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Dear Finalists,

Congratulations on being chosen as a finalist for the 2021 Regeneron International Science and Engineering Fair. We hope your experience, while virtual, lived up to your expectations of this distinguished event. 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 a uniquely challenging year.

Regeneron is honored to sponsor the International Science and Engineering Fair, which celebrates the world’s top young science talent and showcases the critical role science plays in advancing society.

Supporting ISEF is a natural extension of Regeneron’s mission.

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 more than 30 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.

This year, we’ve seen more than ever that science and other STEM fields are critically important. Pursuing your research in the face of adversity during a global pandemic took fortitude and ingenuity—and was more necessary than ever. 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.

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
Congratulations on being a finalist at the Virtual Regeneron International Science and Engineering Fair 2021!

Our biggest fair ever!

Tens of millions of students compete in science fairs every year around the globe, with nearly 2,000 finalists this year competing for $5 million in awards and scholarships! ISEF alumni have gone on to win some of the most prestigious awards, including the Nobel Prize and MacArthur Fellowship, they have gone on to launch companies and they have joined academia to teach the next generation of scientists and engineers.

In a year in which the Society was not certain what to expect in terms of science fair participation, we saw student scientists around the globe inspired to help make the world a better place through science, technology, engineering and math. It’s clear: 2020 and 2021 have been tremendous years for science. We have witnessed, first hand, the amazing impact that science has on our everyday lives. We have seen scientists work collaboratively at breakneck speed to learn more about the COVID-19 virus and discover new treatments and vaccines. In a year that has been bleak, science has given us hope.

Through virtual Regeneron ISEF 2021, Society for Science extended that sense of hope to you—our finalists—as well as the general public.

Our virtual science fair enabled people around the world to hear from top scientists, engineers and entrepreneurs, including Michio Kaku (STS 1964; ISEF 1963), futurist, physicist and author; George Yancopoulos (STS 1976), Regeneron Scientific Founder, President and Chief Scientific Officer; Frances Arnold, winner of the Nobel Prize in Chemistry; H. Robert Horvitz, winner of the Nobel Prize in Physiology or Medicine; Monika Schleier-Smith (STS 2001), MacArthur Fellow; Roderic Pettigrew (ISEF 1967), winner of the Vannevar Bush Award; Heidi Williams (ISEF 1999), MacArthur Fellow; Huda Zoghbi, Breakthrough Prize Winner; and many others.

We also showed the world the amazing research projects taking place by student scientists and engineers, by showcasing your work in our virtual Finalists’ Hall. You are poised to solve our world’s most intractable challenges.

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

Thank you to all our sponsors, volunteers, judges and interpreters who made this event possible. I hope to see you next year for Regeneron ISEF 2022!

Sincerely,

Maya Ajmera
President & CEO
Society for Science
Publisher, Science News
Science Talent Search 1985
ABOUT 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 a global 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 $5 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; National Geographic Society; Akamai Foundation; Jacobs; King Abdulaziz & his Companions Foundation for Giftedness & Creativity; Microsoft; Microsoft Azure Sphere; Richard F. Caris Foundation; Rise, an initiative of Schmidt Futures and the Rhodes Trust; Siegel Family Endowment; West Pharmaceutical Services; Cesco Linguistic Services; Gordon and Betty Moore Foundation; Insaco and Zeiss. 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
For 100 years, the Society for Science’s flagship magazine, Science News, has been a trusted source for journalism on the latest scientific research and discoveries. Science News for Students continues this tradition of excellence by providing age-appropriate science news to students, parents and educators.

For 80 years, the Society has inspired the next generation of scientists and engineers through our world-class STEM competitions, including the International Science and Engineering Fair. Those competitions helped launch the careers of more than 70,000 young people.

More recently, the Society launched a range of programming aimed at ensuring that every young person has an opportunity to pursue their passion in STEM.

**LETS MEET OUR FUTURE CHALLENGES TOGETHER**

Today, we face global challenges, including the pandemic and climate change. Evidence-based science journalism and new generations of innovative scientists and engineers are essential to meeting these and other challenges of the next century.

**Please visit us at www.societyforscience.org**
GRAND AWARDS AT REGENERON ISEF 2021

George D. Yancopoulos Innovator Award—$75,000
Michelle Hua
Bloomfield Hills, Michigan
Dilated Silhouette Convolutional Neural Network
Booth ROBO033

Regeneron and Society for Science are pleased to present an award of $75,000 to the top First Place project. 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 is selected on the basis of outstanding and innovative research, as well as on the potential impact of the work—in the field and on the world at large.

Regeneron Young Scientist Awards—$50,000
Catherine Kim
Jericho, New York
Hierarchical Prediction of Adverse Drug Reactions
CBIO080

Daniel Shen
Raleigh, North Carolina
AI-Powered Facial-cue Control Module
SOFT012

Regeneron and Society for Science are pleased to present $50,000 to two First Place projects. These finalists are selected for their commitment to innovation in tackling challenging scientific questions, using authentic research practices and creating solutions to the problems of tomorrow.

Gordon E. Moore Award for Positive Outcomes for Future Generations—$50,000
John Benedict Allasas Estrada
Fresno, California
AI Model for Drought Stress Assessment in Plants
PLNT012

In recognition of Gordon E. Moore’s continued legacy of honoring the best at the International Science and Engineering Fair, the Gordon and Betty Moore Foundation is providing the $50,000 Gordon E. Moore Award for Positive Outcomes for Future Generations. The Gordon E. Moore Award is given 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. The award will be used by the winner to cover post-secondary educational expenses.
Craig R. Barrett Award for Innovation — $10,000
Arya Tschand
Lincroft, New Jersey
Low-Cost, High-Efficiency Irrigation Network ENMC072

Society for Science is proud to present the Craig R. Barrett Award for Innovation. This $10,000 award is given 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. The award will be used by the winner to cover post-secondary educational expenses.

H. Robert Horvitz Prize for Fundamental Research — $10,000
Neha Mani
New York, New York
Diagnostic Method Based on Bacterial Motion MCRO043

H. Robert Horvitz is the 2002 Nobel Prize Winner in Medicine or Physiology. He served as the Chair of the Society for Science’s Board of Trustees from 2010-2019. In recognition of his scientific excellence and service and contributions to the Society, the $10,000 H. Robert Horvitz Prize for Fundamental Research is 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. The award will be used by the winner to cover post-secondary educational expenses.

Peggy Scripps Award for Science Communication — $10,000
Franklin Wang
Palo Alto, California
Asteroid Discovery with Synthetic Data & ConvNets PHYS050

Society for Science is proud to celebrate its Centennial through a $10,000 award honoring Peggy Scripps who was a science journalist who served as a writer and editor of Science Newsletter for many years. This award is given to the finalist who is best able to communicate their project to the lay public, explaining both the science and its potential impact on society. The award will be used by the winner to cover post-secondary educational expenses.

Grand Awards are presented in each of the 21 ISEF categories, as follows:

- 1st Place Award: $5,000 cash award
- 2nd Place Award: $2,000 cash award
- 3rd Place Award: $1,000 cash award
- 4th Place Award: $500 cash award
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 2021 SAOs!

Acoustical Society of America
Aerojet Rocketdyne Foundation
Air Force Research Laboratory on behalf of the United States Air Force
American Chemical Society
American Committee for the Weizmann Institute of Science
American Institute of Aeronautics & Astronautics
American Mathematical Society
American Meteorological Society
American Psychological Association
American Statistical Association
Arizona State University
Association for Computing Machinery
Association for the Advancement of Artificial Intelligence
ASU Rob and Melani Walton Sustainability Solutions Service
Central Intelligence Agency
China Association for Science and Technology (CAST)
Drug, Chemical & Associated Technologies Association (DCAT)
Edison International
Embark China
Florida Institute of Technology
Fondazione Bruno Kessler
IEEE Foundation
ISEF Special Award Organizations

Innopolis University
International Council on Systems Engineering – INCOSE
K. Soumyanath Memorial Award
King Abdulaziz & his Companions Foundation for Giftedness and Creativity
Mu Alpha Theta, National High School and Two-Year College Mathematics Honor Society
National Anti-Vivisection Society
National Oceanic and Atmospheric Administration – NOAA
National Taiwan Science Education Center
NC State 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
Raytheon Technologies Corporation
Ricoh USA, Inc.
Serving Society Through Science
Shanghai Youth Science Education Society
Sigma Xi, The Scientific Research Honor Society
SPIE, the international society for optics and photonics
The Susie and Gideon Yu Awards for Innovation in Sustainability
U.S. Agency for International Development
United States Environmental Protection Agency
University of Arizona
Wolfram Research, Inc.
YM American Academy
Zeiss
VIRTUAL REGENERON INTERNATIONAL SCIENCE AND ENGINEERING FAIR
2021 PROGRAM

FRIDAY, MAY 14

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<tr>
<td>10:00 a.m. Eastern</td>
<td>Finalists Orientation/Enter Platforms</td>
<td>ProjectBoard</td>
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<td>Finalists only</td>
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<tr>
<td>11:00 a.m.–1:00 p.m. Eastern</td>
<td>College Fair Live</td>
<td>ProjectBoard</td>
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<td>Finalists only</td>
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<td>1:00 p.m.–3:00 p.m. Eastern</td>
<td>STEM Career Hall Live</td>
<td>ProjectBoard</td>
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<td>Finalists only</td>
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<td>5:00 p.m.–7:00 p.m. Eastern</td>
<td>College Fair Live</td>
<td>ProjectBoard</td>
</tr>
<tr>
<td>7:00 p.m.–8:00 p.m. Eastern</td>
<td>Opening Ceremony</td>
<td>Sponsored by Regeneron</td>
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Welcome Remarks, Maya Ajmera, President & CEO, Society for Science; Publisher, Science News
Remarks from George Yancopoulos, Scientific Founder, President & Chief Scientific Officer, Regeneron
Keynote Address, Michio Kaku, Futurist, Physicist, Author
“Around the World” Dance Video featuring Regeneron ISEF 2021 finalists

8:30 p.m.–10:00 p.m. Eastern | Student Pin Exchange | Sponsored by National Geographic Society | Event Farm |
| Finalists only networking event |

MONDAY, MAY 17

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<td>5:00 p.m.–7:00 p.m. Eastern</td>
<td>College Fair Live</td>
<td>ProjectBoard</td>
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<tr>
<td>5:00 p.m.–7:00 p.m. Eastern</td>
<td>STEM Career Hall Live</td>
<td>ProjectBoard</td>
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<tr>
<td>7:00 p.m. Eastern</td>
<td>Excellence in Science and Technology Panel</td>
<td>Sponsored by Society for Science</td>
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Moderated by Joe Palca, Science Correspondent, National Public Radio

Featuring:

- **Frances Arnold**
  Linus Pauling Professor of Chemical Engineering
  California Institute of Technology
  Nobel Prize in Chemistry 2018

- **H. Robert Horvitz**
  David Koch Professor, Department of Biology
  Massachusetts Institute of Technology
  Investigator, Howard Hughes Medical Institute
  Nobel Prize in Physiology or Medicine 2002
Dr. Michio Kaku is one of the most widely recognized figures in science in the world today. He has written four New York Times best sellers.

He graduated summa cum laude in physics from Harvard in 1968, graduating first in his physics class. He received his Ph.D. from the University of California, Berkeley in 1972. He has taught at City College of the City University of New York for 45 years and holds the Henry Semat Chair in Theoretical Physics at CCNY.

Dr. Kaku is an internationally recognized authority in two areas. The first is Einstein’s unified field theory, which Dr. Kaku is attempting to complete. The other is to predict trends affecting business, medicine, finance and our way of life, based on the latest research in science.

Dr. Kaku is the science correspondent for CBS This Morning TV. His weekly science radio show is heard in 100 cities across the country. He has 3 million fans on Facebook and one million people follow him on Twitter. He has hosted numerous science specials on the Discovery Channel and Science Channel, BBC-TV, and has appeared on the David Letterman Show, Good Morning America, Today Show, HBO, Stephen Colbert Report, CNN, the History Channel, PBS-TV, National Geographic and all the major news media.
Schedule

- **Roderic Pettigrew**
  Chief Executive Officer, Engineering Health
  Executive Dean for Engineering Medicine
  Texas A&M University
  Vannevar Bush Award 2020
  ISEF 1967

- **Monika Schleier-Smith**
  Associate Professor, Physics
  Stanford University
  MacArthur Fellow 2020
  STS 2001

8:30 p.m. Eastern  Innovation and Entrepreneurship Panel | Sponsored by Society for Science  ProjectBoard
Moderated by Maya Ajmera, President & CEO, Society for Science; Publisher, Science News
Featuring:

- **Omar Abudayyeh**
  Fellow, McGovern Institute
  ISEF 2008

- **Eden Full Goh**
  Founder & CEO, Mobot
  ISEF 2007–2008

- **Michael Li**
  Founder, The Data Incubator and President for data at Pragmatic Institute
  STS 2003; ISEF 2003

- **David Schlesinger**
  CEO & Co-founder, Mendelics
  ISEF 1997

**TUESDAY, MAY 18**

9:00 a.m.–6:00 p.m. Eastern  Public Exhibition of Projects  ProjectBoard
Finalists will be asked to be at their projects for 2 hours, as their schedule allows.

9:00 a.m. Eastern  STEM Experiential Hall  ProjectBoard

10:00 a.m.–11:00 a.m. Eastern  National Leadership Council Meet & Greet  Event Farm
What do a Harvard professor, entrepreneurs in AI, health, and aviation, a Venture Capitalist and more have in common? They're all members of the Society’s National Leadership Council, or NLC, a body of ISEF and STS alumni from our science competitions (just like you!). Finalists can join us on Event Farm to meet them “in-person.”
Featuring:

- **Shantanu Gaur**
  Co-founder and CEO, Allurion Technologies
  ISEF 2003–2004

- **Felipe Gómez del Campo**
  CEO of FGC Plasma Solutions Inc.
  Visiting Scientist at MIT RGD Lab
  ISEF 2012

- **Catherine Havasi**
  CEO and Co-founder of Dalang Health
  Co-founder and Board Advisor of Luminoso Technologies, Inc.
  STS 1999; ISEF 1998–1999
EXCELLENCE IN SCIENCE AND TECHNOLOGY PANEL

Sponsored by Society for Science

FRANCES ARNOLD
• Linus Pauling Professor of Chemical Engineering, California Institute of Technology
• Nobel Prize in Chemistry 2018

H. ROBERT HORVITZ
• David Koch Professor, Department of Biology, Massachusetts Institute of Technology
• Investigator, Howard Hughes Medical Institute
• Nobel Prize in Physiology or Medicine 2002

MONIKA SCHLEIER-SMITH
• Associate Professor, Physics, Stanford University
• MacArthur Fellow 2020
• STS 2001

RODERIC PETTIGREW
• Chief Executive Officer, Engineering Health
• Executive Dean for Engineering Medicine, Texas A&M University
• Vannevar Bush Award 2020
• ISEF 1967

Moderated by

JOE PALCA
Science Correspondent, National Public Radio
Schedule

- **Michael Li**
  Founder, The Data Incubator and President for data at Pragmatic Institute
  STS 2003; ISEF 2003

- **Kate Lowry**
  Science Director of Science Philanthropy Alliance
  STS 2006

- **Rajen Sheth**
  Vice President, Google Cloud AI and Industry Solutions, Google

**11:30 a.m. Eastern**

**Women in STEM Panel | Sponsored by Johnson & Johnson**

Moderated by Nancy Shute, Editor in Chief, Science News

Featuring:

- **Dapo Ajayi**
  Vice President, Technical Operations and Supply Chain Strategy
  Johnson & Johnson

- **Heidi Williams**
  Charles R. Schwab Professor of Economics
  Stanford University
  MacArthur Fellow 2015
  ISEF 1999

- **Dawn Wright**
  Chief Scientist
  ESRI

- **Huda Zoghbi**
  Professor
  Baylor College of Medicine
  Investigator, Howard Hughes Medical Institute
  Breakthrough Prize in Life Sciences 2017

**1:00 p.m. Eastern**

**Social Innovation Panel | Sponsored by Rise, an Initiative of Schmidt Futures and the Rhodes Trust**

Moderated by Cheryl Dorsey, President, Echoing Green

Featuring:

- **Pelagia Majoni**
  Grace Hopper Award Winner
  Haverford College
  ISEF 2017

- **Sahithi Pingali**
  Founder & CEO, WaterInsights
  Stanford University
  ISEF 2017

- **Nathan Wang**
  Policy Entrepreneur
  Johns Hopkins University
  ISEF 2019

- **Ryan Westcott**
  Founder & President
  Aeronautics Northwest
  ISEF 2017–2020
INNOVATION AND ENTREPRENEURSHIP PANEL

Sponsored by Society for Science

OMAR ABUDAYYEH
• Fellow, McGovern Institute
• ISEF 2008

EDEN FULL GOH
• Founder & CEO, Mobot
• ISEF 2007–2008

MICHAEL LI
• Founder at The Data Incubator and President for data at Pragmatic Institute
• STS 2003; ISEF 2003

DAVID SCHLESINGER
• CEO & Co-founder, Mendelics
• ISEF 1997

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

Moderated by

SOCIETY FOR SCIENCE
What do a Harvard professor, entrepreneurs in AI, health, and aviation, a Venture Capitalist and more have in common? They’re all members of the Society’s National Leadership Council, or NLC, a body of ISEF and STS alumni from our science competitions (just like you!). Finalists can join us on Event Farm to meet them “in-person.”

Featuring:

- **Kevin Heller**
  Executive Vice President Research and Development, Jasper Therapeutics
  STS 1989

- **Elyse Hope**
  Section Manager, Health, Genome British Columbia
  STS 2006; ISEF 2004–2006; DCYSC 2002

- **Scott Duke Kominers**
  MBA Class of 1960 Associate Professor, Harvard Business School
  Faculty Affiliate, Department of Economics, Harvard University
  STS 2005; ISEF 2005

- **Meredith M. Lee**
  Chief Technical Advisor, UC Berkeley Computing, Data Science, & Society
  ISEF 2000

- **Willie T. Reaves Jr.**
  Chief Business Strategy Innovation Officer, Biotechnology Innovation Organization (BIO)
  ISEF 2007–2008

- **Sheel Tyle**
  Founder and CEO, Amplo
  ISEF 2006–2008; DCYSC 2005

**WEDNESDAY, MAY 19**

8:00 a.m.–8:00 p.m. Eastern  **Category Receptions**  Event Farm

Finalists will be invited to meet with representatives from the sponsor of their category as well as their fellow finalists during receptions, which will take place throughout the day.

**THURSDAY, MAY 20**

**Symposia**

9:00 a.m.–10:00 a.m. Eastern  **Beyond the Lab with National Geographic Young Explorers**  ProjectBoard

Hear from three former ISEF finalists (now National Geographic Young Explorers!) working on projects that take science to the next level.

10:00 a.m.–11:00 a.m. Eastern  **US Patent and Trademark Office**  ProjectBoard

Learn how intellectual property tools (patents, trademarks, copyrights, trade secrets) can help protect your science and engineering projects and help you continue on the path to innovation.

11:00 a.m.–12:00 p.m. Eastern  **Answering the Call of Science with Regeneron**  ProjectBoard

Regeneron experts answer questions from Regeneron ISEF finalists about biotechnology, scientific breakthroughs, emerging technologies, COVID-19 and more. Hear what’s on the minds of young innovative thinkers from around the world.
Johnson & Johnson

WOMEN IN STEM PANEL
Sponsored by Johnson & Johnson

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

HEIDI WILLIAMS
• Charles R. Schwab Professor of Economics, Stanford University
• MacArthur Fellow 2015
• ISEF 1999

DAWN WRIGHT
• Chief Scientist, Esri

HUDA ZOGHBI
• Professor, Baylor College of Medicine
• Investigator, Howard Hughes Medical Institute
• Director, Neurological Research Institute
• Breakthrough Prize in Life Sciences 2017

Moderated by

NANCY SHUTE
• Editor in Chief, Science News
### Schedule

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<tr>
<th>Time</th>
<th>Event</th>
<th>Platform</th>
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</thead>
<tbody>
<tr>
<td>2:00 p.m.–3:00 p.m. Eastern</td>
<td>Using Your Talents to Build a Better World with Rise</td>
<td>ProjectBoard</td>
</tr>
<tr>
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<td>Join this session to learn about Rise—a global talent program that finds extraordinary young people who need opportunity and supports them for life as they use their talents to serve others. An initiative of Schmidt Futures and the Rhodes Trust, Rise is building a global community of future leaders, connecting everyone who applies with a network of peers, learning resources and additional opportunities from Rise partners around the world.</td>
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</tr>
<tr>
<td>3:00 p.m.–4:00 p.m. Eastern</td>
<td>Regeneron Science Talent Search</td>
<td>ProjectBoard</td>
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<td>Learn about the United States’ oldest and most prestigious STEM competition (and a chance to win $250,000). The 2022 application will open June 1, 2021 for rising U.S. high school seniors.</td>
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</tr>
<tr>
<td>6:00 p.m.–7:00 p.m. Eastern</td>
<td>AI Research and Industry: What It’s Like and What Comes Next</td>
<td>Zoom Webinar</td>
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<td>Join us for a live conversation with pioneers in Artificial Intelligence from OpenAI, Google and comma.ai as they walk you through a day-in-the-life and what big ideas are on the horizon. The conversation will be led by ISEF alumnus and National Leadership Council member David Holz, CTO and Co-founder of Leap Motion (now UltraLeap).</td>
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<tr>
<td>8:00 p.m. Eastern</td>
<td>Special Awards Ceremony</td>
<td>ProjectBoard</td>
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<tr>
<td>FRIDAY, MAY 21</td>
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<tr>
<td>10:00 a.m.–11:30 a.m. Eastern</td>
<td>Grand Awards Ceremony</td>
<td>ProjectBoard</td>
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Regeneron International Science and Engineering Fair 2021
SOCIAL INNOVATION PANEL
Sponsored by Rise, an Initiative of Schmidt Futures and the Rhodes Trust

PELAGIA MAJONI
• Grace Hopper Award Winner
• Haverford College
• ISEF 2017

SAHITHI PINGALI
• Founder & CEO, WaterInsights
• Stanford University
• ISEF 2017

NATHAN WANG
• Policy Entrepreneur
• Johns Hopkins University
• ISEF 2019

RYAN WESTCOTT
• Founder & President, Aeronautics Northwest
• ISEF 2017–2020

CHERYL DORSEY
President, Echoing Green

Moderated by
In Case You Missed It

You can still explore Regeneron ISEF’s amazing programming. The opening ceremony, panel discussions and symposia are all available on our YouTube channel www.youtube.com/SocietyforScience

Don’t miss an opportunity to hear from top scientists, engineers and entrepreneurs like

- **Frances Arnold**, Nobel Prize in Chemistry
- **H. Robert Horvitz**, Nobel Prize in Physiology or Medicine
- **Roderic Pettigrew**, Vannevar Bush Award
- **Heidi Williams**, MacArthur Fellow
- **Huda Zoghbi**, Breakthrough Prize in Life Sciences

Excellence in Science and Technology Panel, Sponsored by Society for Science

Women in STEM Panel, Sponsored by Johnson & Johnson

Innovation and Entrepreneurship Panel, Sponsored by Society for Science

Social Innovation Panel, sponsored by Rise, an Initiative of Schmidt Futures and the Rhodes Trust
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Every purchase supports our mission to advance science literacy and help young scientists and engineers shine.
In 2021, the Society for Science is celebrating 100 years of championing science. Founded in 1921 as Science Service by journalist Edward W. Scripps and zoologist William Ritter, the Society communicates, fosters and advances the public understanding of science. In its first century of service, the organization published accurate, objective journalism in its Science News magazine, advised government agencies, cultivated the nation’s top science talent and ignited a passion for science in generations of students. Celebrate with us and visit our new online timeline, 100 Years of Impact!

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In 2021, the Society for Science is celebrating 100 years of championing science. Founded in 1921 as Science Service by journalist Edward W. Scripps and zoologist William Ritter, the Society communicates, fosters and advances the public understanding of science. In its first century of service, the organization published accurate, objective journalism in its Science News magazine, advised government agencies, cultivated the nation’s top science talent and ignited a passion for science in generations of students.

Celebrate with us and visit our new online timeline, **100 Years of Impact!** Learn about the Society’s role in the Scopes trial. Read about the first National Science Fair in 1950. Learn about the two films focused on the International Science and Engineering Fair that debuted at the Sundance Film Festival.

Visit us at https://centennial.societyforscience.org
CONGRATULATIONS
TO THE GEORGE D. YANCOPoulos
INNOVATOR AWARD WINNER

In the Category of Robotics and Intelligent Machines

MICHELLE HUA
Bloomfield Hills, Michigan
Dilated Silhouette Convolutional Neural Network
Booth ROBO033

Regeneron applauds the winner of the George D. Yancopoulos Innovator Award.
CONGRATULATIONS
TO THE REGENERON YOUNG SCIENTIST AWARD WINNERS

CATHERINE KIM
Jericho, New York
Computational Biology and Bioinformatics
Hierarchical Prediction of Adverse Drug Reactions
Booth CBIO080

DANIEL SHEN
Raleigh, North Carolina
Systems Software
AI-Powered Facial-cue Control Module
Booth SOFT012

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

**Plant Sciences**

**JOHN BENEDICT ALLASAS ESTRADA**  
Fresno, California  
AI Model for Drought Stress Assessment in Plants  
Booth PLNT012

*Gordon and Betty Moore Foundation* applauds the winner of the Gordon E. Moore Award for Positive Outcomes for Future Generations.
CONGRATULATIONS

CRAIG R. BARRETT
AWARD FOR INNOVATION

H. ROBERT HORVITZ PRIZE FOR FUNDAMENTAL RESEARCH

PEGGY SCRIPPS AWARD FOR SCIENCE COMMUNICATION

ARYA TSCHAND
Lincroft, New Jersey
Engineering Mechanics
Low-Cost, High-Efficiency Irrigation Network
Booth ENMC072

NEHA MANI
New York, New York
Microbiology
Diagnostic Method Based on Bacterial Motion
Booth MCR0043

FRANKLIN WANG
Palo Alto, California
Physics & Astronomy
Asteroid Discovery with Synthetic Data & ConvNets
Booth PHYS050

Society for Science applauds these finalists for their achievements.
Finalist Directory

COUNTRIES, REGIONS, AND TERRITORIES PARTICIPATING IN VIRTUAL REGENERON ISEF 2021

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

AMERICAN SAMOA
Pago Pago, American Samoa, TEAS01, American Samoa Science Fair
BCHM031  How are Enzyme Reaction Rates Affected by Temperature and pH Levels?
Princess Jazzelle Franco Viesca, 15, Freshman, Princess Jazzelle Franco Viesca, 15, Freshman, Fa’asao Marist High School, Pago Pago, American Samoa, T: Cassandra Garcia

EAEV119  Calculating Evapotranspiration on Tutuila Island with Python
#  Victor Ruohao Chen, 18, Senior, Victor Ruohao Chen#, 18, Senior, Pacific Horizons School, Pago Pago, American Samoa, T: Karen Dizon

MCRO061  How Effective are Expired Antibiotics in Killing Escherichia coli?
Gabrielle Vicencio Gayapa, 14, Freshman, South Pacific Academy, Pago Pago, American Samoa, T: Cecilia Tuionoula

PLNT048  Determining the Effects of Moringa oleifera Leaves on the Growth and Yield of Solanum melongena
Pearl Eunice Miranda Munoz, 16, Junior, Fa’asao Marist High School, Pago Pago, American Samoa, T: Cassandra Garcia

ARMENIA
Yerevan, Armenia, ARM002, Armenia Science Fair
BMED060T  Diabetes Mellitus and Alcohol
Ani Geghamyan, 16, Junior, Anna Ghazaryan, 16, Junior, Anna Taroyan, 18, Senior, High School #118 after A. Yerznkyan, Yerevan, Armenia, T: Nune Kocharyan

EBED024T  Differentiation of Scents and Gases Using Neural Network
Davit Gyulamiryan, 18, Senior, Robert Simonyan, 18, Senior, Karen Aleksanyan, 18, Senior, Quantum College, Yerevan, Armenia, T: Grigor Aghababyan

AUSTRALIA
Sydney, Australia, AUS002, Young Scientist
ANIMO06  The Survival of the Fairy: An In-Depth Survey into the Behavior and Life Cycle of the Sand Fairy Cicada, Year 3
Antonio Shane Rajaratnam, 18, Senior, Redeemer Baptist School, North Parramatta, NSW, Australia, T: Stuart Garth

BEHA013  A Randomized Controlled Trial Evaluating the Differential Efficacy of Ginkgo biloba, Ginseng, Curcuma longa Linn. and Vinpocetine on Spatial Learning and Memory in Mice
Sarah Elise Hens, 19, Senior, Menai High School, Illawong, New South Wales, Australia, T: Ann Hanna

CBIO001  Full versus Partial Vaccination for Meningococcal Meningitis: A Mathematical Model
Jemmima Grace Schembri, 18, Senior, Inaburra School, Bangor, New South Wales, Australia, T: Amy Homola

CONGRATULATIONS 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.

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EQUIP students with scientific skills
ELEVATE the best and brightest young scientists
CONGRATULATIONS
TO THE 2021
REGENERON ISEF FINALISTS
AND WINNERS!

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More than 90 percent of our community investments are focused on STEM education. We aim to:

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young minds
to the power of science

EQUIP
students with scientific skills

ELEVATE
the best and brightest young scientists

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CHEM006
Determining the Rate Law of Crystal Violet and Sodium Hydroxide Using Alternative Methods
Yiting Shen, 18, Senior, Kambala School, Rose Bay, NSW, Australia, T: Kathryn Hillier

EAEV001
The Effect of pH on RNA Absorption and Liberation on Mineral Surfaces
Sarah Nolan, 18, Senior, Brigidine College Randwick, Randwick, NSW, Australia, T: Luke Steller

ENBM012
Cold Capping for Chemotherapy Patients
Safi Wheeldon, 18, Senior, Wenona School, North Sydney, NSW, Australia, T: Jan McNally

ENMC001
The CycleHub — A Prototype for the Future of Cycling
Liam Robert Davies, 19, Senior, Gosford High School, Gosford, NSW, Australia, T: Luke Shelley

MATS002
Investigating the Relationship Between Carburising Time and Case Depth in Steel Case Hardened by Pack Carburising, Gas Carbonitriding and Cyaniding Techniques
Conrad Alexander Petrovic, 18, Senior, Broughton Anglican College, Menangle Park, NSW, Australia, T: Rahmi Jackson

PHYS005
A General Vector Theory of the Dynamics of a Rapidly Rotating Top
Alexander Simon Gray, 19, Senior, Barker College, Sydney, New South Wales, Australia, T: Matthew Hill

Melbourne, Australia, AUS003, BHP Foundation Science and Engineering Awards

BCHM002
Investigating the Effects of Disaccharides and Monosaccharides on the Rate of Respiration in Saccharomyces cerevisiae (S. cerevisiae)
Raihanah Nurul Jannah Pranggono, 18, Senior, Glenunga International High School, Glenunga, SA, Australia, T: Alex Turnbull

CHEM007
Thrown, but Will It Break Down? — A Study of the Correlation of the pH of Soil and Its Effect on the Rate at which Biodegradable Materials Decompose and the Application of the Findings of this Experiment in Landfills
Hadia Bizhan, 15, Freshman, Lyneham High School, Lyneham, ACT, Australia, T: Julie Collins

EAEV007T
An Investigation into Salix fragilis and the Subsequent Environmental Impacts of Its Introduction to the Tasmanian Landscape
Caitlin Marr, 16, Sophomore, Emily Walter, 17, Sophomore, St. Mary’s College, Hobart, Tasmania, Australia, T: Heather Omant

ENBM014
The Giraffe Walker
Rebecca Paratz, 14, Freshman, LabRats Science Club, Wantirna, VIC, Australia, T: Caitlin Ingham

PLNT002
Variation in Flammability of Flora in the Sydney Sandstone Vegetation Community
Maja Dalby-Ball Olson, 18, Senior, Barrenjoey High School, Avalon, NSW, Australia, T: Milena Driscoll

ROBO001
RoboBall
Hannah Elizabeth Jones, 18, Senior, St Columba Anglican School, Port Macquarie, New South Wales, Australia, T: Justin Munro

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

BMED008
NIRS: An Innovative Approach to the Diagnosis of Neonatal Seizures
Faik Gasimov, 15, Sophomore, Baku European Lyceum, Baku, Absheron, Azerbaijan, T: Kamala Alasgarova

BMED013T
EMG Based Device that Converts Face Muscle Activity into Speech
Murad Mammadzade, 14, Freshman, Banuchichak Karimli, 16, Junior, High School #11, Sumgayit, Azerbaijan, T: Leyla Taghizade
Rise, a global community of exceptional young leaders, applauds all the 2021 finalists on their hard work, creativity, and dedication to further the fields of science, technology, engineering, and math.

