial Fuel Cell With Biochar Substrate

PHYS058 A Specialized Searching Algorithm Towards the Improvement in Detection of Single-Transit and Long-Period Exoplanets in Brightness Time-Series Data
Joseph Bronislaw Nadol IV, 18, Senior, Hackley School, Tarrytown, New York, T: Andrew Ying

PLNT041 Developing a Model in situ Resource Utilization System for Oxygen Sustaining Life Support and Launch Cost Reduction for Mars
Ariella Maia Blackman, 17, Junior, Harrison High School, Harrison, New York, T: Allison Blunt

ROBO062 How To Train Your Multi-View Cloth Classifier
Chigozirim Ncubechukwu Ifeji, 16, Junior, Elmont Memorial Junior-Senior High School, Elmont, New York, T: Kathryn Farley

SOF048 An Active Fairness Algorithm for Estimating Socioeconomic Status From Household Surveys and Satellite Images
Ritika Candagi Brahamedasam, 18, Senior, Ossining High School, Ossining, New York, T: Valerie Holmes

TMED048 Cancer-Specific NF-kB Inhibition via Novel Small Molecule IT-848: Investigating IT-848 Monotherapy and Combination Therapy for Hematological Malignancy Treatment
Janice Kirti Rateshwar, 18, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

NORTH CAROLINA

Charlotte, USNC01, Charlotte-Mecklenburg Regional Science Fair

ANIM021 The Effect of Rider Ability and Movement on the Stress/Discomfort Indicating Behavior
Hannah Jordan Mullis, 18, Senior, East Gaston High School, Mt. Holly, North Carolina, T: Ryan Johnson

EAEV021T Sustainable Subsistence: A Low-Cost Method of Greywater Recycling for Hydroponic Agriculture
Mason Brandt Sufnarski, 18, Senior, Josephine Anne Barber, 16, Junior, Marvin Ridge High School, Waxhaw, North Carolina, Mercer Island High School, Mercer Island, Washington, T: Raji Suresh T: Susie Brown

Chapel Hill, USNC02, North Carolina Central Region III Science Fair

TMED014 EyeGen: A Low-Cost Biomarker for the Ophthalmological Assessment of Ophthalmic Diseases Using Deep Learning Models
Abhinav Gurram, 16, Sophomore, Green Hope High School, Cary, North Carolina, T: Bala Gurram
Finalist Directory

Durham, USNC03, North Carolina Science Fair Region 3B

EAEV007  Developing a Machine Model to Predict Wildfire Risk and Identify Key Wildfire Drivers in California
#  Angela Chen, 16, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Robert Gotwals

ROBO011  Q-NEST: Quantum Neuroevolutionary Strategies for Parametrically Optimizing and Topologically Augmenting Artificial Neural Networks via Novel Mutation, Translocation, and Crossover Hybrid Quantum-Classical Genetic Operators
#  Paarth Tara, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Robert Gotwals

Raleigh, USNC50, North Carolina State Science Fair

ANIM052  Collective Behavior and Coastal Health: How Individual Personality Influences Population Mortality in a Marsh Ecosystem Predator-Prey Interaction
#  Regan Catherine Williams, 17, Junior, John T Hoggard High School, Wilmington, North Carolina, T: Hunter Moody

ANIM063  The Epigenetic Effects of Climate Change on Aiptasia
Shelby Anne-Marie Wray, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Kimberly Monahan

BCHM035  Computational and Experimental Design of a Novel Acetylcholinesterase Inhibitor: Silanediols for Alzheimer’s Disease Treatment
Archita Khaire, 16, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Tom Schmedake

CELL035  Neurotoxicity of GenX, a Perfluoroalkyl Substance Found in Drinking Water
Yunjia Quan, 15, Sophomore, Charlotte Country Day School, Charlotte, North Carolina, T: Lowell Combs

EAEV065  Modeling Sea Level Rise Driven Coastal Forest Loss and the Aboveground Carbon Impacts With Remote Sensing and Machine Learning
Felicia Yen, 17, Junior, William G. Enloe High School, Raleigh, North Carolina, T: Chad Ogren

ENBM051  Development of a Bioactive, Biodegradable, and Variable-Density 3D Printer Filament for Patient-Specific Bone Reconstructive Implants
Jacob Andrew Rose, 18, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Michael Bruno

ENBM066  A Precise, Portable, Non-Invasive Melanoma Detection Device Using Image-Based Deep Learning Approach
Shubhan Bhattacharya, 15, Freshman, William G. Enloe High School, Raleigh, North Carolina, T: Lori Kubik

ENEV088T  Further Studies on the Application of Novel Rapidly Degrading Bioplastics Derived From Upcycled Waste Products To Replace Polystyrene and Polypropylene in Single-Use Hard Plastics Like Cutlery
Kaitlyn Lee Zuravel#, 18, Senior, Lauren Gail Zuravel#, 16, Sophomore, Terry Sanford High School, Fayetteville, North Carolina, T: Deborah Vajner

PHYS052  Simulating Quantum Key Distribution in Three Polarization Bases
Katherine Mary Panebianco, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Jonathan Bennett

SOFT051  Sustainability Scanner: Empowering Consumers To Make Eco-Friendly Grocery Purchases
Jay Omkar Nimballar, 17, Junior, Green Hope High School, Cary, North Carolina, T: Daniel Nolan

TMED056  AutoFlow: A Novel Method for Assessing Minimal Residual Disease in Breast Cancer Patients by Identifying Bone Marrow Disseminated Tumor Cells Using Flow Cytometry Data
Dheepthi Mohanraj, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Robert Gotwals

Visionary Leader
Priya Donti ’15, a joint computer science and mathematics alum, is among those “looking to the future of quantum computing, energy policy, robotics and more.” MIT Technology Review named her to its list of Innovators Under 35. Donti is a PhD student at Carnegie Mellon University working at the intersection of machine learning, electric power systems and climate change mitigation, with a focus on the world’s most vulnerable citizens.

First in Fellowships
For 2021, Harvey Mudd ranked first among all U.S. colleges and universities for the number of NSF Graduate Research Fellowships awarded on a per-student basis.

Discover more hmc.edu/explore
OHIO

Athens, USOH01, Southeastern Ohio Regional Science and Engineering Fair

MATS038 Growing Sustainable Packaging Material With Mycelium and Agricultural Waste
Luca Gagliano, 16, Junior, Athens High School, The Plains, Ohio, T: Natalie Kruse

Cleveland Heights, USOH02, Northeastern Ohio Science and Engineering Fair

ANIM037 Sensory Input Underlying Natural Behaviors in Sepsis punctum (Diptera: Sepsidae)
Sasha Turner, 17, Junior, Hawken School, Gates Mills, Ohio, T: Lacy Chick

CHEM037 Electrolysis of 3D Polyactic Acid (PLA) for Custom Fabrication of Sustainable Electromagnets
Ryan McGinnis, 18, Senior, West Geauga High School, Chesterland, Ohio, T: Stephanie Meyer

ENEV046 The Effects of Pyrolysis on Upcycling Polyvinyl Chloride (PVC) Present in Gloves Through Reattaining Hydrochloric Acid (HCl) for Higher-Value Applications
Grace Chen, 16, Junior, Mentor High School, Mentor, Ohio, T: Lori Cohen

ETSD037 Designing and Testing a Prototype Automatic Electronic Control System for Active Magnetic Levitation of a Ferromagnet Towards Magnetically Deflected Ballistic Mass Technology
Carlton Gould Cort, 17, Senior, University School, Chagrin Falls, Ohio, T: Paul Moody

PHYS043 The Search for Dark Matter Through Soft Unclustered Energy Patterns at CMS
Michelle Seoyo Kwon, 18, Senior, Solon High School, Solon, Ohio, T: Christoph Paus

Shaker Heights, USOH05, Hathaway Brown Upper School Fair

BMED022 CI9orf12 Ablation-Caused Iron Accumulation, Mitochondrial Dysfunction, and Susceptibility to Ferroptosis
Julia Zhu, 15, Sophomore, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

CBIO010 Epidemiology of Pineblastoma in the United States, 2000–2017
Kaitlyn Mary Elizabeth Greppin, 18, Senior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

ENBM026 Procoagulant Synthetic Platelets To Restore Hemostatic Clot Quality in Platelet Dysfunction Settings
Neha Sangani, 15, Sophomore, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

ROBO025 Creating an Autonomous Path Navigator To Generate Interest in Machine Learning Among Children
Avery Rose Simon, 18, Senior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

Bryan, USOH06, Northwest Ohio Science and Engineering Fair

BMED16 Comparison of Skin Moisturizers and Antibiotic Ointments in the Ability To Inhibit Bacteria
Kelly Danielle Wyse, 17, Junior, Pettisville High School, Pettisville, Ohio, T: Donna Miller

EAEV019 The Effect of Artificial Light at Night on Anabaena and Microcystis Growth
Carys Kaylene Hagans, 18, Senior, Archbold High School, Archbold, Ohio, T: Laura Bickel

Marion, USOH07, Marion Area Science and Engineering Fair

EAEV060 Interactions of Various Algae Species and Phosphate
William Allen, 15, Freshman, Buckeye Valley High School, Delaware, Ohio, T: Matt Sforza

Dublin, USOH50, Buckeye Science and Engineering Fair

CELL038 BO34-200 Engagement With Integrin CD11b for Modulating Tumor-Associated Myeloid Cells in Pancreatic Cancer
Kaitlyn Ernst, 16, Sophomore, Laurel School, Shaker Heights, Ohio, T: Kimberly Corrigan

EBED041 A Novel Optical Approach: Developing a Generic Nanophotonic Processor (GNP) for Classical and Quantum Computing Applications
Mihai Crisan, 18, Senior, Upper Arlington High School, Upper Arlington, Ohio, T: Gwyneth Pinta

ENEV090 Removal of Arsenic(III) and Chromium(VI) From Contaminated Water Using Novel Chitosan Coated Polyamide Adsorbent With Ethylenediaminetetraacetic Acid, EDTA, Regeneration
Johann DeMessie, 17, Junior, William Mason High School, Mason, Ohio, T: Karen Young

MATS053 Deployment of Thermoplastic and Thermosetting Technologies To Improve the Durability of Solar Sails
Destynn Ayrom Keuchel, 18, Senior, Hawken School, Gates Mills, Ohio, T: Lacy Chick

MCRO053 Function of Neurons AVA, BAG, and RIM in Response to an Aversive Stimulus in Caenorhabditis elegans
Maya Leela Sarkonda, 18, Senior, Sylvania Northview High School, Sylvania, Ohio, T: Kathryn Nelson

ROBO080 Ceres: A Novel Device Utilizing Raspberry Pi and Neural Networks To Detect Crop Diseases Using Imaging
Laasya Acharya, 14, Freshman, William Mason High School, Mason, Ohio, T: Karen Young

OKLAHOMA

Alva, USOK01, Northwestern Oklahoma State University Regional Science Fair

ETSD046 Faster Than the Wind
Elizabeth Grace Wallace, 17, Senior, Northwest Technology Center, Fairview, Oklahoma, T: Shawn Cusack

ETSD053 Bouncing Off the Walls (Testing Safety of Walls Around Welders)
Lexie Grace Zuniga, 17, Junior, Northwest Technology Center, Fairview, Oklahoma, T: Shawn Cusack

Bartlesville, USOK02, Bartlesville District Science Fair

EAEV020 Orange Is the New Green; From Waste to Water Absorbent BioPolymer: How Can Orange Peels Help Plants Resist Drought?
Mehdi Molsen Achour, 15, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman

EAEV017 Greener Concrete and Cleaner Oceans
Rachel Cochrane, 15, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman

MATH014 Emergency Savings Fund vs. Emergency Relief Fund: An Economic Model
Joyce Yixin Yang, 17, Junior, Bartlesville High School, Bartlesville, Oklahoma, T: Tanya Knollmeyer

Muskogee, USOK05, Muskogee Regional Science and Engineering Fair

EAEV053 Fluid Filtration
Jorge M. Romero, 16, Junior, Muskogee High School, Muskogee, Oklahoma, T: Tami Riossett

Tulsa, USOK10, Tulsa Regional Science Fair

BEHA008 Personality and Learning in the Classroom: How Personality Traits and Learning Styles Relate to High School GPA
Victoria Soranno, 17, Senior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Chaunna Steen

BMED007 Determining the Effects of Insulin on Serotonin Levels With and Without Vitamin D3 Using Drosophila melanogaster as a Model Organism
Labrini Panagopoulos, 17, Senior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Chaunna Steen
Stillwater, USOK50, Oklahoma State Science and Engineering Fair

**EAEV061**  Big Data Analysis of Climate Change: Extreme Temperature, Rainfall, Snowfall
Jason Chung-Yee Wang, 17, Junior, Oklahoma School of Science and Mathematics, Oklahoma City, Oklahoma, T: Mark Wang

**ETSD057**  A Novel Way To Clean Solar Panels Using a Self-Powered Arduino Controlling a Servo
George Panagopoulos, 15, Sophomore, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Chaunna Steen

**MCRO036**  Analysis of Antibiotic and Disinfectant Resistance in E. coli Implicated UTIs
Laci Goldner, 17, Junior, Grove High School, Grove, Oklahoma, T: Donna Deason

OREGON

Gresham, USOR01, Gresham-Barlow Science Expo

**EAEV040**  A Novel Approach for Coral Rehabilitation: Growth Enhancement With Electrochemical Deposition of CaCO$_3$
Dev Rishi Udarta, 18, Senior, Jesuit High School, Portland, Oregon, T: Lara Shamieh

**PLNT028**  Seed Dispersal of Achy wholea mollis
Rachel Catherine Warner, 17, Junior, Oregon City High School, Oregon City, Oregon, T: Elizabeth Scott

**TMED032**  Oncorx: An Integrative Approach to Identification of Pan-Cancer Molecular Biomarkers and Prediction of Targeted Multi-Drug Cancer Therapeutics
Darsh S. Mandera, 17, Junior, Jesuit High School, Portland, Oregon, T: Lara Shamieh

Beaverton, USOR04, Beaverton-Hillsboro Science Expo

**BEHA072**  Mental Health Risk Detection With Artificial Intelligence
Irene Lim, 16, Junior, Alexander Yisiang Lim, 16, Junior, International School of Beaverton, Beaverton, Oregon, T: Jaimie Yee

**CBIO051T**  A Novel Computational Pipeline To Identify Target Genes That Define Cancer Subtypes To Improve Cancer Detection and Therapy
Vatsal H. Parikh, 17, Junior, Eknath Mittal, 16, Sophomore, Sunset High School, Portland, Oregon, Westview High School, Portland, Oregon, T: Korrin Riske

**PHYS039**  Skew-Axis Cylinder Lens Optical System: Physical Properties, Application for Novel Method of Clinical Optometry of Astigmatism, and Engineering Implementation
Alexander Plekhanov, 16, Sophomore, Beaverton Academy of Science and Engineering, Hillsboro, Oregon, T: Melissa Shell

**ROBO058**  Using Subpixel Interpolation and Deep Learning Convolution Models To Compress Domain-Specific Audio Waveforms
Nikhil Nayak, 15, Sophomore, Sunset High School, Portland, Oregon, T: Korrin Riske

Portland, USOR05, Aardvark Science Exposition

**BCHM010**  Reversible Inhibition of Retinoic Acid Synthesizing Enzyme ALDH1A2 With WIN18,446 Derivatives in Male Contraception
Mingya Wang, 19, Senior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

**EAEV012**  The Effect of Climate Change on Carbon Sequestration in Pinus ponderosa
Cameron Mae Gabrielson, 16, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Peter Kimball

**EGSD008**  Prototyping an Algae-Based Martian in situ Oxygen Generation System
Kara Gaiser, 18, Senior, Oregon Episcopal School, Portland, Oregon, T: Robert Orr

**ETSD002**  Polaris II: Gamma Ray Visualization System and Risk Mitigation Through Real-Time Radionuclide Atmospheric Dispersion Modeling
Naphat Siripun, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

**ROBO022**  Real-Time American Sign Language (ASL) Detection and Translation Using Kinect Sensor
Claire Jaroonjetsuemong, 16, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

---

**STEM at HPU**

**Undergraduate Programs**
- Biochemistry
- Biology
- Biomedical Engineering
- Chemistry
- Computer Science
- Electrical Engineering
- Environmental Science
- Environmental Studies
- Health Professionals
- Marine Biology
- Mathematics
- Oceanography

**Graduate Programs**
- MS Business Analytics & Information Security
- MS Marine Science
Wilsonville, USOR06, CREST-Jane Goodall Science Symposium

EAEV026T What Are the Effects of Cyanobacteria Blooms on the Taxa Diatoma?  
Melinda Lin, 16, Junior, Uma Aditi Grover, 16, Junior, West Linn High School, West Linn, Oregon, T: Julie McDevitt

EBED017 Invisible Blues (Novel Device for Detection and Measurement of Nitrogen Traces in a Sample)  
# Aditi Shaskar, 17, Junior, Wilsonville High School, Wilsonville, Oregon, T: CJ Koll

MCR0013 Inhibiting Streptococcus mutans With Antibacterial and Antioxidant Hibiscus Polyphenolic Compounds  
Isabella Scalise, 18, Senior, Wilsonville High School, Wilsonville, Oregon, T: Brian Ramm

ROBO033 Autonomous Rapid Disaster Damage Assessment Using Machine Learning Techniques  
Anish Goswami, 17, Junior, West Linn High School, West Linn, Oregon, T: Julie McDevit

Salem, USOR07, Central Western Oregon Science Expo

ENEV010T Comparison of Ambient Air Pollutants in Varying Income Tracts Using a Constructed, Portable Device That Precisely Measures Ambient Air Concentrations (PAQMS)  
Mary Parmigiani, 15, Sophomore, Joe Parmigiani, 15, Sophomore, Pablo Ellis Garcia, 15, Sophomore, Corvallis High School, Corvallis, Oregon, T: Britt Holmen

PHYS019 Simulating Off-Axis Short Gamma-Ray Burst Afterglows To Inform Electromagnetic Follow-Up To Future Gravitational Wave Events  
Leon Garcia, 17, Junior, Corvallis High School, Corvallis, Oregon, T: Jillian Rastinejad

Bend, USOR08, Central Oregon Community College Regional Science Expo

EGSD026 Investigating the Impacts of Dye Color on Energy Production of Luminescent Solar Concentrators  
Teaghan Rose Knox, 18, Senior, Summit High School, Bend, Oregon, T: David Bermudez

TMED020 Using Machine Learning To Detect and Prevent Early Stages of Skin Cancer in Underrepresented Communities  
Emma Nordstrom, 16, Sophomore, Trinity Lutheran High School Bend Oregon, Bend, Oregon, T: Thomas Stueve

Banks, USOR50, Northwest Science Expo

EAEV084 Boundary Detection of Debris-Covered Glaciers Using Fractal Analysis and Normalized Differentiating of Thermal and Infrared Bands in Remote-Sensed Landsat Datasets  
Mithra Karamchedu, 18, Senior, Jesuit High School, Portland, Oregon, T: Lara Shamieh

ENBM074 Synthetic DNA Engineering With ICOR: Improving Codon Optimization With Recurrent Neural Networks Towards Efficient, Low-Cost, High-Efficacy Recombinant Vaccine and Pharmaceutical Manufacturing  
Rishab Kumar Jain, 17, Junior, Westview High School, Portland, Oregon, T: Taylor Lee-Rouille

ENBM075 Dynamic Extraocular Filtering: A Novel Method for Active Correction of Color Vision Deficiency, Validated With Steady-State Visual Evoked Potentials  
Vladimir Mamchik, 16, Junior, Jesuit High School, Portland, Oregon, T: Alexander Mamchik

ENBM076 MustENG: A Wearable Triboelectric Nanogenerator for Personalized Muscle Spasticity Data for Improved Rehabilitation and Monitoring of Children With Cerebral Palsy  
# Ishan Ahiuvalia, 16, Sophomore, Jesuit High School, Portland, Oregon, T: Lara Shamieh

MATH039 Products of Reflections in Smooth Bruhat Intervals  
Ram Krishna Goel, 17, Junior, Krishna Homeschool, Portland, Oregon, T: Gunjan Tiwari

TMED063 EZ Rhythm: ECG Diagnosis Framework Using Novel Patient-Specific Morphology Comparison To Screen Disadvantaged Populations  
# Ronald Lin, 16, Junior, International School of Beaverton, Beaverton, Oregon, T: Jamie Yee

PENNYSYLVANIA

Yardley, USPA03, Mercer Science and Engineering Fair

CBIO050 RARE: Machine Learning Approach for Binning Rare Variant Features to Detect Association With Disease  
Satvik Dasari, 16, Junior, The Lawrenceville School, Lawrenceville, New Jersey, T: Ryan Urbanowicz

ETSD078 Innovative Climate Change Emissions Reduction: Flettner Vortex Scrubber With Active Seakeeping  
Charlotte Lenore Michaluk, 15, Sophomore, Hopewell Valley Central High School, Pennington, New Jersey, T: Stefanie Rebeccia

Bradford, USNY12, Twin Tiers Regional Science Fair

MCR0042 The Inhibitory Effects of Essential Oils on Staphylococcus epidermidis Biofilms on Stainless Steel and Glass  
Catherine Przybyla, 18, Senior, Archbishop Walsh Academy, Olean, New York, T: Louis Housler

Duncannon, USPA01, Capital Area Science and Engineering Fair

ANIM038 Spot the Predator  
# Ian Lentz, 15, Freshman, Camp Hill High School, Camp Hill, Pennsylvania, T: Amy Diehl

PLNT050 Effectiveness of Plant Growth in Vertical Aeroponics vs. Horizontal Raft Aquaponics  
Sadie Grace Zehner, 17, Senior, Berwick Area High School, Berwick, Pennsylvania, T: Matthew Shrader

Lancaster, USPA02, North Museum Science and Engineering Fair

ENEV069 Amphibious Vehicle for Collecting Water Samples  
Curtis Cheng, 18, Junior, Lancaster Country Day School, Lancaster, Pennsylvania, T: James Ringlein

MCRO054 Thrautochytrids: The Understudied Coral Symbionts  
George Wafrel, 18, Senior, Lancaster Country Day School, Lancaster, Pennsylvania, T: Juliette Winterer

Exton, USPA03, Delaware Valley Science Fairs

ANIM065 Breakthroughs in Honey Bee Health: Continuous-Release Mist Diffusion of Thymol-Based Essential Oils in Varroa Control, Part II: The Field Study  
# Kastlyn Nicole Culbert, 18, Sophomore, Toms River High School North, Toms River, New Jersey, T: Christie Girtain

ANIM067 Early Gonadectomy as a Factor that Predisposes Canines to Cranial Cruciate Ligament Injury: An Evaluation With Reference to the Tibial Plateau and Femoral Anteversion Angles  
Raina A. Bandekar, 17, Junior, Germantown Academy, Fort Washington, Pennsylvania, T: Sarah Kesten

ANIM068 Enhancing Human Embryonic Kidney Cell Regeneration Through Transducing Exogenous Ambystoma Mexicanum Pax-7 DNA  
Matthew Edward Brownrigg, 18, Senior, Central Bucks High School East, Doylestown, Pennsylvania, T: Mark Hayden

BCHM038 Biochemical Interactions of siRNA-Based Gene Silencing To Augment Elastogenesis in Abdominal Aortic Aneurysms  
Rayna Malhotra, 15, Sophomore, Moravian Academy, Bethlehem, Pennsylvania, T: Peter Kish
BCHM039  Novel Plant-Derived Scaffolds Influence Cellular Mechanotransduction and Differentiation
# Maya Sonal Butani, 17, Senior, Moorestown High School, Moorestown, New Jersey, T: Sean Watson

EBED038  Designing a Low-Cost Wayfinder for the Visually Impaired Using Bluetooth Angle-of-Arrival Feature
Brandon Cai, 14, Freshman, Parkland High School, Allentown, Pennsylvania, T: Kautil Heintzelman

ENBM072  A Novel Robust and Low-Cost Anthropomorphic Myoprosthesis: Utilizing an Articulated Soft Robotic System and Convolution Kernel Compensation-Based Non-Invasive EMG Decoding for Bionic Restoration of Upper Limb Function to Amputees
Okezue Alexander Bell, 16, Junior, Moravian Academy, Bethlehem, Pennsylvania, T: Peter Kish

ENBM078  Non-Invasive Method To Efficiently Detect Bronchial Carcinoma, Chronic Obstructive Pulmonary Disease, and Emphysema Without Deleterious Effects on the Chest’s Cavity
Grace S. Yacobe, 15, Freshman, Academy of Notre Dame de Namur, Villanova, Pennsylvania, T: Jessica Reid

MATH038  Determining the Pebbling Number for Endpoint Root Vertices of Generalized Theta Graphs
Kevin Matthew Liu, 16, Junior, High Technology High School, Lincroft, New Jersey, T: Dina Ellsworth

MCRO055  Abundance of Multidrug Resistant Genes (MDRs) in Suburban Residential Community Soil
Anand Shah, 14, Freshman, Unionville High School, Kennett Square, Pennsylvania, T: Sandra Litvin

MCRO056  Monitoring the Cellular Immune Profiles of COVID-Vaccinated Donors Using in silico-Designed Immunogenic Epitopes From SARS-CoV-2 Proteins
Rayan Rai Jawa, 16, Senior, Holmdel High School, Holmdel, New Jersey, T: Kevin Chang

MCRO058  Modeling Quorum Sensing Cycles in Pseudomonas aeruginosa Using Longitudinal Approaches by Measuring Gene Expression
Maryam Abdel-Azim, 15, Sophomore, Central Bucks High School East, Doylestown, Pennsylvania, T: Judith Elinow

Pittsburgh, USPA04, Pittsburgh Regional Science & Engineering Fair

CELL031  A Novel Autophagy-Related Gene Regulates Autophagy Through Endolysosomal Pathway
Michael Ziqi Gao, 17, Junior, North Hills High School, Pittsburgh, Pennsylvania, T: Nicholas Hand

CHEM045  Techno-Economic Assessment of a Cost and Quality-Based Algal Biodiesel Production Process
Steven D. Liu, 18, Senior, Shady Side Academy, Pittsburgh, Pennsylvania, T: Heather Fan

SOFT032  Using Kleisli Morphisms for Malware Detection With Graph Convolution Networks
Landon Penn Colaresi, 16, Junior, Pittsburgh Allderdice High School, Pittsburgh, Pennsylvania, T: Janet Waldeck

SOFT039  Using Machine Learning To Augment Dynamic Time Warping-Based Signal Classification
Arvind Seshan, 17, Junior, Fox Chapel Area High School, Pittsburgh, Pennsylvania, T: Justin Patterson

Reading, USPA05, Reading and Berks Science and Engineering Fair

CHEM057  Pulverizing PFOA: Analyzing Molecular Dynamics Simulations Between Perfluorooctanoic Acid and a Fluoroacetate Dehalogenase Enzyme
Srirgouni Oruganty, 18, Senior, Muhlenberg High School, Reading, Pennsylvania, T: Kayla Gordon

Why Wait?
Elevate Your College Future Now

Want college and real-world experiences before your first year of college? Illinois Tech’s Elevate College Prep program has you covered.