CONGRATULATIONS TO TOMMOROW’S SCIENTIFIC AND ENGINEERING LEADERS
<table>
<thead>
<tr>
<th>Finalist Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CBIO012T</strong></td>
</tr>
<tr>
<td>Tamilla Suleymanova, 15, Sophomore, Rafsan Habibullayev, 15, Sophomore, Young Talents Lyceum, Baku, Azerbaijan, T: Ilham Shahmuradov</td>
</tr>
<tr>
<td><strong>MATH014</strong></td>
</tr>
<tr>
<td>Rafiq Gasimov, 17, Junior, The Modern Educational Complex in Honour of Heydar Aliyev, Baku, Nasimi Region, Azerbaijan, T: Vugar Sardarov</td>
</tr>
<tr>
<td><strong>MATS003</strong></td>
</tr>
<tr>
<td>Emin Khalifayev, 16, Junior, Educational Complex 132-134, Baku, Absheron, Azerbaijan, T: Francis Mang-Benza Dit Manthota</td>
</tr>
<tr>
<td><strong>ROBO010</strong></td>
</tr>
<tr>
<td>Mahammad Abbasli, 15, Freshman, Lyceum Named after Academician Zarifa Aliyeva, Baku, Azerbaijan, T: Zaur Balagadashov</td>
</tr>
<tr>
<td><strong>SOFT007T</strong></td>
</tr>
<tr>
<td>Ilkin Samedov, 15, Sophomore, Ali Akberzade, 15, Sophomore, High School #260, Baku, Azerbaijan, Young Talents Lyceum, Baku, Azerbaijan, T: Mubariz Khalilov</td>
</tr>
<tr>
<td><strong>BRAZIL</strong></td>
</tr>
<tr>
<td>Novo Hamburgo, Brazil, BRA001, International Fair of South America — MOSTRATEC</td>
</tr>
<tr>
<td><strong>ANIM017T</strong></td>
</tr>
<tr>
<td>Isadora Luisa Scheffler Kortz, 19, Junior, Eduarda Schmachtenberg Farias, 19, Sophomore, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Julio Volmann Machado</td>
</tr>
<tr>
<td><strong>BEHA020</strong></td>
</tr>
<tr>
<td><strong>BEHA021T</strong></td>
</tr>
<tr>
<td>Ana Carolina Rossa Burato, 19, Senior, Artur Alano Daniel, 18, Senior, Colegio Murialdo, Ararangua, Santa Catarina, Brazil, T: Carlos Martins T: Carlos Martins</td>
</tr>
<tr>
<td><strong>BEHA022T</strong></td>
</tr>
<tr>
<td>Jaqueline Lourenco Campos, 18, Junior, Larissa Tiemi Daikubara, 18, Junior, Instituto Federal de Educacao, Ciencia e Tecnologia de Sao Paulo, Campus Registro, Registro, Sao Paulo, Brazil, T: Ellen Batista</td>
</tr>
<tr>
<td><strong>EAEV054T</strong></td>
</tr>
<tr>
<td>Samuel Cavalcante Silva#, 15, Sophomore, Gustavo Alves da Silva, 15, Sophomore, Sophia Lira de Paula Pinto, 15, Senior, Luiz Nunes de Oliveira, Palmes, Buritirana, Brazil, T: Rosielson Soares de Souza</td>
</tr>
<tr>
<td><strong>ENBM027T</strong></td>
</tr>
<tr>
<td>Isabella Correa Bauer, 19, Senior, Andressa Pinheiro Franca, 19, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Diego Moreira</td>
</tr>
<tr>
<td><strong>MATS009</strong></td>
</tr>
<tr>
<td>Amanda Vitoria Elgert Becker, 15, Sophomore, Colegio Estadual Jardim Porto Alegre, Toledo, Brazil, T: Dioneia Schauren</td>
</tr>
<tr>
<td><strong>MATS010</strong></td>
</tr>
<tr>
<td>Ana Beatriz Castro Silva, 16, Junior, Centro Educacional ArteCeb, Imperatriz, Maranhão, Brazil, T: Zilmar Soares</td>
</tr>
</tbody>
</table>
CONGRATULATIONS
ISEF 2021 FINALISTS

Broadcom Foundation is a proud sponsor of the Public Exhibition of Projects and STEM Experiential Hall.

Broadcom Foundation
Finalist Directory

TMED012T  Evaluation of Gherkin's (*Cucumis anguria L.*) Bioactive Potential Against Non-communicable Chronic Diseases
André Victor Oliveira Avellar, 19, Senior, Victoria Barros dos Santos, 19, Senior, Instituto Federal de Educaçao, Ciencia e Tecnologia do Rio de Janeiro, Rio de Janeiro, RJ, Brazil, T: Vivian Silva

Sao Paulo, Brazil, BRA002, FEBRACE – Feira Brasileira de Ciencias e Engenharia

BEHA034  FIDERE: Circular Economy App to Support Thrift Stores and Women’s Associations in the South of Brazil
Victorya Leal Silva, 17, Junior, Instituto Federal de Educaçao, Ciencia e Tecnologia do Rio Grande do Sul (IFRS) – Campus Osório, Osorio, Rio Grande do Sul, Brazil, T: Flavia Twardowski

ENBM055  System for Inertial Data Collection and Data Visualization for Individualized Medicine with Focus on Parkinson’s Disease
Wanghley Soares Martins, 18, Senior, Instituto Federal de Educaçao, Ciencia e Tecnologia de Brasilia – Campus Brasilia, Brasilia, Distrito Federal, Brazil, T: Fabio Henrique Monteiro Oliveira

ENEV055T  Using Zophobas morio to Build a Biodigester for Polymers Decomposition
Alaide Hellen Silva, 17, Junior, Katrina Medeiros Viana, 17, Junior, Antonio Danilo Gonçalves do Vale, 16, Junior, Escola de Ensino Medio Joaquim de Figueiredo Correia, Iracema, Ceara, Brazil, T: Karla Nobre de Oliveira

ENEV056  Automated Water Analysis: A Water Drone Developed with Microcontrollers
Rafaela Curcio, 18, Senior, ETEC Benedito Storani, Jundiaí, Sao Paulo, Brazil, T: Jose Cunha, Jr.

ENMC065  The Development of a Low-Cost Open-Source Underwater Remotely Operated Vehicle for Coral Mapping
Guilherme Beyruti Suranyi, 17, Senior, Colegio Santa Cruz, Sao Paulo, Sao Paulo, Brazil, T: Nathan Rabinovitch

MATS027T  Evaluation of the Repellent Potential of Noni (*Morinda citrifolia*) Fruit Extract Applied in Food Packaging to Inhibit Weevils (*Sitophilus spp.* and *Trichobius castaneum*)
Igor Guissani Bruno, 17, Senior, Diego Soares Soares Ribeiro, 18, Sophomore, Joao Victor Ramos Sidronio dos Santos, 17, Senior, Escola do SESI Aparecida do Taboado, Aparecida do Taboado, Mato Grosso do Sul, Brazil, T: Vinicius Machado

MCRO034  Fungitoxic Potential of Different Plant Extracts on the *in vitro* Development of the Fungus that Causes Anthracnose in Banana Fruits, Phase IV
Ana Carolina Gonçalves Selva, 17, Senior, Colegio Estadual Jardim Porto Alegre, Toledo, Brazil, T: Dioneia Schauren

PLNT023T  Alternative Technology for Crop Improvement and Potentiation of Secondary Metabolites in Coriander Plants through Dunaliella Salina Biomass Incorporated in Bioplastic Films, Phase II
Nicole Melo de Almeida, 18, Senior, Yasmin Barreto Teles Fonseca, 19, Senior, Escola Djalma Pessoa – Sesi Bahia, Salvador, Bahia, Brazil, T: Fernando Moutinho

SOFT033  Development of Immersive Technologies Applied to Astrobiology Teaching
Henrique Rodrigues Hissa Amorim, 16, Senior, Colegio Dante Alighieri, Sao Paulo, Sao Paulo, Brazil, T: Tiago Bode

BULGARIA

Sofia, Bulgaria, BG0001, Bulgarian Science and Innovation Fair

BEHA006  Voice Emotion Recognition with Audio Data Analysis and Machine Learning Algorithms
Gabriela Kunova Chavgova, 18, Junior, Model High School of Mathematics "Akademik Kiril Popov", Plovdiv, Bulgaria, T: Stoyanka Zaharieva

MATH009  Ranking of the Vertices in a Weighted Graph
Anna Rosenova Mihalkova, 18, Senior, Sofia High School of Mathematics, Sofia, Bulgaria, T: Elena Kiselova
CONGRATULATIONS TO OUR CATEGORY FINALISTS

Animal Sciences

Serena Ahmad
Ramiz Akbar
Lamya Al Handhali
Marwa Al Handhali
Jaiba Tahir Ali
Kellen Apuna
Nanami Arimura
Zarrin Askari
Kelsie Avery
Caroline Bayer
Natthida Benjapiyaporn
Kristi Biswas
Madison Carson
Jenna Ceele
Ying-Ru Chen
Celyn Chng
Agnes Cho
Braden Collard
Kaitlyn Culbert
Aniruddha Das
Zack Dupre
Karim Ebey
Eduarda Farias
Sharon Fernandez
Lilly Figueroa
Nathan Foo
Kyi Forman
Anna Gibler
Amiris Guerrios Toledo
Alexandria Harper
Grace Helle
Ann Itakura
Bryce Jacobs
Laiba Fatima Kanchwala
Rohini Kilaru
Fiona Kinney
Chloe Kirk
Isadora Kortz
Naipaphon Kumphom
Shan Lateef
Eva Ledvina
Iling Low
Varun Madan
Teeradon Manasviyongkul
Krish Mathur
Margaret Mattson
Ratchanon Metheesitthikun
Avery Miles
Riko Nakajima
Wakana Nakayama
Mateus Nascimento
Warinyupa Ngamjarenwong
Clayton Nyiri
Avery Orth
Andrew Paget
Vyshnavi Poruri
Natnicha Punyainkaew
Maya Raghu
Antonio Rajaratnam
Simren Samba
Isabella Sanchez
Carissa Scheel
Nathalie Schelin
Olga Scieszka
Jesse Shepherd
Isabel Sierra
Thanakorn Silaphan
Trinity Skaggs
Joanna Sohn
Nonthaporn Sriha
Sarah Stutsman
Li Ann Tay
Warakorn Thammawong
Talia Thornton
Harmony Tracy
Pattarapoom Tubtim
Ellie Vaserman
Swetha Velayutham
Emily Weimer
Nanthawat Wiwatpisit
Thanyakorn Yantarasaart
Elia Yoder

Society for Science applauds the finalists in Animal Sciences.
<table>
<thead>
<tr>
<th>Finalist Directory</th>
<th>Project Title</th>
<th>Student Name</th>
<th>Grade</th>
<th>School Name</th>
<th>City</th>
<th>Province</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROBO011</strong></td>
<td>Limited Query Black-box Adversarial Attacks in the Real World</td>
<td>Hristo Todorov Todorov</td>
<td>18</td>
<td>High School of Mathematics and Natural Sciences</td>
<td>Kyustendil</td>
<td>Bulgaria</td>
<td></td>
</tr>
<tr>
<td><strong>ROBO014</strong></td>
<td>Neural Abstract Reasoner</td>
<td>Victor Stilianov Kolev</td>
<td>18</td>
<td>Sofia High School of Mathematics</td>
<td>Sofia</td>
<td>Bulgaria</td>
<td></td>
</tr>
<tr>
<td><strong>SOFT008</strong></td>
<td>Heimdall: Detecting Malicious Behavior in USB Mass Storage Devices</td>
<td>Ivan Petrov Zlatanov</td>
<td>18</td>
<td>National Trade and Banking High School</td>
<td>Sofia</td>
<td>Bulgaria</td>
<td></td>
</tr>
<tr>
<td><strong>CANADA</strong></td>
<td>Hamilton, Canada, CAN001, Bay Area Science and Engineering Fair</td>
<td>Becca Barbera</td>
<td>16</td>
<td>Cathedral High School</td>
<td>Hamilton</td>
<td>Ontario</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>CHEM059</strong></td>
<td>Diffusion Mechanism of Pu+3 in Sedimentary Repository Conditions: Ab Initio Molecular Dynamics Study</td>
<td>Becca Barbera</td>
<td>16</td>
<td>Cathedral High School</td>
<td>Hamilton</td>
<td>Ontario</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>EAEV113</strong></td>
<td>Predicting Mechanisms of Flood Vulnerability for Southeast Asia Using Statistical Percolation Theory</td>
<td>Caroline Huang</td>
<td>18</td>
<td>Abbey Park High School</td>
<td>Oakville</td>
<td>Ontario</td>
<td>Canada</td>
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<tr>
<td><strong>EAEV115</strong></td>
<td>A Novel and Low-cost Microfluidic-based C. elegans Electrotaxis Assay for Screening of Toxic Chemicals in Water</td>
<td>Neha Gupta</td>
<td>16</td>
<td>Westdale Secondary School</td>
<td>Hamilton</td>
<td>Ontario</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>EGSD049T</strong></td>
<td>Microwave Irradiation with Submerged Ultrasonication: A Novel Lignocellulosic Pretreatment Method</td>
<td>Julia Anne Seymour</td>
<td>17</td>
<td>Rylan Quinn Donohoe</td>
<td>Oakville</td>
<td>Ontario</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>BMED035T</strong></td>
<td>Analysis of the Correlation Between Immunogenomic Phenotype and Patient Outcomes for Prostate Cancer</td>
<td>Haolin Li</td>
<td>16</td>
<td>Crescent School</td>
<td>Toronto</td>
<td>Ontario</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>EAEV112T</strong></td>
<td>A Novel Approach to Bio-Friendly Microplastic Extraction with Ascidians</td>
<td>Yuntong Li</td>
<td>17</td>
<td>Rowan David Ross</td>
<td>Burnaby</td>
<td>British Columbia</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>MCRO035</strong></td>
<td>Smiglace-C: A Novel Antibacterial Saponin from Annona muricata</td>
<td>Dheiksha Sivashree Jayasankar</td>
<td>16</td>
<td>Sir Winston Churchill Secondary School</td>
<td>St. Catharines</td>
<td>Ontario</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>PHYS046</strong></td>
<td>An Investigation of a Dark Sector Interaction Model to Solve the Hubble Tension</td>
<td>Angela Zitian Zhou</td>
<td>16</td>
<td>Magee Secondary School</td>
<td>Vancouver</td>
<td>British Columbia</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>ROBO049</strong></td>
<td>FyreWatch: Deep Learning for Accurate Wildfire Environmental Conditions Detection</td>
<td>Gurik Mangat</td>
<td>17</td>
<td>Semiahmoo Secondary School</td>
<td>Surrey</td>
<td>British Columbia</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>TMED047</strong></td>
<td>TeleAEye: Low-Cost Automated Eye Disease Diagnosis Using a Novel Smartphone Fundus Camera with AI</td>
<td>Tienlan Sun</td>
<td>17</td>
<td>Eric Hamber Secondary School</td>
<td>Vancouver</td>
<td>British Columbia</td>
<td>Canada</td>
</tr>
</tbody>
</table>
Montreal, Quebec, Canada, CAN004, Montreal Regional Science and Technology Fair

CBIO074 Computer-Based miRNA Predictions to Inhibit SARS-Cov-2 Replication
Laurence Liang, 19, Senior, Marianopolis College, Westmount, Quebec, Canada, T: Angela Keane

EBED025 Hide and Seek Help: Improved Key-Finder System for Visually Impaired People
Maria Bayder, 14, Freshman, West Island College, Dollard-Des Ormeaux, Quebec, Canada, T: Allan Tabatchnick

SOFT045 MediGraph: A Novel Clinical Assistant from Automated Biomedical Literature Extraction and Knowledge Graphs
Jordan Levett, 19, Senior, Vanier College, Saint-Laurent, Quebec, Canada, T: Lissiene Neiva

CHINA

China, CHN001, China Adolescents Science and Technology Invention Contest

BCHM008 A Research on Natural Acne Ointment Based on Yam Mucin
Letong Jiang, 16, Junior, No. 2 High School of East China Normal University, Shanghai, China, T: Feng Qian

BMED018 Adolescent Physical Fitness Improvement Training System
Jiayi Zheng, 16, Senior, Hefei No.8 Senior High School, Hefei, Anhui, China, T: Lan Rong

CBIO021 The Pattern of Age-related Height Loss: Evidence from a Study of Deep-learning Derived Phenotypes Based on Large-scale DXA Images
Yuhao Lu, 14, Sophomore, Shanghai Experimental School, Shanghai, China, T: Ming Pei

CBIO023 Determination of the Key Parameters in SIR Compartment Model for Novel Coronavirus Pneumonia Propagation
Jiayi Zhai, 16, Junior, Hefei No 6 High School, Hefei City, Anhui Province, China, T: Kangsheng Bao

CBIO032 The Early Control of China's COVID-19 Pandemic and Its Enlightenment
Ziyuan Su, 16, Junior, Nanjing Foreign Language School, Nanjing, Jiangsu, China, T: Zichun Hua

CELL013 Changing Region on AAV-PHP.eB Brings Negative Effects on Human AAVR Binding
Zhengjia Yuan, 17, Junior, Capital Normal University High School, Beijing, Beijing, China, T: Ling Li

CHEM008 Photocatalysis Degradation of Oil-Polluted Water Enhancement via Pickering Emulsion Stabilized by TiO₂
Mingyi Zhang, 18, Senior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Bo Li

CHEM009T Zwitterionic Nanogel Grafted Polymer Porous Membrane for Emulsified Oil/Water Separation
Yu Ren, 18, Senior, Jingze Fang, 17, Senior, Ziye Xiao, 18, Senior, Suzhou No.10 High School of Jiangsu Province, Suzhou, Jiangsu, China, T: Xiaomin Qian

EAEV011 Study on Protein Precipitation Methods of Wastewater in Sweet Potato Food Processing
Jinyi Xu, 16, Junior, No. 2 High School of East China Normal University, Shanghai, China, T: Yao Qu

EAEV027 Effects of Elevated Temperatures on the Photodegradation of Pyrethroid Insecticides on Vegetable Leaves
Yixiao Yang, 16, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, China, T: Xinghui Xia

EBED007 Intelligent Infusion Detection and Accompanying System for Children
Chuqi Hu, 17, Junior, Xian Gao Xin No 1 High School, Xi’an, Shannxi, China, T: Gongen Han
EGSD013 Preparation of Ionic Liquids Modified Cathode Catalysts for PEMFC
Guo Li, 16, Junior, Beijing No. 166 High School, Beijing, China, T: Fan Zhang

EGSD022 E-waste Derived Copper-based Catalysts Derived Toward Carbon-Neutral Electrochemical CO₂ Reduction
Juntao Wu, 17, Junior, Shanghai High School, Shanghai, Shanghai, China, T: Gengfeng Zheng

#

ENBM029 A Novel, Multifunctional Tracheal Tube Based on Directive Sound Wave Monitoring Technique
Yuqian Zhang, 18, Senior, The Affiliated High School of South China Normal University, Guangzhou, Guangdong, China, T: Xiaoxan Yang

ENEV023 Filter-Free Air Filtration System Based on Nano Steam Technology
Ruixi Zhang, 16, Junior, Guangzhou No. 16 Middle School, Guangzhou, Guangdong, China, T: Le Yang

ENEV024 Research on Aquaponics System Based on Artificial Intelligence
Runmin Wang, 17, Junior, Beijing No. 101 Middle School, Beijing, Beijing, China, T: Lixia Ma

ENEV025 Enhancing Effectiveness of Medical Equipment for Filtrating and Sterilizing Aerosol
Zhiyu Cao, 17, Junior, The Affiliated High School of South China Normal University, Guangzhou, Guangdong, China, T: Xiaoxan Yang

ENMC018 Theoretical Simulation and Practical Fabrication of a Novel Vertical Axis Fan
Muyao Li, 17, Junior, No. 2 High School of East China Normal University, Shanghai, Shanghai, China, T: Zhehtang Wang

ENMC025 Using Semi Flexible and Deformable Bionic Crawler Robot to Adapt Complicated Terrains
Jiarong Sheng, 15, Sophomore, Shanghai Pinghe Bilingual School, Shanghai, China, T: Yinghe Lv

ENMC026 The Underwater Magic Carpet: A Movable Underwater Platform Based on Bionic Cownose Ray
Tianqi Dai, 17, Junior, Beijing No. 4 High School, Beijing, Beijing, China, T: Lian Kong

MATH021 A Linear Constraints Based Mathematical Model for Optimizing the Production Plan of a Mask Factory
Tingxi Zhang, 16, Junior, The Affiliated High School of South China Normal University, Guangzhou, Guangdong, China, T: XiaoRong Zhang

MATH022 Period-3 Point of Generalized Tent Mapping: Orbit Type and Stability Analysis
Yi Shuai, 18, Senior, Huayang High School, Chengdu, Sichuan, China, T: XiaoRong Zhang

MATH024 The Mathematical Analysis of Claude Monet’s Impressionistic Masterwork — Haystack
Ziyue Jiang, 15, Junior, Beijing No. 8 High School, Beijing, Beijing, China, T: Laifu Liu

MATS008 Construction of Thermal Conductivity Measurement Platform Based on 3-Omega Method
Rundong Zhou, 16, Junior, Chongqing Bashu Secondary School, Chongqing, China, T: Xiaoyuan Zhou

MCRO014 Exploring the Mechanism of Bacterium in Tumor Therapy: Comparison of Immunoactivity of Lipopolysaccharide from Salmonella enterica and Salmonella typhimurium
Mingjiu Zhao, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Wei Ma

MCRO015 Effects of Pseudoxanthomonas Combined with Other Beneficial Bacteria Against Pepper Fusarium Wilt
Yuhang Shen, 16, Junior, Beijing No. 4 High School, Beijing, China, T: Shuai Kang
CONGRATULATIONS
TO OUR CATEGORY FINALISTS

Behavioral and Social Sciences

Ahmad Al Mseidein
Zeina Al Sharaydeh
Myrto Alexopoulou
Layla Alkhatib
Noor Alkhatib
Tamara Almubiden
Rasha AlQahtani
Emam Alsaadi
Hamzeh Arabiyyat
Omar Arafah
Ariana Arroyo Salazar
Mazyar Azmi
Arjun Barrett
Blake Bernhardt
Lorenza Botton
Lia Bu
Rachel Buksbaum
Jaqueline Campos
Amanda Cao
Karina Castaneda
Gabriela Chavgova
Larissa Daikubara
Artur Daniel
Anwesha Das
Lucianna Davis
Naman Doad
Rakin Faruk
Mandy Feuerman
Carly Friedman
Ishani Ghosh
Bru Gomez Bonilla
Estella Guerin
Anika Halappanavar
Kathleen Hammett
Sarah Hens
Noor Naila Himam
Phuc Hoang
Jennifer Hu
Chih-Hsien Huang
Kailani Ibanez
Mina Issa
Kadek Januarta
Maria Jimenez Rojas
Raheed Kabir
Alexander Kesin
Ju eun Kim
Seo Yeon Kim
Yvonne Kim
Naci Konar-Steenberg
Dustin Kraft
Alexander Lan
Natalia Leon-Diaz
Aditya Mangalampalli
Dante Martinez
Emlin Mathew
Eden Maxwell
Arjun Mazumdar
Natalia McMorris
Athifah Millati
Gomana Mohammed
Jood Mohammed
Lauren Morgan
Malak Naimi
Adeline Norgaard
Divya Nori
Elenith Pacheco Ramos
Wahyu Padma Baskara
Tanvi Palsamudram
Vidhi Patel
Sidhiya Peddinti
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Maieasha Rashid
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Ana Rossa Burato
Stefan Salaices
Madeline Santoso
Sharanya Sharma
Aleksei Shremzer
Akul Shrivastava
Vicotrya Silva
Tuffy Simon
Malavika Singh
Pranav Somani
Isabella Souza
Amalia Toutziaridi
Aditya Tummala
Kosha Upadhyay
Ixianis Valentin-Morales
Alexander Van der Merwe
Mai Vu
Ibrahim Wahdani
Abigail Weaver
Nethmi Withanage
Paulina Wodarz
Cheng-Ying Yu
Bill Zhang

Society for Science applauds
the finalists in Behavioral and Social Sciences.
MCRO016 Maintenance Mechanism of Health Nests of Pet Harvest Ants
Jiutong Wang, 16, Junior, Beijing No. 8 High School, Beijing, China, T: Yue Hou

PHYS013 A Multifunctional Hamiltonian Mechanics Simulator and Some of Its Application Examples
Youqiu Zhan, 17, Junior, High School Affiliated to Shanghai Jiao Tong University, Shanghai, China, T: Qian Shao

PHYS014 Non-linear Dynamics of Confined Leidenfrost Droplet: A Video-based Analysis
Tianrui Wu, 18, Senior, Hangzhou Foreign Languages School, Hangzhou, Zhejiang, China, T: Yan Xu

PHYS022 Why Do Beginners Produce Noise Instead of Music When They Play Musical Instruments?—Taking Erhu for Example
Wanjia Fu, 16, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Xiaoyuan Hou

ROBO017 Cross-Age Face Recognition Based on Deep Neural Network with Multi-Stage Feature Decomposition
Xinyun Jiang, 17, Senior, Hangzhou Foreign Languages School, Hangzhou, Zhejiang, China, T: Yuntao Qian

ROBO027 The Mind of Pixels: Video Aesthetic Feature Analysis Based on Graph Representation of Pixel Block Relations
Xiru Hou, 17, Junior, The High School Affiliated to Renmin University of China, Beijing, China, T: Xin Jiang

ROBO028 Home Support System for ALS Patients Based on the Internet of Things
Jiayun Liu, 17, Junior, QuanZhou No.5 High School, Quanzhou, Fujian, China, T: Chunxu Haung

ROBO029 Golf Swing Correction Based on Deep Learning Body Posture Recognition
Gaoyue Sun, 17, Junior, The High School Affiliated to Renmin University of China, Beijing, China, T: Dan Wan

SOFT010 CDD Model: A Cylinder Detector and Dewarper
Haoyun Qin, 16, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Xiaoyang Wang

SOFT016 A Hash Algorithm for Directory Tree
Linzhou Jiang, 17, Senior, Chengdu No. 7 High School, Chengdu, Sichuan, China, T: Hongyou Li

SOFT017 Magic-Beijing-Mirror: Facilitating Beijing Opera via a Real-Time Interactive Opera Making up System
Shirui Gao, 16, Sophomore, Beijing No. 2 Middle School, Beijing, China, T: Kai Gao

SOFT018 A Two-Step Approach to Effectively Find Analogies in Knowledge Graphs
Xuerui He, 16, Junior, No. 2 High School of East China Normal University, Shanghai, China, T: Beiyu Ye

TMED014 A Hopeful SSc Drug: Immune Regulation of Astragalus (Huangqi) in the Treatment of Systemic Scleroderma (SSc)
Yexin Li, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Jiucun Wang

Chengdu, China, CHN008, Sichuan Science Fair

CBIO026 MULTI-DEEPNet: A Novel Weakly-Supervised Multi-Task and Multi-View Deep Learning Model for COVID-19 Diagnosis from CT Images
Richard Xue, 16, Sophomore, Shanghai American School—Puxi Campus, Shanghai, China, T: Yi Guo

ENBM033T Test of Gross Motor Development: Evaluation through AI Image Processing and Wearable Sensors
Emma Aiming Li, 17, Junior, Sophie Ge Li, 15, Sophomore, Shanghai High School International Division, Shanghai, China, T: Lin Chen
MCRO009 Potential Probiotic Therapy of Inhibitory Commensal S. epidermidis on Decolonization/Treatment of MRSA and C. acnes and Their Infections
# Vincent Zhong Xin, 17, Junior, Shanghai American School—Puxi Campus, Shanghai, China, T: Gregory Rose

SOFT019 An Intelligent Assistive Human Emotion Recognition and Adjustment System
Yixiu Li, 17, Junior, Shanghai SMIC Private School, Shanghai, China, T: Jamie Hutt

TMED019T An Atypical Cure for Atopic Dermatitis: Investigating the Effects of L-Histidine on Filaggrin Expression
Chaejeong Hyun, 17, Senior, Ivan Lee, 18, Senior, Concordia International School Shanghai, Pudong, China, T: Daniel Barrientes

CHINA, HONG KONG SPECIAL ADMINISTRATIVE REGION
Hong Kong, China, Hong Kong Special Administrative Region, HKG001, Hong Kong

S&T Invention Contest

BMED005T Leukemia War: Rise of White Grape-Tea
Ka Hei Wong, 17, Junior, Wai Ming Bella Lam, 16, Junior, Hoi Ching Yeung, 17, Junior, The Chinese Foundation Secondary School, Hong Kong, China, Hong Kong Special Administrative Region, T: Tik Shun Ho

ENEV040T A Practical Alginate-based Synthetic Differentially Permeable Membrane for Metal Ions Separation
Chiu Ming Kwan, 17, Junior, Ka Pui Ngan, 17, Junior, King's College, Hong Kong, China, Hong Kong Special Administrative Region, T: Bob Lui

MATH004 An Innovative Conversion from Decimal to Gray Code: Inspired by Chinese Rings
Tsz Tung Tsei, 19, Senior, Maryknoll Fathers' School, Hong Kong Special Administrative Region, T: Yuen Man To

ROBO006 Magnetically-Powered Multi-Segment Degradable Microswimmer
Michael Ho-Cheung Sun, 17, Junior, King George V School, Hong Kong, Hong Kong, China, Hong Kong Special Administrative Region, T: Dong Sun

ROBO007 COVID-19 Chest X-ray Images: Lung Segmentation and Diagnosis Using Neural Networks
Alan Zhang, 17, Senior, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Chong Chen

CHINA, MACAO SPECIAL ADMINISTRATIVE REGION
Macao, China, Macao Special Administrative Region, MAC001, Macao Region Science Fair

BMED029T 4-Cryptochlorogenic Acid Positively Regulates Pigmentation via Inducing Melanoblast Specification and Melanin Synthesis in Zebrafish Embryos and B16F10 Cell
Run Ying Li, 16, Junior, Lok Hei Gu, 15, Sophomore, Chi Kei Lam, 15, Sophomore, Escola Kao Yip, Macao, China, T: Wai Lam Chao

EGSD005 Modulating Surface Reconstruction of Nickel Cobalt Phosphide by Iron Incorporation Enhancing ORR/OER for Hybrid Sodium–air Battery
# Jeremy Hu, 18, Senior, Pui Ching Middle School, Macao, China, Macao Special Administrative Region, T: Ka Kong Chan

ENEV046T A New Concept of Packaging – Solving the Problem of Excessive Plastic
Chi Mei Lam, 15, Sophomore, Helen Ngie#, 15, Sophomore, Weng Hei Lau, 15, Sophomore, The Affiliated School of the University of Macao, China, Macao Special Administrative Region, T: Ka Man Wong

ENMC012T An Analysis and Optimization of Double Parallelogram Lifting Mechanism
# Su Fong, 17, Junior, Keng Hang Tang, 16, Sophomore, Hei I Lei#, 17, Senior, Pui Ching Middle School, Macao, Macao, China, Macao Special Administrative Region, T: Hao Nian Min
MATS021T  Supramolecular Aggregation and Fusion of Lysosomes for Improving Cellular Defense Against Bacteria
# Sap Tou Lao, 16, Junior, Hong U Fong#, 16, Junior, Pui Ching Middle School, Macao, Macao, China, Macao Special Administrative Region, T: Weng Si Kou

ROBO008T  A Self-Adaptive Intelligent Inspection System for Polar Palaeoenvironment Research
Hou Hei Lam, 17, Junior, Chi Weng Fong, 17, Junior, Maggie Xie, 16, Junior, The Affiliated School of the University of Macao, Macao, China, Macao Special Administrative Region, T: Yan Long Lin

Chinese Taipei
Taipei, Chinese Taipei, TWN001, Taiwan International Science Fair

ANIM024  Exploring the Role of Frazzled in Drosophila Neural Circuit Assembly and Foraging Behavior
Ying-Ru Chen, 17, Junior, The Affiliated Senior High School of National Taiwan Normal University, Taipei City, Chinese Taipei, T: Suewei Lin

BEHA019T  Investigate the Assimilation and Contrast Effects on Color Induction with Color Discrimination Paradigm
Cheng-Ying Yu, 17, Junior, Chih-Hsien Huang, 17, Junior, Taipei First Girls High School, Taipei City, Chinese Taipei, T: Yi-Yi Hsu

BMED015T  Anti-inflammatory Effects of the Biflavonoid Biflata on Macrophage
Chian-Ruei Chen, 18, Senior, Yun-Ting Yeh, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, T: Yu Ling Lin

CHEM016T  A Pentipptcyene-Anthracene Hybrid Smart Fluorescent Material
Catriona Tingsea Wu, 17, Junior, Jeannine Lee, 17, Junior, Taipei First Girls High School, Taipei, Taiwan, T: Jye-Shane Yang

EAEV020  Rotation of Inner Eyewall within Double-Eyewall Typhoons
Yi-Sin Tsang, 18, Senior, The Affiliated Senior High School of National Taiwan Normal University, Taipei City, Chinese Taipei, T: Hung-Chi Kuo

EGSD012  Toward Designing an Omni-directional Vertical Axle Wind Turbine
Ting-Ru Chen, 18, Senior, Taipei First Girls High School, Taipei, Taiwan, T: Chien Li Hsien

MATH011  Enumeration of Polygon Dissections with Prescribed Conditions
Tzu-Hsuan Chiu, 17, Junior, Taipei First Girls High School, Taipei, Taiwan, T: Pei-Kai Liao

MATH012  Turning Grids into Forests
Ting-Yun Su, 17, Junior, Taipei Municipal Jianguo High School, Taipei City, Chinese Taipei, T: Huang Shih-Yin

PHYS019  A Laser Spot as a Line Thermal Gradient Sensor for Non-Equilibrium Complexes
Yu-You Luo, 17, Senior, National Chiai Senior High School, Chiayi City, Taiwan, T: Wen-Teng Lee

ROBO022  Non-invasive Autonomous Anemia Screening Using Conjunctival Images
I-Ning Tsai, 16, Junior, Taipei Municipal Zhongshan Girls High School, Taipei City, Chinese Taipei, T: Sheng-Lung Huang

COLOMBIA
Medellin, Colombia, COL001, Colombia Science & Engineering Fair

EGSD017T  Obtainment of Briquettes Made of Coffee Husk as an Alternative of Heat Energy to the Use of Coal
Juan Camilo Soto Marulanda, 17, Junior, Ana Maria Garcia, 17, Junior, Santiago Vallejo, 17, Senior, Institucion Educativa Colegio Loyola para la Ciencia y a Innovacion, Medellin, Antioquia, Colombia, T: Robinson Salazar Diaz
CONGRATULATIONS TO THE FIRST PLACE CATEGORY WINNER

Biochemistry

MAYA SONAL BUTANI
Mooresstown, New Jersey

Novel Plant-Derived Tissue Engineering Scaffolds
Booth BCHM028

Regeneron applauds the finalists in Biochemistry.