Take part in much more than pre-college courses at Illinois Tech. You’ll broaden your knowledge and skills through an array of academic offerings, hands-on experiences, and personalized mentorship—giving you an advanced look at the same range of guaranteed opportunities in our one-of-a-kind Elevate program, which empower current Illinois Tech undergraduates to stand out. Our summer college programs highlight cool topics taught at Chicago’s only tech university.

Learn more about our Elevate College Prep programs today!
go.iit.edu/isef-summer22
**Finalist Directory**

**REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR 2022**

**MCRO039**
**Inhibition of Staphylococcus epidermidis Utilizing Borate-Based and Silica-Based Bioactive Glass**
Lindsay Preston, 16, Junior, Conrad Weiser High School, Robesonia, Pennsylvania, T: John Siefert

**York, USPA06, York County Science and Engineering Fair**
**CELL020**
**The Effect of Covalent Cross Links on the Secondary Structure of the Tetracycline Aptamer**
Anand Dipak Patel, 18, Senior, Dallastown Area High School, Dallastown, Pennsylvania, T: Michael Tapp

**RHODE ISLAND**
Warwick, USRISO, Rhode Island Science and Engineering Fair
**BMED043T**
**Evaluating the Migration of Glioblastoma Stem Cells in vitro Towards a Chemoattractant Gradient**
Helen Lucille Copple, 17, Junior, Shaswat Singh, 17, Junior, Barrington High School, Barrington, Rhode Island, T: Diana Siliez-Shields

**SOUTH CAROLINA**
North Augusta, USSC01, Central Savannah River Area Science and Engineering Fair
**BMED032**
**Multiple Sclerosis and the Retina: A Study on Neurodegeneration**
Nidhi Shenoy, 17, Junior, Lakeside High School, Evans, Georgia, T: Charlotte Smith
Bluffton, USSC02, Sea Island Regional Science Fair
**BEHA044**
**The Serial Position Effect and Recency Effect**
Meagan Elizabeth Berger, 17, Junior, Hilton Head Island High School, Hilton Head Island, South Carolina, T: Alexandra Mazur

**SOUTH DAKOTA**
North Dakota, USSD01, Northern South Dakota Science and Math Fair
**ANIM053**
**The Effects of Pulsed Electro-Magnetic Fields on Bovine Semen Collection Rates**
William Vincent Hummel**, 18, Senior, Aditya Tummala**, 17, Senior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

**TENNESSEE**
**CHEM052T**
**Carbon Capturing**
Love Karan Patel, 17, Junior, Mason Nash Headrick, 17, Junior, McMinney County High School, Athens, Tennessee, T: Brandi Bridwell

**REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR 2022**

**MCRO046**
**Designing a Litter Box That Neutralizes Toxoplasma gondii: A Parasite That Causes Toxoplasmosis in Humans**
Doonya Wali Khan, 16, Junior, Center for Advanced Technical Studies, Chapin, South Carolina, T: Julie Krusen

**ROBO068**
**Automatic Detection of Stroke-Induced Aphasia**
Satvik Nelakuditi, 15, Sophomore, Spring Valley High School, Columbia, South Carolina, T: Michelle Wyatt

**Spartanburg, USSC07, Piedmont South Carolina Region III Science Fair**
**PHYS072T**
**Faster Than Light: Voltage and Resistance Phenomena on a 1 km Loop**
Logan Sean Kuscher**, 17, Senior, Cam Srivastava**, 17, Junior, Spartanburg Day School, Spartanburg, South Carolina, T: Jason Lonon

**SOUTH DAKOTA**
Aberdeen, USSD02, Eastern South Dakota Science and Engineering Fair
**BEHA049T**
**The Disproportionate Effect of the Labor Force Exodus on Rural Communities**
William Vincent Hummel**, 18, Senior, Aditya Tummala**, 17, Senior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

**ETSD052T**
**Car Seat Safety**
Grayson Joseph Girard, 15, Freshman, Bentlee Ann Kollbaum, 15, Freshman, Elk Point Jefferson High School, Elk Point, South Dakota, T: Melanie Norris

**PLNT047**
**Impact of Fish Fertilizer on Plant Growth**
Julie Madison Sundheim, 18, Senior, Elk Point Jefferson High School, Elk Point, South Dakota, T: Paul Kuhlman

**Rapid City, USSD01, Northern South Dakota Science and Math Fair**
**ROBO068**
**Automatic Detection of Stroke-Induced Aphasia**
Satvik Nelakuditi, 15, Sophomore, Spring Valley High School, Columbia, South Carolina, T: Michelle Wyatt

**SOUTH DAKOTA**
Aberdeen, USSD02, Eastern South Dakota Science and Engineering Fair
**BEHA049T**
**The Disproportionate Effect of the Labor Force Exodus on Rural Communities**
William Vincent Hummel**, 18, Senior, Aditya Tummala**, 17, Senior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

**PHYS060**
**Goldilocks' Paradox**
Samantha Jo Brodeen, 18, Senior, Avon High School, Avon, South Dakota, T: Paul Kuhlman

**PLNT047**
**Impact of Fish Fertilizer on Plant Growth**
Julie Madison Sundheim, 18, Senior, Elk Point Jefferson High School, Elk Point, South Dakota, T: Paul Kuhlman

**Rapid City, USSD01, Northern South Dakota Science and Math Fair**
**ROBO068**
**Automatic Detection of Stroke-Induced Aphasia**
Satvik Nelakuditi, 15, Sophomore, Spring Valley High School, Columbia, South Carolina, T: Michelle Wyatt

**SOUTH DAKOTA**
Aberdeen, USSD02, Eastern South Dakota Science and Engineering Fair
**BEHA049T**
**The Disproportionate Effect of the Labor Force Exodus on Rural Communities**
William Vincent Hummel**, 18, Senior, Aditya Tummala**, 17, Senior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

**ETSD052T**
**Car Seat Safety**
Grayson Joseph Girard, 15, Freshman, Bentlee Ann Kollbaum, 15, Freshman, Elk Point Jefferson High School, Elk Point, South Dakota, T: Melanie Norris

**PLNT047**
**Impact of Fish Fertilizer on Plant Growth**
Julie Madison Sundheim, 18, Senior, Elk Point Jefferson High School, Elk Point, South Dakota, T: Paul Kuhlman

**Rapid City, USSD01, Northern South Dakota Science and Math Fair**
**ROBO068**
**Automatic Detection of Stroke-Induced Aphasia**
Satvik Nelakuditi, 15, Sophomore, Spring Valley High School, Columbia, South Carolina, T: Michelle Wyatt

**TENNESSEE**
Chattanooga, USTN01, Chattanooga Regional Science and Engineering Fair
**CHEM052T**
**Carbon Capturing**
Love Karan Patel, 17, Junior, Mason Nash Headrick, 17, Junior, McMinney County High School, Athens, Tennessee, T: Brandi Bridwell

**TMED055**
**A Multi-Output Convolutional Neural Network Model for Melanoma Detection and Prevention**
Anya A. Parambath, 16, Junior, Girls Preparatory School, Chattanooga, Tennessee, T: Keith Sanders

**Knoxville, USTN04, Southern Appalachian Science and Engineering Fair**
**EAEVO69**
**Planning Equitable Accessibility to Dialysis Care: A Case Study of Hurricane Ida**
Eyrin Kim, 16, Junior, Farragut High School, Knoxville, Tennessee, T: Matthew Milligan

**Finalist Directory**

**REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR 2022**

**MCRO039**
**Inhibition of Staphylococcus epidermidis Utilizing Borate-Based and Silica-Based Bioactive Glass**
Lindsay Preston, 16, Junior, Conrad Weiser High School, Robesonia, Pennsylvania, T: John Siefert

**York, USPA06, York County Science and Engineering Fair**
**CELL020**
**The Effect of Covalent Cross Links on the Secondary Structure of the Tetracycline Aptamer**
Anand Dipak Patel, 18, Senior, Dallastown Area High School, Dallastown, Pennsylvania, T: Michael Tapp

**RHODE ISLAND**
Warwick, USRISO, Rhode Island Science and Engineering Fair
**BMED043T**
**Evaluating the Migration of Glioblastoma Stem Cells in vitro Towards a Chemoattractant Gradient**
Helen Lucille Copple, 17, Junior, Shaswat Singh, 17, Junior, Barrington High School, Barrington, Rhode Island, T: Diana Siliez-Shields

**SOUTH CAROLINA**
North Augusta, USSC01, Central Savannah River Area Science and Engineering Fair
**BMED032**
**Multiple Sclerosis and the Retina: A Study on Neurodegeneration**
Nidhi Shenoy, 17, Junior, Lakeside High School, Evans, Georgia, T: Charlotte Smith
Bluffton, USSC02, Sea Island Regional Science Fair
**BEHA044**
**The Serial Position Effect and Recency Effect**
Meagan Elizabeth Berger, 17, Junior, Hilton Head Island High School, Hilton Head Island, South Carolina, T: Alexandra Mazur

**SOUTH DAKOTA**
North Dakota, USSD01, Northern South Dakota Science and Math Fair
**ANIM053**
**The Effects of Pulsed Electro-Magnetic Fields on Bovine Semen Collection Rates**
William Vincent Hummel**, 18, Senior, Aditya Tummala**, 17, Senior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

**TENNESSEE**
Chattanooga, USTN01, Chattanooga Regional Science and Engineering Fair
**CHEM052T**
**Carbon Capturing**
Love Karan Patel, 17, Junior, Mason Nash Headrick, 17, Junior, McMinney County High School, Athens, Tennessee, T: Brandi Bridwell

**TMED055**
**A Multi-Output Convolutional Neural Network Model for Melanoma Detection and Prevention**
Anya A. Parambath, 16, Junior, Girls Preparatory School, Chattanooga, Tennessee, T: Keith Sanders

**Knoxville, USTN04, Southern Appalachian Science and Engineering Fair**
**EAEVO69**
**Planning Equitable Accessibility to Dialysis Care: A Case Study of Hurricane Ida**
Eyrin Kim, 16, Junior, Farragut High School, Knoxville, Tennessee, T: Matthew Milligan
Finalist Directory

EAEV086  Quantification of Environmental Drivers Underlying the Changes in Urban Vegetation Across the United States
#  Ridhima Singh, 16, Junior, Farragut High School, Knoxville, Tennessee, T: Matthew Milligan

Memphis, USTN05, Memphis-Shelby County Science and Engineering Fair
ENBM077  Sticky Stitches
Ahmad Elabiad, 16, Sophomore, Pleasant View School, Memphis, Tennessee, T: Farhana Chowdhury

Nashville, USTN06, Middle Tennessee Science and Engineering Fair
BCHM031  Pyrocystis fusiformis vs. the Circadian Rhythm: How Does Light Exposure Affect the Bioluminescence of Pyrocystis fusiformis?
Ella Jane Brown, 17, Junior, Columbia Central High School, Columbia, Tennessee, T: Emily Stafford

ENBM059  Development of an Electronic Nose: Detecting VOC Levels
Brittney Williams, 18, Senior, Fred J. Page High School, Franklin, Tennessee, T: Jennifer Mackie