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<tr>
<th>Country</th>
<th>City, Country, Code, Fair Name</th>
<th>Title</th>
<th>Author(s)</th>
<th>Affiliation</th>
<th>Contact Person(s)</th>
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<tr>
<td>CZECH REPUBLIC</td>
<td>Prague, Czech Republic, CZ001, Students' Professional Activities (SPA)</td>
<td><strong>CELL008</strong> Examining the Effect of Fibroblast Growth Factors on Development of Mammary Gland in 3D Cultures</td>
<td>Ema Grofova, 18, Junior, Gymnazium Matyase Lercha, Brno, Moravia, Czech Republic</td>
<td>T: Martin Krejci</td>
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<td><strong>ENMC021</strong> Improving Print Quality, Precision and Repeatability of Open Source MSLA 3D Printer</td>
<td>Adam Schuppler, 19, Junior, Gymnazium a SOS Plasy, Plasy, Pilsen kraj, Czech Republic</td>
<td>T: Libor Jelinek</td>
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<td><strong>PLNT007</strong> The Role of Phytochromes in Regulation of Auxin Transporter Expression in Hypocotyls of <em>Solanum lycopersicum</em></td>
<td>Anna Hyskova, 19, Senior, Gymnazium J. A. Uhersky Brod, Czech Republic</td>
<td>T: Martin Fellner</td>
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<td><strong>BCHM027</strong> Assessment of Selected Fatty Acids in Human Breast Milk Using GC-FID</td>
<td>Tereza Jaklova, 18, Senior, Gymnazium Aloise Jiraska v Litomysli, Litomysl, Pardubicky kraj, Czech Republic</td>
<td>T: Martina Kunderova</td>
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<td><strong>SOFT050</strong> Development of Procedurally Generated Game from Scratch</td>
<td>Daniel Tefr, 20, Senior, Gymnazium Aloise Jiraska v Litomysli, Litomysl, Pardubicky kraj, Czech Republic</td>
<td>T: Martina Kunderova</td>
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<tr>
<td>EGYPT</td>
<td>Cairo, Egypt, EGY001, Egypt Science and Engineering Fair — Cairo &amp; Upper Egypt</td>
<td><strong>BEHA067</strong> The Social and Psychological Problems that Facing Talented Involved Students in the Middle Schools</td>
<td>Gomana Abdelnaser Mohammed, 16, Sophomore, S.T.E.M. Luxor School, Luxor, Egypt</td>
<td>T: Sohair Ali</td>
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<td><strong>BMED027</strong> X Linked Retinitis Pigmentosa and Age-related Macular Treatment by Induced Pluripotent Stem Cells AMD/XLRP &gt;&gt; IPS</td>
<td>Maria Emad Youssef, 16, Junior, Azza Zidan Experimental School for Languages, El Fayoum, Egypt</td>
<td>T: Enass Fathy</td>
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<td><strong>CHEM055</strong> Reuse CO₂ in Cement Industry to Decrease Its Effect as Greenhouse Gas as well as Using the Waste from Marble Cutting and Steel Slag instead of Polluting the Environment</td>
<td>Zyad Emad Emad, 17, Junior, Red Sea STEM, Hurgada, Egypt</td>
<td>T: Malak Fahmy</td>
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<td><strong>EGSD042T</strong> Microbial Fuel Cells in Water</td>
<td>Farah Ibrahim Abdellkader, 18, Junior, Alaa Maher Gaballah, 17, Junior, Maadi STEM School for Girls, Cairo, Egypt</td>
<td>T: Tarek Ibrahim</td>
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<td><strong>ENBM070T</strong> Medical Sensor</td>
<td>Omar Mostafa Mahmoud Sharaf, 16, Junior, Saif Ahmed Abd El-Fattah, 17, Junior, 6 of October STEM Egypt School, Giza, Egypt</td>
<td>T: Esraa Mohamed</td>
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<td><strong>ENBM081</strong> SIMON Smart Deaf Speaker Device</td>
<td>Sandy Salem Anwar, 17, Junior, Pioneer Integrated Schools, Cairo, Cairo, Egypt</td>
<td>T: Shaimaa El Badawi</td>
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<td><strong>ENEV063</strong> COD Decrement, Water Forever</td>
<td>Mohamed Ashraf Abdelrazek, 17, Junior, Obour STEM School, Obour, Kalubya, Egypt</td>
<td>T: Shaimaa El Sayed</td>
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<td><strong>TMED054T</strong> Mom Care</td>
<td>Steven Adel Ata Adel, 18, Senior, Abdel- Rahman Khaled Mohamed Mahmoud, 17, Senior, S.T.E.M. Luxor School, Luxor, Egypt</td>
<td>T: Mohamed Shahat T: Mohamed Nader</td>
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Alexandria, Egypt, EGY002, Bibliotheca Alexandrina Science and Engineering Fair – Alexandria

BCHM021 The Usage of Moringa Seeds in Sewage Purification for Agriculture and Clean Energy Production
Fatma Ali Elbanna, 17, Junior, STEM School of Alexandria, Alexandria, Egypt, T: Eman Ali

EAEV098 Enhancement of Binary Geothermal Power Plants by Using Nanoparticles and It’s Application in Egypt
Yasmin Osama Hegy, 16, Junior, Kafrawy Language School, New Damietta, Damietta, Egypt, T: Eman El Dahshan

ENEV067 Smart Electrical Device for Contamination Detection and Drinking Water Quality Monitoring
Omar Walid Elbehiry, 17, Senior, Abo Bakr Elsdeek Secondary School, New Damietta, Damietta, Egypt, T: Doaa Elemam

ROBO062 Hard Mission Robot
Abd Elrahman Ahmed Draz, 17, Junior, Future International Schools Sadat City Branch, Sadat City, El Sadat, Egypt, T: Mohamed Elkafory

SOFT043T Utilizing Computer Vision and Machine Learning Systems to Develop an Algorithm Helping Physically Disabled People to Use Computer
# Gasser Mohamed Galal, 17, Mostafa Ahmed Abdelmohyem#, 18, Senior, Elnasr Boys' School, Alexandria, Egypt, T: Effat Nasr

ESTONIA

Tartu, Estonia, EST001, Estonian Young Scientist Contest
ENEV034T The Use of Peat in Eliminating Environmental Pollution from Bodies of Water
Ats Oskar Laansalu, 19, Senior, Henri Pihelgas, 19, Senior, Tallinna Mustamae Gumnaasium, Tallinn, Harju County, Estonia, T: Heli Stroom

FINLAND

Helsinki, Finland, FIN001, Finland National Science & Engineering Fair
BCHM033 Investigating How Temperature Affects the Rate of Decomposition of Hydrogen Peroxide in the Presence of Catalase
Klaara Aurora Huima, 17, Senior, Helsingin Suomalainen Yhteiskoulu, Helsinki, Finland, T: Katarina Yliheikkilä

MATH052 Understanding the Four Color Theorem and Attempts to Prove It
Alexander Liedtka, 18, Senior, Ressun Lukio IB World School, Kalevankatu 8-10, Helsinki, Finland, T: Chong Su

PLNT052 Manifestations and the Evolutionary Background of the Fibonacci Sequence and the Golden Ratio in Plants
Sisu Lauri Henrikki Kiuru, 17, Junior, Classical High School in Tampere, Tampere, Finland, T: Elina Luoma-aho

GEORGIA

Tbilisi, Georgia, GEO002, Leonardo da Vinci Fair
EGSD023T Automated Hydrogen Generator for Perspective Fuel Cell
Nikoloz Tavadishvili, 19, Senior, Rostomi Nioradze, 17, Junior, The Georgian Patriarchate Tbilisi School of St. Ilia The True, Tbilisi, Georgia, Cervantes Gymnasium AIA-GESS, Tbilisi, Georgia, T: Teimuraz Chichua

ENMC042T Queue Control System
Nia Norakidze, 15, Sophomore, Dimitri Gulua, 17, Senior, Gigi Gugunava, 16, Junior, Cervantes Gymnasium AIA-GESS, Tbilisi, Georgia, St. Alexi Shushania’s School-Gymnasium, Senaki, Samegrelo Zemo-Svaneti, Georgia, T: Davit Solgulashvili
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<td>Optimizing Human Feedback in Reward Modelling</td>
<td>Chioma Stella Opara</td>
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<td>Junior</td>
<td>Nigerian Tulip International Colleges</td>
<td>Abuja</td>
<td>Abuja</td>
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<td>David Krueger</td>
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<td>FeelWrite: An Application to Improve our Mood and Mental Health</td>
<td>Amalia Christina Toutziaridi</td>
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<td>Myrto Vasiliki Alexopoulou</td>
<td>15</td>
<td>Sophomore</td>
<td>Athens College</td>
<td>Andreas Karampelas</td>
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<td>Solar Park with Photovoltaic 3D-printed Trees: Technology Allies with Nature</td>
<td>Charikleia Moraitaki</td>
<td>16</td>
<td>Junior</td>
<td>Maria-Eleni Batatoudi</td>
<td>17</td>
<td>Junior</td>
<td>Athens College</td>
<td>Evangelos Kotronis</td>
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<td>GUAM</td>
<td>Mangilao</td>
<td>Guam Island-Wide Science Fair</td>
<td>Developing a Flexible, Stretchable, and Conductible Polyurethene/Liquid Metal Composite for Future Electronics</td>
<td>Kasey Xu</td>
<td>16</td>
<td>Sophomore</td>
<td>St. John's School</td>
<td>Upper Tumon</td>
<td>Guam</td>
<td>Robert Alvarez</td>
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<td>Optimizing Astrophotgraphy and Image Analysis of the Orion Nebula, Milky Way Stars, and the Moon in Guam</td>
<td>Enqi Joseph Yang</td>
<td>17</td>
<td>Junior</td>
<td>Harvest Christian Academy</td>
<td>Mongmong Toto Mai</td>
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<td>Leah Bere</td>
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<td>Preventing Pseudococcidae Infestation by Strategical Plant Placement Based Upon the Photosynthates, Alcohol Content, and Acidity Level of Solanum melongena, Abelmoschus esculentus, Citrofortunella microcarpa, and Origanum vulgare</td>
<td>Anica Bejerana Camacho</td>
<td>16</td>
<td>Junior</td>
<td>Academy of Our Lady of Guam</td>
<td>Hagatna</td>
<td>Guam</td>
<td>Yvette Camisura</td>
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<td>HAITI</td>
<td>Port-au-Prince</td>
<td>Expo-Sciences Haiti</td>
<td>The Transformation of Household Waste into Combustible Briquettes</td>
<td>Rolains Benjamin</td>
<td>18</td>
<td>Senior</td>
<td>Ravelito Oculte</td>
<td>19</td>
<td>Senior</td>
<td>Petit Seminaire College Saint-Martial</td>
<td>Jude Pean</td>
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<td>EcoAir: Biochar Low-cost Portable Purifier for Indoor Pollution</td>
<td>Noah Araya Bigio</td>
<td>16</td>
<td>Sophomore</td>
<td>Chloe Laplanche</td>
<td>15</td>
<td>Sophomore</td>
<td>Nathalia Michelle Succar</td>
<td>Katarina Laforune</td>
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<td>Smart Irrigation</td>
<td>Christelle Marie Dheliane Jean</td>
<td>16</td>
<td>Junior</td>
<td>Isabelle Marie Fredana Jean</td>
<td>16</td>
<td>Junior</td>
<td>Union School Haiti</td>
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Regeneron International Science and Engineering Fair 2021
CONGRATULATIONS TO THE FIRST PLACE CATEGORY WINNERS

Biomedical and Health Sciences

ASHWIKA AGRAWAL
Cupertino, California
An Apparatus for Assessment of Respiratory Health
Booth BMED054

ISABELLA MARY LILLIAN HEFFERNAN
Riverside, Rhode Island
Peanut Allergy: Butyrate Therapy, Better Diagnoses
Booth BMED069

Regeneron applauds the finalists in Biomedical and Health Sciences.
HUNGARY

Budapest, Hungary, HUN001, Innovation Contest for Young Scientists

ENMC037 Making a Remote-controllable Mars Rover with the Main Functions of the Real Rovers
Matyas Rozsavolgyi, 18, Senior, Perintparti Szo-Fogado Szombathely Waldorf Ovoda, Altalanos Iskola, Gimnizium es Alapfoku Muveszeti Iskola, Szombathely, Vas, Hungary, T: Laszlo Meszaros

MATH015 The Contraharmonic Mean: Connections, Relations to Number Theory, Possible Generalizations
Sara Hargitai, 18, Senior, Godolloi Reformatus Liceum Gimnizium, Godollo, Hungary, T: Tamas Unyi

SOFT025 Rip Current Detection: An Orientation-aware Machine Learning Approach
Boglarka Ecsedi, 18, Senior, Istvan Bocskai Secondary Grammar School in Hajduboszormeny, Hajduboszormeny, Hajdu-Bihar, Hungary, T: Tibor Olah

INDIA

New Delhi, India, INDO01, IRIS (Initiative for Research and Innovation in STEM)

ANIM009T Experimentation on Larvicidal Activities of *Acacia auriculiformis* Dry Fruit Extracts on Different Life Cycle Stages of *Anopheles sp*, *Culex sp*, *Chironomus sp* and *Clogmia sp* for Showing Its Potential Ability as a Natural Sewage Treatment Agent
Aniruddha Das, 16, Sophomore, Ramiz Akbar, 16, Sophomore, Kaitha High School, Nalhati, Birbhum, West Bengal, India, T: Syed Ahmed

BEHA009T Autest: Culturally Adapted Risk Assessment Game for Autism Spectrum Disorder
# Aranyo Ray, 18, Senior, Anwesha Das, 18, Senior, Kalyani Public School, Kolkata, West Bengal, India, Delhi Public School – Kalyanpur, Kanpur, Kanpur, Uttar Pradesh, India, T: Simran Bhattty

BEHA010 Using Response Times to Investigate the Face Recognition Mechanism in Developmental Prosopagnosia
Tanvi Palsamudram, 18, Senior, The International School of Bangalore (TISB), Bangalore, Karnataka, India, T: Joseph DeGutis

BMED009 Postpartum Cup: A Lifesaving Innovation for Realtime and Accurate Estimation of Obstetric Blood Loss in Postpartum Haemorrhage
Archit Rahul Patil, 15, Freshman, Kashinath Palod Public School, Jalgaon, Maharashtra, India, T: Sangeeta Khanna

CBIO010 ResPred: Biomarker Discovery and Antibiotic Resistance Prediction Through Machine Learning-based Genomic Analysis of *Neisseria gonorrhoeae*
Rushank Goyal, 15, Sophomore, Rajeev Gandhi Higher Secondary School, Bhopal, Madhya Pradesh, India, T: Rashmi Chowdhary

EAEV009 Earthquake Magnitude and b Value Prediction Model Using Extreme Learning Machine
Gunbir Singh Baveja, 16, Junior, Delhi Public School, Dwarka, Delhi, India, T: Jaspreet Arora

EAEV111T Forest Guard: An Integrated Sensor cum AI-based Fire-prone Area Mapping and Early Forest Fire Detection System with Real-time Tracking and Prediction of the Direction of Spread through a Mobile User-app Interface
Utkarsh Mittal, 16, Junior, Rudranch Agnihotri, 16, Junior, Birla Vidya Niketan, New Delhi, Delhi, India, T: Navin Rajput

EBED015 "Raksha": System for Prevention of Electrocution and the Hazardous Effects of Short Circuits
Efraem Joji, 17, Senior, Devamatha CMI Public School, Thrissur, Kerala State, India

ENBM016 StethoDoc: Screening for Lung Disorders with an Augmented Reality Guided Smart Stethoscope
Aria Narayan Vikram, 16, Junior, National Public School, Indiranagar, Bangalore, Karnataka, India, T: B. Ramachandra
ENBM021  J Tremor3D: A Wearable Tremor Profiling Device for Patients with Parkinson's Disease
Jui Abhijit Keskar, 15, Freshman, The Orchid School, Pune, Maharashtra, India, T: Sangeeta Kapoor

ENBM048T  Creating a Haptic 4D Model along with Machine Learning Analysis by Developing a Non-invasive Pressure Mapping Method to Screen Genital Skin Cancer
Aasimm Aarif Khan, 17, Junior, Sidharth Shekhar Jain#, 17, Junior, Jamnabai Narsee International School, Mumbai, Maharashtra, India, T: Reetu Jain

ENEV012T  Safe Disposal of Sanitary Napkins (Mensuburner)
Kritika Singh, 17, Junior, Presentation Public School, Jugial, Punjab, India, T: Kanchan Guleria

MATH010  Cracking the Infinite Shuffle: Solving the Kimberling Sequence Problem
Niranjan Baskaran, 16, Junior, Gateway International School, Chennai, Tamil Nadu, India, T: Sangeetha Solomon

MATH027  Diophantus Equations and Partially Ordered Sets
Addea Gupta, 18, Senior, Sanskriti School, New Delhi, Delhi, India, T: Roohollah Ebrahimian

MATS005T  Unique Sensor for Radiation Detection Applications
Sahilkrishna Vazhathodyiil, 16, Junior, BVM Global Bollineni Hillside, Chennai, Tamilnadu, India, T: Latha Parameswaran

PHYS007  Visual Appearance of Extended Objects in Special Relativity
Utkarsh Bajaj, 17, Senior, DPS International, New Delhi, Delhi, India, T: Seema Rawat

PLNT003  In silico Genome-wide Study of NAC Gene Family in Brassica juncea (L.) for the Prediction of Abiotic-stress Responsive Genes
Shivam Rawat, 16, Senior, Jaycees Public School, Rudrapur, Uttarakhand, India, T: Savita Mehta

SOFT029T  A Web Application to Examine the Environmental Impact of Consumer Textiles and Provide Climate-conscious Recommendations

TMED003  Diagnosing the Stage of COVID-19 Using Machine Learning on Breath Sounds
Chinmayi Ramasubramanian, 15, Freshman, Sri Kumaran Children's Home–CBSE, Bangalore, Karnataka, India, T: Pranish Ramakrishna

TMED004  ADiag: Graph Theory and Deep Learning Based Diagnosis of Alzheimer's Disease
Vishnu Ram Sampathkumar, 17, Junior, National Public School, Indiranagar, Bangalore, Karnataka, India, T: Prizilla Fernandez

INDONESIA
Jakarta, Indonesia, IDN001, Youth Science Competition

BEHA025T  The Impact of Women Flying Kites Community "Rare Angon Srikandi" to Teenager Girl's Attention on Gender Equality Education in Denpasar City
Kadek Januarta, 18, Senior, Wahyu Padma Baskara, 18, Senior, SMA Negeri 4 Denpasar, Denpasar, Bali, Indonesia, T: Ni Margiani

EAEV031  Analysis of Potential Groundwater Availability Using Euclidean Distance in Yogyakarta Suburban City
Valencio Evanio Sahasika Kusumadyas, 17, Junior, SMA Negeri 3 Yogyakarta, Yogyakarta, D.I. Yogyakarta, Indonesia, T: Didik Purwaka

EAEV043T  Identification of Microplastics in Baby Fish Tuna (Euthynnus affinis) in Manis Market Purwokerto
Amira Kumala Syifa, 16, Junior, Edenia Evelina Larisa, 16, Junior, Al Irsyad Al Islamiyyah Senior High School Purwokerto, Purwokerto, Central Java, Indonesia, T: Nur Fitriani
ENEV033T  Synthesis of GO-CS (Graphene Oxide-Chitosan) Microparticle Composite as Pb (II), Zn (II), and Mn (II) Adsorbent
Christian Agung Novianto, 17, Senior, Steven Mathias Holme, 18, Senior, Regina Pacis High School, Bogor, West Java, Indonesia, T: Silvia Monica

MATS019  Synthesis and Analysis of Graphene and Carbon Quantum Dots (CQDs) Composites Based on Epoxy Matrix
Mochamad Sutrimo Raharjo, 18, Senior, MAN 2 Kudus, Kabupaten Kudus, Central Java, Indonesia, T: Sri Indrawati

MCRO019T  Algae Facade Technology in Improving Air Quality and Building Health: Analysis of Microclimate and Growth of Aspergillus sp
Muhammad Haikal Algafari, 18, Senior, Ridzik Malky Daniel, 16, Junior, SMA Sukma Bangsa Lhokseumawe, Lhokseumawe, Aceh, Indonesia, T: Fauza Azima

SOFT021  3D Memory Bank: Memory Visualization Application with Open 3D Creation Software
Muhammad Atpur Rafif, 16, Junior, SMA Negeri 2 Depok, Depok, Jawa Barat, Indonesia, T: Mahmoudah Cahyaningrum

SOFT028T  Systematic Web-based Assessment of Medical Records and Mammography Image for Breast Cancer Likelihood Prediction
Azizah Auliani Rahma, 18, Senior, Sonia Regina Salsabila, 19, Senior, SMA Negeri 1, Yogyakarta, D.I. Yogyakarta, Indonesia, T: Muhammad Yassirroni

TMED023T  Primary Culture of Colorectal Cancer Cells from BALB/C Model Mice Induced by Diet High in Fat and 7,12-Dimethylbenz(a)anthracene (DMBA)
Siti Andriyani, 19, Senior, Nisrinah Nur Syarafina, 17, Senior, Madrasah Aliyah Negeri 2 Kota Malang, Malang, East Java, Indonesia, T: S. Fatiyatur Rahmah

Jakarta, Indonesia, IDN002, Olimpiade Penelitian Siswa Indonesia

BEHA008T  Optimizing Students’ Working Memory Capacity with Binaural Beats: An Experimental Study on SMA Negeri 28 Jakarta Students
Athifah Qonita Millati, 17, Senior, Noor Naira Imitinan Himam, 17, Senior, SMA Negeri 28 Jakarta, Jakarta Selatan, DKI Jakarta, Indonesia, T: Eri Yudatama

EBED004T  Vanilla Breeding Smart Detector Gun
I Gusti Ngurah Sucahya Satria Adi Pratama, 17, Junior, Ni Putu Ari Budiani, 17, Junior, SMA Negeri Bali Mandara, Buleleng, Bali, Indonesia, T: Kadek Artama

MCRO025T  Woplastic: Innovation of Self Degradable Plastic Diaper Wrappings
Hafidza Fatma Yona, 17, Senior, Siti Andriyani, 19, Senior, Madrasah Aliyah Negeri 2 Kota Malang, Malang, East Java, Indonesia, T: Fathor Rahman

IRELAND

Dublin, Ireland, IRL001, BT Young Scientist & Technology Exhibition

MATH046T  Analytical Solutions of Compartmental Epidemic Models and Their Application to Parameter Estimation
Yaduvir Harhangi, 17, Junior, Marton Andras Goz, 17, Junior, Synge Street CBS, Dublin, Leinster, Ireland, T: Kate Walsh

Dublin, Ireland, IRL002, SciFest

EAEV076 Using Machine Learning to Improve Numerical Weather Prediction
Conor Timothy Casey, 18, Senior, Pobalscoil Inbhear Sceine, Kenmare, Kerry, Ireland, T: Sarah Abbott

ENBM056T  Specs: A Wearable Smart Device for Dementia Patients
Dara Padraig Newsome, 17, Junior, Conor Patrick Bradshaw, 17, Junior, David Patrick Hughes, 17, Junior, Mercy Secondary School, Mounthawk, Tralee, Kerry, Ireland, T: Eimear Nolan

ENBM059  Image Analysis of Rehabilitating Patients’ Exercise to Measure and Improve Recovery
Caoimhin Iarlaith O’Leary, 17, Junior, Ardscoil na Mara, Tramore, Waterford, Ireland, T: Niamh Shannon
CONGRATULATIONS
TO OUR FIRST PLACE CATEGORY WINNERS

Biomedical Engineering

ISHAAN S. BRAR
Bakersfield, California
Tesla Valve and Microporous Membrane Catheter
Booth ENBM047

KEYU WAN
Shanghai, China
Dual Mode Soft Wrist-Fingers Exoskeleton
Booth ENBM028

Johnson & Johnson applauds the finalists in Biomedical Engineering.
ISRAEL
Jerusalem, Israel, ISR001, The Israeli Young Scientists Contest

BMED048 Development of a Protocol for Simultaneously Sequencing Multiple Inherited Retinal Diseases' Founder Mutations
Sapir Shalom, 17, Senior, Israel Arts and Science Academy, Jerusalem, Israel, T: Mor Hanany

BMED049 The Future of Cancer Treatment: Cancer Derived Exosomes In Angiogenesis
Guy Rosenfarb, 17, Senior, Shimon Ben Zvi High School, Givatayim, Israel, T: Shira Chorny

CHEM042 Novel Ultra-Low-Density Nickel Aerogel
Omer Eyal, 17, Senior, The Hebrew University Secondary School, Jerusalem, Israel, T: Orli Metzer-Kahane

EGSD037 Future Generation Batteries: Solid State Batteries
Ariel Gat, 18, Senior, Tamar Ariel (Shapira) School, Netanya, Tel Aviv District, Israel, T: Itzik Gvili

ITALY
Milano, Italy, ITA001, I Giovani e le Scienze

CHEM021T CASH-LOCK: A Way to Find Out What You Are Wearing
# Alberto Racerro, 18, Senior, Elisa Destro#, 19, Senior, Bibiana Dellavalle#, 18, Senior, Istituto Superiore Ascanio Sobrero, Casale Monferrato, Italy, T: Federica Borasi

ENBM083 EyesDrive: A Novel, Non-invasive, Brain-Computer Interface for Paralysis Sufferers
Federico Runco, 19, Senior, Istituto Superiore Ascanio Sobrero, Casale Monferrato, Italy, T: Monica D’Urso

ENEV075T Healir: An Innovative Smart and Intelligent Air Filter
Matteo Grondona, 16, Senior, Martina Rattini#, 16, Senior, Edward Levi Burns#, 17, Junior, I.I.S A.Maserati, Voghera, Pavia, Italy, T: Marialuisa Castoldi

PLNT030T Hybrid Autonomous Living System
Joao Vitor Sinigardi, 18, Senior, Matteo Bigi, 18, Senior, Luca Giuliani, 19, Senior, Istituto Superiore "Enrico Fermi", Mantova, Italy, T: Mauro Grandi

ROBO050T N.I.M.P.H.A. (Neural Network Interface for Monitoring Plants via Hybrid Aircraft)
Matteo Girelli, 18, Senior, Nicola Bormolini, 18, Senior, Istituto Rainerum – Salesiani Don Bosco, Bolzano, Bolzano, Italy, T: Stefano Monfalcon

ROBO081 Machine Perception: How Robots Navigate and Map the World
Patrick Turricelli, 18, Senior, Liceo Rinaldo Corso, Correggio, Italy, T: Erick Turricelli

JAPAN
Tokyo, Japan, JPN001, Japan Students Science Awards

ANIM021T Where Are They from? The Origin of Alien Cicada (Graptopsaltria bimaculata) in Izumi, Kagoshima, Japan
Nanami Arimura, 18, Senior, Riko Nakajima, 18, Senior, Ann Itakura, 18, Senior, Kagoshima Prefectural Kokubu High School, Kirishima City, Kagoshima, Japan, T: Katsuki Komizo

CHEM035 A New Method for the Selective Synthesis of Indirubins
Shun Tanaka, 16, Freshman, Fuzoku Middle School Attaced to Naruto University of Education, Tokushima City, Tokushima, Japan, T: Yukitaka Hayafuji
Finalist Directory

EAEV032  How Do We Save Our Lives? Discovery of Realistic Evacuation Issues and a Proposal of New Solution  
Koya Takahashi, 18, Junior, Tosa High School, Kochi, Kochi, Japan, T: Fumio Takeda

PHYS024T  Mechanism of Supernumerary Rainbows  
Takuto Murata, 17, Junior, Kenta Mizuyoshi, 18, Junior, Saitama Prefectural Yono High School, Saitama, Japan, T: Toshio Ishii

PLNT024  Mushrooms Wear Sand Grains for Survival: A Strategy of Marasmiellus mesosporus on Beach  
Shohei Wada, 19, Senior, Kobe Gakuin University High School, Kobe-shi, Hyogo, Japan, T: Takamasuka Takada

SAO22  Supporting People Working with Disabled People Towards an Inclusive Society  
Keidai Toyoshima, 19, Senior, Senior High School at Komaba, University of Tsukuba, Setagaya-ku, Tokyo, Japan, T: Chiyoko Hayakashi

Tokyo, Japan, JPO02, Japan Science & Engineering Challenge

ANIM022  How Do Butterfly Wings Repel Water? The Relationship between Super-Hydrophobicity and the Fine Structure Common to Butterflies  
Wakana Nakayama, 18, Senior, Kobe University Secondary School, Kobe, Hyogo, Japan, T: Takuya Yamamoto

CHEM022T  Improvement of Hydrolysis Efficiency of Cellulose Using Ionic Liquids for Efficient Bioethanol Production  
Yuri Muto, 18, Senior, Nanami Kanzaki, 18, Senior, Kazuki Toida, 18, Senior, Aichi Prefectural Ichinomiya Senior High School, Ichinomiya-City, Aichi-Pref., Japan, T: Masaki Inamori

CHEM030T  Separation and Nondestructive Identification of Solid Particles by NeFeB Permanent Magnets with Microgravity: Toward "Solid-State Version Chromatography"  
Keita Maishi, 19, Senior, Yuichirou Okuno, 18, Senior, Mai Fujitani, 18, Junior, Kasugaoka Senior High School of Osaka Prefecture, Ibaraki-shi, Osaka, Japan, Otemae Senior High School The Evening Course, Osaka City, Osaka Prefecture, Japan, T: Keiji Hisayoshi

EGSD016T  Photochemical Hydrogen Production Using Tea Leaf Residue and Iron Ions  
Rio Tanimoto, 17, Junior, Ryo Mochizuki, 17, Junior, Hibiki Tanaka, 17, Junior, Shizuka Kitahiga High School, Shizuka-Pref., Japan, T: Yuji Takagi

MATH025  An Expansion of "Buffon's Needle" to Higher Dimensions: Computational Theory of Probability Using Figures and Its Application to Geometry  
Haruki Sato, 18, Senior, Nara Women's University Secondary School, Nara-City, Nara-Pref., Japan, T: Shinji Kawaguchi

PHYS025T  Performance Evaluation of a Supercomputer Made from Discarded PCs  
Kosuke Oya, 17, Junior, Toshifumi Komatsu, 17, Junior, Yasutaka Tokumaru, 17, Junior, Makuhari Senior High School, Chiba, Chiba, Japan, T: Bunji Suzuki