TEXAS
Dallas, USTX01, Beal Bank Dallas Regional Science and Engineering Fair
BEHA003  iPonder: A Multimodal and Anonymous Approach to Remote Teen Mental Health Diagnosis and Peer-Based Conversational Therapy via Deep Transfer Learning and Computer Vision
Vivek Reddy Kogilathota, 17, Senior, Rick Reedy High School, Frisco, Texas, T: Derek McDowell

CBIO002  Experimental Characterization of Inhibitors of the MSUT-2 Protein for the Treatment of Neurodegenerative Diseases (Year 2)
Rithvik Ganesh, 18, Senior, Plano West Senior High School, Plano, Texas, T: Emily Sharma

CELL002  The Mechanism of Methylmercury Permeation Through the Blood-Brain Barrier Using C. elegans
Zehra Jaffery, 16, Sophomore, Jasper High School, Plano, Texas, T: Vashka Desai

EAEV036  A Novel Solution to Combat Brewery Waste Utilizing Hermetia illucens
Sreya Lakshmi Das, 17, Senior, Liberty High School, Frisco, Texas, T: Derek McDowell

EBED004  IVY - Intelligent Vision System for the Visually Impaired
Sarang Goel, 16, Sophomore, Coppell High School, Coppell, Texas, T: Holly Anderson

MATH002  Fast and Furious: Designing an Ultra-Efficient Hybrid Matrix Multiplication Algorithm
Meryl Zhang, 14, Freshman, R. C. Clark High School, Plano, Texas, T: Jamesion Johns

MCRO003  Computational Analysis of the Cystic Fibrosis Lung Microbiome and Development of a Non-Toxic Quorum Quenching Cocktail Therapy To Inhibit Multispecies Biofilm Proliferation
Shriya Prakash Bhat, 17, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

ROBO003  Adaptive Learning: Evolving Explainable Predictions
Harshal V. Bharatia, 17, Senior, Plano Senior High School, Plano, Texas, T: Rachel Carlson

SOFT016  A Home Automation System for Neuromuscular Disorder Patients Using Brain-Computer Interface
Navya Ramakrishnan, 18, Senior, Plano Senior High School, Plano, Texas, T: Elizabeth Carson

El Paso, USTX02, Sun Country Science Fair
EBED014  Addressing Medicine Adherence in Older Adults Through User-Friendly Medicine Dispensers
Maya Cosette Ruiz, 15, Freshman, Americas High School, El Paso, Texas, T: Elizabeth Mullins

Attend a world top 10 university
THEN TAKE ON THE UNIVERSE

Top 10 best university in the world
QS World University Rankings 2022
1st for graduate employability
The Guardian University Guide 2022

Find out more:
imperial.ac.uk/study/ug
Finalist Directory

PHYS020  The Effects of Qubit Entanglement in Quantum Teleportation
  Galilea Stephania Rodriguez, 16, Junior, Harmony Science Academy, El Paso, Texas, T: Myrna Villanueva

TMED015  Attenuating the Consequences of Ethanol Exposure With Probiotics
  Hendi Danielle Houck, 15, Freshman, Transmountain Early College High School, El Paso, Texas, T: David Esparza

Arlington, USTX03, Fort Worth Regional Science and Engineering Fair

CBIO008  Novel-DTI: A Machine Learning Pipeline To Predict Drug-Target Interactions for Large-Scale Drug Repurposing and Drug Discovery Using Multiplex, Heterogeneous Networks
  Shreya Amalapurapu, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez

CHEMO11  Breaking Chemical Bonds by Force: A Computational Investigation of Metal-C-H Interaction Under High Pressure
  Carly Yang, 17, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Hao Yan

EBED012  Optimizing Micro-Computer Architecture in the Arithmetic Logic Unit
  Emily Kathleen Troutman, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Dana Troutman

ENBM015  Using (PVDF) Sensors and Microphones To Determine Infant Heart Rate and Respirations in Novel Machine Learning Modeling Approach to SIDS Detection
  Eshan Singhal, 16, Junior, The Oakridge School, Arlington, Texas, T: Jeff Farley

ETSD009T  Microfluidic Fabrication of Double Emulsion Photonic Microlasers
  Jayanith Narasimha Pandit, 17, Junior, Shanthprakash Reddy Kunam, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Omar Cavazos

MCRO005T  Identifying Metabolites in Aspergillus heteromorphus and Magnaporthe grisea and the Overproduction of Cytochalasins
  Neha Singaravelan, 17, Junior, Arianna Fa, 16, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez

PLNT010T  Identification and Characterization of Genes Functioning With HR4, a Newly Identified Gene Conferring Resistance to the Green Peach Aphid
  Siddharth Shah, 18, Senior, Shreya Nair, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Alyssa Rodriguez

Weslaco, USTX04, Rio Grande Valley Regional Science and Engineering Fair

BCHMO09T  An Experimental Study of the Effects of Increased CO2(g) on the Production and Concentration of Biocommmolecules of Plants
  Kathia Michelle Palacios, 18, Senior, Dyllan Mackenzie Lozano-Lomeli, 17, Junior, Ashley Gabriela Nunez, 17, Junior, James Pace High School, Brownsville, Texas, T: Dora Lopez

BMED003  Exploring Ethanol Tolerance in Honey Bees
  Noah Trstenjak, 19, Senior, UTRGV Mathematics and Science Academy, Edinburg, Texas, T: Armando Montes

CBI001T  Genes Negatively Regulated by FOXY1 and Their Association With Breast Cancer
  Bipul Raj Soti, 16, Junior, Science Academy of South Texas, Mercedes, Texas, T: Megan Keniry

EGSD003  Underwater Turbine Innovations
  Alan Gael Garcia, 16, Sophomore, Veterans Memorial Early College High School, Brownsville, Texas, T: Cynthia Garcia

ROBO014T  iGlide: An ROV SeaGlide Design Engineered To Collect Oil in a Marine Environment
  Adrian Gonzalez-Vega, 18, Senior, Tasharenry Baez, 17, Senior, James Pace High School, Brownsville, Texas, T: Dora Lopez

TMED018T  Determining the Cumulative Effects of Saccharin, Ethanol, and Taurine on the Developing Embryo of Danio rerio
  # Rianna Rachel Trevino#, 18, Senior, Gadiel Alejandro Garcia##, 18, Senior, Hanna Early College High School, Brownsville, Texas, T: Phebe Fuentes

Houston, USTX05, Science Engineering Fair of Houston

ANIMO31T  Year II: Optimizing the Bioavailability of Curcumin in Dugesia tigrina as a Model To Mitigate the Negative Effects of Radiotherapy
  Zaina Fatima Siddiqi, 16, Junior, Rotem Ris, 16, Junior, College Park High School, The Woodlands, Texas, T: Sara Fox

  Siddharth Pachipala, 17, Junior, College Park High School, The Woodlands, Texas, T: Sara Fox

CHEM034T  Engineering an Inexpensive and Sustainable Cellulose Battery Cell
  Shivani Mundra, 16, Sophomore, Madelyn Puza, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Sara Fox

EAEV028  Enhanced CO2 Capture via Carbon Mineralization
  Emily Li, 16, Junior, Clear Lake High School, Houston, Texas, T: Robin Mayeaux

EGSD014  Utilizing Soft Robotic Concepts To Achieve Passive Solar Tracking To Increase Efficiency of a Solar Panel
  Ricardo Victorio, 15, Sophomore, College Park High School, The Woodlands, Texas, T: Joseph Ewbank

ENVE038T  Sea It To Believe It: Machine Learning-Based Prediction of Harmful Algal Bloom (HAB) Intensity
  Olivia Ye, 16, Junior, Ada Tian Wang, 17, Junior, College Park High School, The Woodlands, Texas, T: Joseph Ewbank

ETSD024  Conquering Chaos: Can Engineering Design Be Applied To Prove Coin Flips Are Not Random?
  Abigail Rose Hindman, 15, Sophomore, Saint John's School, Houston, Texas, T: Franco Posa

ETSD029T  From Space to Horizon: Improving Efficiency and Modeling the Future of Ion Thrusters
  Mahi Patel, 18, Senior, Felipe Aceves, 18, Senior, College Park High School, The Woodlands, Texas, T: Stephanie Marts

MATH025  Random Forest To Predict Dengue Cases and Outbreaks
  Mahi Patel, 18, Senior, Felipe Aceves, 18, Senior, College Park High School, The Woodlands, Texas, T: Stephanie Marts

MAT5021  Programmable Matter: A Microscale, Self-Reconfigurable, Modular Robotic Metamaterial
  Sofi Sanjay Patel, 16, Junior, College Park High School, The Woodlands, Texas, T: Sara Fox

PLNT019  Measuring the Effects of Varying Wavelengths of Light on the Growth of Hydroponically Grown Allium fistulosum
  Aarushi Pandey, 14, Freshman, College Park High School, The Woodlands, Texas, T: Sara Fox

TMED017  Use of Bio-Electrical Impedance Analysis To Detect Changes in Bone Density Indicative of Osteoporosis
  Sanskriti Manoharan, 14, Freshman, Hightower High School, Missouri City, Texas, T: Chelsea Baker

Kilgore, USTX06, East Texas Regional Science Fair

EAEV032T  Plant Growth With At-Home Soil Treatments Planted in Riverside Soil
  Srira Lezeth Rocha, 18, Senior, Jade De La Garza, 18, Senior, Nacogdoches High School, Nacogdoches, Texas, T: Jason Ray
Laredo, USTX07, United Independent School District Regional Science Fair

BMED004 Does Genetically Modified Produce When Compared to Organic and School Produce Differ in Calorie Intake?
Karla Sophia Rocha, 16, Junior, United High School, Laredo, Texas, T: Janet Haverkamp

Lubbock, USTX08, South Plains Regional Science and Engineering Fair

ENEV025 Constructing Soil Moisture Spatial Variability Maps of Golf Course Fairways
Michael (Mac) Andrew Chaloupka, 17, Senior, Christ the King Cathedral School, Lubbock, Texas, T: Joshua Cortez

MCRO012 Determining If Bacterial Genera Found in Natural Bat Roosts Are Known Fungal Inhibitors of Pseudogymnoascus destructans (Pa) (Y7)
Calvin Kirtley Harold Carpenter, 16, Sophomore, All Saints Episcopal High School, Lubbock, Texas, T: Divya Parvatiyar

ROBO029 A Novel Approach of Deep Learning on Detection and Classification of Leukemic Cells and BCR-ABL1 Gene
Leonardo Amato Regis de Farias, 17, Junior, Lubbock High School, Lubbock, Texas, T: Milene de Farias

Odessa, USTX09, Permian Basin Science & Engineering Fair

MCRO011T Germs and You
Aubrie Estella Aguilar, 16, Junior, Alexis Monique Gonzales, 17, Junior, Juan Ortiz Avila, 18, Senior, Marfa High School, Marfa, Texas, T: Elizabeth Donaldson

San Antonio, USTX11, Alamo Regional Science and Engineering Fair

CBIO009 Decoding Genetics of Aging: A Neural Network Interpretation on Age-Associated Biomarker Data and Diseases
# Hannah Guan, 16, Junior, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Sarah Chavez

EAEV013 Replicability of Light Pollution Effects on Timing of Butterfly Metamorphosis
Josephine Elizabeth Schultz, 14, Freshman, Winston Churchill High School, San Antonio, Texas, T: Theodore Schultz

EBED011 Finding Perfect Watermelons: Non-Destructive Ripeness Detection via Photoacoustics – A Pilot Study
Eric Zou, 16, Sophomore, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Sarah Chavez

ENBM014 Wearable Electrochemical Sweat Sensor for Patients With Chronic Kidney Disease (CKD): Year III
# Suran Upul Somawardana, 18, Senior, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Sarah Chavez

ENEV018T Termite Biomimicry for Affordable, Eco-Friendly Homes
Sathina Trevino, 16, Junior, MiHika S. Eratne, 16, Junior, Keystone School, San Antonio, Texas, T: Jason Nydegger

PHYS013 A Simulation of Pluto’s Tholin Creation in Its Intermittent Atmosphere Due to Its Elliptical Orbit
Ryan Robert Fletcher, 17, Senior, John Jay Science and Engineering Academy, San Antonio, Texas, T: Jennifer Grover

PLNT011 The Study of Biomimicry in Architecture
Daniel Charles Fletcher, 15, Freshman, John Jay Science and Engineering Academy, San Antonio, Texas, T: Penney Maretzki

Waco, USTX12, Central Texas Science and Engineering Fair

CELL014 Using Cellular Techniques To Assess Bioindicator Plants’ Response to Environmental Pollutants
Miriam Lerryn Carl, 15, Freshman, Live Oak Classical School, Waco, Texas, T: Katherine Pitts

Find your true path at Lawrence Tech and become a leader who inspires, innovates, and solves the challenges of today while building a better future.