PHYS026T  Designing Cups to Adjustable to the Changing Temperatures of Viscous Liquids  
Mana Kawano, 18, Senior, Motoka Nagata, 19, Senior, Hiroshima University High School, Hiroshima, Japan, T: Kosei Kajiyama

PHYS042T  Measurement of Film Thickness of Antihydrogen Using Interference of Transmitted Light  
Chika Enomoto, 18, Senior, Yui Tokimoto, 18, Senior, National Institute of Technology, Tsuyama College, Tsuyama City, Okayama, Japan, T: Makoto Sato

JORDAN

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

BEHA029  Be Better  
Ibrahim Ahmad Wahdani, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah
BEHA040T  Silence: A Novel Method of Communication for MND and MS Patients Using Eye Movements
Hamzeh Yahia Arabiyat, 16, Junior, Omar Mazen Arafeh, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jamaah

BEHA041T  Smart Wallet for Blind People
Noor Nasser Alkhatib, 15, Sophomore, Layla Nael Alkhatib, 15, Sophomore, Al-Hoffaz Academy, Amman, AlMoqablain, Jordan, T: Sajedah Mansour

BEHA042T  Application for Screening Attention Deficit Disorder (Inattentive ADHD (ADD))
Zeina Ahed Al Sharaydeh, 17, Junior, Jood Faisal Mohammed, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jamaah

BEHA043T  Down Syndrome Smart Watch
Emam Ahmad Alsaodi, 14, Freshman, Ahmad Talib Al Mseidein, 14, Freshman, Abu Baker Al Sdeeq, Tafilah, Jordan, T: Khalid Al Zadaneen

BEHA068  Early Diagnosis of Children Developmental Delay
Tamara Rasm Almubiden, 12, Freshman, Alridwan Schools, Amman, Amman, Jordan, T: Basma Diab

CHEM031T  High Efficiency Adsorption of Methane Using Modified Activated Carbon and Modified Clinoptilolite
Sarah Osama Abdallah, 16, Junior, Fares Amer Qtaishat, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah T: Sawsan Abujammaah

ENBM058T  SFAD: Spoiled Food and Allergy Detector
Salma Omar Al-Shaghnobi, 13, Freshman, Jana Kamal Al-alaween, 14, Freshman, Bunat Alghad Academy, Amman, Jordan, T: Liza Al-Adwan

ENBM092T  Medical Car
Diya'a Alhaq Abdullah Meza'l Al-Shabatat, 15, Sophomore, Hazem Nader Alsawalqah, 16, Sophomore, King Abdullah II School for Excellence, At-Tafilah, Jordan, T: Ahmad Alshabatat

ENBM103T  Measuring Blood Glucose Level by Acetone Concentration in Exhaled Air
Salma Abdulmajeed Al-Amr, 17, Junior, Noor Kamal Almasri, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah

ENBM106  Smart Prosthetic Hand Helper
Mohammad Alzoubi, 17, Junior, Alramtha Secondery School, Irbid, Jordan, T: Omar Alzoubi

ENEV045  Smart Green Organic Farm
Saja Obeybat, 17, Senior, Um-Alsummaq Southern Secondary School, Amman, Jordan, T: Ola Amr

ENEV049T  A Robot Ultrasonic Pest Repellent
Mohammad Yahya Ismail Hammoudeh, 17, Junior, Wafa’ Eslam Mohammed Hassan AlHayek, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu-Jamma’ah

MATSO30T  Magnetite Nanoparticles Coated with Oleic Acid for Removal of Toxic Elements
Farah Fawwaz AlZaatreh, 17, Junior, Nagham Ala’a AlHourani, 17, Junior, King Abdullah II School for Excellence – Maddaba, Maddaba, Jordan, T: Mohammad Aljdou

PHYS041  Alive Rover Wheel
AbdelRahman Iyad AlHroob, 16, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jamaah

TMED036T  Liver Disease Artificial Intelligence Diagnosis through Fingernails
Suhaila Saeed Al-Fawara, 16, Junior, Mohammad Moayyad Ghanem, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jamaah
CONGRATULATIONS
TO THE FIRST PLACE CATEGORY WINNER

Cellular and Molecular Biology

PARISA ARYANA VAZIRI
Plano, Texas
Neuro-Protective Role of Transcription Factors
Booth CELLO37

Regeneron applauds the finalists in Cellular and Molecular Biology.
KAZAKHSTAN

Nur-Sultan city, Kazakhstan, KAZ001, DARYN National Junior Science Projects Competition

**MATH047**  Ramanujan Congruences for Tangent Numbers
Medet Jumadildayev, 16, Sophomore, Nazarbayev Intellectual School of Physics and Math, Almaty, Kazakhstan, T: Ramazan Sultan

**ROBO085**  Visual Sign Language Translator
Ilyas Serikovich Umurbekov, 18, Senior, Nazarbayev Intellectual School of Physics and Mathematics in Kokshetau, Kokshetau, Aqmola Region, Kazakhstan, T: Faizal Bhula

LATVIA

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

**CHEM060**  Local Strontian Ranelate Delivery Systems
Samanta Cvetkova, 18, Junior, Nereta Janis Jaunsudrabins' High School, Nereta, Aizkraukle district, Latvia, T: Viktorija Truksa

**ENBM082**  Recombinant Expression of NT-2Rep-CT SpiderSsilk Minispidroin
Marta Vecziedina, 18, Junior, Riga State 3rd Gymnasium, Riga, Riga, Latvia, T: Anita Rozenblate

LUXEMBOURG

Luxembourg, Luxembourg, LUX001, National Contest “Jonk Fuerscher”

**CHEM050**  Sulfur Dioxide Quantification: Improvements to the Classical Ripper Titration Using Colorimetric Analysis
Sarah Mackel, 17, Senior, International School of Luxembourg, Luxembourg, Luxembourg, T: Morgan Smith

**ENBM071**  Device for Analysing Coughing Patterns to Diagnose and Monitor Asthmatic Patients
Elias Fizesan, 17, Junior, St. Paul's School, London, Barnes, United Kingdom, T: Tomi Herceg

MALAYSIA

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

**CHEM013**  A Combination of nNeem and Clove in the Form of Cream Against Tetraponera rufonigra
Yu Zhe Chu, 16, Sophomore, Chung Ling High School Penang, Georgetown, Penang, Malaysia, T: Whey Cheng Heah

**ENBM023**  Stroke Rehabilitation Using Artificial Intelligence K.A.K.I (Kinesthetic Augmented Kinematic Inference)
Saan Cern Yong, 15, Sophomore, Sheng Ze Yeoh, 14, Freshman, Sekolah Menengah Kebangsaan Katholik, Petaling Jaya, Selangor, Malaysia, T: Voon Siew Yong

**ENMC022**  Ferro-Oil Capsule (Encapsulated Recycle Oil with Ferric Oxide for Self-Healing Potholes)
Nik Nurfarahana Tengku Rosman, 17, Junior, Nurul Fayyadhah Ahmad Zainudin#, 16, Junior, Sekolah Menengah Kebangsaan Kubang Bemban, Pasir Mas, Kelantan, Malaysia, T: Nor Zaihan Shamsudin T: Nor Zaihan Shamsudin

**MCRO065**  EX-BAC: The Extraction of Chitin and Chitosan from the Waste of Shrimp Shells and Potato Peels Mix with TiO2 as an Eco-friendly and Effective Bacteriostatic Agent
Eugene Lim, 16, Junior, Daniel Yi Heng Leong, 16, Junior, Chung Ling High School Penang, Georgetown, Penang, Malaysia, T: Whey Cheng Heah

**PLNT008**  Garlic and Ginger Combined Crude Extract as a Novel, Cost-Effective and Eco-Friendly Locust Repellent
Bo Wei Lai, 17, Junior, Chuen Keat Tan, 16, Junior, Chung Ling High School Penang, Georgetown, Penang, Malaysia, T: Whey Cheng Heah
Plectra Gold: Herbal Honey Formulation as an Effective Relief for Common Respiratory Diseases such as Flu, Cough and Sore Throat
Abhirami Ramachandran, 15, Sophomore, Mahisha Kaur Dalvendar Singh, 15, Sophomore, Kanimolee Saminatha Kumaran#, 15, Freshman, Sekolah Menengah Kebangsaan Jalan Empat, Bandar Baru Bangi, Selangor, Malaysia, T: Sumathy Raghavan

Flours Prepared Without Gluten “Mezky”
Laisha Vázquez Murrieta, 16, Freshman, Alexia Sarahi Cerezo Cruz, 17, Freshman, Colegio de Estudios Científicos y Tecnológicos del Estado de Puebla, Tecamachalco, Puebla, Mexico, T: Marycarmen Alducin Jiménez

Hypoglycemic Gummy from Prickly Pear, Nopal, Gelatin, and Aloe as a Supplement Alternative for Type II Diabetes Mellitus
Aylin Lizeth Mendoza Lopez, 18, Freshman, Jezabed Alexandra Gómez Flores, 18, Freshman, Annex School to the Normal High School of Teotihuacan, Estado de Mexico, Teotihuacan, Mexico, T: Magdalena Hernandez Aguilar

Biodegradable Film Based on Banana Peel, Cornstarch and Glycerin
Daniel Rodriguez, 16, Junior, Dannai Rojas, 17, Junior, Colegio de Estudios Científicos y Tecnológicos del Estado de Puebla Plantel Magdalena, Acajete, Puebla, Mexico, T: Oscar García

Edible Spoon Made from Cereals, Seeds and Natural Gums
Diego Castillo, 17, Senior, Colegio de Estudios Científicos y Tecnológicos del Estado de Puebla Plantel Cholula, Cholula, Estado, Mexico, T: Paulina Albores

The Smart Electric Pressing Iron
Jimisola Somtochukwu Balogun, 15, Junior, Isaac Ayomide Olufunminiyi, 13, Junior, Doregos Private Academy, Lagos, West Africa, Nigeria, T: Oluseyi Lawal

Fiscus exasperata vahl: A Therapeutic Approach to Hypertension and Diabetes
Colette Onyinyechukwu Eyemonu, 15, Junior, Oluseyi Esther Olufunminiyi, 12, Sophomore, Doregos Private Academy, Lagos, West Africa, Nigeria, T: Oluseyi Lawal

The Smart Electric Pressing Iron
Jimisola Somtochukwu Balogun, 15, Junior, Isaac Ayomide Olufunminiyi, 13, Junior, Doregos Private Academy, Lagos, West Africa, Nigeria, T: Oluseyi Lawal

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Colette Onyinyechukwu Eyemonu, 15, Junior, Oluseyi Esther Olufunminiyi, 12, Sophomore, Doregos Private Academy, Lagos, West Africa, Nigeria, T: Oluseyi Lawal

Representing the Curvature of a Chain as a Graph Using High School Math and Physics
Victor Yash Klippgen, 19, Senior, Blindern VGS, Oslo, Norway, T: Emmanuelle Bjerkem

A Statistical Analysis of the Assumptions of Normality and Independence of Returns of the Black-Scholes Option Pricing Formula
Simran Sahajpal, 18, Senior, Lillestrom High School, Lillestrom, Viken, Norway, T: Siren Veflingstad

Herbal Nanoparticles (Plant Crystals) and Extract — A Safe Alternative to Combat Anopheles culicifacies and Aedes aegypti
Marwa Khalifa Al Handhali, 16, Junior, Lamya Hamed Al Handhali, 16, Junior, Habiba Mohammed Al Handhali, 17, Junior, Al-Ghubra Basic Education School for Girls, Ibra, North Sharqia, Oman, T: Asila Al Sibayi
ENEV083T Employing Artificial Intelligence to Protect the Ras AL Hadd Turtle Reserve
Laila Khamsi AlMukhaiti, 16, Junior, Sheyam Nasser Al-Ghailani, 17, Junior, Lubaba Bint
Al-Harith, Sur, South Sharqiyyah, Oman, T: Habiba AlKathiri

PAKISTAN
Islamabad, Pakistan, PAK001, National Science and Engineering Fair Pakistan
ANIM043T Saving Cats from Dehydration by Balancing Their Diet
# Laiba Fatima Kanchwala, 16, Junior, Jaiba Tahir Ali#, 17, Junior, Aga Khan Higher
Secondary School, Karachi, Sindh, Pakistan, T: Shaista Abid
EBED021 Clozer: Brings You Closer to Your Loved Ones
Ali Raza, 18, Senior, Aga Khan Higher Secondary School, Karachi, Sindh, Pakistan, T: Irfan Abdullah
EBED034 Assistive Tongue Operated Mouse
Saad Zahid, 16, Freshman, PakTurk International Schools and Colleges- Lahore, Lahore,
Punjab, Pakistan, T: Bazla Sarwar
ENEV086 Compostable Flame-resistant Hydrophilic Psyllium Paper with Strengthening Fibers
of Banana and Paddy Husk
Maya Sohail, 15, Freshman, Pak Turk Maarif International Schools and Colleges, Karachi,
Sindh, Pakistan, T: Shaista Mehmood
ENMC053 Design and Implementation of a Quadcopter Flight Controller with Non-uniform
Hardware to Cater for Third-World Supply-Chain Issues
Muhammad Muazzam Salman, 16, Junior, Lahore American School, Lahore, Punjab,
Pakistan, T: Sajida Bokhari
MATS031T An Experimental Approach to Construct an Organic Slab
Maha Khan, 17, Junior, Umme Barira, 16, Junior, PakTurk International Schools and
Colleges, Gulshan-e-Iqbal Girls Campus, Karachi, Sindh, Pakistan, T: Hira Bashir
MCRO044 The Anti Eczemal (Anti Fungal) Oil: A Herbal Medical Cure to Eczema
Syed Sibtay Hasan, 16, Sophomore, Sultan Mahomed Shah Aga Khan School, Karachi,
Sindh, Pakistan, T: Sana Zaib

PALESTINE
Ramallah, Palestine, PSE001, Palestine Science and Technology Fair
BEHA075T Save Life. Be a Hero
Mira khader Issa, 17, Junior, Malak Samer Naimi, 16, Junior, Alawda Secondary School
for Girls, Bethlehem, Bethlehem, Palestine, T: Rana Khair
EBED035T Smart Phone Speaks Hand Movements
Ali Salah, 18, Senior, Ahmad Salah, 17, Senior, Alkhader Secondary School for Boys,
Bethlehem, Bethlehem, Palestine, T: Mahmoud Abed
ENMC074 Transferring Bodies Movements to a Computer
Nada Basil Abuisaa, 18, Senior, Slafeet Girls Secondary School, Salfeet, Salfeet,
Palestine, T: Walaa Shtayyah
MATS047 Enhancing the Competence of the Artificial Stone
# Saif Maher Jabari, 17, Senior, Al Hussein Bin Ali Secondary School, Hebron, Palestine,
T: Mohammed Alkaraki
ROBO083 Motherhood Guide
Layali Nemer Khatib, 15, Sophomore, Um Dar and Alkhuljan Girls Secondary Girls
School, Jenin, Palestine, T: Rana Sadi
CONGRATULATIONS
TO OUR CATEGORY FINALISTS

Chemistry

Sarah Abdallah
Dana Al Rogaiti
Laura AlAmiri
Abdullah AlGhamdi
Zane Alsebai
Zakhar Balandin
Becca Barbera
Aditi Bhaskar
Eric Bi
Hadia Bizhan
Jacie Boelhower
Dawit Boonyakitnotai
Mehmet Cekuc
Hyunjun Chang
Soumya Chauhan
Vivian Chinoda
Alexandru Chivulescu
Yu Zhe Chu
Samanta Cvetkova
Bibiana Dellavalle
Elisa Destro
Tam Do
Tianyu Dong
Zyad Emad
Omer Eyal
Jingze Fang
Kiara Fenn
Mai Fujitani
George Hasnah
Shanley Ho
Yehyun Hwang
Nouraldeen Ibrahim
Elijah Jones
Yeonsu Kang
Nanami Kanzaki
Vedant Karalkar
Sanjna Kedia
Anna Khan
Min Jae Kim
Min Jung Kim
Se Ryeon Kim
Brian Lee
Jeannine Lee
Bryan Lee Chong Han
Dillion Lim
Andrew Lipton
Shawn Lokshin
Natalia Lonescu
Genesis Lopez-Aviles
Alexis MacAvoy
Sarah Mackel
Anh Mai
Keita Maishi
Sapol Maison
Ryan McGinnis
Prepilta Mihaela
Grace Moeller
Yuri Muto
Sathvik Nallamalli
Kijakarn
Namsawangrungrueng
Yuichirow Okuno
Ratislav Ozhiganov
Kacper Pajak
Hiren Parekh
Anya Patidar
Stepan Portnov
Suphawit Promkhot
Fares Qtaishat
Alberto Racerro
Vaidehi Rathod
Yu Ren
Adam Roberge
Eva Savin
Lingbo Shen
Yiting Shen
Alexander Shliakhturov
Smriti Somasundaram
RagHAV Sriram
Savannah Stephens
Setttanan
Suangburanakul
Alanna Sun
Kevin Sun
Shun Tanaka
Thai Thaloengboonsiri
Yadiel Tirado-Laboy
Kazuki Toida
Laura Towner
Aaron Trinh
Dev Rishi Udata
Marius Vrabie
Catriona Wu
Ziye Xiao
Carly Yang
Kaien Yang
Zhi-Wei Zeng
Jason Zhang
Lisa Zhang
Mingyi Zhang

Society for Science applauds
the finalists in Chemistry.
PANAMA
Panama City, Panama, PAN001, Feria Científica del Ingenio Juvenil
EGSD026T Osiris: The Study and Evaluation of Piezoelectric Effect as a Renewable, Clean Electric Energy Source through an Energy Harvesting Footsteps-Powered Platform
Isabella Marie Rodriguez, 16, Junior, Franklin Omar Lopez, 16, Junior, Academia Interamericana de Panama sede Cerro Viento, Panama City, Panama, Panama,
T: Anela Gough

PERU
Lima, Peru, PER001, Peru Science and Engineering Fair
BEHA060 Violence Against Women in Peru During the COVID-19 Pandemic
Ariana Isabel Arroyo Salazar, 15, Sophomore, La Asuncion, Huancayo, Junin, Peru,
T: Luis Atencio Olivares
BEHA061 Andean Popular Participation in the Huancavelican Route for the Cause of Emancipation; Towards the Bicentenary
Elizent Brithney Pacheco Ramos, 16, Junior, Javier Heraud, Churcampa, Huancavelica, Peru,
T: Luis Torres Perez
BEHA062 Level of Depression, Anxiety and Stress in Adolescents Due to the Effect of the Pandemic COVID-19 in the I.E. Victor Manuel Maurtua Parcona, ICA-2020
Maria Claudia Jimenez Rojas, 16, Sophomore, Victor Manuel Maurtua, Parcona, Ica, Peru,
T: Samuel Espinoza Jeronimo
EBED027 Implementing the OSTEC System for COVID Detection by Measuring Oxygen Saturation in Blood and Body Temperature and Sending Data to a Database in the Cloud in the Chalhuanca District
Estrella Esquivel Romero, 15, Freshman, High Performance College of Apurimac, Chalhuanca, Apurimac, Peru,
T: Pablo Ataucusi Romero
ENEV071 Coffee Pulp Ecoboards in the High Yurinaki Annex — 2020
Alexandra Nancy Lima Quispe, 18, Senior, Jorge Basadre, Perene, Junin, Peru,
T: Raquel Caparacin Casachagua
ENEV072 CEC, pH, Electric Conductivity and ESP Study in Sodic Loam Clay Soils
Maira Flor Stefany Cruz Ore, 16, Junior, High Performance College of Apurimac, Chalhuanca, Apurimac, Peru,
T: Lilian Huallpa Tito

POLAND
Gdynia, Poland, PLD001, E(x)plory Science Fair
ANIM012 Preferences of Varroa destructor in Controlling Brood Raised on Young and Old Bee Combs
Olga Scieszka, 18, Senior, XL Liceum Ogolnoksztatcace z Oddziatami Dwujezycznymi im. Stefana Zeromskiego w Warszawie, Warsaw, Mazowieckie, Poland,
T: Kamil Kwiecien
BMED014 Hyperhomocysteinemic Diet Promotes Amyloid Beta Accumulation in Brains of a Mouse Model of Alzheimer’s Disease
Robert Kaptur, 18, Senior, Akademeia High School, Warsaw, Mazovia, Poland,
T: Joanna Suszynska-Zajczyk
CHEM071 Hydrothermal Synthesis of Copper Sulphide Nanoparticles, Analysis of Their Physical-Chemical Properties and Cytotoxicity in vitro
Kacper Julian Pajak, 19, Senior, III LO im. Adama Mickiewicza, Katowice, Slaskie, Poland,
T: Monika Galkiewicz
ENBM024T Oxilium : Olfactory Examination Procedure of Detecting Cancer Cells Based on the Smell of Honey Bees
Dorian Oliwier Zarna, 19, Senior, Wiktor Marcin Kus, 19, Senior, IX Liceum Ogolnoksztalcaste imienia Tadeusza Nowakowskiego z Oddzialami Dwujezycznymi, IB World School 2988, Bydgoszcz, Kujawsko-Pomorskie, Poland,
T: Agata Opaska
ENBM067T  Dosimetric Verification of Cancer Patient’s Treatment Plan Using Anthropomorphic, 3D-Printed Phantom  
Kacper Waluk, 19, Senior, Jakub Jaroslaw Pietrzak, 19, Senior, XVIII Liceum Ogolnokształcące im. Jana Zamojskiego, Warsaw, Mazowieckie, Poland, T: Beata Brzozowska T: Beata Brzozowska-Wardecka

ENMC024T  Autonomous Hybrid Drone System for Human Rescue  
Franciszek Mikolajczyk, 18, Junior, Ludwik Skowronek, 19, Senior, Zygmunt Skowronek, 16, Sophomore, V Liceum Ogolnokształcace im. Augusta Witkowskiego, Krakow, Malopolskie, Poland, Jagiellonian University in Cracow, Krakow, Malopolskie, Poland, Zespół Szkół Łączności im. Obronców Poczty Polskiej w Gdansku w Krakowie, Krakow, Malopolskie, Poland, T: Jakub Niewiedzial

ENMC044T  CPS – Custom Printed Submarine: A Community Based Approach to Designing Unmanned Underwater Vehicle Systems Using 3D Printing and Widely Available Production Methods  
Filip Mikolaj Bulawa, 19, Senior, Piotr Domanowski, 19, Senior, Marcin Jerzy Hnat, 18, Senior, I Liceum Ogolnokształcace Dwujęzyczne im. Edwarda Dembowskiego w Gliwicach, Gliwice, Słaskie, Poland, T: Michal Kwiatkowski

SOFT013  A Novel Method of Creating Block Ciphers Provably Immune to Linear and Differential Cryptanalysis  
Szymon Perlicki, 15, Freshman, Szkola Podstawowa nr 28 im. Generala Leopolda Okulickiego we Wroclawiu, Wroclaw, Województwo Dolnośląskie, Poland, T: Aurelia Ceglowska

PORTUGAL

MCRO022T  The Relationship Between Fe Availability and the Capacity of CO₂ Sequestration by Tretaseimis chuii  
Beatriz de Almeida Fernandes, 19, Senior, Joana Espirito Santo Couto, 18, Senior, Diogo Filipe Rosa Heleno, 18, Senior, Escola Secundaria Engenheiro Acacio Calazans Duarte, Marinha Grande, Leiria, Portugal, T: Rui Fernandes

PHYS033  Study of the Statistical Effect of Data Whitening and Anomalous Behaviour in Gravitational Wave Events  
# Joao Dinis Ribeiro Machado de Carvalho Alvares, 19, Senior, Escola Secundaria Dona Maria II, Braga, Portugal, T: Joao Vieira

PHYS034T  Radio Watching: Modelling of Radio Wave Fire Detection  
Andre Amorim Ribeiro, 19, Senior, Larissa Pereira Andrade, 18, Senior, Agrupamento de Escolas Clara de Resende, Porto, Norte, Portugal, T: Helena Rodrigues T: Maria Rodrigues

SOFT014T  SandSpace  
Nuno de Figueiredo Brito e Castro, 18, Senior, Bruno Dylan Pinto Ferreira, 18, Senior, Jorge Miguel Fernandes Correia, 19, Senior, Escola Secundária Dr. Serafim Leite, São João da Madeira, Portugal, T: Maria de Fatima Gomes Pais Ferreira T

PUERTO RICO

MATH028  Analyzing Computer Generated Collatz-type Fractals (Phase 2)  
Hector Manuel Lugaro, 17, Junior, CROEM HS, Mayaguez, Puerto Rico, T: Edwin Benvenutti

MATH029T  Domain Specific Language for Differential Equations with Scott-Strachey Semantics  
Benjamin Philippe, 18, Senior, Jan-Paul Vincent Ramos#, 18, Senior, University Gardens High School, San Juan, Puerto Rico, T: José Cruz
Caguas, Puerto Rico, TEPRO4, Caguas Regional Science Fair

BEHA069 Emotional Effect of Virtual Classes and the New School Schedule on High School Students
Ixlianis Valentin-Morales, 18, Senior, Specialized School of Science and Mathematics
Genaro Cautiño Vázquez, Guayama, Puerto Rico, T: Haydee Laporte-Berrios

MCRO026 Bioprospects Capable of Inhibiting the Proliferation of Pathogens (fungi) Affecting Musa acuminata x Musa balbisiana
Mireliys Rodriguez-Reyes, 18, Senior, Specialized School of Science and Mathematics
Genaro Cautiño Vázquez, Guayama, Puerto Rico, T: Haydee Laporte-Berrios

Humacao, Puerto Rico, TEPRO5, Humacao Regional Science Fair

CHEM045T H₂O as a Method of Sustainable Fuel for a Bus
Genesis Noelia Lopez-Aviles, 17, Senior, Yadiel Omar Tirado-Laboy, 17, Senior, Centro Residencial de Oportunidades Educativas de Ceiba, Ceiba, Ceiba, Puerto Rico, T: Wilmayris Alvira-Concepcion

EGSD038 Use of Anaerobic Biodigestion to Produce Energy, Reduce the Amount of Waste Generated, and Eliminate the Emission of Greenhouse Gases in Agricultural Projects
Mirelys Dallene Santana-Rivera, 17, Senior, Centro Residencial de Oportunidades Educativas de Ceiba, Ceiba, Puerto Rico, T: Wilmayris Alvira-Concepcion

ENBM063 Functionalized Biosensor for Tissue Plasminogen Activator (tPA) Detection
Paolina Morales-Lopez, 17, Senior, Escuela Superior Dr. Juan Jose Maunez Pimentel, Naguabo, Puerto Rico, T: Elianid Espinosa

Ponce, Puerto Rico, TEPRO6, Ponce Regional Science Fair

CELL028 Averrhoa carambola in the Oxidative Stress of Caenorhabditis elegans
Angelys Marie Rivera-Hernandez, 17, Senior, Centro Residencial de Oportunidades Educativas de Villalba, Villalba, Puerto Rico, T: Rocio Hernandez-Quinones

EGSD039 Generating an Electrical Power System from a Static Bicycle
Sebastian Negron-Collazo, 16, Senior, Centro Residencial de Oportunidades Educativas de Villalba, Villalba, Puerto Rico, T: Rocio Hernandez

PHYS053 Spatial Distribution of Known Exoplanets and Potentially Habitable Exoplanets within 100- Light Years from Earth
Mirelys Mendez-Pons, 18, Senior, Escuela Superior Josefa Velez Bauza, Penuelas, Puerto Rico, T: Vicmaris Lugo

Mayaguez, Puerto Rico, TEPRO8, Mayaguez Regional Science Fair

CBIO083 A Novel Approach to Increase Testing with Contact Tracing Apps in COVID-19 Pandemic
Edrick Ernesto Aponte, 17, Senior, CROEM HS, Mayaguez, Puerto Rico, T: Brenda Cabrera

San Juan, Puerto Rico, TEPRO9, San Juan Regional Science Fair

BEHA063 The Perception of Adolescents on the Effects of Social Media in Their Attention Span
Natalía Isabel Leon-Diaz, 16, Junior, Escuela Secundaria de la Universidad de Puerto Rico (UHS), San Juan, Puerto Rico, T: Keyla Soto-Hidalgo

ENBM079 New Design of a Biomechanical Prototype of an Obstetric Delivery Table
Beatriz Cristina Fuentes, 16, Junior, University Gardens High School, San Juan, Puerto Rico, T: Nelson Ruiz

San Juan, Puerto Rico, TEPRO12, Puerto Rico Metropolitan Science Fair

ANIM050 Development of a Mobile Application that Facilitates Temperature Monitoring of the Honeybee (Apis mellifera) for Beekeeping in Rural Areas
Amiris Yarit Guerríos Toledo, 16, Junior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez

BEHA048 Development of a Device to Improve Dysphasia in 3- to 6-Year-Old Children
Paola Cristal Rivera-Soto, 17, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez
CONGRATULATIONS TO THE FIRST PLACE CATEGORY WINNERS

Computational Biology and Bioinformatics

CATHERINE KIM
Jericho, New York
Hierarchical Prediction of Adverse Drug Reactions
Booth CBIO080

NATTHAKAN SAENGNIL
Rayong, Thailand
EGFRNet: Drug Discovery of Cancers for EGFR Family
Booth CBIO084T

PURI VIRAkarIN
Rayong, Thailand
EGFRNet: Drug Discovery of Cancers for EGFR Family
Booth CBIO084T

Regeneron applauds the finalists in Computational Biology and Bioinformatics.

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<table>
<thead>
<tr>
<th>Entry</th>
<th>Title</th>
<th>Participant Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBIO069</td>
<td>CRISPR Cas9 as a Possible Mechanism to Modify Influenza Viral Mutation</td>
<td>Natalia Isabel Acosta-Laboy, 15, Junior, Colegio Rosa-Bell, Guaynabo, Guaynabo, Puerto Rico, T: Yajaira Torres de Jesus</td>
</tr>
<tr>
<td>EAEV081T</td>
<td>Phenotypic Analysis on Trichoptera Larvae Behavior to Assess a Stream Quality and Changes in Flow</td>
<td>Lorraine Sophia Rosario Pizarro, 16, Junior, Rubén A. Rosario Pizarro, 16, Junior, Colegio Rosa-Bell, Guaynabo, Guaynabo, Puerto Rico, T: Yajaira Torres</td>
</tr>
<tr>
<td>EAEV082</td>
<td>Design and Creation of an Artificial CaCo3 Porous Reef Prototype as a Support Structure for the Adaptation Capacity of the Marine Ecosystem</td>
<td>Claudia Renta Ortiz, 17, Junior, Escuela Especializada en Ciencias, Matemáticas y Tecnología, Caguas, Puerto Rico, T: Shierly Martinez</td>
</tr>
<tr>
<td>ENBM065T</td>
<td>Design and Development of an Alert Prototype to Assist People with Simple Motor Seizures Events Using Triaxial Micro-sensors</td>
<td>Endrick Y. Garcia-Torres, 17, Junior, Savdiel Ducret, 16, Junior, Colegio Rosa-Bell, Guaynabo, Puerto Rico, T: Yajaira Torres-De Jesus</td>
</tr>
<tr>
<td>PLNT044T</td>
<td>Use of Manihot esculenta as an Alternative for Phytoremediation of Soil</td>
<td>Amanda Sofia Aviles de Leon, 15, Sophomore, Daniela Rodriguez-Veguilla, 16, Sophomore, The School of San Juan, San Juan, Puerto Rico, T: Edna Guzman</td>
</tr>
<tr>
<td>SOFT039</td>
<td>Safe Woman: Creation and Development of an Innovative Mobile Application for the Safety of Women</td>
<td>Alejandra Kristina Garcia-Baez, 17, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Jonathan Perez Rivera</td>
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**QATAR**

Doha, Qatar, QAT001, The National Student Research Fair

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<tr>
<th>Entry</th>
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<th>Participant Information</th>
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</thead>
<tbody>
<tr>
<td>BMED041T</td>
<td>The Interesting Reality of Stress Granules Formed in Regulating Stem Cell Fate: A Step Towards Successful Personalized Medicine</td>
<td>Adam Al-Shawagfeh, 16, Senior, Waleed Alsauwaidi, 17, Senior, Ahmad Bin Mohammad Al-thani Secondary School, Doha, Doha, Qatar, T: Ammar Othman</td>
</tr>
<tr>
<td>EAEV067T</td>
<td>Remote Monitoring System for Swimming Pools Water Quality (IOT)</td>
<td>Ahmad Tayseer Makableh, 17, Senior, Mohammed Abdulrahman Alshaibi, 17, Senior, Ahmad Bin Hanbal Secondary School, Doha, Qatar, T: Tawfiq Alwakded</td>
</tr>
<tr>
<td>EGSD031T</td>
<td>Smart and Robust Nanocomposite Fibers for Self-Powering Electronic Devices</td>
<td>Abdullah Abdulrahim Al-Janahi, 17, Junior, Abdullah Khalid Al-Nasr, 17, Junior, Qatar Science and Technology Secondary School for Boys, Doha, Ain Khalid, Qatar, T: Mohammed Salameh</td>
</tr>
<tr>
<td>MATS023T</td>
<td>The Fabrication of Nano Sensor Technology to Detect Blood Glucose Levels in the Breath of Diabetic Patient</td>
<td># Sama Ayoub, 18, Senior, Noor Al Thani, 17, Junior, Qatar Academy Senior School, Doha, Al-Rayan, Qatar, T: Jason Maraku</td>
</tr>
<tr>
<td>PLNT020T</td>
<td>Hydrogel Sensors for the Agricultural Applications</td>
<td>Tamim Fahad Alrashid, 17, Senior, Yousef Al-Mahmoud, 19, Senior, Qatar Banking School for Boys, Doha, Qatar, T: Ahmed Shawer</td>
</tr>
</tbody>
</table>

**REPUBLIC OF MOLDOVA**

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

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<thead>
<tr>
<th>Entry</th>
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<th>Participant Information</th>
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</thead>
<tbody>
<tr>
<td>CHEM041T</td>
<td>Valorification Potential of Wormwood (Artemisia absinthium L.) for the Preparation of the Broad-Spectrum &quot;HOPE&quot; Spray</td>
<td>Prepelița Mihaela, 18, Senior, Marius Vrabie, 18, Senior, Theoretical Lyceum Ion Creanga-Ungheni, Ungheni, Republic of Moldova, T: Alina Buga</td>
</tr>
</tbody>
</table>
SOFT034T  Augmenting Under-Researched Medical Domains with an Intuitive Querying System on Resourceful Crowd-Collected Data
Ana Vizitiv, 18, Junior, Madalina Griza, 17, Junior, Da Vinci School, Chisinau, Chisinau, Republic of Moldova, Theoretical High School "Orizont, Durlești," Chiainau, Republic of Moldova, T: Svetlana Golubev

ROMANIA
Suceava, Romania, ROM001, Romania Science and Engineering Fair
CHEM046  Strong Electric Field Electroosmosis: Physical Principles and Measurements in the Strongly Nonlinear Regime
Natalia Lonescu, 17, Junior, Mihai Viteazul National College, Bucharest, Bucharest, Romania, T: Mircea Ignat

CHEM047T  Aspects Regarding Electrochemical Actuation
Alexandru Adrian Chivulescu, 18, Senior, Eva Maria Savin, 18, Senior, Mihai Viteazul National College, Bucharest, Bucharest, Romania, T: Mircea Ignat

ENBM026T  Study of Microbiological Structures with the Purpose of Creating MEMS Actuators with Various Applications in Medicine
Andreea Magdalena Sovei, 18, Junior, Robin Cristian Bucur-Portase, 17, Junior, Mihai Viteazul National College, Bucharest, Bucharest, Romania, T: Mircea Ignat

ENBM068T  Designing Bionic Mechanisms Inspired by the Legs of Insects
Mihai Mitrea#, 19, Senior, Eric Gabriel Drutu-Danciu#, 19, Senior, International Computer High School of Bucharest, Bucharest, Romania, T: Mircea Ignat

ENBM080  Finger Biometrics with Applications in Psychiatry
Iulia Costache, 19, Senior, Colegiul National "Spiru Haret", Bucharest, Romania, T: Mircea Ignat

RUSSIAN FEDERATION
Nizhny Novgorod, Innopolis City, Russian Federation, RUS001, ROST
BEHA011  SMART CUBES: Interactive Tactile and Sound Set for Blind Children
Aleksei Shremzer, 15, Freshman, Gymnasium #32, Nizhnekamsk, Republic of Tatarstan, Russian Federation, T: Elena Garanina

CHEM026T  Determination of Optimal Conditions for Hydrogenolysis of Sulfur Compounds to Improve Efficiency of Jet Fuel Production
Alexander Shliakhturov, 17, Sophomore, Zakhar Balandin, 16, Sophomore, State School "Lyceum #86", Yaroslavl, Yaroslavl, Yaroslavskaya Oblast, Russian Federation, T: Anton Petrov

MATH013  Generalized Solution of the Fibonacci Problem
Nikita Poplevin, 16, Freshman, Municipal School #1, Severomorsk, Murmansk Region, Russian Federation, T: Ludmila Niryan

MATH016  Simple Closed Geodesic Lines on Catalan Solids
#  Stepan Akinshin, 17, Junior, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation, T: Yaroslav Abramov

PHYS009  Improving the Dipole Trap: The Way to Ultracold Gas
Dmitrii Khitrin, 17, Senior, Lyceum #40, Nizhny Novgorod, Nizhny Novgorod Region, Russian Federation, T: Kirill Karpov

Moscow, Russian Federation, RUS002, Junior – I
CBIO087  A Study of Cas9 Protein of Mollicutes Bacteria on the Example of M. gallisepticum
Sofya Maksyuta, 16, Junior, School #1553 named after V. I. Vernadskiy, Moscow, Russian Federation, T: Mikhail Litvinov

CHEM044  All-Stretchable Electrodes: Experiments on Non-industrial Manufacturing
Stepan Vyacheslavovich Portnov, 18, Junior, Higher School of Economics Lyceum, Moscow, Moscow, Russian Federation, T: Elvira Kiva
MATH038  Braid Theory and Classification of Periodic Orbits of the Three-Body Problem  Adelina Kildeva, 17, Junior, School #17, Shchylolkovo, Moscow Oblast, Russian Federation, T: Natalia Batkhina

PHYS051  Blood Glucose Monitoring Using a Biosensor Based on Porous Silicon (pSi)  Vladimir Sidorov, 17, Junior, Municipal School #148, Samara, Samara Oblast, Russian Federation, T: Olga Spirina

PHYS052T The Research of the Dynamics of Charged Particles in a Quadrupole Paul Trap  Leonid Shmyrkov, 18, Senior, Kirill Klimeshov, 17, Junior, Lyceum No. 1511 Affiliated with MEPHI, Moscow, Russian Federation, T: Sergei Derevyashkin

Moscow, Russian Federation, RUS003, Russian Youth Program "Step Into the Future"

ANIM030 Ishim and its Surroundings Horsefly Species Range Study with the Use of a Variety of Traps  Anna Evgenievna Gibler, 14, Freshman, Secondary School No. 7 of the City of Ishim, Ishim, Tyumen region, Russian Federation, T: Vitaly Stolbov


ENBM057 Making an Inexpensive Bionic Hand Prosthesis Using Additive Technologies  Vladislav Olegovich Medvedev, 16, Sophomore, Lyceum #1, Bratsk, Irkutsk Region, Russian Federation, T: Egor Davidovich

ENMC071T Underwater Vehicle "Poseidon"  Gerard Olegovich Ismagilov, 16, Freshman, Pavel Dmitrievich Smolin, 17, Junior, Lyceum #31, Chelyabinsk, Chelyabinsk Oblast, Russian Federation, T: Dmitry Lovchikov

ROBO087 Development of a Robotic System for Installing Various Devices  Vsevolod Valeryevich Shkodskikh, 17, Junior, Lyceum 11 of Chelyabinsk, Chelyabinsk, Chelyabinskaya Oblast, Russian Federation, T: Dmitriy Ovsyanitskiy

St. Petersburg, Russian Federation, RUS004, Baltic Science and Engineering Fair

ENMC013 New Method for Measuring the Viscosity of Liquids  Matvei Kuznetsov, 17, Junior, State School "Lyceum #86", Yaroslavl, Yaroslavl, Yaroslavskaya Oblast, Russian Federation, T: Anton Petrov

MATH005 On Geometry of Central Extension of Klein Bottle Group  Oleg Chistov, 17, Sophomore, School 564, St. Petersburg, Russian Federation, T: Ruslan Magdiev

MATH006 Commutator Lengths of Free Group Orbits and Their Squares  Lev Andreevich Mukoseev, 16, Sophomore, School 564, St. Petersburg, Russian Federation, T: Sergey Ivanov

MATH007 New Classes of Finitely Separable Finitely Generated Commutative Rings  Elkhan Kachabekov, 17, Junior, School 564, St. Petersburg, Russian Federation, T: Stanislav Kublanovskii

SOFTWARE Software Package for the Analysis of Spectra of Substances for Low-field Low-resolution NMR Spectrometers  # Vladimir Kirilenko, 17, Junior, Vorobyovy Gory School, Moscow, Russian Federation, T: Vladimir Suhotskii

Moscow, Russian Federation, RUS005, Avangard

BCHM030T Synthesis of Analogues of S-adenosyl-L-methionine for Identification of WBSCR27 Substrate  Anna Milovanova, 17, Junior, Mikhail Andreevich Losev, 17, Junior, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation, T: Sophia Maryasina
CONGRATULATIONS
TO OUR CATEGORY FINALISTS

Earth & Environmental Sciences

Rudransh Agnihotri
Ayush Agrawal
Hiba Ali
Mohammed Alshaibi
Kenna Anderson
Michelle Arguello
Ayaan Bargeer
Avi Bagchi
Morgan Barnes
Günbir Baveja
Rolains Benjamin
William Berry, IV
Rithik Bhushan
Brett Bober
Claire Bucklin
Nicole Camilliare
Diego Castillo
Cameron Carter
Conor Casey
Angela Chen
Victor Chen
Marlvn Chimbwanda
Rhea Choudhary
Madeline Christensen
Rachel Christensen
Johan DeMessie
Saketh Dhulipalla
Jack Dougherty
Anna Du
Aahana Dugar
Camille Duma
Daniel Dusevic
Adrie Earl
Shrika Eddula
Lauren Egaas
Marisol Enguidanos
Blake erwiller
Tarini Eswaran
Caleb Grow
Claire Gu
Neha Gupta
Nevan Hanford
Ishrak Haque
Annalee Haralson
Jordan Harrow
Vivien He
Sydney Hefty
Yasmin Hegy
Sanjana Hiremath
Cameron Holder
Chelsea Hu
Caroline Huang
Jennifer Huang
Vedant Janapaty
Ishaan Javali
Shrey Joshi
Eliana Juarez
Julia Kagilliery
Harriet Kallberg
Shreya Khullar
Gyunho Kim
Minseong Kim
Amy King
Madelyn Kirklin
Kiersten Knebke
Samuel Koda
Emma Kratcha
Gavin Kratcha
Christopher Kwok
Nicholas Kwok
Alexander LaFortune
Edenia Larisa
Lucia Lavallee
Jaeyoung Lee
Junsung Lee
Yuchen Li
Yuntong Li
James Licato
Stephan Lindenthal
Eleanor Little
Ahmad Makableh
Sharlene Faye
Manlontat
Angela Mao
Caitlin Marr
Katherine McCarthy
Natalie McGee
Ellery McQuilkin
Echo Mitchell
Emily Mitchell
Utkarsh Mittal
Kai Mottley
Rithika Narayan
Christian Nichols
Anna Nielsen
Sophia Nielsen
Emma Noble
Sarah Nolan
Kajsa Norman
Ravelito Oculto
Marta Pambukchyan
Geunhee Park
Madeline Phuong
Melanie Quan
Alyse Radle
Mireya Ramirez
Liv Nilsson Rapping
Aseel Rawashdeh
Camille Rawinski
Joshua Rennekamp
Daniel Rodriguez
Lorraine Rosario
Pizarro
Rubén Rosario Pizarro
Claudia Renta Ortiz
Dannai Rojas
Isabel Ross
Rowan Ross
Ashley Roth
Valencia Sahasaka
Nanmudayas
Ashston Ryan
Lila Schweinfurth
Cameron Sharma
Aniyah Shen
Vlada Shevchenko
Thanaphone Shields
Lily Sikorski
Ridhima Singh
Talia Smith
Anastasia Soboleva
HeeGyu Son
Hyokejung Song
Mason Sufnarski
Amira Syifa
Koya Takahashi
Sriya Teerdhala
Mckayla Tingey
Yi-Sin Tsang
Richard Usdin
Brooke Vachal
Alexa VanSush
Breanna Vaughan
Emily Walter
Jason Wang
Hajin Woo
Alex Xu
Jinyi Xu
Rosemary Yahne
Jessica Yan
Yixiao Yang
Sunny You
Joseph Young
Anya Zhang

Welcome to #GenGeo, a community of young people who are committed to exploring connections, taking action for our planet, and inspiring a sustainable future.

NATIONAL GEOGRAPHIC
CHEM070  Syntesis of S-Adenosyl-L-homocysteine Analogs for Structural Studies of Methyltransferases  
Ratislav Maksimovich Ozhiganov, 17, Junior, Moscow South-Eastern School Named After V.I. Chuikov, Moscow, Russian Federation, T: Alexander Rudenko

MATH049  Arithmetic and Algebraic Methods for Solving Multiplicative Quadratic Congruences  
Dmitry A. Sukhotin, 18, Junior, Higher School of Economics Lyceum, Moscow, Moscow, Russian Federation, T: Alexander Kuptsov

Moscow, Russian Federation, RUS006, Scientists of the Future Fair

EEAEV006  The Luch-2 Lava Cave in the Zvezda Crater, Tolbachik Volcanic Complex, Kamchatka Peninsula  
Vlada Shevchenko, 16, Freshman, The Specialized Educational Scientific Center on Physics, Mathematics, Chemistry and Biology of Novosibirsk State University, Novosibirsk, Novosibirsk Oblast, Russian Federation, T: Elena Kruk

ENEV043  Optimization of Sorption of Porous Materials  
Anastasia Shenkova, 17, Junior, The Advanced Education Science Center Kolmogorov Boarding School of the Moscow State University, Moscow, Moscow Region, Russian Federation, T: Klim Sladkov

ENMC014T  Platform for Omnidirectional Traffic  
Mikhail Satleykin, 17, Junior, Pavel Kuznetsov, 18, Junior, Advanced Educational Scientific Centre, A.N.Kolmogorov Boarding School, Moscow, Moscow, Russian Federation, T: Sergey Pankov

SOFT004  Search for Algorithmic Errors in the Program Code Using Machine Learning Methods  
Dmitrii Vasilchenko, 17, Junior, Lyceum 1533 of Information Technologies, Moscow, Russian Federation, T: Alexander Giglavy

SOFT011  Wavenote: Smart Notepad for Musicians  
Fedor Sedov, 18, Junior, School #1329, Moscow, Moscow, Russian Federation, T: Pavel Stepanov

Kemerovo, Russian Federation, RUS007, Children's Scientific Competition of The Andrey Melnichenko Foundation

EBED018  A Non-invasive Electromyographic Interface for Hand Gesture Recognition with Active Noise Suppression Using a Combined Biosignal Processing Algorithm  
Vadim Sannikov, 18, Junior, The Andrey Melnichenko Foundation, The Centre for the Development of Children's Creativity in Science and Engineering at the Kuzbass State Technical University, Kemerovo, Kemerovo, Russian Federation, T: Vladislav Nemov

ENEV014  Post-pyrolysis Processing of Mixed Polymeric Waste to Obtain Useful Organic Raw Materials  

ROBO018T  An Improved Method for the Stable Transmission of Quantitative Information through Human Skin, Characterized by Low Error Rates and Long-term Reliability

Regeneron International Science and Engineering Fair 2021
BMED079  Mitigating Digestive-related Obstructions and Other Risks Caused by Hard Particles of Stuffed Toys through Creating a Coated Beeswax
Faisal Fahad Almohaish, 15, Freshman, Alkifah Academy, Al Hufuf, Eastern Province, Ahsaa, Saudi Arabia, T: Maha Alkhalaf

CBIO072  In-silico Prediction of Desoxyhavannahine as a Potential Novel Inhibitor of SARS-COV-2 with Minimal Side Effects
Lana Abujamil, 17, Senior, Manarat Al-Madinah National School, Madinah, Madinah, Saudi Arabia, T: Hisham Al-Tayeb

CBIO073  Identification of a Potential Beta-site Amyloid Precursor Protein Cleaving Enzyme-1 Inhibitor as a Disease Modifying Agent for Alzheimer's Disease
Mawaddah Omar Ali, 16, Junior, Umm Salamah, Makkah, Makkah, Saudi Arabia, T: Hisham Altayeb

CHEM048  Tunable NiFe-LDH Electrocatalyst Synthesis via Benzyl Alcohol Solvation for Enhanced Water-splitting
Abdullah Abdulaziz AlGhamdi, 16, Junior, Alhussan Private School, Dammam, Eastern Province, Saudi Arabia, T: Rady Saad

CHEM049  The Use of Activated Carbon Prepared from Tires Waste Filled with Nano Zinc and Nano Molybdenum to Remove Sulfur from Petroleum Products
Laura Hani AlAmiri, 17, Senior, AlBassam Schools, Dammam, Saudi Arabia, T: Rawan Abahussain

CHEM066  Graphene Cyclodextrin Nanosheets as a Potential Corrosion Inhibitor for Oil and Gas Pipelines
Dana Ziyad AL Rogaiti, 16, Sophomore, AL Bassam-IGCSE, Dammam, Eastern, Saudi Arabia, T: Muna AL Ghamdi

EBED023  Increasing the Power Efficiency for Communication Between IoT Devices Using Source and Channel Coding
Hussain Hani AlSaif, 16, Junior, Rowad Alkhaleej International School, Dammam, Eastern Province, Saudi Arabia, T: Alan Hood

EGSD040  Advanced Synthesis of Potent Photocapacitor Based on Novel 3D-Hierirachical BiVO4 and Self-Synthesized Carbon
Mansour Al Marzooqi, 17, Junior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Prof. Zain Yamani

Abdullah AlShangiti, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Zahra Albu

EGSD048  Enhancing the Efficiency of Solar Steam Turbine by Adding a Thermoelectrical Generator for Renewable Clean Energy Generation
Anas Arafat, 16, Junior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Maryam Alsufyani

EGSD052  Novel Perovskite-based Photo-rechargeable Supercapacitor
Tala Saad Al-Qahtani, 16, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Idris Popoola

ENBM069  Enhancing Communication and Music Sensory Perception for the Hearing Impaired through Haptic Feedback in an Improved Tactile Glove
Ruby Rajab, 16, Senior, Manarat Al-Riyadh, Riyadh, Saudi Arabia, T: Habib Farooq

ENEV059  A Novel All-In-One Membrane for Microplastics Removal, Oil-Water Separation, and Organic Dyes Photodegradation in Wastewater
Ahmed H. AlBadrani, 17, Senior, Ibn Al-Nafees High School, Yanbu RCY, Alamdina, Saudi Arabia, T: Talal Qahtan

ENEV060  Green Chemistry for Plastic Waste Circulations and Its Application
Layan Zaid AlHamashi, 18, Senior, The First Secondary School in Hail, Hail, Central Province, Saudi Arabia, T: Ahmed Alotaibi
ENEV061 Efficient Visible Light Removal of Organic Pollutants in Water Using Novel Synthesis of g-C3N4-CdS Nanocomposite by Pulsed Laser Ablation in Liquid
Norah Thamer AlHarbi, 17, Junior, University Schools, Dhahran, Eastern Province, Saudi Arabia, T: Adil Hawsawi

ENEV062 Design a Multi-functional Smart Chimney to Eliminate the Byproducts of Combustion Processes and Reduce Global Warming by Using Innovative Technologies
Nada Abdalrahman Alhajri, 15, Sophomore, The Third High School in Abha, Abha, Asir, Saudi Arabia, T: Nasser Awwad

MATS032 A Novel Hard/Soft Spinel Ferrite Nanocomposite as Potential Electrode Material for a Supercapacitor
Dana Fahad AlDahmash, 17, Senior, AlBassam Schools, Dammam, Saudi Arabia, T: Mona Alghamdi

Jana Mohammad AlSinan, 14, Freshman, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Sara Sajjad

MATS034 Fabrication of Self-charging Supercapacitor Using LASER-assisted Self-synthesized Carbon Quantum Dots
Arwa Niyazi, 17, Senior, University Schools, Dhahran, Eastern Province, Saudi Arabia, T: Mohammed Khan

MCRO055 Anti-VOCs and Antimicrobial Activity of Natural Palm Waste Cellulose Fibers/ZnO Nanoparticles Biocomposite for Use in Face Masks: The GBV99
Lama Abdulrahman AlQahtani, 16, Junior, AlBassam Schools, Dammam, Saudi Arabia, T: Mona AlGhamdi

PHYS055 Study of Ultraviolet Light on Graphene Oxide/Nitrocellulose Films for Surface Protection
Sultanah Omar AlEssa, 16, Junior, AlBassam Schools, Dammam, Saudi Arabia, T: Layla AlGhamdi

PHYS056 Stained Barriers Influence on InGaAsN Quantum Well Laser Diodes
Hussam Mohammad J. Ashour, 18, Senior, Dar Althikr Private School, Jeddah, Mecca, Saudi Arabia, T: Mohammed Alghamdi

PHYS057 A New Model to Explore the Quarks’ Inner Structure in the Proton State Using the 3D Isotropic Harmonic Oscillator
# Lana Fahad AlAbbasi, 17, Senior, 18th Secondary School, Jeddah, Western Region, Saudi Arabia, T: Abdulla Abdulsalam

PLNT033 Effective Use of Krypton and Argon Pumping Model KAP in Controlling Temperature in Plant Greenhouse
Shatha Mohammad AlAhmadi, 18, Senior, The 24th Secondary School at Madinah-marrat, Madinah, Madinah, Saudi Arabia, T: Nadia Alkaff

PLNT038 A Study of the Effect of Alcoholic and Aqueous Extract of Salvia officinalis on the Disease of the Plant Fungus Fusarium
Juman Abdullah AlHarbi, 16, Junior, Mother of Believers Aisha, May Allah be Pleased with the Talented, Buraydah, Al-Qassim, Saudi Arabia, T: Afaf AlHarbi

ROBO053 Diagnosis of COVID-19 Using Deep Learning and Data Augmentation from Chest CT-Scan Images
Raghad Mohammed Alasiri, 16, Junior, The Third High School in Abha, Abha, Asir, Saudi Arabia, T: Nada Alomare

TMED044 Photobiomodulation by High Power Pulsed Nd:YAG Laser as a Novel Approach for the Treatment of Colorectal Cancer
Juwain Assahafi, 18, Senior, Umm Salamah, Makkah, Makkah, Saudi Arabia, T: Bassem Refaat
CONGRATULATIONS TO OUR CATEGORY WINNERS

Embedded Systems

FIRST PLACE
Vadim Sannikov

SECOND PLACE
Anushka Dhaya Sridhar
Pranav Sehgal
Tim C. Solberg

THIRD PLACE
Roy Gross
Milidu Jayaweera
John William Madland

FOURTH PLACE
I Gusti Ngurah Sucahya
Satria Adi Pratama
Haluk Baran Akbulut
Emre Akman
Karen Aleksanyan
Ni Putu Budiani
Tyler Burt
Davit Gyulamiryan
Robert Simonyan

Azure Sphere applauds the finalists in Embedded Systems.
TMED045  Development of Monodispersed Hollow Silica Nanospheres Loaded with 5-Fluorouracil to Enhance the Drug Delivery on Breast Cancer Cell Line MCF-7
Lena AlQahtani, 14, Freshman, AL Bassam-IGCSE, Dammam, Eastern, Saudi Arabia, T: Layla AlGhamdi

TMED046  Improving Image Contrast in MRI 7T for Early Diagnosis and Disease Detection
Asaad Bandar Basamad, 18, Senior, Qurtuba High School, Jeddah, Western, Saudi Arabia, T: Mohammed Bassiouni

SINGAPORE
Singapore, Singapore, SGP001, Singapore Science and Engineering Fair

ANIM056T  Supplementation of *Lactobacillus casei* Reduces Beta-amyloid Accumulation in Alzheimer *Drosophila melanogaster*
Li Ann Tay, 17, Junior, Ing Low, 17, Junior, Celyn Chng, 17, Junior, Raffles Girls School (Secondary), Singapore, Singapore, T: Ai Khim Lim

Jishnu Talukdar, 17, Senior, Anglo-Chinese School (Independent), Singapore, Singapore, T: Jonas Chow

CHEM067  Novel Coating of Porous Cu as Heat Pipe for Thermal Management
Lingbo Shen, 19, Senior, National Junior College, Singapore, Singapore, T: Si Ling Ang

CHEM068T  Intricate Study of Hydrothermally-synthesized Hexagonal K2W4O13 Nanowires for the Adsorption and Photodegradation of Organic Dyes and Heavy Metal Ions
Dillion Lim, 16, Junior, Bryan Lee Chong Han, 17, Junior, Shanley Ho, 17, Junior, Hwa Chong Institution, Singapore, Singapore, Singapore, T: Sow-Peh Yoke Keow

ENBM097  Wearable Strain Sensors with Silver Nanowires for Health Monitoring
Huiyan Huang, 17, Senior, Hwa Chong Institution, Singapore, Singapore, Singapore, T: Erkan Polatdemir

ROBO080  Liar Liar Pants on Fire: A Computer Vision Approach to Deception Detection
Nathaniel Xin Rui Tan, 18, Senior, Raffles Institution, Singapore, Singapore, T: Guoxian Tan

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

ROBO036  Effective Object Detection Neural Network on an Autonomous Robotics Platform Applied on TPU and Other Systems
Jakub Gal, 18, Senior, Stredna Priemyselna Skola Strojnicka a elektrotechnicka, Nitra, Nitra, Slovakia, T: Michal Mada

SLOVENIA
Ljubljana, Slovenia, SVN001, Slovenia Science and Engineering Fair

MCRO001T  Bacteriophages in a Fight Against *Serratia marcescens*
Misa Pintaric, 18, Junior, Kaja Zupanic, 17, Junior, Gradbena Sola in Gimnazija Maribor II Gimnazija Maribor, Maribor, Stajerska, Slovenia, T: Jure Skraban

SOFT001  Breaking the Substitution Cipher: Coding an Automatic Cipher Solver
Jasa Knap, 18, Senior, Gimnazija Bezigrad, Ljubljana, Slovenia, T: Jasna Kos

SOUTH AFRICA
Johannesburg, South Africa, ZAF001, Expo for Young Scientists—South Africa

BEHA005  Can We Differentiate Between Computer Generated and Human Art? Spot the Fake!
Alexander Brink Van der Merwe, 16, Sophomore, Paul Roos Gymnasium, Stellenbosch, Western Province, South Africa, T: Alta Cilliers
ENBM002 Non-invasive Blood Glucose Level Monitoring
# Hritik Mitha, 18, Senior, Bryanston High School, Johannesburg, Gauteng, South Africa, T: Megan Lester

ENMC003 ThembaBot: Mine Surveying Robot
Muhammed Hassen, 17, Junior, Greenside High School, Johannesburg, Gauteng, South Africa, T: Melusi Shezi

ENMC007 A Robotic System for Temperature Scanning and Sanitizing
Suhana Singh, 16, Junior, Saint Dominic’s Newcastle, Newcastle, Kwa-Zulu Natal, South Africa, T: Catherine Kloppers

SOUTH KOREA

Seoul, South Korea, KOR001, Korea Code Fair

ENMC061 Cleaning Clip Applying the Principle of Acoustic Levitation
Seung won Lee, 17, Senior, Yeosu High School, Yeosu-si, Jeollanam-do, South Korea, T: Saet Byeol Moon

ENMC062 SAFEARM
JeongHun Im, 15, Freshman, Posan Middle School, Daeug, Dalsung, South Korea, T: Kwon Ohil

ROBO063 PedGUARD: Pedestrian's Guiding Utility – Avoid Road Danger
Jaewoong Jeong, 18, Senior, Chadwick International School, Incheon, South Korea, T: Sharon Moore

SOFT047 Emergency Disaster Framework: Utilizing Textual Analysis to Estimate Daily COVID Patients
# Taeuk Kang, 17, Junior, Korea International School, Jeju Campus, Seogwipo-si, Jeju-do, South Korea, T: Joseph Catron

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

BEHA073T Looking for Sema's Sound
Seo Yeon Kim, 16, Junior, Ju eun Kim, 17, Junior, SEMA Highschool, Osan-si, Kyeonggi-do, South Korea, T: Aejin Jeong

CHEM065T A Study on the Production of Kit to Detect Nickel Ion in Waste Water Using Luminol
Yehyun Hwang, 17, Junior, Se Ryeon Kim, 16, Junior, Min Jung Kim, 16, Junior, Incheon Jinsan Science High School, Incheon, South Korea, T: Insook Park

EAEV109T Operation and Verification of Weather Prediction System for Marine Vessels Using NOAA Polar Orbit Satellites
Hajin Woo, 18, Senior, Geunhee Park, 17, Senior, Hyeokju Song, 17, Senior, Kyeongbuk Science High School, Pohang, Gyeongsangbuk-do, South Korea, T: Beomseok Kim

EAEV117T The Production of Bioplastics Using Persimmon Pruned Branches
Gyunho Kim, 17, Junior, HeeGyu Son, 17, Junior, Minsong Kim, 18, Senior, Jongsam High School, Masan, Chongsangnam-do, South Korea, T: Yeong Hee Heo

ENBM095T Wearable Ringer Device Using Static Load Spring
Woojin Jeong, 17, Senior, Jeongbin Park, 17, Senior, Sejong Academy of Science and Arts, Sejong, Chongcheong, South Korea, T: Gildong Jang

ENEV076 A Study on Eco-friendly Removal Method of Plastic Cup Printing Ink
SeungHyeon Noh, 17, Senior, Yeosu High School, Yeosu-si, Jeollanam-do, South Korea, T: Saetbyeol Moon

MATH050 Perfect Triangle Research and Exploration of Expansion to Four Dimensions with Using Code Design
Geonheung Jang, 17, Senior, Chung-Buk Science High School, Cheongju-Si, Chungcheongbukdo, South Korea, T: Youngteck Kwon

MATH051T Curve Optimization Using Curvature Based Models with Calculus of Variations
Hyungwon Han, 17, Senior, Dohyeon Kim, 17, Senior, Hyunjun Cho, 17, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Jongsool Choi
PHYS069T  A Learning Tool that Can Explain the Principle of Equation of Time
Jun Hyeok Park, 17, Senior, SangHyun Ju, 17, Senior, Seun Lim, 17, Senior, Daejeon Science High School, Daejeon, Daejeon, South Korea, T: Woo Kyum Kim

PHYS070T  Manufacture of Diffraction Grating Spectroscope and Development of Automatic Spectrum Analysis System
Uicheol Park, 17, Senior, Yunseo Lee, 18, Senior, Sejong Park, 17, Senior, Kyeongbuk Science High School, Pohang, Gyeongsangbuk-do, South Korea, T: Beomseok Kim

PLNT046T  Research on the Antibacterial Activity of Jeju Seaside Lichen
Yujin Kim, 16, Junior, Yewon Jwa, 17, Junior, Yuna Seo, 16, Junior, Namnyeong High School, Jeju, South Korea, T: Jongmun Lee

SOFT053T  Remote Learning Reminding Buddy (RLRB): Class Schedule, Attendance, Homework Management App. for Distance Learning
Dong Hyun Kim, 16, Sophomore, Joon Sung An, 16, Sophomore, Suwan Kim, 15, Sophomore, Hyundai Senior High School, Seoul, Seoul, South Korea, Hankuk Academy of Foreign Studies, Yongin, Gyeonggido, South Korea, Seoul, Seoho, South Korea, T: Taeeseon Yoon

BMED075  Characterization of Brown Pine Needle Extract for the Treatment of Acne and Atopic Dermatitis
Kyoungseun Kim, 18, Junior, Daegu Science High School, Daegu-si, South Korea, T: Youngran Kim

CHEM062T  Invention of a Novel Detection Kit Based on Thiourea Doped Cellulose for Antibacterial Film’s Validity
Adam Roberge, 18, Senior, Hyunjun Chang, 17, Senior, Cheongshim International Academy, Seoul, South Korea, T: Eun Gyeong Kim

CHEM064T  A Novel Metal-Ligand Complex System Based on Uric Acid Ligands and Its Application on Gout Early Detection
Min Jae Kim, 17, Senior, Yeonsu Kang, 17, Senior, Cheongshim International Academy, Seoul, South Korea, T: Hyeon Soo Ryu

EGSD050  Study on the Electric-potential Properties of Nanotubes Using Computational Simulations
Byounghyun Lee, 16, Sophomore, North London Collegiate School Jeju, Seogwipo-si, Jeju-do, South Korea, T: Hyung Joon Kim

ENBM087T  The Power of Twisted Strings: A Portable Elbow CPM Machine with Twisted String Actuator
Joonseo Kim, 17, Senior, Doyoon Kim, 17, Senior, Jaewoo Park, 17, Senior, Incheon Academy of Science and Arts, Incheon, Incheon, South Korea, T: Daeki Cho

ENBM088T  Improving the Accuracy of the FSR Insole Sensor by Inserting Intermediate Layer Material (Which Can Diagnose Parkinson’s Disease)
Moosung Kim, 18, Senior, Gyugwang Lee, 18, Senior, Nayeon Kim, 18, Senior, Incheon Academy of Science and Arts, Incheon, Incheon, South Korea, T: Cho Daegi