Lawrence Technological University
admissions@ltu.edu

Southfield, Michigan
BLUE DEVILS DARE!
Finalist Directory

Finalist Directory

MCR0015 Aquatic Plant Surface Micro-Flora and the Coliform Response
# Maddie Machelle Kirklin, 16, Sophomore, Live Oak Classical School, Waco, Texas, T: Katherine Pitts

Austin, USTX13, Austin Energy Regional Science Festival

BCHM013 In silico Analysis of Small Molecules With Possible SARS-CoV-2 RNA-Dependent RNA Polymerase Inhibiting Properties and Their Therapeutic Potential
Michael Yang, 16, Junior, A&M Consolidated High School, College Station, Texas, T: Michelle Jedlicka

CBIO021 A Novel Computational Modeling Framework To Analyze Synovial-Tissue Based Drug Targets and Diagnostic Biomarkers in Rheumatoid Arthritis
Pandhi Latawa, 17, Senior, Liberal Arts and Science Academy, Austin, Texas, T: Neno December

EAEV022 A New Method for Automated Identification and Prediction of Invasive Species Growth Using Deep Learning
Nathan Elias, 16, Junior, Liberal Arts and Science Academy, Austin, Texas, T: Neno December

ENBM023 Smart Leukemia Labs: A Low-Cost Microscope and Diagnostic Tool That Use Semantic Segmentation, Image Processing and Object Detection To Detect Acute Lymphoblastic Leukemia
Adelle Jia Xin Yong, 16, Junior, Westlake High School, Austin, Texas, T: Nancy Misage

MATS011 Three-Dimensional Hierarchical Porous Electrode Structure for Improved Performance in Battery Applications
Alan Wang, 17, Junior, Westlake High School, Austin, Texas, T: Nancy Misage

TMED016T A Novel Methodology To Improve Hand Hygiene Compliance Using Computer Vision and 3D Depth Sensors
Laya Yalamanchili, 18, Senior, Kaavya Yalamanchili, 16, Sophomore, L C Anderson High School, Austin, Texas, T: Anne Goshorn

Laredo, USTX14, Laredo Independent School District Science Fair

BCHM011 Comparing the Polymerization of Casein Protein Using Homogenized Bovine Milk Types
Jose Antonio Avila, 16, Junior, Joseph W. Nixon High School, Laredo, Texas, T: Melissa Allred

Corpus Christi, USTX15, Coastal Bend Regional Science Fair

ENBM033 ACEREVERS 1: Development of an Artificial Prototype Biosensor System for Identification and Treatment of Diabetic Ketoacidosis (DKA)
Priyam Kumar, 16, Junior, Santa Gertrudis Academy High School, Kingsville, Texas, T: Rachel Escobedo

ENBM046 Athlete Temperature Sensor: A Novel Approach to Heat Exhaustion Monitoring in Student Athletes
Cauhtemoc Zamora, 15, Freshman, Veterans Memorial High School, Corpus Christi, Texas, T: Porfirio Zamora

College Station, USTX50, Texas Science and Engineering Fair

BCHM022T An Integrative Approach of Utilizing Antipsychotic Supplements Designated for Schizophrenia and Endogenous Firing Rate Differential Equation Models To Induce Neuronal Synaptic Activity in PINK1-Gene Mutated C. elegans With Parkinson’s Disease
Ravi Rajesh Babaria, 16, Junior, Mehak Gaba, 16, Junior, Halley Madyson Compuesto, 17, Junior, Vista Ridge High School, Cedar Park, Texas, T: Rhonda Christman

BEMD082 Reusable Screening Method for Malaria Infections From Thin Blood Smear Images Using Convolutional Neural Network
Aaron Joel George, 15, Freshman, Saint Dominic Savio Catholic High School, Austin, Texas, T: Pamela Koo

EAEV087 Finding an Accessible, Environmentally Friendly Solution to Water Purification: Testing the Effectiveness of Aloidendron barberae and Bambusa dolichomerithalla as Natural Coagulants on Copper Ion Concentration Using UV-vis Spectrophotometry
Katherine Lee, 16, Sophomore, Jasper High School, Plano, Texas, T: Vashika Desai

EGSD041 Redesigning Surface Conduction Manifolds To Improve the Efficiency and Reliability of Solar Cells
Otto Beall, 16, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

ENBM060T Using AI To Detect Morphological Abnormalities of Leukocytes To Diagnose Leukemia
Anushka Aggarwal, 15, Sophomore, Madison Burke, 16, Sophomore, Dulles High School, Sugar Land, Texas, T: Kristin Mathew

Asell Rawashdeh, 17, Senior, L C Anderson High School, Austin, Texas, T: Vincent Wrencher

PLNT038 Computational Analysis of the Rhizosphere Metagenome and a Wet Lab Approach To Derive an Optimal Strategy for Heavy Metal Remediation in situ
Prisha Bhat, 14, Freshman, Plano East Senior High School, Plano, Texas, T: Julie Baker

ROBO063 Simulation of Abnormal Crouch Gait and Development of a Generalized Torque-Additive Rehabilitative Technique for Complex Mobility Issues
Allen Shen, 17, Senior, Clear Lake High School, Houston, Texas, T: Brenda Pinchbeck

SOFT059 Xnet: A Novel Machine Learning Model for Fast MRI Reconstruction
Shoumik Roychowdhury, 18, Senior, Westwood High School, Austin, Texas, T: Arvi Kantawala

ENBM026 Effect of Brewery Temperatures on the Antioxidant Capacity of Common Native Beer Yeasts
Sayan Mitra, 17, Sophomore, New Braunfels High School, New Braunfels, Texas, T: Tonya Neff

UTAH

Farmington, USU01, North Davis Area Science and Engineering Fair

ANIMO46 A Caterpillar That Can Eat Polyethylene: Galleria mellonella
Sabra Ludovica Di Bello, 17, Junior, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin

BMED048 The Introduction of Excess Calcium in Cancer Cells
Denali Emilie Isaacs-Perrman, 15, Freshman, West Point Junior High School, West Point, Utah, T: Barbara Trask

EAEV058 How Humans Have an Impact on Our Watersheds Today: A Microbial Study on the Jordan River
Thanaphone Glenn Shields, 16, Sophomore, Syracuse High School, Syracuse, Utah, T: Nannette Gunty

ETS047 The Application of Higher Visibility Road Markings in Inclement Weather
Joshua Hillig, 16, Junior, Farmington High School, Farmington, Utah, T: Jana Barrow

ETS079T 2-in-1 No Mess Toothbrush
Mason Spencer Hymas, 14, Freshman, Brady Farr Hill, 15, Freshman, Shoreline Junior High School, Layton, Utah, T: Alicia Clark

PHYS056 Home-Brew Quantum Key Distribution
Fletcher James Murray, 18, Senior, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin

Cedar City, USU02, Southern Utah Science and Engineering Fair

BCHM032 Effects of Brewing Temperatures on the Antioxidant Capacity of Common Native Herbal Plants: Thesium megaspermaticum and Pectis angustifolia
Tyneshia Amber Shortman, 18, Senior, South Sevier High School, Monroe, Utah, T: Deborah Morgan

Cell032 The Extraction of Apple Juice From Applesauce Using Cellulase Enzyme
Ethan Anthony Calvasina, 16, Sophomore, SUCCESS Academy – SUU, Cedar City, Utah, T: Kimberly McCollum
CHEM071  Novel Synthesis and Characterization of Manganese Nanoparticles: A Third Year Study
Taytum Oakden Stratton, 17, Junior, SUCCESS Academy – SUU, Cedar City, Utah, T: Kimberly McCollum

ETSD062  Building a Prosthetic Hand With Microcomputers and Sensors
Jeron Clarence Osguthorpe, 16, Junior, SUCCESS Academy – SUU, Cedar City, Utah, T: Micah Jackson

Ogden, USUT03, Weber Area Science and Engineering Fair

BEHA045  How Personal Biases Influence Our Voting Habits
Lindley Jane Richards, 17, Junior, Fremont High School, Plain City, Utah, T: Robert Riley

EAEV057  Comparative Analysis of the Effectiveness of Polyethylene, Cetyl Alcohol (Hexadecan-1-ol) and Shade Balls in Preventing Evaporation of Water and Its Effect on Water Quality
Alyse Amelia Radle, 16, Sophomore, Weber High School, Pleasant View, Utah, T: Lareen Radle

EAEV080T  Effectiveness of Grass Clippings as a Fuel Alternative
Oakley Marriott, 17, Junior, Keiley Elean Mitchell, 17, Junior, Fremont High School, Plain City, Utah, T: Robert Riley

PHYS070T  An Analysis of the Factors Affecting Make Rate When Putting
Luke Abraham Dalebout, 17, Junior, Jack Troy Wadsworth, 16, Junior, Fremont High School, Plain City, Utah, T: Robert Riley

Provo, USUT04, Central Utah STEM Fair

BMED067  Effects of STAT3 on Pathological Retinal Angiogenesis
Sarah Lee, 16, Sophomore, Timpview High School, Provo, Utah, T: Joy Petrucka

EGSD042  Electrifying Lake Mud! Part 3
Fianna Jean Smith, 15, Freshman, Early Light Academy, South Jordan, Utah, T: Darci Cordero

ENEV091  Saving Water Around the House
Sky Teeples, 16, Sophomore, Provo High School, Provo, Utah, T: Hyrum Everitt

PHYS071  Trailer Towing Safety: How Load Weight Distribution and Tow Vehicle Size Affects Trailer Sway
Anderson Washburn, 14, Freshman, Canyon View Junior High School, Orem, Utah, T: Jenny Damarjian

Salt Lake City, USUT05, University of Utah Science and Engineering Fair

BEHA023  A Behavioral Study of Public Health Messaging: Community, Self-interest, Vulnerability and Racial Bias
Sierra Anne Sun, 15, Freshman, The Waterford School, Sandy, Utah, T: Karla Stucker

BMED026  Repressed Autophagy in Aging Is Associated With Heightened Blood-Brain Barrier Permeability and Altered Functional Hyperemia
Megan Adrianne Tandar, 15, Junior, West High School, Salt Lake City, Utah, T: Enrique Arce-Larreta

ETSD025T  Engineering the Future of Air Travel
Evan Skyler Weinstein, 15, Freshman, Aiden Shah Gandhi, 15, Freshman, Eli Daniel Hatton, 15, Freshman, Rowland Hall- Lincoln Street Campus, Salt Lake City, Utah, T: Padmashree Rida

MATS026  DiSoCoVeR: An Attention and Density-Based Machine Learning Algorithm for Discovering Novel Superhard Materials
Marianne Feng Liu, 16, Junior, West High School, Salt Lake City, Utah, T: Enrique Arce-Larreta

At Lehigh University, you’ll find hands-on, creative and interdisciplinary experiences that will challenge you and prepare you to solve complex problems in real-world situations. Our world-class faculty and rigorous academic programs will have you ready for success in whatever STEM field you choose.

This is a partial list of Lehigh’s majors and programs. For the full list, please scan the QR code.

156  Regeneron International Science and Engineering Fair 2022
Finalist Directory

**TMED026** Investigating the Cytotoxicity of *Centella asiatica* Methanolic Leaf Extracts on MDA-MB-231 Human Breast Cancer Cells
Mercedes Randhahn, 16, Junior, Saint Joseph Catholic High School, Ogden, Utah, T: Kory Ulle

**TMED029T** Development of Novel, Selective, Orally Available Small Molecule CDK9 Inhibitors for Prostate Cancer Therapy – Mechanistic Studies
Saisha Vankayalapati, 16, Junior, Sowmya Paritala, 17, Junior, Hillcrest High School, Midvale, Utah, T: Jody Oostema, T: Andie Arnold

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

**BEHA050** Do People Prefer Online or Physical Libraries?
Bethany Ball, 17, Junior, Northern Utah Acadamy for Math, Engineering and Science, Layton, Utah, T: Jon Simerrick

**CBIO057** Predicting Virus-Human Interactions To Facilitate the Design of Anti-Coronavirus Vaccines and Therapeutics
Angela Zhan, 14, Freshman, Logan High School, Logan, Utah, T: Christian Howell

**VERMONT**

**Northfield, USVT50, Vermont Science, Technology, Engineering and Mathematics Fair**

**CELL023** Coordination of Myosin Va Motors Within a Team During Cargo Transport
Hiba Ali, 18, Senior, South Burlington High School, South Burlington, Vermont, T: Nathaniel Moore

**CHEM068** Identification of Microplastics in Soil Using Fluorescence
Cecilia Sweeney, 18, Senior, Saint Johnsbury Academy, St. Johnsbury, Vermont, T: Edwin Eckel

**EGSD048T** The Effectiveness of Various Hydroelectric Turbines
Ben Gregg Mahdessian, 15, Sophomore, Sam Troy, 16, Sophomore, Langley High School, Mclean, Virginia, T: Amy Speegle

**Virginia**

**Arlington, USVA01, Northern Virginia Science and Engineering Fair**

**BMED047** Development of RNA Vaccines Targeting Alzheimer’s Disease Using Single-Cell RNA Sequencing and Proteomic Analysis
Chloe Yan, 16, Sophomore, Episcopal High School, Alexandria, Virginia, T: Kim Olsen

**MCRO034** Anti-Biofilm Activity of Isolated Bacteriophages for the Treatment of Multidrug-Resistant Pulmonary Infections
Julia Rose Brodsky, 16, Junior, H-B Woodlawn Secondary Program, Arlington, Virginia, T: Eric Young

**MCRO033** Changing the Martian Atmosphere: Examining Lichen’s Effect on Oxygen Percentage in a Simulated Martian Atmosphere
Fiona Anne Dreesbach, 17, Senior, Hayfield Secondary School, Alexandria, Virginia, T: Julia Riley

**Charlottesville, USVA02, Virginia Piedmont Regional Science Fair**

**EGSD012** Novel Model of an Adaptive Wave Energy Converter With Spectral Analysis-Based Sea State Classification
Gwyneth Liu, 17, Junior, Mills E. Godwin High School, Henrico, Virginia, T: Samantha Cope

**ETSD038** Vehicle Rollover Prevention Through Dynamic Sizing of Center of Mass
Vivian Wenyin Hui, 16, Junior, Albermarle High School, Charlesville, Virginia, T: Kevin Huff

**ETSD083T** An Efficient and Interpretable Vehicle Controller for Safe Navigation in Neighborhood Environment With Riemannian Motion Policies
Zitong Wang, 17, Junior, Eddy Xu, 18, Senior, Shanghai Pinghe Bilingual School, Shanghai, China, Miller School of Albermarle, Charlottesville, Virginia, T: Luke Robbins

**TMED033** FluVaxAI: A Novel AI-Inspired Regional Flu Vaccine Formulation
Cameron Sharma, 18, Senior, Mills E. Godwin High School, Henrico, Virginia, T: Bishop Boshier

**Fairfax, USVA03, Fairfax County Regional Science and Engineering Fair**

**ANIM069** The Effect of Substrate Type on Black Soldier Fly Larvae Mass
Colin Luke Surabian, 15, Sophomore, South Lakes High School, Reston, Virginia, T: Emily Texdahl

**BCMO028** Investigation Into the Feasibility of *Maclura pomifera* as a Commercial Source of Pectin
Aaron Kurtz, 16, Junior, Thomas Edison High School, Alexandria, Virginia, T: Kate Anderson

**EGSD043** PAMNSys: An Integration of Novel Machine Learning and Reinforcement Learning Algorithms To Accurately Predict and Optimize Electrical Energies Within Heaving Point Absorbers Based on Placement, Implementation and Real-Time Control
Shanak Tandon Sinha, 16, Junior, George C. Marshall High School, Falls Church, Virginia, T: Amy Speegle

**EGSD048T** The Effectiveness of Various Hydroelectric Turbines
Ben Gregg Mahdessian, 15, Sophomore, Sam Troy, 16, Sophomore, Langley High School, Mclean, Virginia, T: Cynthia Chung

**ETSD074T** Decentralized Shared Intelligence of Autonomous Vehicles With Real-Time Multi-Agent Reinforcement Learning
Irfan Kabir Nafi#, 17, Senior, Eugene Choi##, 17, Senior, Raffu Al Khondaker##, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Kevin Huff

**TMED041** Post-Traumatic Stress Disorder (PTSD) Biomarker Identification Using Integrative Network Fusion and Deep Learning With Bayesian Hyperparameter Optimization
Seohui Banerjee, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Jane Iyengar

**TMED064** PANDwriting: An Accessible, High-Sensitivity Parkinson’s and Alzheimer’s Screening System Using Vision-Based Handwriting Kinematic Analysis and Machine Learning
Ron Nachum, 17, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Selma Yilmaz
Finalist Directory

Harrisonburg, USVA04, Shenandoah Valley Regional Science and Engineering Fair

PHYS053 Understanding the Variability of Optical Spectra of H$_2$O Megamasers
William Austin St. John, 18, Senior, Massanutten Regional Governor’s School, Mt. Jackson, Virginia, T: Kara Bates

ROBO084 Demonstration and Accuracy of Machine Learning for Sorting Recyclables
Anish Aradhye, 17, Junior, Harrisonburg High School, Harrisonburg, Virginia, T: Andy Jackson

Lynchburg, USVA05, Central Virginia Regional Science Fair

BMED030 The Effect of Bacillus cereus on the Central Nervous System of Dugesia tigrina
Justin Keonhyoung Kim, 17, Junior, Central Virginia Governor’s School for Science and Technology, Lynchburg, Virginia, T: Michele Chamot

EGSD024 The Effect of Hydrophobic Coatings on the Efficiency of Solar Panels
Burke Watson Bankston, 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

ANIM027 Dozing Off With Drosophila: The Effect of Disrupted Circadian Rhythms and Disturbed Sleep on Mortality, Mood, and Addiction
Rania Sophia Lateef, 15, Freshman, Charles J. Colgan Sr. High School, Manassas, Virginia, T: Stephanie Brown

CBIO030 A Novel Visualization Tool: Application to RNA-Sequence Classification
Ebru Ayyorgun, 17, Junior, Battlefield High School, Haymarket, Virginia, T: Chelsea Bollinger

MCRO065T Creating Novel Bacteriophage Solutions as a Preventative Measure for Escherichia coli Biofilm Formation on Elastomer Biomaterials in Medically Relevant Settings in vitro
Gabriella Luna La Cour, 17, Junior, Alahna Moreno, 16, Junior, Anisha Ramakrishnan, 16, Junior, Governor’s School at Innovation Park, Manassas, Virginia, T: Elizabeth Romano

PLNT020 A Low-Cost Deep Learning Solution for Early Detection of Lettuce Stress in Indoor Farms
Naman Agarwal, 17, Junior, Governor’s School at Innovation Park, Manassas, Virginia, T: Elizabeth Romano

Ashburn, USVA07, Loudoun County Science and Engineering Fair

ENBM035T Evaluating the Viability of an Asymmetric Electrospun Nanofiber Composed of Polycaprolactone, Chitosan, and Curcumin To Promote Chronic Wound Healing
Brett Wilson, 18, Senior, Laasya Doppalapudi, 18, Senior, Academies of Loudoun, Leesburg, Virginia, T: Michael Tomlinson

ETSD033 Constructing a Reusable Solid-Fuel Rocket Capable of Propulsive Landing
Ravin Joshi, 17, Senior, Academies of Loudoun, Leesburg, Virginia, T: Trevor Barry

PHYS040 Real-Time Prediction of Solar Flares and Coronal Mass Ejections
Rohit Prasanna, 17, Senior, Academies of Loudoun, Leesburg, Virginia, T: Duke Writer

ROBO046 Realtime ASL Translation Using ML and Computer Vision
Enzo Tiptur, 18, Senior, Academies of Loudoun, Leesburg, Virginia, T: Peter Randall

SOFT031 Combating Disease in Under-Resourced Areas: Synthetic Degradation as a Method to Low-Quality Image Classification
Raahi Reddy Chada, 17, Senior, Academies of Loudoun, Leesburg, Virginia, T: Zachary Minchow-Proffitt

Roanoke, USVA08, Western Virginia Regional Science Fair

ANIM055 Col-IV: An Indicator of Vascular Formation and P
Michelle Hu, 16, Sophomore, Woodside High School, Newport News, Virginia, T: Rita Mina

CONGRATULATIONS
ISEF 2022 FINALISTS FROM
MAINE MARITIME ACADEMY

A College of Engineering, Management, Science and Transportation offering majors in

- Engineering
- Engineering Technology
- Marine Transportation
- International Business
- Ocean Studies

CHART YOUR COURSE TODAY AT MMA!

mainemaritime.college-tour.com | 207-326-4311 | Pleasant Street, Castine, ME 04420
Finalist Directory

BMED037  A Novel Glioblastoma Prognostic Assay Using Droplet Digital Polymerase Chain Reaction
Caroline Elizabeth Grant, 18, Senior, Roanoke Valley Governor’s School for Science and Technology, Roanoke, Virginia, T: Brandon Taylor

TMED034  A Precision Medicine Approach: In silico Analysis of a Novel Anti-Tumor Peptide as a Future Targeted Therapy
Rebecca Liu Qiu, 16, Junior, Roanoke Valley Governor’s School for Science and Technology, Roanoke, Virginia, T: Mark Levy

Norfolk, USVA09, Tidewater Science and Engineering Fair

BEHA069T  Flies on the Fly: A Novel Research on Thiamine as a Preventative Measure to Traumatic-Brain-Injury-Induced Locomotive Ability Loss
Claire Hyunji Chang, 17, Junior, Olivia Chang, 18, Senior, New Horizons Governor’s School for Science and Technology, Hampton, Virginia, T: Laura Vobrak

ENBM064  Swim Smart, Swim Fast: Development and Application of a Fitbit App for Swim Technique Study
Rockwell Tianyou Li, 15, Freshman, Ocean Lakes High School, Virginia Beach, Virginia, T: Babette Shoemaker

Radford, USVA10, Blue Ridge Highlands Regional Science Fair

BMED020  The Effects of Inflammatory Neutrophils on Endothelial Cell Integrity
Jacqueline J. Hou, 18, Senior, Blacksburg High School, Blacksburg, Virginia, T: Katharine Davis

ENBM080  An Optimized Whiterwater Helmet Designed Using a Newly Developed Helmet STAR Evaluation System and 3D Printing
Brock Duma, 18, Senior, Blacksburg High School, Blacksburg, Virginia, T: Katharine Davis

Roanoke, USVA50, Virginia State Science and Engineering Fair

BEHA073  Bringing Truth Into Fake News: The Diffusion of Fact-Checked Fake Stories on Twitter
Colin Berry, 17, Senior, Yorktown High School, Arlington, Virginia, T: Allyson McKowen

BMED083T  Staying Ahead of the Hit: Concussion Recovery in Youth Optimized Using a Comprehensive App-Based Program (CRYO CAP)
Hamza Arman Lateef, 16, Junior, Tony Bright, 16, Junior, Gabriel Brian Ralston, 17, Junior, Governor’s School at Innovation Park, Manassas, Virginia, T: Alexis Patanarut

EAEV091  Tar Print Novel Convolutional Remote Sensing Techniques To Quantify Urbanization and Study Water Quality
Suraj Vaddi, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Brian Mandell

ROBO071  A Helmholtzian Deep Learning Approach to Glomeruli Segmentation Using Energy-Based Models for Uncertainty Estimation
Omar Abul-Hassan, 17, Senior, Ocean Lakes High School, Virginia Beach, Virginia, T: Babette Shoemaker

ROBO088  Deepfake Detection Using Deep Learning
Michelle Hu, 16, Sophomore, Woodside High School, Newport News, Virginia, T: Rита Mina

WASHINGTON

Prosser, USWA01, Mid-Columbia Regional Science and Engineering Fair

ANIMO32  Characterizing the Feeding Behavior of Western Screech Owls
Emmaline McKinnon, 17, Senior, Hanford High School, Richland, Washington, T: Joyce Stark

EAEV037  How Do Sound Waves Affect Plant Root Physiology and Photosynthesis?
Ruth Elizabeth Wise-Maldonado, 16, Sophomore, Sunnyside Senior High School, Sunnyside, Washington, T: Joyce Stark

PHYS036  A Comparison of Machine Learning Algorithms for Higgs Boson Identification
Ourania-Maria Glezakou-Elbert, 16, Junior, Hanford High School, Richland, Washington, T: Brian Palmer

Puyallup, USWA02, Discovery Regional Science and Engineering Fair

ETSD045  A Novel Approach to Biomimicking the Avian Tail on Fixed Wing Micro Air Vehicles
Kevin Shen, 15, Freshman, Olympia High School, Olympia, Washington, T: Jenn Halsey

ROBO005  Real-Time Sign Recognition for ASL to Text Conversion
Nidhi Krishna Kumar, 17, Junior, Olympia High School, Olympia, Washington, T: Kimberly Crites

SOFT037  Million.js: A Fast, Compiler-Augmented Virtual DOM for Performant JavaScript UI Libraries
Aiden Yutong Bai, 17, Senior, Camas High School, Camas, Washington, T: Brianna Abraham

Dallas, USWA03, Central Sound Regional Science & Engineering Fair

CBIO038  A Machine Learning Approach to Identifying Blood-Based Biomarkers for Differential Diagnosis of Alzheimer’s Disease
Anjali Sreenivas, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

CHEM044  Characterization of Enzymes, Chalcone Synthase, Chalcone Isomerase, andDihydroflavonol 4-Reductase, by X-Ray Crystallography To Improve the Efficacy of Crops Panicum virgatum and Sorghum bicolor as Potential USDA Biofuel Sources
Rishi Hazra, 17, Junior, Skyline High School, Sammamish, Washington, T: Jacob Lewis

EAEV052T  It’s Flaming Out: Using Artificial Intelligence To Emulate Critical Aspects of Wildfire Growth
Druhin Bhowal, 16, Junior, Ariel Singh, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