ENEV070  Research on the Resourceization of Jellyfish Gelatin Using Its Adhesive Component
June-Hue Koo, 18, Senior, Sejong Science High School, Seoul, South Korea, T: Jiah Lee

ENEV073T  High Efficiency Wet Scrubbing System Utilizing Impeller
Seung Chan Lee, 17, Senior, Jooyoung Lee, 18, Senior, Hyunjae Cheon, 17, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Jong-In Han

ENEV077T  Research on Hydrophobicity and Lipophilicity of Wood Decomposed by Brown Rot Fungi and Its Potential Application as an Oil Absorbent
Sunmin Lee, 17, Junior, Sanghyun Na, 17, Senior, Seoul International School, Seoul, South Korea, Hankuk Academy of Foreign Studies, Yongin, Gyeonggido, South Korea, T: David Bonar T: Taesun Yoon
CONGRATULATIONS
TO OUR FIRST PLACE CATEGORY WINNER

Energy: Sustainable Materials and Design

MARGARET YANG
Bloomfield Hills, Michigan
Engineering Biocatalysts for Biofuel Production
Booth EGSD015

King Abdulaziz & his Companions Foundation for Giftedness & Creativity applauds the finalists in Energy: Sustainable Materials and Design.
MATS041  Study on Exceptional Hydrogen Storage in High Entropy Alloys
#   Jihye Heo, 17, Junior, Seoul International School, Seoul, Gyunggi-Do, South Korea, T: Byungmin Ahn

MATS044T  A Study on the Improvement of Contact Angle and Anti-Condensation Performance by Nano-Coating Treatment of Metal Surfaces
   Hyunwoo Bae, 17, Senior, Dongmin Sim, 18, Senior, Dongmin Kim, 18, Senior, Incheon Jinsan Science High School, Incheon, South Korea, T: Changjae Lee

MCRO054T  Enhancement of Flavor and Taste by Fermenting Coffee Beans with Six Mixed Microbes from Traditional Korean Liquors
   Sae Rom Pak, 18, Senior, Sung Jun Lim, 18, Senior, Saeng Myong Cho, 18, Senior, Chung-Buk Science High School, Cheongju-Si, Chungcheongbukdo, South Korea, T: Kyung Ha Hwang

PHYS076T  Real Orbital Implementation of Visual Binary through an Analysis of the Orbital Elements
   Myoungbo Shim, 18, Senior, Joon Soo Lee, 18, Senior, Do Gyun Han, 18, Senior, Incheon Jinsan Science High School, Incheon, South Korea, T: Hyun Jung Park

ROBO076T  Omni-wheel Based Circular Orbit Flight Simulator for G-Force Generation
   Hyun Woo Kim, 16, Sophomore, Seungwon Yoo, 16, Sophomore, North London Collegiate School Jeju, Seogwipo-si, Jeju-do, South Korea, T: Hyung Joon Kim

SPAIN

Barcelona, Spain, SPN001, Exporecerca Jove

BEHA076  Relationships Between Fluid and Crystallized Intelligence and Hippocampus Subareas' Volumes: An MRI Study with Standardized Testing
   Bru Gomez Bonilla, 17, Senior, Institut Manuel de Cabanyes, Vilanova i la Geltru, Barcelona, Spain, T: Eduard Juanmartí

CELL036  Saccharomyces cerevisiae as a Model Organism to Study Hog1 and Mammalian Homologous P38 Pathway
   Andrea Cami Bonet, 17, Senior, Escola Mare de Deu de la Salut, Sabadell, Barcelona, Spain, T: Sergi Bonet Martinez

EGSD053  The Cleanest Energy: Microbial Fuel Cells
   Martí Cousillas, 18, Senior, Institut de Vilafant, Vilafant, Girona, Spain, T: Eulalia Amoros

ENEV095T  The Environmental Impact of Clothing: A Comparative Study Between Cotton and Lyocell from an Environmental, Economical and Quality Perspective
   Liv Nilsson Nilsson Rapping, 18, Senior, Vagga Gymnasieskolan, Karlshamn, Blekinge, Sweden, T: Louise Rietz

PHYS078  Formulation and Implementation of a Support Vector Machine on D-Wave's Quantum Annealer
   Carla Caro Villanova, 17, Senior, Aula Escola Europea, Barcelona, Catalunya, Spain, T: Jordi Mazón

SWEDEN

Stockholm, Sweden, SWE001, Utstallningen Unga Forskare

BMED064  Adiponectin and BAT: Structure and Morphology of Brown Adipose Tissue in Adiponectin Transgenic Mice
   Nils Grimbeck, 19, Senior, Goteborgs Hogre Samskola, Gothenburg, Vastragotalands regionen, Sweden, T: Ingrid Wernstedt Asterholm

EAEV095  The Environmental Impact of Clothing: A Comparative Study Between Cotton and Lyocell from an Environmental, Economical and Quality Perspective
   Liv Nilsson Nilsson Rapping, 18, Senior, Vagga Gymnasieskolan, Karlshamn, Blekinge, Sweden, T: Louise Rietz

EAEV108T  What Underwater Sounds Does a Small Boat Make and Do the Dominant Frequencies in the Noise Coincide with Fish Calls?
   Harriet Birgitta Kallberg, 18, Senior, Kajsa Helena Norman, 19, Senior, Lugnetgymnasiet, Falun, Dalarna, Sweden, T: Gunnar Kihlberg
Finalist Directory

MATH041 Robinson-Schensted Correspondence and Standard Young Tableaux
Clara Sofia Linnea Ekback, 18, Senior, Berzeliuskolan, Linkoping, Ostergotland, Sweden, T: Axel Hultman

MCRO047 The Antimicrobial Effect of Beehive Products: The Effect of Honey, Propolis Extract and Royal Jelly on Gram-Positive and Gram-Negative Bacteria
Amela Peco, 18, Senior, Sjolins Gymnasium Sodermalm, Stockholm, Stockholm, Sweden, T: Rabeeh Najafi

SOFT046 Using Artificial Intelligence and Algorithms for Natural Language Processing to Analyze the Emotions of Gender in Literature and Songs
Alice Louise Heiman, 17, Junior, Viktor Rydbergs Gymnasium Odenplan, Stockholm, Stockholm, Sweden, T: Tobias Ericson

SWITZERLAND
Bern, Switzerland, CHE001, Swiss Youth in Science
ENBM105 Using Fluorescence Imaging to Investigate the Organisation of Human Brain Organoids
Nathalie Weibel, 20, Senior, University of Zurich, Zurich, Switzerland, T: Annina Denoth

ENMC079 Development of a Rotor with Improved Aerodynamics to Propel a Quadcopter – Design and Manufacture According to the Laws of the Propeller Theory by Betz and Schmitz
Max Schaldach, 18, Senior, Freies Gymnasium Zurich, Zurich, Switzerland, T: Jean-Charles Demierre

THAILAND
Bangkok, Thailand, THA001, SST-NSM National Science Projects Competition
ANIM005T Behavior Study and Development of Artificial Nest for Nurturing Assassin Bugs (Sycanus indagator Stal.) Beneficial in Biological Pest Control
Nonthaporn Srikha, 16, Sophomore, Natthida Benjapiyaporn, 17, Junior, The Demonstration School of Khon Kaen University (Modindaeng), Muang Khonkaen, Khonkaen, Thailand, T: Kultida Thongnum

ANIM013T Lac Insect Cultivation on Local Weeds for Increasing Lac Production
Ratchanon Methesithikun, 15, Sophomore, Natricha Punyainkaew, 16, Sophomore, Warakorn Thammawong, 16, Sophomore, Huayso Wittayakhom Rachamangkalaphisek, Chiang Khong, Chiang Rai, Thailand, T: Keerati Thayen

ANIM020T Development of Lady Beetle Cultivation for Pest Control
Warinyupa Ngamjarenwong, 15, Sophomore, Naipaphon Kumhom, 14, Freshman, Thanakorn Silaphan, 14, Freshman, The Demonstration School of Khon Kaen University (Modindaeng), Muang Khonkaen, Khonkaen, Thailand, T: Akkarawat Srisawat

ANIM031T The Mystery behind Burrowing of Mole Crickets
Thanyakorn Yantarasart, 17, Junior, Nanthawat Wiwatpisit, 16, Junior, Teeradon Manasviyoungkul, 17, Junior, Montfort College, ChiangMai, ChiangMai, Thailand, T: Junjira Chaiinseeard

CHEM028T Structurally Modified Chlorophyll a as a Natural-Based Pigment for Dye-Sensitized Solar Cells
Sapol Maison, 17, Junior, Settanan Suangburanakul, 16, Junior, Suphawit Promkhot, 17, Junior, Kamaootvidya Science Academy, Rayong, Thailand, T: Prasongporn Ruengpirasiri

MATS007T The Development of Helicoid-Shaped Model for Increasing Flow Rate of Removing Blood Clots in Medical Treatments
Pittinun Harnsingkun, 18, Senior, Patcharapol Rujipornpong, 18, Senior, Nonthanat Wetthayanon, 17, Senior, Princess Chulabhorn Science High School Phetchaburi, Chai-Am, Phetchaburi, Thailand, T: Saknarin Channark
Finalist Directory

PLNT009T  Imitation of Fig Wasp Pollination: An Innovation for Efficient Production of Cluster Fig (*Ficus racemosa*)
Karit Keereekaew, 17, Junior, Teerateep Boonlert, 17, Junior, Kornkanok Promruk, 17, Junior, Damrongratsongkroh School, Muangchiangrai, Chiangrai, Thailand, T: Kiettisak Inrajsadon

PLNT013T  The Relationship Between Sweetness and Internode Feature of Sugarcane
Panchanok Leela, 17, Senior, Rutsiripol Putsorn, 18, Senior, Kowit Sukchai, 18, Senior, Princess Chulabhorn Science High School Phetchaburi, Cha-Am, Phetchaburi, Thailand, T: Sita Taweekan

ROBO023  A Web Application for Skin Diseases Classification with a Small Dataset Using Deep Learning
Waranthorn Chansawang, 18, Senior, Princess Chulabhorn Science High School Pathumthani, Ladlumkaew, Pathumthani, Thailand, T: Khunthong Klaythong

Bangkok, Thailand, THA002, Young Scientists Competition

BMED071T  Extraction and Preparation of Prebiotic from Oil Palm Polysaccharide for Application in Functional Product
Fatin Meesa, 17, Junior, Narathorn Duangodiri, 17, Junior, Demonstration School of Prince of Songkla University, Mueang Pattani, Pattani, Thailand, T: Pochanan Kanjan

BMED072T  Rapid Osteoporosis Risk Assessment: Non-invasive Detection Kit of Calcium, Phosphate and pH in Human Sweat
Krit Kasikpan, 17, Senior, Korrawee Leelaadisorn, 17, Senior, Patt Phurtivilai, 18, Junior, Mahidol Wittayanusorn School, Nakhon Pathom, Nakhon Pathom, Thailand, T: Kiattipoom Rodpun

CBIO084T  EGFRNet: Transfer and Multi-task Learning Based on Graph Convolutional Network Toward Multi-target Drug Discovery Against Cancers for EGFR-Family Proteins
Natthakan Saengnil, 17, Junior, Puri Virakarin, 16, Junior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Kiattipoom Rodpun

CBIO085  Meta-analyses to Identify Master Regulatory Elements with Potential to Induce a Pre-implantation State in Human Endometrial Cells *in vitro*
Koravit Poyusungnoen, 17, Junior, Triam Udom Suksa, Pathumwan, Bangkok, Thailand, T: Chanani Jantrachotchatchawan

CHEM056T  Development of Multi-sensor Paper-Based Test Kit for Heavy Metal Detection
Kijakarn Namsawangrungrueng, 16, Junior, Dawit Boonyakitnotai, 17, Junior, Thiti Thaloengboonsiri, 17, Junior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Suranan Anantachatthachawan

PHYS066  Development of New Theory for Superior Mirage and Fata Morgana Mirage
Kamonsap Sapmee, 19, Senior, Benjamarchutit School, Mueng Nakon Si Thammarat, Nakhon Si Thammarat, Thailand, T: Chatan Chamthong

ROBO072T  Karyogram for the Primary Diagnosis of Human Chromosomal Abnormalities
Kiartip Keesaratan, 17, Junior, Siwasit Saengnikun, 17, Junior, Princess Chulabhorn Science High School Mueang Mukhahan, Mukhahan, Thailand, T: Theearawut Chantapan

TURKEY

Ankara, Turkey, TUR002, Tubitak Fair

CBIO050  A Helical Wheel Based Coiled Coil Prediction Algorithm and Its Application to Disease
Ahmet Enis Guven, 17, Junior, Malatya Erman Illicak Fen Lisesi, Malatya, Yesilyurt, Turkey, T: Mehmet Arslan

Mehmet Sertac Cekuc, 19, Senior, Kartal Anadolu Imam Hatip High School, Istanbul, Turkey, T: Ersin Erturk
CONGRATULATIONS TO OUR CATEGORY FINALISTS

Engineering Mechanics

Nathaniel Abrams
Nada Abuissa
Fawaz Ahmad
Nurul Fayyadhah Ahmad
Zainudin
Jimisola Balogun
Kerem Bayhan
Gulherme Beyruti
Suranyi
Aidan Bienker
Filip Bulawa
Caleb Chakmakjian
Jay Chavakula
Joseph Cinquemani
McKenna Collins
Tianqi Dai
Liam Davies
Piotr Domanowski
Rebekah Dorminy
Timothy Drinkall
Owen Emerich
Su Fong
Luke Foye
Crawford Fuzzell
Ao Ga
Ved Ganesh
Gigi Gugunava
Dimitri Gulua
Adam Guthrie
Muhammed Hassen
Matthias Hefty
Charlotte Hively
Marcus Hnat
Jeonghun Im
Gerald Ismagilov
Andres Iturregui
Henry Jacobson
Chandini Jain
Natalie Janzaruk
Luke Jouflas
Ashutosh Kandala
Daniel Kim
Alexander Kmetko
Wills Kookogey
Matvei Kuznetsov
Pavel Kuznetsov
Seung Won Lee
Hei I Lei
Jennifer Lew
John Lewis
Muyao Li
Kenzie Madrid
Mitchel Masters
Anika Mathur
Franciszek Mikolajczyk
Brian Minnick
Nur Hazwani Sahira Mohd
Nissham
Logan Murray
Julius Neumann
An Nguyen
Brayden Noh
Nia Norakidze
Max Oberg
Iracl Olufumminiyi
Dakota Perry
Linh Pham
Elijah Plattner
Holden Rice
George Richards
Matyas Rozsavolgyi
Landon Runion-Driskel
Jack Saito
Muhammad Muazzam
Salman
Vivek Sandrapaty
Mikhail Satleynin
Max Schaldach
Tate Schrock
Adam Schupper
Christopher Schweitzer
Cayden Shaffer
Jiarong Sheng
Suhana Singh
Ludwijk Skowronek
Zygmun Skowronek
Pavel Smolin
Shaylee Stanger
Kierstyn Stanely
Bronte Stump
Lauren Suzuki
William Sweeney
Aaban Syed
Imaad Syed
Keng Hang Tang
Nik Nurfarahana Tengku
Rosman
Arya Tschand
Seth Tuma
Antonio Velasco
Steven Vokoun
Sydney Vokus
Ryan Wans
Isabella Weiner
Ethan Wong
Jack Woods
Ken Yaguchi
Rygel Tristen Yance
Kristina Yu

Society for Science applauds the finalists in Engineering Mechanics.
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Finalist</th>
<th>Institution</th>
<th>T:</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBED002T</td>
<td>Poly-open LIDAR: Fast and High Resolution Adaptive LIDAR with Original Multi-Opening Polygon Mirror System</td>
<td>Emre Akman, 18, Senior, Haluk Baran Akbulut, 17, Senior, Ankara Fen Lisesi, Ankara, Turkey</td>
<td>T: Askin Unal</td>
<td></td>
</tr>
<tr>
<td>EGSD002T</td>
<td>Recovery of Lithium and Cobalt from Waste Li-ion Batteries with a Newly Developed Method</td>
<td>Zeynep Bayindir, 17, Junior, Beliz Kargi, 18, Senior, TED Antalya Collage Foundation Private High School, Antalya, Muratpasa, Turkey</td>
<td>T: Gulay Demirci</td>
<td></td>
</tr>
<tr>
<td>EGSD003</td>
<td>Investigation of Spectral Response and Efficiency of Boron and Nitrogen-doped Diamond-like Carbon as the Top Junction in Multijunction Silicon Solar Cells</td>
<td>Feridun Balaban, 18, Senior, Malatya Bilim ve Sanat Merkezi, Malatya, Malatya, Turkey</td>
<td>T: Savas Zafer Guler</td>
<td></td>
</tr>
<tr>
<td>ENBM005</td>
<td>Application of 3D-Bioprinting and Electromagnetic Field for the Development of Bioartificial Bone from Stem Cell-Laden Bioink Incorporating Sepiolite and Eggshell</td>
<td>Tan Elcin, 19, Senior, Ted Ankara College Foundation Private High School, Ankara, Golbasi, Turkey</td>
<td>T: Demet Izgu</td>
<td></td>
</tr>
<tr>
<td>ENBM010T</td>
<td>The Design of Microfluidic Pump (MFP) for Medical Field</td>
<td>Lara Yucebas, 18, Senior, Sila Karakusoglu, 17, Senior, Cakabey Schools, IZMIR, Turkey</td>
<td>T: Aysenur Ozdemir</td>
<td></td>
</tr>
<tr>
<td>ENEV036</td>
<td>The Investigation of the Limitations of Toxic Dye Biosorption by Pyracantha coccinea</td>
<td>Idil Buyuk golcigezli, 16, Junior, Bilkent Erzurum Laboratory School, Erzurum, Turkey</td>
<td>T: Onur Sozudogru</td>
<td></td>
</tr>
<tr>
<td>ENMC004</td>
<td>Proposal of an Electro-Mechanical System to Reduce the Fatality of Car Underride Crashes</td>
<td>Kerem Bayhan, 17, Junior, Izmit Bilim ve Sanat Merkezi, Izmit, Kocaeli, Turkey</td>
<td>T: Nefize Tunali</td>
<td></td>
</tr>
<tr>
<td>MATH003</td>
<td>The Arbelos in Three-Dimensional Space and the Archimedean Spheres</td>
<td>Bilgenaz Altiparmak, 18, Senior, Izmir Ozel Ege Lisesi, Izmir, Bornova, Turkey</td>
<td>T: Okan Aciksoz</td>
<td></td>
</tr>
<tr>
<td>MATH036</td>
<td>Proposal for an Algorithm for Finding the Crossing Number of a Graph</td>
<td>Olcay Oransoy, 16, Junior, Izmir Bahcesehir College 50. Year Science and Technology High School, Izmir, Izmir, Turkey</td>
<td>T: Mehmet Kurt</td>
<td></td>
</tr>
<tr>
<td>ROBO002</td>
<td>SUMRO (Symmetric Upper-limb Mapping Robotic Prosthesis)</td>
<td>Dilay Dal, 17, Senior, Ozel Enka Mesleki ve Teknik Anadolu Lisesi, Dilovasi, Kocaeli, Turkey, T: Omer Alemdar</td>
<td></td>
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</tr>
<tr>
<td>ROBO037T</td>
<td>Assistive Glasses for the Vision Impaired: Continuation</td>
<td>Okan Demir Baykal, 17, Senior, Tankut Cekic#, 18, Senior, Izmir Ozel Ege Lisesi, Izmir, Bornova, Turkey, T: Atajan Rovshenov</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOFT003T</td>
<td>MRyze: A Web Application that Analyzes MR Images to Detect and Segmentate Brain Tumor for Both Doctors and Patients</td>
<td>Eren Ekrem Kallikci, 19, Senior, Huseyin Kaan Kucukturan, 18, Junior, Antalya Bilim ve Sanat Merkezi, Antalya, Kepez, Turkey</td>
<td>T: Hatice Kupeli</td>
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</tr>
</tbody>
</table>

**UKRAINE**

Kyiv, Ukraine, UKR001, Eco-TechnoUkraine

**BCHM006**

*In silico* Research of the Potential Role of a Number of Compound Class N-acyethanolamines as Inhibitors of E-protein Coronavirus SARS-CoV-2

Adam Trach, 16, Junior, Specialized School #89, Kyiv, Ukraine, T: Volodimir Nazarenko

**CELL010**

Obtaining of Transgenic Broccoli Plants with Alpha-2B Leucocyte Interferon Gene

Antonina Shkrobiak, 16, Sophomore, Vyshve Secondary School #1, Vyshneve, Kyiv Oblast, Ukraine, T: Nataliia Shcherbak
**ENEV020**  
**Method of Bacterial Cellulose Production from Plant Waste Substrates**  
Olena Klimova, 17, Junior, Mariupol Technical Lyceum, Mariupol, Ukraine,  
T: Viacheslav Ponomarchuk

**MATH020**  
**Specialized Digital Signatures Based on the Paillier Cryptosystem**  
Valentyna Zinkova, 16, Junior, Technic Lyceum of NTUU "KPI", Kyiv, Ukraine,  
T: Serhii Yakovlev

**PHYS020**  
**Investigation of Self-Oscillations in Hydrodynamic Systems**  
Viktor Ulanov, 17, Junior, Dnipro Lyceum of Information Technologies at DNU, Dnipro, Dnipropetrovsk Oblast, Ukraine, T: Oleh Orlianskyi

**UNITED STATES OF AMERICA**

**ALABAMA**

Auburn, USAL01, Greater East Alabama Regional Science and Engineering Fair

**EAEV077**  
**Environmental Conservation: Calculation of Irregular Surface Area Utilizing the Monte Carlo Method and the Law of Large Numbers**  
Jaeyoung Lee, 18, Senior, Auburn High School, Auburn, Alabama, T: Jacque Middleton

**EGSD044**  
**Harvesting Energy from Everyday Movements by Developing a Two-Dimensional MXene-Based Triboelectric Nanogenerator**  
Naeim Mahjouri, 16, Sophomore, Auburn High School, Auburn, Alabama, T: Jacque Middleton

**ENMC052**  
**Supercapacitor Assisted Hybrid Electric Vehicle Powertrain and Power Selection Using Fuzzy Rule-Based Algorithm**  
Brayden Noh, 19, Senior, Auburn High School, Auburn, Alabama, T: Jacque Middleton

**Birmingham, USAL02, Central Alabama Regional Science and Engineering Fair**

**ANIM016**  
**Factors that Affect Bird Activity and Diversity In Jefferson County in the Morning vs. the Afternoon**  
Eva Noel Ledvina, 15, Freshman, Jefferson County International Baccalaureate, Irondale, Alabama, T: Ryan Reardon

**BMED019**  
**Intratumoral Heterogeneity in Gene Expression within Single Glioblastoma Tumors**  
Mayu Nakano, 16, Sophomore, Indian Springs School, Indian Springs, Alabama, T: Tessa Magnuson

**EBED016T**  
**Sensor Notification System for Tail-Light Failure**  
Wesley Drew McDowell, 17, Senior, Elijah Tate Muncher, 18, Senior, Hewitt Trussville High School, Trussville, Alabama, T: Jason Dooley

**ENBM030**  
**Processing of Sensory Information from a Bio-Inspired Flexible Artificial Skin Using a Kohonen Artificial Neural Network**  
Catherine Kung, 16, Junior, Indian Springs School, Indian Springs, Alabama, T: Christina Tetzlaff

**ENEV026**  
**Dye Removal with GO Reinforced Nanocomposite MOFs**  
Amitis Moradkhani, 16, Junior, Indian Springs School, Indian Springs, Alabama, T: Tessa Magnuson

**ROBO025**  
**An Investigation in Precipitation Prediction with Machine Learning**  
Emma Seidel, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Anton Spraul

**Huntsville, USAL03, North Alabama Regional Science and Engineering Fair**

**BCHM019**  
**Application of Bayesian Inference for the Deconvolution of Nuclear Magnetic Resonance Spectra to Assess Metabolic Alterations and Type I Diabetes Susceptibility**  
Yewon Lee, 17, Junior, James Clemens High School, Madison, Alabama, T: Leah McRae
ENBM060 Scalable Track, Trace, and Isolate Solution for Pandemic Contagion and Risk Management
Neha Singhal, 15, Sophomore, James Clemens High School, Madison, Alabama, T: Leah McRae

ENBM061 Personalized Implantable Scaffolds for Wound Treatment and Management
Ashwin Prabhakar, 16, Sophomore, Bob Jones High School, Madison, Alabama, T: Jessye Gaines

Mobile, USA04, Mobile Regional Science Fair

CELL006 Escherichia coli Growth Inhibition through Dose Treatments of Pomegranate, Lemon, Ginger, and Turmeric Extracts
Dev Vipul Mehta, 17, Junior, WP Davidson High School, Mobile, Alabama, T: Aimee Tucker

EBED006 Machine Learning-Optimized Filters for Wireless, Low-Error Networks
Cary Xiao, 17, Senior, Alabama School of Mathematics and Science, Mobile, Alabama, T: Grey Gaillard

ENMC019 Reduction of Tsunami Impacts on Coastal Inhabitants and Infrastructure by Armoring Shorelines Using Hydrodynamics
Dakota Kaitlyn Perry, 14, Freshman, WP Davidson High School, Mobile, Alabama, T: Ryan Moody

MATH019 Classification of Small Orthomodular Posets in Quantum Logic through Clique Structures of Dacey Graphs
Gregory Li, 18, Senior, Alabama School of Mathematics and Science, Mobile, Alabama, T: Ethan Sussman

Huntsville, USA50, Alabama Science and Engineering Fair

CBIO093 Through the Looking Glass: Uncovering the Molecular Mechanisms of Phytochemical Treatment for the Prevention of Age-Related Macular Degeneration
Rishab Samant, 16, Sophomore, Vestavia Hills High School, Vestavia Hills, Alabama, T: Rajeev Samant

ENBM084 A Low-Cost Approach to EEG based Mind-Controlled Prosthetic Arm Using Brain-Computer Interface
Madhushalini Balaji, 15, Freshman, James Clemens High School, Madison, Alabama, T: Leah McRae

MATS045 Targeted Core-Shell Nanoassembly Composed of a Mesoporous Silica Core, Liposome Shell, and GE11 Peptide as a Drug Delivery Nanocarrier
Kailyn Rhyah Grant, 16, Junior, Bob Jones High School, Madison, Alabama, T: Torri Clay

ROBO073 Computationally Light Tree Species Classification Using RGB Bark Images
Longji Jerry Chen, 17, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Vincent Spraul

ALASKA

Anchorage, USA50, Alaska Science and Engineering Fair

EGSD036 Can Juneau Sustain a Complete Transition to Green Technology?
Annabella Noel Williams, 17, Junior, Thunder Mountain High School, Juneau, Alaska, T: Kathleen Galau

ENEV064 Storm Drain Oil Filtration Device with a Flexible Tyvek Material Container
Kate Renee Marie Deering, 14, Freshman, IDEA Homeschool, Anchorage, Alaska, T: Michele Deering
CONGRATULATIONS TO OUR CATEGORY WINNERS

Environmental Engineering

FIRST PLACE
Sahil Azad
Haoyu Bradley Wang

SECOND PLACE
Autumn Ann-Marie Kim
Alden James Kruse
Aesha Shah
Julius Yoh
Xenia Zhao

THIRD PLACE
Sean Brooks
Guillermo Canosa
Rafaela Curcio
Pedro Gefaell
Jack Hlavka
Sunmin Lee
Sanghyun Na
Kyle P. Tianshi
Max Cole Watchmaker

FOURTH PLACE
Idil Buyukgolcigezli
Zoe Francesca Diederich
Omar Walid Elbehiry
Olena Klimova
Chiui Ming Kwan
Chi Mei Lam
Weng Hei Lau
Mingxin Liu
Charlotte Lenore Michaluk
Nathan Muszynski
Ishika Nag
Ka Pui Ngan
Helen Ngie

Jacobs applauds the finalists in Environmental Engineering.
**Arizona**

Sierra Vista, USAZ02, SSVEC’s Youth Engineering and Science Fair

**BMED028T**  The Bacteria Between Us: The Connection Between Classrooms, Ventilation, and Airborne Bacteria  
Zoe Elizabeth Lynn, 17, Junior, Angelina Stilwell, 17, Senior, Veritas Christian Community School, Sierra Vista, Arizona, T: Daniel Doyle

**CELL019**  Environmental Effects on Mitosis  
Sofia Grossi, 17, Senior, Veritas Christian Community School, Sierra Vista, Arizona, T: Daniel Doyle

**ENEV050T**  Bags to Bridges: A Use for Polythene Plastic Bags  
Manuel Alejandro Castillo, 15, Sophomore, Joseph Ezra Schmidt, 16, Sophomore, Veritas Christian Community School, Sierra Vista, Arizona, T: Melissa Bravenec  
T: Melissa Bravenec

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

**BMED020**  Effects of *Prosopis glandulosa* Leave Extract on Lowering the Antibiotic Resistance of *Escherichia coli*, *Sarcina lutea*, and *Staphylococcus epidermidis*  
Andrea Romero, 16, Sophomore, Harvest Preparatory Academy, Yuma, Arizona, T: Alfred Santos

**CBIO025**  mRNA Sequence Analysis to Determine Genes Causing Unilateral Incompatibility in *S. lycopersicum* and *S. pennellii*  

**CELL012**  In Amyotrophic Lateral Sclerosis (ALS) Patient Tissue, UG Rich RNA Is Not Preferentially Soluble as Predicted  
Karah Michelle Mayer, 17, Junior, Tanque Verde High School, Tucson, Arizona, T: Grazyna Zreda

**CHEM020**  The Feasibility of the Extraction of (2E)-3-phenylprop-2-enal from *Cinnamomum cassia* Bark Using Water and Aqueous Ethanol as Solvents in Distillation  
Aaron Xiang Trinh, 17, Senior, Canyon del Oro High School, Oro Valley, Arizona, T: Jill Christman

**EAEV028**  Green Infrastructure Impacts on Carbon Cycling: Evaluating Changes in Soil Microbial Composition and Function  
Isabel Kay Ross, 17, Junior, Cienega High School, Vail, Arizona, T: Lisa Baker

**EGSD014**  Making a Saguaro H.A.W.T. (Horizontal Axis Wind Turbine)  
Amanda Ruth Whalen, 17, Senior, Veritas Christian Community School, Sierra Vista, Arizona, T: Daniel Doyle

**ENBM032**  Fabrication of a Bioprinted Scaffold Cuff: Implications for Tissue Engineering of an Implantable Organ  
Ethan N. Lee, 17, Senior, University High School, Tucson, Arizona, T: Elyse Wexler

**MCRO017**  Viral Abundance in Terrestrial Cyanobacteria Differs as a Function of Host Ecology  
Esha Mathur, 18, Senior, University High School, Tucson, Arizona, T: Elyse Wexler

Phoenix, USAZ50, Arizona Science and Engineering Fair

**ANIM046**  Investigation on Amino Acid DL-Phenylalanine’s Ability as a Cognitive Stimulant in *V. costata*  
Zarrin Askari, 17, Junior, Cibola High School, Yuma, Arizona, T: Patricia Garcia

**BCHM024**  A Novel Approach to Treating Burn Wound Infections Using Flavonoids: Exploring the Interaction between Antibiotics and Flavonoids  
Michelle Zahra Sheikh, 17, Senior, Arizona College Preparatory- Erie, Chandler, Arizona, T: Rachna Nath