ENEV053  Eqwis: Rapid Animal Detection and Driver Warning System To Mitigate Animal Vehicle Collisions Using Artificial Intelligence
Vedant Malolan Srinivas, 15, Sophomore, Eastlake High School, Sammamish, Washington, T: Emma Morris

MCRO030  Exploiting Plasmid-Mediated Resistance: Discovery of Small-Molecule Inhibitors for the Artificial Activation of the Kid-Kis toxin-antitoxin System in Plasmid R1
Pinyu Liao, 16, Junior, Inglemoor High School, Kenmore, Washington, T: Beth Stewart

Spokane, USWA04, Eastern Washington Regional Science and Engineering Fair

ANIMO367  Effect of a Multi-Strain Probiotic (Visbiome ®) on Intestinal Microbiome Diversity in Two-Breeds of Canines
Jacob Paul Gannon, 18, Senior, Alexis Schallock, 18, Senior, North Central High School, Spokane, Washington, T: Dan Shay

BEHA028  A Detailed Statistical Analysis of Chest Muscle Recruitment Patterns During Activities of Daily Life
Neha Ann Kommareddy, 15, Junior, Central Valley High School, Spokane Valley, Washington, T: Tanya LaPier

ENEV052  Engineering a Bioplastic With Aspergillus oryzae To Increase Degradation Rate
Anna Jean Armstrong, 18, Senior, Joel E. Ferris High School, Spokane, Washington, T: Darci Hastings

TMED028  Regression Analysis of Pectoralis Major Muscle Electromyography To Estimate Anterior Thoracic Cage Forces
Ansel Kinney LaPier, 18, Senior, Central Valley High School, Spokane Valley, Washington, T: Tanya LaPier

Silverdale, USWA05, Washington State Science and Engineering Fair

BEHA062  Cognitive Profiling and Personalized Therapy Recommendation for Dementia Through a Language-Aware Multi-Model Artificially Intelligent System
Kosha Upadhyay, 15, Sophomore, Bellevue Senior High School, Bellevue, Washington, T: Sydney Katz

Regeneron International Science and Engineering Fair 2022
Finalist Directory

CBIO045  Elucidating the Mechanisms of Drug-Induced Hearing Loss: Characterization of Interferon Gamma Signaling as a Regulator of Hair Cell Regeneration and Inflammation in Zebrafish
Rohak Jain, 15, Sophomore, Interlake High School, Bellevue, Washington, T: Pankaj Jain

ETSD080  Study and Application of a Biomimetic Fish Propulsion System Mimicking the Body Structure and Stroke of Black Marlin for Energy-Efficient Propulsion With Respect to the Added Mass Effect
Jake W. Chung, 18, Senior, Interlake High School, Bellevue, Washington, T: Jinkyu Yang

MATS041  ScGAN: A Generative Adversarial Network To Predict Hypothetical Superconductors
Evan Eunjee Kim, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

PHYS047  Analysis of Ring Galaxies Detected Using Deep Learning With Real and Simulated Data
Harish Krishnakumar, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

PHYS073  Inferring the Neutron Star Maximum Mass and Lower Mass Gap in Neutron Star-Black Hole Systems With Spin
Christine Ye, 17, Senior, Eastlake High School, Sammamish, Washington, T: Casey Green

WEST VIRGINIA

Keyser, USWV01, Eastern Panhandle Science and Engineering Fair

PHYS018  A Measurement of Naturally Occurring Ambient Light Levels Near Peak Wavelength = 540 nm Near Twilight Hours
Audrey MacLachlan, 15, Sophomore, Hedgesville High School, Hedgesville, West Virginia, T: Andrew Ferber

ROBO027  Sibling Safe With LiDAR
Sydney Renee Boxtio, 14, Freshman, Spring Mills High School, Martinsburg, West Virginia, T: Jana Woofter

Charleston, USWV50, West Virginia State Science and Engineering Fair

BEHA022  Facial Recognition: The Impact on Identifying People When Features Around the Face Are Altered
Abigail Mae Snider, 15, Freshman, Hedgesville High School, Hedgesville, West Virginia, T: Andrew Ferber

BMED027  Analyzing Relationships Among Features of Diabetes-Induced Cerebral Microvascular Disease Using Causal Inference Methods
Lauren Shen, 16, Sophomore, Morgantown High School, Morgantown, West Virginia, T: Stacey Yuhase

WISCONSIN

Glendale, USWI02, Nicolet Science and Engineering Fair

SOFT035  Novel Method for the Identification of High-Risk Space Debris
# Thomas Marshall Vielmetti, 18, Senior, Nicolet High School, Glendale, Wisconsin, T: Stephanie Rasmussen

MBED013  Functional Comparison of LV19.20 Bispecific CAR T-Cells Manufactured Under Distinct Cytokine Priming Conditions
# Jordan Lee Thomas, 16, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

CBIO017  Leveraging Singular Value Decomposition(SVD) to Detect SARS-CoV-2 Variants
Aidan Wang, 16, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

LEARN MORE
Finalist Directory

ENEV015T  The Use of Laminar Flow To Reduce Aerosolized Particle Dispersion: A Strategy for Respiratory Disease Prevention
Max Cole Watchmaker#, 17, Junior, David Anthony Watkins, 16, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Jurianitch

Madison, USWI04, Capital Science and Engineering Fair

ENBM034  An Efficient and Accurate Super-Resolution Approach to Low-Field MRI via U-Net Architecture With Logarithmic Loss and L2 Regularization
Aryan Thomas Kalluvila, 17, Junior, Hartford Union High School, Hubertus, Wisconsin, T: Matthew Rosen

MATS027  3D Printed Foam Structures for Safer High School Football Helmets
Varun Nathan, 17, Junior, James Madison Memorial High School, Madison, Wisconsin, T: Hridyesh Tewani

Fond du Lac, USWI50, Badger State Science and Engineering Fair

BMED035  Defining the Mechanism of Fibroblast Death in Pulmonary Emphysema To Target Novel Therapies for COPD
Jonathan Crawford, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Jurianitch

WYOMING

Greybull, USWY01, Northern Wyoming District Science Fair

ENEV036  A Low-Cost Device To Improve the Quality of Drinking Water: Utilization of Ultrasonic Transduction in Conjunction With Filtration
Jose Atiano, 19, Senior, Greybull High School, Greybull, Wyoming, T: Joel Kuper

Laramie, USWY50, Wyoming State Science Fair

CBIO034  Modeling Genetic and Neurological Changes With Alcohol Use Disorder
Zoya Khan, 15, Sophomore, Cheyenne Central High School, Cheyenne, Wyoming, T: Sobia Khan

# ROBO045  Evaluating Machine Learning Methods for Modeling the Distribution of the Two Form Bumble Bee (Bombus bifarius) in Wyoming
Padmalakshmi Ramesh, 15, Freshman, Laramie High School, Laramie, Wyoming, T: Jason Carlisle

VIETNAM

Hanoi City, Vietnam, VNMO01, Hanoi Science Fair

BEHA063T  Environmentally Responsible Consumption Behavior of Youth
Huy Nguyen Quang Pham, 17, Senior, Bao Nguyen Gia Pham, 15, Sophomore, Phan Huy Chu High School, Hanoi, Vietnam, T: Huy Tran

BMED077T  Evaluation of Gastric Cancer Stem Cell Targeting Ability of Saponin Extract and Preparation of Tea Product from Ardisia gigantifolia Stapf. Leaves
Minh Xuan Dao, 18, Junior, Cuong Le Nguyen, 17, Junior, Thai Nguyen Specialized High School, Thai Nguyen, Vietnam, T: Thanh Truong

ZIMBABWE

Harare, Zimbabwe, ZWE001, Zimbabwe National Science Fair

BEHA053T  Mechatronics in a Zimbabwean Girl's World: Cultivating Interest in STEM Among Female Students in Zimbabwe by Using Mechatronics
Tanatswa Alexandra Matonda, 17, Senior, Tadiswa-Chloe Chipa Mafara, 18, Senior, Peterhouse Girls School, Marondera, Mashonaland East, Zimbabwe, T: Samantha Satumba

CHEM040  Extracting Hemic Acid From Banana Peels To Reduce the Risks of Salinization
Ruvurashare Sharon Mutuma, 18, Senior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Coughlan Ndambakuwa

EGSG007  Typhi capensis (Reed) Biofuel
# Memory Panashe Bvungo, 18, Senior, Dominican Convent High School Harare, Harare, Zimbabwe, T: Coughlan Ndambakuwa

ENEV013  An Inexpensive and Easily Produced System To Reduce Indoor Air Pollution
# Tanaka Chirira, 17, Senior, ZRP High School, Harare, Zimbabwe, T: Richard Ngomanyuni

ENEV049T  Development of a Low-Cost Highly Efficient Filter for Heavy Metal and Organic Contaminant Removal
Nyaradzo Nicole Mutiti#, 18, Senior, Omar Chinyanga, 17, Senior, Peterhouse Girls School, Marondera, Mashonaland East, Zimbabwe, T: Samantha Satumba

ENEV099  Clay Bricks: An Ultimate Solution to Zimbabwe's Clean Water Crisis
Ruvurashare Moyo, 16, Sophomore, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Knowledge Chikundi

MATS031  Novel Biodegradable and Eco-Friendly Porous Carbon Dioxide Adsorbent Porous Coordination Polymer
Sananthtavut Kaseke, 18, Senior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Memory Mutema

ROBO020  A Novel Amyotrophic Lateral Sclerosis Diagnostic Tool Using Machine Learning and Biomarkers
Start your STEM Career at Millikin University

Missouri University of Science and Technology is where careers are built. Whether you dream of becoming a scientist, engineer, educator or CEO, this is a place where you'll put your ideas into action and map out your future.

Get started on your future with Millikin’s real-world approach to education.

millikin.edu/STEM

See for yourself

There's no place quite like Missouri S&T. We invite you to tour campus and learn about life at S&T from one of our admissions ambassadors. These students can show you what it means to be a Miner.

Schedule an on-campus or virtual visit at visit.mst.edu

Start your journey today

futurestudents.mst.edu
Learn how 30+ hands-on learning opportunities enable our students to go off-road, explore Mars, and pursue their own paths to becoming Unconventional Engineers.
IF YOU CAN DREAM IT, YOU CAN MAKE IT AT NJIT.

Learn more about NJIT and visit campus on The College Tour!

ACCESSIBLE AND AFFORDABLE
83% of recent seniors graduated debt free.

GO BEYOND.
At Princeton, it’s not just about learning the who, what and when. We’ll help you examine the how and the why.

Our liberal arts curriculum emphasizes creativity, innovation and collaboration through the humanities, arts, social sciences, natural sciences and engineering.

Students also benefit from extraordinary academic resources and low student-to-faculty ratios.

Congratulations!
ISEF 2022 FINALISTS
A rare form of cancer left Colin Beach blind in one eye, but it also gave the Rose-Hulman biochemistry major a lifelong passion for helping people. Now Colin is a 2021 Goldwater Scholar, recognized as one of the nation’s top undergraduate STEM students for his work in biochemistry, medical physics and nanomedicine.

Rose-Hulman is one of The Princeton Review’s top five colleges for internships and science labs, and Colin has taken full advantage of both – serving five internships and research experiences in just three years. His work includes COVID-19 molecular biology, cancer research, biostatistics and clinical data analysis.

As one of Rose-Hulman’s 12 Goldwater Scholars in 16 years, Colin is set to deliver a healthier future for us all.

Check out more of Colin’s story. rose-hulman.edu/colin

You know what you want. You just need the opportunity to bring it to life.

Stevens Institute of Technology provides you with the project-based learning you need to transform your ideas into solutions that will change the world. Undergraduate research, the Launchpad@Stevens entrepreneurship training program, internships, co-ops with industry leaders, corporate-sponsored capstone projects and Stevens’ proximity to the corporate and cultural offerings of New York City all present you with a world of opportunity. With more than 97% of the Class of 2021 reaching their desired outcomes within 6 months of graduation, the proof is in the numbers.

Stevens ranked 9th in the nation for “Best Career Placement” from The Princeton Review’s “Best Value Colleges,” 2021
Join the hunt and find out more about Swarthmore’s liberal arts curriculum, including an ABET-accredited engineering program: swarthmore.edu

AT SWARTHMORE COLLEGE, WE HUNT PTERODACTYLS.

Wait, seriously?
Yep. It’s a tradition. We also rank #3 among U.S. colleges and universities for students who go on to earn Ph.D.s and 5 alumni have won a Nobel Prize.

Wow. Sounds like a lot happens in the classroom.
It does! With small class sizes, you work closely with your professors. (They know all the best techniques for slaying prehistoric winged beasts amidst our 425-acre arboretum campus!)

So is this pterodactyl hunt all you do outside of classes?
Of course not! Swarthmore funds and supports a lot of undergraduate research projects...I BET YOU CAN GUESS WHAT I AM RESEARCHING?!