**CBIO086**  De Novo Design of Ubiquitin Substrate for Neuritic Plaque-Busting  
Khushi Parikh, 16, Junior, Gilbert Classical Academy, Gilbert, Arizona, T: Erik Gillman
<table>
<thead>
<tr>
<th>Project Number</th>
<th>Title</th>
<th>Author(s)</th>
<th>School/College</th>
<th>T:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CELL034</td>
<td>A Novel Method for Measuring Cell Permeability as a Number of Viable Pores Using Spectroscopy and Pore Reliant Antibiotics</td>
<td>Bailey Bree Tischer, 16, Junior, San Tan Charter School, Gilbert, Arizona</td>
<td>T: Christopher Newton</td>
<td></td>
</tr>
<tr>
<td>EAEV089T</td>
<td>The Degradation of Polystyrene (Styrofoam) by Tenebrio Beetles and Their Larvae</td>
<td>Aahana Dugar, 17, Junior, Nevan Jacob Hanford, 17, Junior, Blake Enwiller, 16, Junior, Arizona College Preparatory- Erie, Chandler, Arizona</td>
<td>T: Rachna Nath</td>
<td></td>
</tr>
<tr>
<td>ENBM075</td>
<td>Wearable Risk Indicator via Sugar Tracking (WRIST): A Novel, Wearable, Non-Invasive Glucose Monitoring System via Quantitative Spectroscopy Analysis</td>
<td>Roshan Ravi Pillai, 18, Senior, BASIS Scottsdale, Scottsdale, Arizona</td>
<td>T: Ryan Carey</td>
<td></td>
</tr>
<tr>
<td>ENEV074</td>
<td>Rethinking Food Waste: Optimizing the Food Bank Supply Chain to Tackle Food Waste and Food Insecurity</td>
<td>Xenia Zhao, 18, Senior, Hamilton High School, Chandler, Arizona</td>
<td>T: Debbie Nipar</td>
<td></td>
</tr>
<tr>
<td>MATH040</td>
<td>A Novel Approach to Estimate the Number of Asteroids in Different Belts Using Weighted Regression</td>
<td>Chloe Feiyang Zhan, 14, Freshman, Hamilton High School, Chandler, Arizona</td>
<td>T: Debbie Nipar</td>
<td></td>
</tr>
<tr>
<td>PHYS065T</td>
<td>Mathematical Analysis of an Effective Negative Mass Rocket Propulsion System Along a Linear Trajectory to Mars</td>
<td>Medha Ninad Tambe, 16, Junior, Taneesha Rajiv Kapadia, 17, Junior, Hamilton High School, Chandler, Arizona</td>
<td>T: Debbie Nipar</td>
<td></td>
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<tr>
<td>ROBO055</td>
<td>HemaVision: A Deep Learning and Computer Vision-Based Mobile Screening System for Rapid, Inexpensive, and Automated Diagnosis of Hematological Diseases</td>
<td>Ella Yue Wang, 17, Junior, BASIS Chandler, Chandler, Arizona</td>
<td>T: Joseph Bostaph</td>
<td></td>
</tr>
<tr>
<td>ROBO059</td>
<td>Detecting Microbial Contaminants in Water Using Artificial Intelligence and Deep Learning Algorithms in order to Prevent the Spread of Waterborne Illnesses</td>
<td>Anshul Verma, 16, Junior, Hamilton High School, Chandler, Arizona</td>
<td>T: Sara Loutzenheiser</td>
<td></td>
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<tr>
<td>SOFT049</td>
<td>qGenerator: A Novel Way to Create Qudit Quantum Error Correction Codes</td>
<td>Arun J. Moorthy, 16, Sophomore, BASIS Scottsdale, Scottsdale, Arizona</td>
<td>T: Kay Yoo</td>
<td></td>
</tr>
<tr>
<td>TMED052</td>
<td>ImmunoNet: A Novel in-silico Platform to Personalize Immunotherapy for Breast Cancer Treatment</td>
<td>Arjun Kumar Moorthy, 18, Senior, BASIS Scottsdale, Scottsdale, Arizona</td>
<td>T: Ryan Carey</td>
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</tr>
</tbody>
</table>

**ARKANSAS**

Little Rock, USAR01, Ouachita Mountains Regional Science & Engineering Fair

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Title</th>
<th>Author(s)</th>
<th>School/College</th>
<th>T:</th>
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<tbody>
<tr>
<td>EAEV021</td>
<td>Water Energy Usage</td>
<td>Joseph Douglas Young, 15, Freshman, Mountain Pine High School, Mountain Pine, Arkansas</td>
<td>T: Bobby Young</td>
<td></td>
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</table>

Fayetteville, USAR03, Northwest Arkansas Regional Science and Engineering Fair

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Title</th>
<th>Author(s)</th>
<th>School/College</th>
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<tbody>
<tr>
<td>ROBO041</td>
<td>Improving Alzheimer's Disease Diagnosis Using AI-Based Artificial Neural Networks</td>
<td>Chandra Kiran Suda, 14, Freshman, Bentonville High School, Bentonville, Arkansas</td>
<td>T: Cynthia Cardwell</td>
<td></td>
</tr>
</tbody>
</table>
Jonesboro, USAR04, Northeast Arkansas Regional Science Fair

EAEV022  Quantifying Soybean CO₂ Exchange with Chlorophyll Content
Cameron B. Holder, 16, Sophomore, Nettleton High School, Jonesboro, Arkansas,
T: Bryant Fong

EAEV035  Seasonal Abundances of Macroinvertebrate Orders in an Intermittent Ozark Headwater Stream
# Echo Jordan Mitchell, 15, Sophomore, Rural Special High School, Fox, Arkansas,
T: Ty Pitcock

Little Rock, USAR05, Central Arkansas Regional Science and Engineering Fair

BMED016  Deciphering the Cellular Effects and Bioavailability of Moringa oleifera Leaf Extract
Bhavana Sridharan, 15, Freshman, Little Rock Central High School, Little Rock, Arkansas,
T: Patrick Foley

CHEM017  Synthesis & Characterization of Phosphorus/Nitrogen Co-Doped Carbonized Waste Cigarette Filters: Application as Textile Dye Adsorbents & Oxygen Reduction Electrocatalysts
# Zane Abdeen Alsebai, 17, Junior, Little Rock Central High School, Little Rock, Arkansas,
T: Patrick Foley

EAEV023  Plant Based Water Purification
Tarini Eswaran, 14, Freshman, Little Rock Central High School, Little Rock, Arkansas,
T: Tarsha Parker

EAEV056  The Impact of Root Depth in Regards to Carbon Dioxide Absorption in Brassica rapa Subspecies Pekinensis Plants
Rhea Choudhary, 14, Freshman, Pulaski Academy, Little Rock, Arkansas, T: Katie Parson

ROBO026  Heuristic Oncological Prognosis Evaluator (HOPE): A Novel Approach Implementing a Deep Learning Convolutional Neural Network Framework to Detect Brain Cancer, Breast Cancer, Colorectal Cancer, and Lung Cancer
# Anu Iyer, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas,
T: Lee Conrad

Hot Springs, USAR07, West Central Regional Science Fair

CBIO018  Application of EEG Signal Analysis and Machine Learning on Neonatal Seizure Prediction
# Daye Kwon, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts,
Hot Springs, Arkansas, T: Brian Monson

MCRO011  The Surprise in the Slime: Sulfate-Reducing Bacteria and Iron-Related Bacteria in Public-Use Fountain Biofilms in Hot Springs National Park
Alyssandra Perez Navarro, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts,
Hot Springs, Arkansas, T: Whitney Holden

PLNT006  The Effect of Soil Composition on Competition between Native and Invasive Plants
Cameryn Dawn Berryhill, 17, Junior, Arkansas School for Mathematics, Sciences and the Arts,
Hot Springs, Arkansas, T: Whitney Holden

Conway, USAR50, Arkansas State Science Fair

ANIM049  A Study of the Abundance and Diversity of Pollinators in Eureka Springs Urban Gardens and Black Bass Lake Park for Use in the Native Pollinator Conservation Effort
Chloe Kirk, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts,
Hot Springs, Arkansas, T: Brian Monson

BEHA072  Memory Treachery: How False Memories Are Formed
Akul Shrivastava, 15, Freshman, Little Rock Central High School, Little Rock, Arkansas,
T: Melissa Donham

CHEM057  Synthesis, Characterization and in vitro Cytotoxicity of Tunable Sized Chemo-PTT Combination Nanomedicines for Cancer Therapy
## Amna Khan, 17, Junior, Little Rock Central High School, Little Rock, Arkansas,
T: Patrick Foley
CONGRATULATIONS
TO OUR CATEGORY WINNERS

Materials Science

FIRST PLACE
Ethan Mark Zentner

SECOND PLACE
Vedanth Iyer
Jacqueline Prawira
Stephen Xia

THIRD PLACE
Thilina Navod Balasooriya
Naisha Anaum Chowdhury
Kailyn Rhyah Grant
Howard Tang Hua
Wesley Peng
Nikhil Suresh

FOURTH PLACE
Jihye Heo
Christopher Changhoon Huh
Kelly Sanae Mukai
Arwa Niyazi
Sohi Sanjay Patel

West Pharmaceutical Services applauds the finalists in Materials Science.
<table>
<thead>
<tr>
<th>Finalist Directory</th>
<th>Project Title</th>
<th>Applicant</th>
<th>School</th>
<th>T:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM058</td>
<td>The Effect of pH on Dye Degradation by Titanium (IV) Dioxide Nanoparticles</td>
<td>Soumya Chauhan, 16, Junior, Arkansas School for Mathematics, Sciences and the Arts</td>
<td>Hot Springs, Arkansas</td>
<td>Brian Monson</td>
</tr>
<tr>
<td>ENMC064</td>
<td>Facile and Green Assembly of a Novel Photovoltaic Array Cooling Mechanism: A Study Preventing Hot Spot Damage Using a Sealed Liquid Cooling Unit within a Hydrophobic Encasement</td>
<td>Landon Patrick Runion-Driskel, 17, Senior, Little Rock Central High School</td>
<td>Little Rock, Arkansas</td>
<td>Melissa Donham</td>
</tr>
<tr>
<td>SOFT051</td>
<td>Visualizing Fractals with Three Dimensional Turtle</td>
<td>William Lawson Smith, 17, Junior, Arkansas School for Mathematics, Sciences and the Arts</td>
<td>Hot Springs, Arkansas</td>
<td>Nicholas Seward</td>
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<tr>
<td>CALIFORNIA</td>
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<td>Costa Mesa, USCA01, Orange County Science and Engineering Fair</td>
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<tr>
<td>EAEV070</td>
<td>Assessing Grass Water Use Efficiency through Smartphone Imaging and ImageJ Analysis</td>
<td>Aniyah Xu Shen, 16, Sophomore, University High School</td>
<td>Irvine, California</td>
<td>Shannon Bunch</td>
</tr>
<tr>
<td>ENBM076</td>
<td>The Fabrication and Optimization of an Integrated Microfluidic Test Strip for Prothrombin INR Testing</td>
<td>Firas Qureshi, 16, Junior, Yorba Linda High School</td>
<td>Yorba Linda, California</td>
<td>Greg Walls</td>
</tr>
<tr>
<td>ENMC068</td>
<td>A Novel Approach to Utilizing Collapsible Origami Structures in Weight Bearing Applications</td>
<td>Ashutosh Kandala, 17, Junior, Irvine High School</td>
<td>Irvine, California</td>
<td>Joseph Elmasri</td>
</tr>
<tr>
<td>MATH031</td>
<td>The Structure of the Positive Monoid of Integer-Valued Polynomials Evaluated at an Algebraic Number</td>
<td>Andrei Mandelshtam, 17, Senior, University High School</td>
<td>Irvine, California</td>
<td>Tim Smay</td>
</tr>
<tr>
<td>PHYS060</td>
<td>EXoplanet ConfIrmaTioN throuGh transits (EXCITING): Determining False Positives for Exoplanet Candidates</td>
<td>Haedam Im, 18, Junior, University High School</td>
<td>Irvine, California</td>
<td>Tim Smay</td>
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<tr>
<td>TMED033</td>
<td>OCULI: Smartphone-based Screening Application and Low-Cost Lens that Identifies the Risk for Cataracts</td>
<td>Shaivi Shah, 16, Junior, Tesoro High School</td>
<td>Los Angeles, California</td>
<td>Nathanial Ritscher</td>
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<tr>
<td>Los Angeles, USCA02, Los Angeles County Science and Engineering Fair</td>
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<tr>
<td>CBIO053</td>
<td>Refined Genome-wide Prediction of Transgenerational Epimutations and an Ensemble-based Solution to the Imbalanced Class Problem in Epigenetics</td>
<td>Jason Apostol, 18, Senior, Palos Verdes Peninsula High School</td>
<td>Rolling Hills Estates, California</td>
<td>Melissa Klose</td>
</tr>
<tr>
<td>CHEM029</td>
<td>Removal of Microplastics from Watery Environments with 3D Printed Wax Filters</td>
<td>George Hasnah, 16, Sophomore, Cabrillo Marine Aquarium</td>
<td>San Pedro, California</td>
<td>Andres Carrillo</td>
</tr>
<tr>
<td>EAEV049</td>
<td>Polar Vortex and Long-Duration Events: Climate Change in the U.S. and Canada</td>
<td>Jason Wang, 16, Sophomore, Walnut High School</td>
<td>Walnut, California</td>
<td>Garrett Lim</td>
</tr>
<tr>
<td>EAEV074</td>
<td>Leachate-Filtering Efficacy of Varied Liners</td>
<td>Marta Pambukhchyan, 15, Sophomore, Crescenta Valley High School</td>
<td>La Crescenta, California</td>
<td>Orenda Tuason</td>
</tr>
<tr>
<td>ENMC035</td>
<td>Proverse Yaw Characteristics of a Powered Blended Wing Body Aircraft of a Novel Design and Manufacture</td>
<td>Ethan Wong, 17, Junior, Arcadia High School</td>
<td>Arcadia, California</td>
<td>Bill Chapman</td>
</tr>
<tr>
<td>PLNT016</td>
<td>When Two Problems Meet: Analysis and Prediction of the Spread of Invasive Plant Species in Relation to the Changing Environment</td>
<td>Sarah Cao, 17, Junior, Palos Verdes Peninsula High School</td>
<td>Rolling Hills Estates, California</td>
<td>Melissa Klose</td>
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</tbody>
</table>
TMED029  In silico High Throughput Identification of Novel Alpha-Synuclein Aggregation Inhibitors for Parkinson’s Disease Treatments
Amrutha Srivatsav, 16, Junior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

Fresno, USCA03, Fresno County Science Fair

CBIO033  CanceRNA: A Computational Method for Colorectal Cancer Diagnostic Biomarker Detection and Treatment Prediction
Pratham Hombal, 17, Junior, Floyd B. Buchanan High School, Clovis, California, T: Kendia Herrington

CBIO043  The Development of an Artificial Intelligence Model to Predict Weekly COVID-19 Cases Using Important Socioeconomic Variables
Deepro Fazlul Pasha, 17, Senior, Clovis North High School, Fresno, California, T: Kay Barrie

EGSD018  Replacing Lithium-ion Batteries with Graphene Based Supercapacitors
Maya Martine Tovar, 16, Junior, Sierra High School, Tollhouse, California, T: Karen Low

EGSD032  Spira Aer: A Novel Hurricane-Inspired Logarithmic Spiral Fan Design for HVAC System Applications
Jordan Prawira, 14, Freshman, Mountain House High School, Mountain House, California, T: Micah Wynn

MATS025  Cyclo.Plas 2: A Dual Focus Development as Alternative Materials to Plastic by Upcycling Fish Scale Waste Components
Jacqueline Prawira, 16, Junior, Mountain House High School, Mountain House, California, T: Kristin Olson

PLNT012  Development of a Novel AI Drought-Stress Assessment (AIDA) Model in Bell Pepper (Capsicum annuum) Plants Using a Custom-Built Robotic RGB + Infrared (IR) Camera
John Benedict Aliasas Estrada, 16, Sophomore, Clovis North High School, Fresno, California, T: Kay Barrie

Sacramento, USCA04, Sacramento Regional Science and Engineering Fair

EGSD032  Spira Aer: A Novel Hurricane-Inspired Logarithmic Spiral Fan Design for HVAC System Applications
Jordan Prawira, 14, Freshman, Mountain House High School, Mountain House, California, T: Micah Wynn

MATS025  Cyclo.Plas 2: A Dual Focus Development as Alternative Materials to Plastic by Upcycling Fish Scale Waste Components
Jacqueline Prawira, 16, Junior, Mountain House High School, Mountain House, California, T: Kristin Olson

PLNT021  Identification and Characterization of a Gene Controlling Tomato Growth and Branching
Ayesha Mahfuz, 17, Junior, Vista del Lago High School, Folsom, California, T: Julin Maloof

San Diego, USCA05, Greater San Diego Science and Engineering Fair

CBIO046  Molecular Dynamics Simulation of Novel Klebsiella pneumoniae Treatment Disrupting the Outer Membrane
Eleanor S. Jung, 15, Sophomore, Mt. Carmel High School, San Diego, California, T: Amy Klingborg

EAEV062  Detection of Arsenic Contamination Using Satellite Imagery and Machine Learning
Ayush Agrawal, 16, Junior, Canyon Crest Academy, San Diego, California, T: Wendy Slijk

ENEV047  NEREID: Microplastic Detector Using Laser Microscopy and Image Processing Powered by the Raspberry Pi
Kyle P. Tianshi, 14, Freshman, The Cambridge School, San Diego, California, T: Melissa Mayne

PHYS038  Evolution of the Cat's Eye Nebula Revealed through Morpho-Kinematic and Hydrodynamic Modeling
Ryan A. Clairmont, 16, Junior, Canyon Crest Academy, San Diego, California, T: Wendy Slijk

PHYS039  The Age of the Coma Ber Cluster Constrained Using Amateur Data
Andrew Li, 16, Sophomore, Canyon Crest Academy, San Diego, California, T: Wendy Slijk

TMED056  Kawasaki.AI: A Robust Deep Ensemble Network with Joint Detection for Differential Diagnosis of Kawasaki Disease
Ellen Xu, 15, Sophomore, Del Norte High School, San Diego, California, T: Andrea Callicott
San Francisco, USCA06, Golden Gate STEM Fair

CBIO047  A Novel Deep Learning System for Scoliosis Assessment: Automatic Extraction of Skeletal Maturity Using Region Proposal and Compound Scaling Convolutional Neural Networks
Audrey Y Ha, 16, Junior, Menlo-Atherton High School, Atherton, California, T: Matthew Sandora

EAEV050T  Modifying the Activity of Hydrogenase and Carbonic Anhydrase Enzymes in Chaetomorpha to Mitigate Ocean Acidification
Christopher Sammy Kwok, 16, Sophomore, Nicholas Sammy Kwok, 16, Sophomore, Sequoia High School, Redwood City, California, T: Te Ton

MATS022  Anisotropy and Angles: A Novel Approach to Thermoelectric Energy
Charlotte Bree MacAvoy, 15, Freshman, San Mateo High School, San Mateo, California, T: Kyle Odom

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

BMED054  A Low-Cost Computer-Aided Lung Auscultation Apparatus and Automated Diagnosis of Respiratory Illnesses
Ashwika Agrawal, 15, Sophomore, Cupertino High School, Cupertino, California, T: Stuart Hamilton

BMED055  Novel Stage Optimized Image Processing to Improve Deep Learning Driven Diagnosis of Early Stage Diabetic Retinopathy
Ella Yee, 15, Freshman, The Harker School, San Jose, California, T: Anu Datar

CBIO054  A Novel Transformation of Genetic Information into Images for Improved Primary Cancer Classification
Sidra Yang Xu, 17, Senior, The Harker School, San Jose, California, T: Chris Spenner

CBIO062  FastFold: Streamlining End-to-End Deep Learning Protein Domain Prediction on COVID-19 Mutations and Other Universal Applications
Tim Jing, 16, Junior, Lynbrook High School, San Jose, California, T: Bradley Fulk

CBIO064  Style Transfer Augmentation: A Novel Deep Learning Approach to the Classification of Cancer Subtypes Using Genetic Status in Histopathology Images
Snikitha Banda, 15, Sophomore, Notre Dame High School San Jose, San Jose, California, T: Christine Koltermann

EAEV061 An Accessible, Low Cost Tool for Citizen Scientists: Using Remote Sensing Techniques to Predict Fire Damage Propensity
Vedant V. Janapaty, 15, Freshman, Silver Creek High School, San Jose, California, T: Bich Nguyen

MATH045 A Novel and Efficient Method of Persistent Homology to Detect and Remove Topological Errors in Triangle Mesh Data
Alexander Zhang, 16, Junior, Lynbrook High School, San Jose, California, T: Jeremy Dybdahl

MATS035 Investigation and Design of Two-Dimensional Nanomaterial Biosensors for Breath-Based COVID-19 Detection Using Density Functional Theory
Stephen Xia, 15, Sophomore, The Harker School, San Jose, California, T: Xuan Luo

PHYS050 The Fast and Inconspicuous: New Near Earth Asteroids Discovered Using Deep Learning and Synthetic Data Are Fainter and Move Faster than Those Previously Discovered
Franklin Wang, 17, Junior, Palo Alto Senior High School, Palo Alto, California, T: Cynthia Chen
CONGRATULATIONS TO OUR CATEGORY WINNERS

Mathematics

FIRST PLACE
Alexander Zhang

SECOND PLACE
Tzu-Hsuan Chiu
Shoshana Sarah Elgart
Jessica Jihang Zhang

THIRD PLACE
Dev Mayur Chheda
Addea Gupta
Nathan Richard Krause
William Li

FOURTH PLACE
Oleg Chistov
Sara Hargitai
Adelina Kildeeva
Gregory Li
Andrei Mandelshtam

Akamai Foundation applauds the finalists in Mathematics.
SOFT037  vAssist: A Device for the Visually Impaired to Improve In-Store Shopping Using Computer Vision and AI-enabled Routing
Shrinandan Krishna Narayanan, 16, Junior, Cupertino High School, Cupertino, California, T: Hugo Steemers

SOFT038T  Towards Malware Classifiers Robust to Adversarial Malware
Andy Phung, 16, Sophomore, Suryabhan Mohapatra, 16, Junior, Mihir Baviskar, 18, Senior, Independence High School, San Jose, California, T: Larry Winterlin

TMED037  Diagnosing and Classifying Aphasia: Employing Deep Learning to Accelerate Recovery in Aphasic Stroke Victims
Marek David Pinto, 18, Senior, Santa Teresa High School, San Jose, California, T: Channy Cornejo

TMED055  Formulating a Gene Signature for Diagnosis of Autoimmune and Infectious Diseases
Riya Gupta, 17, Junior, Saratoga High School, Saratoga, California, T: Janny Cahatol

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

BCHM012  CarC SPY: Non-Invasive Early Stage Multi-Cancer Detection Using AI-based Electrochemical Biosensor to Detect Circulating Tumor Cells (CTCs)
Jyothikaa Ramann, 16, Junior, Dougherty Valley High School, San Ramon, California, T: Katherine Huang

EAEV034  Analysis of Plastic Pellet Distribution in the Environment Using Citizen Science Nurdle Patrol Data and Batch Identification to Differentiate Spills
Melanie Elise Quan, 18, Senior, Las Lomas High School, Walnut Creek, California, T: Maria Laws

ENBM040  Interpretable Automation of Pulmonary Embolism Diagnosis
Nisha Balaji, 17, Senior, Dougherty Valley High School, San Ramon, California, T: Tim Duong

ENBM041  Accessible Correlative Diagnostic Solution for Multi-Organ Dysfunction Caused by SARS-CoV-2: The Future of Home-Based, AI-Enabled Telemedicine
Gatik Trivedi, 14, Freshman, Dougherty Valley High School, San Ramon, California, T: Patrick Estes

TMED020  A Novel Hybrid Deep Learning Model to Predict Acute Kidney Injury Using Patient Record Data and Ultrasound Kidney Images
Sophia Shi, 17, Junior, Dougherty Valley High School, San Ramon, California, T: Philip Nho

Hayward, USCA09, Synopsys Alameda County Science & Engineering Fair

BEHA059  Analyzing Eye-Movement Data to Evaluate Motor Cognition Functionality for Early Detection of Neurological Conditions Using Deep Learning
Aditya Jagannadha Sai Mangalampalli, 17, Junior, Mission San Jose High School, Fremont, California, T: Charles Brucker

BEHA081T  An Audiovisual Emotion Classification Platform Powered By Deep Neural Networks and Optimized for Individuals with Autism Spectrum Disorder
Arjun Barrett, 15, Sophomore, Alexander Lan#, 16, Sophomore, The Harker School, San Jose, California, T: Anuradha Datar

CBIO048  Accelerated Protein Evolution in Bacteria to Facilitate Environmental Adaptation: Efficient Bioinformatics Algorithms to Discover Diversity-Generating Retroelements (DGRs)
Anakha Ganesh, 16, Junior, James Logan High School, Union City, California, T: Andromeda Stockwell

CBIO089T  Quantifying Model Variation in Assessing Cardiac Function
Ishan Jain, 16, Junior, Neeraj Rattehalli, 17, Senior, Mission San Jose High School, Fremont, California, Menlo-Atherton High School, Atherton, California, T: Charles Brucker
ENBM046  Building a Low Cost Hearing Device with User Customized Frequency Response for the Hearing Impaired
Elizabeth Koh, 16, Sophomore, Dublin High School, Dublin, California, T: Brad Vereen

TMED043  An Application to Monitor Freezing of Gait in Parkinson's Disease
Nitya Ayyagari, 17, Junior, Amador Valley High School, Pleasanton, California, T: Phillip Becker

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

EAEV083  A Consumer Internet-of-Things Device for On-Site and Regional Earthquake Early Warning
Vivien He, 17, Junior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

ENMC010  SafeBuild: Risk-Based Analysis of Overhead Electric Distribution Facilities
Jennifer Lew, 17, Junior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

PHYS004  Optimization of Phased Array Antenna Systems for 3D Surfaces
Akash Anand, 17, Junior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

ROBO038  COV-AID: An Efficient and Interpretable Machine Learning Ensemble for COVID-19 Diagnosis, Prognosis, Abnormality Localization, and Severity Assessment
Aksh Garg, 17, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

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

MCRO032  Investigating Magnetotactic Effects on the Selection and Evolution of Motile Bacteria
Michelle Melody Nazareth, 18, Senior, Georgiana Bruce Kirby Prep School, Santa Cruz, California, T: David Deamer

Salinas, USCA12, Monterey County Science and Engineering Fair

EAEV051  Utilization of Spirulina for Phytoremediation of Cadmium Pollution in Waterways
Rithik Bhushan, 14, Freshman, Monterey High School, Monterey, California, T: Jason Nicholson

PHYS040  Earthquakes in the Inner Ear: A Novel Finite Element Simulation Modelling the Mechanism of the Basilar Membrane & Hair Cells
Hannah T. Shu, 15, Sophomore, Carmel High School, Carmel-By-The-Sea, California, T: Silvia Mazzoni

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

EAEV036  Quantifying Volume of the Dana Glacier Using Field Measurements and 3D Modeling
Ellery Alice Barrgrove McQuilkin, 16, Junior, Lee Vining High School, Lee Vining, California, T: Andrew Sindel

PHYS023  Quantum Cosmology: An Exploration of the Origins of the Universe and Quantum Physics
Komal Kaur, 17, Junior, Chino Hills High School, Chino Hills, California, T: Chirichan Tasanont

SOFT020  Optimizing the Keyboard Layout Using Genetic Algorithms and a Heuristic Approach
Matthew Fogel, 18, Senior, Yucaipa High School, Yucaipa, California, T: Leslie Robertson
SOFT023  Quantifying Census Tract Level COVID-19 Vulnerability and Risk Using Computational Methods
Varun Srivastava, 15, Sophomore, Redlands High School, Redlands, California, T: Paea LePendu

Riverside, USCA15, Riverside County Science and Engineering Fair

ANIM025  Auto-dissemination: A Novel and Effective Tool in Mosquito Control?
Sarah Stutsman, 15, Sophomore, Corona High School, Corona, California, T: Coleen Holtz

BCHM017T Analyzing the Efficacies of Potential Inhibitors of Drug Targets Human Receptor ACE2 and Viral Replication Enzyme RdRp Against SARS-CoV-2
Hedy Bian, 17, Junior, Aditya Sandip Desai, 16, Junior, Martin Luther King High School, Riverside, California, T: Michele Hampton

CBIO034  A Deep Learning Approach to Correlating Neurodegenerative Disease, Chronic Illness, and Environmental Factors
Dimple Amitha Garudadapuri, 17, Junior, Eleanor Roosevelt High School, Eastvale, California, T: Doloumar Bergen

CHEM023 Structural Determination of a Bioinspired Perchlorate Reduction Catalyst through Chemical Modeling
Eric Yunpeng Bi, 17, Junior, Martin Luther King High School, Riverside, California, T: Michele Hampton

MCRO021  The Premises of Applying Computational Algorithms to Enhance Microbiological Studies through Stimulation of Laplacian of Gaussian (LoG) Kernels
Audrey Mae Theresa Meadows, 17, Junior, Martin Luther King High School, Riverside, California, T: Michele Hampton

Bakersfield, USCA16, Kern County Regional Science Fair

ENBM047 Designing, Prototyping and Testing a Novel Urinary Catheter with Tesla Valves and a Microporous Membrane
Ishaan S. Brar, 18, Senior, Stockdale High School, Bakersfield, California, T: Jill Reynolds

SOFT042T PACK It In, PACK It Out: An Experimental File Compression Method
Joseph Angelo Cestone, 17, Senior, Kevindeep Singh Dhesi, 17, Senior, Ridgeview High School, Bakersfield, California, T: Robert Shahan

Los Angeles, USCA50, California Science & Engineering Fair

BEHA077 Analyzing Text Corpora to Determine the Emotional State of Humans
Paulina Felicity Wodarz, 15, Sophomore, University High School, Irvine, California, T: Bre Eagleson

CBIO094 Using Machine Learning to Repurpose FDA-Approved Drugs to Treat Cancers and Inflammatory Diseases
Aakarsh Vermani, 16, Junior, Westview High School, San Diego, California, T: My-Nga Ingram

CHEM069 Investigating the Efficiency of Carpobrotus edulis, Kelp, and Walnut Shell Bioethanol in Comparison to Corn Ethanol Using Percent Yield and Mass Fractionation
Alexis Téa MacAvoy, 16, Sophomore, San Mateo High School, San Mateo, California, T: Jimmy Ikeda

EBED031 Designing and Building a Custom Phased Array Network Using Software-Defined Radio
Roy Gross, 16, Sophomore, Henry M. Gunn High School, Palo Alto, California, T: Catherine Cohn
CONGRATULATIONS
TO THE FIRST PLACE CATEGORY WINNER

Microbiology

NEHA MANI
New York, New York
Diagnostic Method Based on Bacterial Motion
Booth MCRO043

Regeneron applauds the finalists in Microbiology.
ENBM098  A Novel 3D Printed Ventilator for COVID-19
Harjaisal Singh Brar, 15, Freshman, Stockdale High School, Bakersfield, California,
T: Jill Reynolds

MATH048  Classification of Tight Contact Structures on a Solid Torus
Jessica Jihang Zhang, 17, Senior, Proof School, San Francisco, California, T: Kathy Lin

MCRO0059  Plasmids of Curtobacterium: A Nexus of Carbohydrate Utilization Genes
Pranav Sudarshan Moudgalya, 17, Junior, University High School, Irvine, California,
T: David Knight

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

EAEV042  Analyzing the Effects of Spruce Beetles on Aquatic Ecosystems through Macrinovertebrate and Water Quality Sampling in Conejos County, Colorado
Camille Paige Rawinski, 17, Junior, Monte Vista High School, Monte Vista, Colorado,
T: Loree Harvey

EGSD024  Synthesizing Renewable Energy from Water Using Sunlight
Chinmay Narayana Jayanty, 17, Junior, Sargent High School, Monte Vista, Colorado,
T: Rafe Paulson

Durango, USCO02, San Juan Basin Regional Science Fair

ANIM003  Investigation on High Twinning Rates in Cattle Using Sanger Sequencing
Lilly Bell Figueroa, 16, Sophomore, Mancos High School, Mancos, Colorado,
T: Sensa Wolcott

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

ENMC011  Autonomous Surveillance UAV
# Tate Schrock, 17, Junior, Arickaree School, Anton, Colorado, T: Don Myers

Colorado Springs, USCO04, Pikes Peak Regional Science Fair

ENEV001  Separating Microplastics from Beach Sand Using a Fluidized Air Bed
Sean Brooks, 17, Junior, Pine Creek High School, Colorado Springs, Colorado,
T: Kyle Gracia

ENEV011  Something in the Water: Creating an Origami Microfluidic Device for Developing Communities
Alden James Kruse, 17, Senior, Schullandheim Homeschool, Colorado Springs, Colorado,
T: Tamara Kruse

PHYS008  Investigating Chaotic Convection Using a Lorenz Water Wheel and a Model of the Lorenz Attractors in R
### Kathryn Tsi-Pak Kummel, 17, Senior, William J. Palmer High School, Colorado Springs, Colorado,
T: Nathaniel Lohmann

Greeley, USCO06, Longs Peak Science and Engineering Fair

EGSD055  Experimenting with the Radiative Cooling Effect to Generate Electricity from the Night Sky
Julia Michelle Warnock, 17, Junior, PSD Global Academy, Fort Collins, Colorado,
T: Andrew Warnock

TMED002  Connection ICU: A Novel Mobile Application to Prevent Delirium in the Intensive Care Unit
Ava Angeline Steger, 15, Sophomore, Rocky Mountain High School, Fort Collins, Colorado,
T: Elizabeth Peebles

Sterling, USCO08, Northeast Colorado Regional Science Fair

TMED001  Unmasking the Truth: Factors Impacting the Monitoring of Temporal Temperatures
Kinley Marie Eyring, 17, Junior, Yuma High School, Yuma, Colorado, T: Amy Melby
Boulder, USCO09, Corden Pharma Colorado Regional Science Fair

**ANIM064**  Compartimentalization in Lepidopteran Development: Anterior Posterior Boundary Location and Interaction in Genus Morpho  
Margaret Mattson, 18, Senior, Fairview High School, Boulder, Colorado, T: Paul Strode