Get a hands-on, research-fueled STEM education at Temple University.
UTC’S AWARD-WINNING ENGINEERING AND COMPUTER SCIENCE PROGRAM

UTC OFFERS PROGRAMS IN:
- Mechanical Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Engineering Management
- Mechatronics
- Computer Science
- Computer Engineering

SCHEDULE A TOUR AND MEET OUR PROFESSORS!

UTC is home to 6,600 undergraduates across the School of Engineering, the School of Arts and Sciences, and the School of the Museum of Fine Arts (SMFA at Tufts).

Tuft is a kind, collaborative, civically-engaged institution with the heart and soul of a liberal arts college.

- 4 miles outside of downtown Boston with easy access to internships and co-ops.
- 12% first-generation students
- 36% US students of color
- 46% women in the School of Engineering
- 45% need-based aid recipients
- 12% Pell grant recipients

@tuftsadmissions
WITH 13 COFFEE SHOPS ON CAMPUS, IT'S NO WONDER

94 Nobel laureates
160+ research centers, institutes, and committees
80% of undergraduate students involved in research
$450 million in sponsored research annually
99.999+% of the speed of light achieved by electrons in Argonne’s advanced photon source
1st initiative worldwide formally training quantum engineers at the undergraduate level at the Pritzker School of Molecular Engineering
$1 Milkshake Wednesdays
USAID is the world's premier international development agency and a catalytic actor driving development results. USAID's work advances U.S. national security and economic prosperity, demonstrates American generosity, and helps people progress beyond assistance.

SCIENCE FOR DEVELOPMENT AWARDS

The USAID Science for Development Awards will recognize Regeneron ISEF participants with First ($5,000), Second ($3,000), and Third ($2,000) place awards in the following categories for a total of $40,000 in awards:

- Global Health
- Agriculture and Food Security
- Climate and Environmental Protection
- Working in Crisis and Conflict

Engineer at WashU.

Engineer your way.

AEROSPACE ENGINEERING
BIOINFORMATICS
BIOMEDICAL ENGINEERING
CHEMICAL ENGINEERING
COMPUTER ENGINEERING
COMPUTER SCIENCE
COMPUTER SCIENCE + ECONOMICS
COMPUTER SCIENCE + MATH
ELECTRICAL ENGINEERING
ENERGY ENGINEERING
ENVIRONMENTAL ENGINEERING
HUMAN-CENTERED INTERACTION
MATERIALS SCIENCE & ENGINEERING
MECHANICAL ENGINEERING
MECHATRONICS
NANOSCALE SCIENCE & ENGINEERING
ROBOTICS
SYSTEMS

Are you ready to learn in an environment that challenges you to explore and create in a world we cannot yet imagine? Are you ready to make a positive impact on the local community, the country and the world?

Then it’s time to learn more about our programs and how to apply. Visit admissions.wustl.edu

Washington University in St. Louis
Pursue Your Opportunity
Hands on Future Focused Career Ready

Wentworth Institute of Technology

6:1 student-to-faculty ratio

1200+ science, math, and engineering labs on campus

24/7 hours the Center for Engineering Innovation and Design (CEID) is open for student use

200+ summer fellowships for undergraduate science and engineering students annually

2:1 student-to-faculty ratio in STEM majors

>40% of Yale College students graduating with a STEM major are women

Yale Admissions.Yale.EDU
Thank you to the dedicated committee members of REGENERON ISEF 2022

Display & Safety Committee

Courtney Butler, Co-Chair
Ryan Patterson, Co-Chair
Tina Webb-Browning, Co-Chair
Kim Rex, Executive Committee

Lucy Adams
Susan Appel
Warren Bernard
Sharon Boyer
Tom Carson
Tom Conroy
Henry Disston
Nancy Hampson
Loree A. Harvey
Paul Hughes
Paula Johnson
Bruce Jones
Brenda Kroft
Tim Martin
George McKelvy

Anna Pawlow
Elaine Qualter
Janet Roloff
Raevathi Ramadorai
Krystal Robinson
Paul Roger
Lisa Russell-Mina
Carole Russo
Natasha Shah
Karen Shelley
Sharon Snyder
Byron Soto
Allie Hewett Stifel
Caitlin Sullivan
Natalie Sutton
Raina van Duym
Randy Williams

Blake Monroe
Evelyn Montalvo
Raul Montes
Julia Nahman
Michelle Norgren
Jerry Overman
Pam Probert
Katherine Schilling
Joe Scott
Lisa Scott
John Sember
Warren Spalinger
Andrea Spencer
Erin Stoesz
Janet Sullivan
Dan Thomas
Denise Vinton
Laurance (Larry) Walker
Kerrm Yau

Judging Advisory Committee

Robert Yost, Chair
Lorna Glaunsinger
William Glaunsinger
Chris Gould
Alicia Martinez

Robert Reis
Chris Rodee
Charles Vukotich
Janet Vukotich

Daryl Anderson
Deirdre Ball
Christopher Berman
Brandy Boyd
Michele Brenner
Debra Cannan
Paolo Cruz
Lori Dixon
Kevin Easterly
Elaine Edwards
Gabriella Freckmann
Emily Freeland
Christian Gillespie
Shannon Giorgianni
Ricardo Gortaite
Hunter Hart
Lauren Helms
Tzeitel Hirni
Ashley Johnson
William Johnson
June Kee
Nora Kelly
Naveed Khan
Natalie Kinnear
Tracy Lee
Susan Li
Jacqueline Ludden
Nancy Moulding
Rachel Myers
Emma Neely
Eric Nguyen
Eric Olson
Pratham Patkar
Aparna Paul

James C. Moore
Chief Technology Officer
Nancy Shute
Editor in Chief

Rachel Goldman Alper
Chief Operating Officer
Stephen Egts
Chief Design Officer
Matt Fuller
Chief Financial Officer
Michele Glidden
Chief Program Officer

Cait Goldberg
Chief of Event Planning
and Operations
Gayle Kansager
Chief, Communications & Marketing Officer
Bruce Makous
Chief Advancement Officer

Maya Ajmera, President & CEO, Publisher, Science News
Thank you to the dedicated Scientific Review committee members of REGENERON ISEF 2022

Scientific Review Committee
- Susan Appel
- Henry Disston
- Jennifer Green
- Paula Johnson
- Timothy Martin
- Evelyn Montalvo
- Joseph Scott
- Jason Shuffitt
- Andrea Spencer

Scientific Review Committee Readers
- Nancy Aiello
- Tom Conroy
- Andrew Denner
- Andrew Peterson
- Erin Rumpke
- Lisa Scott
- Larry Sernyk
- Jimmy Thorne
- Jeanne Waggener
- Kerrm Yau

Society for Science thanks the Regeneron Team who so greatly contributed to the success of Regeneron ISEF 2022

- Leonard S. Schleifer
  Co-founder, President & Chief Executive Officer

- George D. Yancopoulos
  Scientific Founder, President & Chief Scientific Officer

- Christina Chan
  Senior Vice President, Corporate Communications & Citizenship

- Potoula Stavropoulos
  Senior Director, Social Impact

- Jennifer Topiel
  Strategic Communications Consultant

- Najla Husseini
  Senior Manager, Social Impact

- Alex Bowie
  Executive Director, Corporate and Digital Communications

- Ella Campbell
  Associate Director, Corporate and Digital Communications

- Tara Valenza
  Senior Manager, Digital Communications & Branding

And the dozens of Regeneron employees who judge, interpret and volunteer at Regeneron ISEF.
Society for Science and Regeneron recognize with gratitude the judges, volunteers, parents, teachers and fair directors who support their local, regional, state and national science fairs.

We especially want to express our thanks to those individuals from around the globe who stepped forward to volunteer at this year’s hybrid Regeneron ISEF 2022. We recruited:

- more than 1,600 judges
- 454 volunteer judging proctors
- 97 interpreters in 19 languages

And unique to this year’s hybrid event, our volunteers came from 45 countries, regions and territories, including 48 states within the United States. We could not have done it without the support of the Society for Science Affiliated Fair Network and members of our various Local Arrangements Committees.

Atlanta Local Arrangements Committee

Warren Bernard
Sharon Boyer
Laura Brewer
Lynette Clark
David Cooke
Terri George
Janetta Greenwood
Lesley Litt
Chris Mucha
Will Murray
Lencie Plancher
Jordan Rose
Shelley Seagraves
Tokiwa Smith
Heidi Turcotte
Laura Whitlock

ISEF College and Career Fairs

Thanks to the following colleges, universities and other organizations for their support.

- Alfred University
- Arizona State University
- Boston University
- Caltech
- Carnegie Mellon University
- Case Western Reserve University
- Colby College
- College Essay Mentor
- Davidson Institute for Talent Development
- Drexel University
- Embry-Riddle Aeronautical University
- Florida Institute of Technology
- George Washington University
- Georgia Institute of Technology
- Harvey Mudd College
- Hawaii Pacific University
- Illinois Institute of Technology
- Imperial College London
- Lawrence Technological University
- Lehigh University
- Maine Maritime Academy
- Marist College
- Michigan Technological University
- Millikin University
- Missouri S&T
- MIT
- NC State University - College of Engineering
- New Jersey Institute of Technology
- NYU Tandon School of Engineering
- Princeton University
- Rensselaer Polytechnic Institute
- Rose-Hulman Institute of Technology
- Sigma Xi
- Stevens Institute of Technology
- Swarthmore College
- Temple University
- The Citadel
- Tufts University
- University of Chicago
- University of Tennessee at Chattanooga
- University of Texas at Dallas
- University of Washington - Tacoma
- Virginia Commonwealth University
- Washington University in St. Louis
- Webb Institute
- Wentworth Institute of Technology
- Western Colorado University
- Yale University
- Arconic Foundation
- Cesco Linguistic Services
- King Abdulaziz & his Companions Foundation for Giftedness & Creativity
- National Geographic Society
- National Security Agency
- Rise
- United States Patent and Trade Office
EMPOWER THE NEXT GENERATION OF SCIENTISTS

Invest in scientific literacy to provide students the skills and motivation they need to succeed in STEM

Science News Learning supports effective STEM education in the classroom by bringing the award-winning journalism of Science News, along with ready-to-use educational resources, to middle and high schools across the United States.

PARTICIPATING SCHOOLS RECEIVE

• 10 print copies of each Science News issue throughout the school year
• Year-round access to ScienceNews.org and its full archives, dating back to 1921
• Access to the Digital Educator Guide Library, full of interdisciplinary lesson plans paired to Science News articles and aligned with Next Generation Science Standards
• Programmatic newsletters that highlight the current Educator Guide and provide other teaching resources
• Access to an Educator Community of 17,000 teachers who share ideas for integrating program resources into their classrooms
• Professional development workshop series to build resource-related content and hear best practices from other program educators

Science News Learning

SUPPORT SCIENCE NEWS LEARNING BY MAKING A DONATION

www.societyforscience.org/donateSNLearning
Society for Science is a champion for science, dedicated to expanding scientific literacy, effective STEM education and scientific research. Founded in 1921, we are a nonprofit 501(c)(3) membership organization focused on promoting the understanding and appreciation of science and the vital role it plays in human advancement. Through its acclaimed science research competitions, including the Regeneron Science Talent Search, the Regeneron International Science and Engineering Fair and the Broadcom MASTERS, and impactful outreach and equity programming, its award-winning magazine, Science News and digital media properties, Science News Explores, the Society is committed to inform, educate and inspire.

Learn more at www.societyforscience.org

Follow us on:
Facebook   www.facebook.com/societyforscience
Twitter     @Society4Science
Instagram   @Society4Science
Snapchat    Society4Science

Regeneron is a leading biotechnology company that invents life-transforming medicines for people with serious diseases. Founded and led for over 30 years by physician-scientists, our unique ability to repeatedly and consistently translate science into medicine has led to nine FDA-approved treatments and numerous product candidates in development, almost all of which were homegrown in our laboratories. Our medicines and pipeline are designed to help patients with eye diseases, allergic and inflammatory diseases, cancer, cardiovascular and metabolic diseases, pain, hematologic conditions, infectious diseases and rare diseases.

Regeneron believes that operating as a good corporate citizen is crucial to delivering on our mission. We approach corporate responsibility with three goals in mind: to improve the lives of people with serious diseases, to foster a culture of integrity and excellence and to build sustainable communities. Regeneron is proud to be included on the Dow Jones Sustainability World Index and the Civic 50 list of the most “community-minded” companies in the United States. Throughout the year, Regeneron empowers and supports employees to give back through our volunteering, pro-bono and matching gift programs. Our most significant philanthropic commitments are in the area of science education, including the Regeneron Science Talent Search and Regeneron International Science and Engineering Fair.

Learn more about our programs at www.regeneron.com/scienceeducation

Follow us on:
Facebook   www.facebook.com/Regeneron
Twitter     @Regeneron
Instagram   @Regeneron
Youtube     www.youtube.com/regeneron
LinkedIn    www.linkedin.com/company/regeneron-pharmaceuticals