**EAEV024T**  Hidden Signals in Paleoclimate Records: Investigating the Importance of the Sun to Earth's Climate  
Annalie Brienne Haralson, 17, Senior, Maddie Fox, 18, Senior, Lauren Egaas, 18, Senior, Monarch High School, Louisville, Colorado, T: Katharine Ellis

**TMED006**  A Pharmacokinetic/Pharmacodynamic Analysis of delta-9-Tetrahydrocannabinol and Cannabidiol  
Cooper Joseph Hanley, 17, Senior, Monarch High School, Louisville, Colorado, T: Katharine Ellis

Denver, USCO10, Denver Regional Science and Engineering Fair

**BMED006**  Breakdown of Gluten Proteins Using a Newly Identified Combination of Fruit Derived Enzymes to Alleviate Symptoms of Gluten Intolerance  
Aditi Avinash, 14, Freshman, Rock Canyon High School, Littleton, Colorado, T: Sussane Petri

**EAEV123**  The Environmental Effect on Aquatic Ecosystems of Run-Off from Wildfires Where Fire Retardant Slurry Was Used  
Rachel Elizabeth Christensen, 17, Senior, Evergreen Senior High School, Evergreen, Colorado, T: Stephanie Seevers

**EBED003**  A Novel Mask Insert to Reduce Habitual Particle Transmission  
Tyler Burt, 17, Senior, Wheat Ridge Senior High School, Wheat Ridge, Colorado, T: Charles Sprague

Fort Collins, USCO50, Colorado Science and Engineering Fair

**ENBM036**  XRCT-Net: Development of a Novel Sparse View Deep Learning Framework for Safer, Cheaper, and More Accessible CT Imaging  
Siddharth Bharthulwar, 17, Senior, Fairview High School, Boulder, Colorado, T: Paul Strode

**ENBM099**  Early Diagnosis of Parkinsonism via a Smartphone Application  
Matthew William Anderson, 16, Junior, Cherry Creek High School, Greenwood Village, Colorado, T: Ethan Dusto

**PHYS006**  Mapping the Extent of Neutral Hydrogen Cloud Near Sagittarius A* at 1420 MHz  
Elizabeth Sundheim, 18, Senior, Berthoud High School, Berthoud, Colorado, T: Scott Kindt

**ROBO084**  Fusing LiDAR and Camera Data for Advanced Context Recognition in Autonomous Navigation Sensory Systems through Multidimensional Deep Neural Network Architectures  
Emily SIhan Zhang, 17, Junior, Cherry Creek High School, Greenwood Village, Colorado, T: Timothy Donahue

**TMED18**  Effects of Cannabidiol Exposure on Cortisol Levels in *Danio rerio* Embryos with Heat Induced Stress  
Reese Catherine Titensor, 18, Senior, Rock Canyon High School, Littleton, Colorado, T: Shawndra Fordham

**CONNECTICUT**

Cromwell, USCT50, Connecticut Science & Engineering Fair

**ANIM029**  Evaluating the Intraspecific Relationship and Reciprocal Reaction Within Group Learning Shark Behavior Patterns  
Clayton Joseph Nyiri, 17, Senior, Bridgeport Regional Aquaculture Science and Technology Education Center, Bridgeport, Connecticut, T: Kirk Shadle
Finalist Directory

BMED025  Linking Continued Exposure to E-Cigarette Vapor Constituents with Chronic Obstructive Pulmonary Disease  
Hannah Goldenberg, 17, Senior, Greenwich High School, Greenwich, Connecticut,  
T: Andrew Bramante

CBIO042  Application of K-Means and Hierarchical Agglomerative Machine Learning Algorithms to Cluster Wolbachia Genomes based on Host Organism's Phylum  
Sean Y. Lee, 16, Junior, Loomis Chaffee School, Windsor, Connecticut,  
T: Koby Osei-Mensah

ENEV041  Design of a Fe3O4/Bentonite/Graphite Coated Polyurethane Sponge for Economical and Eco-Friendly Oil Spill Recovery  
Autumn Ann-Marie Kim, 18, Senior, Greenwich High School, Greenwich, Connecticut,  
T: Andrew Bramante

ENMC039  Increasing Aerofoil Lift via Artificial Amplification of the Coanda Effect Using Heat  
Timothy Drinkall, 18, Senior, Greenwich High School, Greenwich, Connecticut,  
T: Andrew Bramante

TMED026  Colorimetric Smartphone-Based Detection of Salivary SOD2 on Photonic Opal Structures for the Rapid Diagnosis of Hepatocellular Carcinoma  
Halla Clausi, 17, Senior, Greenwich High School, Greenwich, Connecticut,  
T: Andrew Bramante

TMED028  Rapid, Noninvasive, Fluorescence-Based Detection for Elevated Levels of Nitric Oxide in Exhaled Breath, as a Marker for Hazardous PM2.5 Exposure  
Ambika Grover, 15, Sophomore, Greenwich High School, Greenwich, Connecticut,  
T: Andrew Bramante

FLORIDA

Avon Park, USFL01, Heartland Regional Science and Engineering Fair

CELL004  Assessing the Expression of Angiogenesis-Related Receptors in Endothelial Cell RNA  
Angela Huang, 15, Sophomore, Sebring High School, Sebring, Florida, T: Amy Bubb

CELL017  Talking Planimlas! Identifying Genes Associated with Coral Bioacoustics  
Camila Rimoldi Ibanez, 18, Senior, Sebring High School, Sebring, Florida,  
T: James Hawker

Bradenton, USFL02, Manatee STEM Competition

CBIO029  Unmasking the Truth: The Effects of Safety Mask Usage on the Infection and Mortality Rates of a Simulated Pathogen  
Madison L. Barendse, 16, Junior, Southeast High School, Bradenton, Florida, T: Steven Craig

DeLand, USFL04, Tomoka Region Science and Engineering Fair

EAEV015  Coagulation Flocculation Sedimentation Filtration of Microplastics  
Amy King, 15, Freshman, Burns Science and Technology Charter School, Oak Hill, Florida, T: Barbara Hawes

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

EAEV016  Analyzing In-situ Environmental Impacts on Long Term Durability, Cohesivity, and Viability Sodium Alginate Immobilized Chlorella vulgaris Bioremediation Units (A Novel Third Year Study)  
Morgan Taylor Barnes, 16, Sophomore, Canterbury School, Fort Myers, Florida,  
T: Kelly Percivall

ENBM018  A Novel Approach to the Comparative Analysis of Natural Polymer-based Biomimetic Neural Scaffolds: Using the Taxic Response of Fungal Mycelium to Model Cell Response and Repair in Peripheral Nerve Gap Injuries such as the Medulla spinalis in Paraplegics  
Michelle Avery Barnes, 16, Sophomore, Canterbury School, Fort Myers, Florida,  
T: Kelly Percivall
CONGRATULATIONS
TO OUR CATEGORY FINALISTS

Physics and Astronomy

Lana AlAbbasi
Matthew Alcantara
Sultanah AlEssa
AbdelRahman AlHroob
Joao Dinis Alvares
Akash Anand
Larissa Andrade
Hussam Ashour
Pratham Babaria
Utkarsh Bajaj
Lane Braun
Carla Caro Villanova
Ethan Chandra
Aditi Chandrashekar
Camille Chiu
Sam Christian
Ryan Clairmont
Susana Cuadra
Rafael de Farias
Melanie Deville
Chika Enomoto
Sydney Feldbush
Taylor Fox
Wanjia Fu
Leon Garcia
Jue Gong
James Gonzalez
Alexander Gray
Do Gyun Han
Emily Hauser
Makaylee Haynes
William Hejtmancik
Joshua Hillbig
Austin Hunter
Haedam Im
Phillip Ionkov
SangHyun Ju
Taneesha Kapadia
Komal Kaur
Mana Kawano
Dmitrii Khitrin
Emma King
Kirill Klimeshov
Madeline Knox
Toshifumi Komatu
Tarun Kota
Vance Kreider
Kathryn Kummel
Joon Soo Lee
Yunseoo Lee
Brody Leisinger
Anthony Lestone
Andrew Li
Sehun Lim
Yu-You Luo
Mirelys Mendez-Pons
Kenta Mizuyoshi
Ashini Modi
Jaci Moss
Takuto Murata
Motoka Nagata
Jack Nowinski
Rohan Ojha
Kosuke Oya
Jasmine Palma
Jun Hyeok Park
Michelle Park
Sejong Park
Uicheol Park
Jianglu Ping
Kathryn Postiglione
Ariel Priel
Timothy Qian
Andre Ribeiro
Kenta Sakamoto
Kamonsap Sapmee
Myoungbo Shim
Leonid Shmyrkov
Hannah Shu
Vladimir Sidorov
Lucas Staten
Elizabeth Sundheim
Aakash Sunkari
Medha Tambe
Yui Tokimoto
Yasutaka Tokumaru
Gustavo Toledo
Maxwell Tsai
Viktor Ulanov
Annika Vaidyanathan
Dennis van Hoesel
Franklin Wang
Michelle Wu
Tianrui Wu
Enqi Yang
Christine Ye
Stephanie Yoshida
Youqiu Zhan
Angela Zhou

The Richard F. Caris Foundation applauds the finalists in Physics and Astronomy.

Richard F. Caris Foundation
ENEV029 A Comparison of Domestic Dryer Contributions to Previous Domestic Washer Data of Microplastic Fiber Emissions in Waste Water Generated from Synthetic Textiles
Heidi Kinsey, 17, Junior, Fort Myers High School, Fort Myers, Florida, T: Cathy Tucker

ENMC017 The Utilization of Dimples to Reduce Wind Load on Parabolic Structures
Jay Chavakula, 17, Senior, Canterbury School, Fort Myers, Florida, T: Kelly Mahan-Percivall

MCRO012 Testing the Antibacterial Effectiveness of Yunnan Baiyao, Propolis, Turmeric, and Tea Tree Oil on the Growth of *Escherichia coli* (*E. coli*) and *Bacillus subtilis* in Comparison to Antibiotics on an Agar Plate
Vanessa Kinley, 16, Sophomore, Bonita Springs High School, Bonita Springs, Florida, T: Melissa Jasczak

PLNT017 Speed of Photosynthesis in Relation to Surface Area
Bryce Krohnfeldt, 16, Sophomore, Estero High School, Estero, Florida, T: Cody Rimes

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

MCRO029 How Does Endophytic Bacteria Affect the Growth of Plant Pathogenic Fungi?
Madison Nicha Adkins, 16, Sophomore, Lincoln Park Academy, Fort Pierce, Florida, T: Deborah Lookabill

PLNT025 Multinutrient Biofortification of Microgreens for Human Health
# Lilian Crawford, 17, Junior, Lincoln Park Academy, Fort Pierce, Florida, T: Deborah Lookabill

Fort Walton Beach, USFL07, Panhandle Regional Science and Engineering Fair

EAEV078 Is It Possible to Create a Self-sufficient Solar Powered Filtration System to Reduce Coral Bleaching Using Natural Resources (Year 3)?
Marisol Rose Enguidanos, 15, Freshman, Niceville High School, Niceville, Florida, T: Gina Emery

ENEV015 Development and Implementation of a Bio-based Filter to Mitigate the Effusion of Harmful Pollutants from Internal Combustion Engines and Combustion Processes
Jonathan Clayton Walker, 17, Junior, Rutherford High School, Panama City, Florida, T: Steven Neely

Gainesville, USFL08, Alachua Region Science and Engineering Fair

MATH001 College Football Playoff Expansion: A Statistical Analysis via Monte Carlo Simulation
Jeffrey Jiayuan Xue, 16, Junior, F. W. Buchholz High School, Gainesville, Florida, T: Marc Moody

Ft Lauderdale, USFL09, Broward County Science Fair

ANIM053 The Effects of the Modulation by Melatonin on the Pathogenesis of Systemic Lupus Erythematosus on *Drosophila melanogaster*
Sharon A. Fernandez, 15, Freshman, American Heritage School, Plantation, Florida, T: Leya Joykutty

BMED080 Investigating Differences in DRD4 Expression in a Comparison Analysis Between Young, Old, and Alzheimer’s Frontal Cortex Brain Tissues
Mahdere M. Yared, 18, Senior, Pine Crest School, Fort Lauderdale, Florida, T: Jennifer Gordinier

CBIO090 Determining the Optimal MRI Sequence for the Automatic Segmentation of Multiple Sclerosis Using Convolutional Encoder Networks
Shaurnav Ghosh, 17, Junior, Pine Crest School, Fort Lauderdale, Florida, T: Jennifer Gordinier

CELL035 Identification and Analysis of Key Candidate Genes and Pathways in Lung Adenocarcinoma by Integrated Bioinformatics
Prateek Gupta, 17, Junior, American Heritage School, Plantation, Florida, T: Leya Joykutty
ENBM096  Using Electrical Stimulation to Provide Reliable Haptic Feedback in Virtual Object Classification Tasks  
Sierra Stocker, 18, Senior, Pine Crest School, Fort Lauderdale, Florida, T: Jennifer Gordinier

Jacksonville, USFL10, Northeast Florida Regional Science and Engineering Fair

CBIO013  Machine Learning to Predict Response to Anti-PD1 in Melanoma Using Genetic Biomarkers  
Sarah Elizabeth Barksdale, 18, Senior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

EAEV005  Demonstrating D. pulex as Environmental Buffers to Acetylcholinesterase Inhibitors on H. littoralis  
Jordan Harrow, 18, Senior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

EAEV010  The Creation and Practical Application of Industry Standards Water Analysis via PXRF  
Julia Marie Kagiliery, 18, Senior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

PLNT043  Dissolved Oxygen Augmentation Effects on the Hydroponic Cultivation of Eruca sativa in a NFT System  
Nicole Elizabeth Stover, 17, Junior, Samuel W. Wolfson High School, Jacksonville, Florida, T: Todd Steele

ROBO039  Engineering a Robot Arm with Computer Vision and Simulated Grabbing for Manipulation of Objects  
George Daniel Delong, 16, Junior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

Lake City, USFL11, Suwannee Valley Regional Science and Engineering Fair

EGSD001  Utilizing Eukaryotic Saccharomyces cerevisiae as an Electricigen in Both Pure & Co-Culture in the Anode of a Microbial Fuel Cell  
Jasmine Diane Bryan, 18, Senior, Madison County High School, Madison, Florida, T: Amanda Phillips

Bartow, USFL12, Polk Region Science and Engineering Fair

BCHM001  Starch Concentrations in Different Varieties of Rice  
Jasmin Kaur Pruthi, 17, Junior, Haines City IB East, Lake Wales, Florida, T: Madhu Thomas

PLNT001  Image Analysis of Herbivory and Leaf Area of Infected and Uninfected Invasive Air Potato Leaves  
Noah John Peracciny, 15, Sophomore, Lakeland Christian School, Lakeland, Florida, T: Matthew Croxton

Melbourne, USFL13, Brevard South Science and Engineering Fair

ANIM004  Utilization of Mechanically Simulated Kangaroo Care as a Novel Homeostatic Method to Treat Mice Carrying a Remutation of the Ppp1r13l Gene as a Model for Humans with Cardiomyopathy  
Nathan Jie Cheng Foo, 17, Senior, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp

ANIM018  "Tri-pawed": Canine Prosthesis  
Isabel Elena Sierra, 18, Senior, Edgewood Junior Senior High School, Merritt Island, Florida, T: Ryan Cilsick

PHYS003  The Use of an Inkjet Printer to Dispense Chlorophyll Photosynthetic Dye onto the Cell Substrate to Aid the Creation of the Cell  
Sydney Elizabeth Feldbush, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Mary Schropp
Finalist Directory

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

CELL001 Customized Cancer Cell Weapons: Using CRISPR dCas9 Genetic Engineering to Modify MCF7 Human Breast Cancer Cells into Double Agent Treatment Vectors, Year III
Neil Reddy, 17, Junior, Satellite High School, Satellite Beach, Florida,
T: Magdalena Molledo

PHYS001 Underwater Golf: An Evaluation of the Effects of Organized Surface Irregularities on the Hydrodynamic Efficiency of Underwater Projectiles
Gustavo Andres Toledo, 17, Senior, Edgewood Junior Senior High School, Merritt Island, Florida,
T: Ryan Cilsick

Miami, USFL15, South Florida Science and Engineering Fair

BEHA001 The Effect of Constraining Eye Movements on Learning Gains and Retention
Dante Amadeo Martinez, 17, Junior, Westminster Christian School, Palmetto Bay, Florida,
T: Lisa Garrido

CBIO003 Molecular Docking Study of the Ebolavirus Surface Glycoprotein to Develop Anti-Ebola Drug
Anna Maria Beck, 15, Sophomore, Coral Reef Senior High School, Miami, Florida,
T: Lauriann Carbajal

EAEV003 A Novel Deep Learning Model for Estimating Tropical Cyclone Intensity from Satellite Images
Sunny You, 14, Freshman, Miami Palmetto Senior High School, Pinecrest, Florida,
T: Pamela Shlachtman

ENBM003 A Mathematically Generated Bessel Function Based Ultrasonic Waveform Tractor Beam for Optimizing Blood Circulation
Isabela Victoria Perdomo, 18, Senior, MAST at FIU Biscayne Bay Campus, North Miami, Florida,
T: Cristina Madrigal

ENEV002 An Efficient and Cost-Effective Cooling System for Nuclear Power Plants
Zoe Francesca Diederich, 16, Junior, Maritime and Science Technology Academy, Miami, Florida,
T: Claudia Torres

PHYS002 Visualization of Three-Dimensional Aerospike Nozzle Flow Using Schlieren Photography
Melanie Deville, 17, Junior, Westminster Christian School, Palmetto Bay, Florida,
T: Lisa Garrido

Ocala, USFL16, Big Springs Regional Science Fair

BMED002 Face Coverings: Which Are Friends, and Which Are Foes?
Luke David Meiers, 16, Sophomore, West Port High School, Ocala, Florida,
T: Michelle Miller

EAEV004 Utilization of Manihot esculenta Peels, Used Coffee Grounds, and Eggshells from Gallus gallus to Create Biodegradable Polymers
Camille Aguilera Duma, 14, Freshman, Vanguard High School, Ocala, Florida,
T: Christina Davis

ENBM006 Development of an Improved High Intensity Off-Grid Phototherapy System to Provide Treatment in Remote Regions of the World
Haylee Adelaide Darling, 17, Senior, Forest High School, Ocala, Florida,
T: Korie-Lanette Grimsley

ENMC032 A Novel Computer Simulation of a Deployable Parachute System with Aerial Detachment of the Cabin for Commercial Airplane Crashes, Year Two
Vivek Sai Sandrapaty, 16, Sophomore, West Port High School, Ocala, Florida,
T: Janice David
CONGRATULATIONS
TO OUR CATEGORY FINALISTS

Plant Sciences

Shatha AlAhmadi
Juman AlHarbi
Yousef Al-Mahmoud
Tamm Alrashid
Amanda Aviles de Leon
Camden Barger
Yasmin Barreto Teles Fonseca
Emelyn Beaster
Cameryn Berryhill
Mary Biggs
Matteo Bigi
Tyler Bissoondial
Teerateep Boondert
Anica Camacho
Sarah Cao
Michael (Mac) Chaloupka
Caylee Combs
Lilian Crawford
Maja Dalby-Ball Olson
Makee Davis
Beverly Eborn
John Benedict Estrada
Aubrey Evilsizer
Luca Giuliani
Andrew Grine
Anna Hyskova
Yewon Jwa
Karit Keereekaew
Yujin Kim
Sisui Kuuru
Aravind Krishnan
Bryce Krohnfeldt
Bo Wei Lai
Sophia Landry
Panchanok Leela
Blake Lippman
Aysha Mahfuz
Behruz Mahmudov
Abbigail Matthews
Brynn McGrail
Nicole Melo de Almeida
Jordynn Michael
Pearl Eunice Munoz
Katherine Opira
Alyssa Park
Joonwoo Park
Noah Peraccinity
Kornkanok Promruk
Rutsiripol Putson
Shivam Rawat
Joseph Reamsnyder
Beth Robinson
Daniela Rodriguez-Vegailla
Laboni Santra
Yuna Seo
Cindy Shen
Joao Sinigardi
Nicole Stover
Kowit Sukchai
Chuen Keat Tan
Bailey Vanderwall
Zach Vazhekatt
Shohei Wada
Daniel Wamsley
Kayla Wang
Regan Williams
Katherine Winchester
Nicole Xiao
Jacob Zajkowski

Society for Science applauds
the finalists in Plant Sciences.
Orlando, USFL17, Dr. Nelson Ying-Orange County Science Exposition

ANIM011 Year 4: Developing a Multiple Linear Regression Model to Predict the Specific Effects of Various Lactic Acid Bacteria Dosages on the Overall Honey Bee Gut Microbiota and Nosema ceranae Reduction
Varun Raj Madan, 16, Junior, Lake Highland Preparatory School, Orlando, Florida, T: Darin Hughes

CBIO007 A Novel Computational Approach to Drug Discovery through Drug Repositioning
Kritik Seela, 15, Sophomore, Lake Highland Preparatory School, Orlando, Florida, T: Darin Hughes

CBIO017 Implementation of Time Frequency Analysis for Seizure Localization, Phase II
Asha Reddy, 16, Junior, Lake Highland Preparatory School, Orlando, Florida, T: Zasha Mickey

ROBO019 Using A Novel Semi-Supervised Machine Learning Method to Improve Image-based Lung Cancer Diagnostic Algorithms
Alexander C. Wang, 16, Junior, Trinity Preparatory School, Winter Park, Florida, T: Elmarie Mortimer

Bushnell, USFL18, Sumter County Regional Science Fair

ANIM001 Shrimply Clean: Effects of Mussels and Prawn on Water Quality
Trinity Kadance Skaggs, 17, Junior, Wildwood High School, Wildwood, Florida, T: Emily Keeler

BMED001 The Effects of Ketone Supplements on Reducing Postprandial Glucose Levels
Cheyenne Rashelle Shirley, 16, Junior, South Sumter High School, Bushnell, Florida, T: Shelia Wiley

CHEM002 Do Oranges Gain or Lose Vitamin C After Being Picked?
Savannah Stephens, 16, Sophomore, South Sumter High School, Bushnell, Florida, T: Stephanie Yarbrough

ENEV004 Substituting Plastic
Michael Vick, 17, Junior, Wildwood High School, Wildwood, Florida, T: Emily Keeler

MCRO003 Sugar and Spice, Aren’t They Nice? Is Garlic, Ginger, Cinnamon, or Honey More Effective than Antibiotics against Bacteria?
Kadie Mariano, 15, Freshman, Wildwood High School, Wildwood, Florida, T: Emily Keeler

Pensacola, USFL20, West Panhandle Regional Science and Engineering Fair

ENEV005 Using a Positive Charged Media to Remove Different Heavy Metal Ions from Contaminated Water Samples
Claire Jinbei Han, 16, Junior, Pensacola High School, Pensacola, Florida, T: Cheri Stephens

Saint Augustine, USFL21, St. Johns County Science Fair

EGSD004 Designing and Testing a Novel 25% Degree of Reaction Steam Turbine
Benjamin Michael York, 15, Freshman, Creekside High School, Saint Johns, Florida, T: Amy Eardley

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

BEHA084 Artificial Voice Intelligence in Memory Retention; Does A.I. Anthropomorphism Impact Auditory Memory Recall?
Naman Doad, 15, Sophomore, Oviedo High School, Oviedo, Florida, T: William Furiosi

EGSD034 Characterizing the Electrical and Thermal Performance of a Circular Exhaust Pipe Thermoelectric Generator
Taehee Um, 18, Senior, Oviedo High School, Oviedo, Florida, T: William Furiosi

ENEV037 Development of a Combinatory Filtration System for Pollution and Virus Abatement
Ishika Nag, 15, Sophomore, Oviedo High School, Oviedo, Florida, T: William Furiosi II
MCRO010  Prevention of Healthcare Associated Infections Using Antibacterial Boron Carbonitride Nanoparticle Coating on Medical Devices  
Varsha Naga, 17, Junior, Winter Springs High School, Winter Springs, Florida, T: Christopher Adamson  

ROBO040  Utilizing Machine Learning to Identify Metastatic Tissue in Histopathologic Scans of Lymph Node Sections  
Siddharth Kini, 15, Freshman, Crooms Academy of Information Technology, Sanford, Florida, T: Josue Urbina

Stuart, USFL25, Martin County Regional Science and Engineering Fair
ENMC059  Creation of a Highly Efficient Surface ROV Invoking Cylindrical Solar Panels, Year 5  
Steven Craig Vokoun, 18, Senior, South Fork High School, Stuart, Florida, T: Mark Turull

Tallahassee, USFL26, Capital Regional Science and Engineering Fair
CELLO02T  Extrathymic T-Cell Development in the Mesenteric Lymph Nodes of Mice  
Sandhya Kumar, 17, Junior, Surabhi Kumar, 17, Junior, Lawton Chiles High School, Tallahassee, Florida, T: Angela Breza-Pierce  

ROBO004  Convolutional Neural Network Approaches for Smartphone-Based Rapid Detection of Tomato Diseases Supporting Mitigation of Unwarranted Pesticide Usage  
Sruthi Sentil, 16, Sophomore, James Rickards High School, Tallahassee, Florida, T: Paula Hall

Tampa, USFL27, Hillsborough Regional Science Fair
CHEM051  Silica-Supported Perovskite Oxides for Low Temperature Carbon Dioxide Conversion  
Anya Kirit Patidar, 17, Junior, C. Leon King High School, Tampa, Florida, T: Daniel McFarland

MCRO062  In vitro Evaluation of a Herbal Bionematicide and Its Effect on the Management of Nematodes in Solanum iycoperiscum  
Shloke Nirav Patel, 15, Sophomore, Hillsborough High School, Tampa, Florida, T: Mishell Thomas-King

Viera, USFL28, Brevard Mainland Regional Science and Engineering Fair
ENMC033  In situ Resource Utilization of Martian Regolith for Construction, Year Four  
Isabella Weiner, 17, Senior, Holy Trinity Episcopal Academy, Melbourne, Florida, T: Terrie Segal

MCRO008  A Multi-Factor Study Deriving a Comprehensive Evaluation of Natural Antibiotic Hybrids Bound to Novel Nanoreactors in an Inorganic Model of an Enterococcus faecalis Infected Jejunum Cross-Analyzed through Static Biofilm Production and Quorum Sensing (Year 5)  
Om Dipakkumar Patel, 17, Junior, Eau Gallie High School, Melbourne, Florida, T: Chelsea George

ROBO015  Novel Architectures for the Artificial Neural Network: Implementation of Virtual Neurotransmitters  
Nikhil Hari Iyer, 17, Junior, Edgewood Junior Senior High School, Merritt Island, Florida, T: Ryan Cilsick

West Palm Beach, USFL29, Palm Beach Regional Science and Engineering Fair
ANIM044  The Effect of Putative Beneficial Microorganisms for Coral (pBMC) in the Prevention of Disease and Bleaching (Year Two)  
Emily Joy Weimer, 18, Senior, Palm Beach Central High School, Wellington, Florida, T: William Bartenslager

BCHM025  Sargassum sp. Reductive, Polyphenol Extract Modulates D. dorotocephala Regeneration by Reduction of ROS, and Has Potential as an Anti-Inflammatory Agent  
Julianna Lian, 17, Junior, Florida Atlantic University High School, Boca Raton, Florida, T: Alexandra Lolavar
Finalist Directory

BEHA053  An Examination of the Association Between Empathy as a Disposition and Adherence to Covid-19 Safety Guidelines
Mandy Brooke Feuerman, 17, Senior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Iris Thompson

ENEV068  Artificial Neural Network Modeling of Harmful Algal Blooms in Lake Okeechobee
Ashesh Amatya, 16, Junior, Alexander W. Dreyfoos School of the Arts, West Palm Beach, Florida, T: Stephen Anand

MCRO048  Testing the Extent of Synergistic Anti-biofilm Activity of Galla chinensis and Potentially Adjuvant Chemicals on Escherichia coli Biofilm Formation and Reformed Biofilm
Angelina Ning, 16, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Iris Thompson

ROBO064  Improved Classification and Prediction of Head and Neck Squamous Cell Carcinomas Using a Novel Generative Adversarial Network Model
Ashwin Parthasarathy, 16, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Iris Thompson

TMED049  Determining the Effect of a Disulfiram Copper Complex on Drug Resistance through Deletion of ALDH1 in Metastatic Breast Cancer Cells (A Three Year Study)
Diane Altidor, 18, Senior, Palm Beach Central High School, Wellington, Florida, T: William Bartenslager

Land O’ Lakes, USFL30, Pasco Regional Science and Engineering Showcase
BEHA003  Jewish Identity Formation Processes within Reform Adolescents
Rachel Elizabeth Buksbaum, 17, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

BMED003  The Influence of Temperature on the Concentration of Hemoglobin in Lumbricus terrestris and Eisenia fetida Erythrocruorins
Bianca Rose Nicholas, 18, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

CBIO005  An Analysis of the Regulatory Role of Small Nuclear and Nucleolar RNA Expression Pathways in the Pathogenesis of Preeclampsia
Cemre Su Kayisli, 17, Junior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

ENEV030  The Utilization of Bambusa vulgaris Biochar to Address Runoff Contamination Following Intense Forest Fires
Rachel Anne Forgas, 18, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

Vero Beach, USFL31, Indian River Regional Science and Engineering Fair
EAEV025  A Novel Model of Microplastics Pollution for Terrestrial Environments in Drosophila melanogaster
Stephan Oscar Lindenthal, 17, Junior, Saint Edward’s School, Vero Beach, Florida, T: Kerryane Monahan

Sarasota, USFL32, Sarasota County STEM Summit
BEHA078  Impact of Protective and Risk Factors on Adolescent Responses to COVID-19
Lauren Xiao Shuang Morgan, 18, Senior, Sarasota High School, Sarasota, Florida, T: Andrew Harshman

EAEV116T  Secretion of Microplastics on the Seafloor
Lily Sikorski, 18, Senior, Alexa VanSuch, 18, Senior, Sarasota High School, Sarasota, Florida, T: Andy Harshman

Mount Dora, USFL34, Lake County Regional Science & Engineering Fair
ENBM011  Biomaterial Fabrication Technique: Using Decellularized Plants as Perfusable Engineering Scaffolds
Kaitlyn R. Dunn, 16, Junior, Tavares High School, Tavares, Florida, T: Courtney Stokes
CONGRATULATIONS
TO OUR FIRST PLACE CATEGORY WINNERS

Robotics and Intelligent Machines

MICHELLE HUA
Bloomfield Hills, Michigan
Dilated Silhouette Convolutional Neural Networks
Booth ROBO033

ELLA YUE WANG
Chandler, Arizona
HemaVision Blood Disease Screening System
Booth ROBO055

Siegel Family Endowment applauds the finalists in Robotics and Intelligent Machines.
Finalist Directory

Green Cove Springs, USFL35, Clay Rotary Regional Science and Engineering Fair

CELL003 Enzymatically Treated Cellulosic Packaging Waste Utilized to Release Fermentable Sugars for the Production of Bioethanol: A Second Year Study
Serenity Renee Derousie, 17, Junior, Ridgeview High School, Orange Park, Florida, T: Devan Skapetis

ENBM009 Muscle Controlled Exoskeleton
Sebastian David Kouchakji, 17, Senior, Orange Park High School, Orange Park, Florida, T: Amanda George

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

ANIM007 Novel Geotoxic Data Show Botanical Therapeutics Slow Parkinson’s Disease in A53T and ParkinKO Models
Kristi Biswas, 16, Sophomore, Paxon School for Advanced Studies, Jacksonville, Florida, T: Emma Gallagher

BEHA064 Digital Phenotyping Autism: Investigating Objective Vocal and Movement Quantification for Characterizing Autism Severity
Emilin Maria Mathew, 16, Junior, American Heritage School, Plantation, Florida, T: Leya Joykutty

BMED073 Differential Expressions of Wnt Pathway Proteins of Colorectal Carcinoma Metastases to Liver versus Lung
Madeline E. Huberman, 16, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Paula Ladd

CHEM061 Fabrication of Naphthalimide Point-of-Care (POC) Chemosensor Using InkJet Printing on Cellulose Paper for Determination of Uric Acid (UA) in Synthetic Urine and Aqueous Solution of Grain Samples, and Chromium Metal (Cr) in Drinking Water
Vedant Nilesh Karalkar, 16, Junior, Eastside High School, Gainesville, Florida, T: Adenike Akinyode

EAEV090 Predictive Modeling of Tropical Cyclone Rapid Intensification by Analyzing Convective Patterns with Convolutional Neural Networks, Year Four
Alexander Michael LaFortune, 18, Senior, Satellite High School, Satellite Beach, Florida, T: Magdalena Molledo

PHYS017 Dynamic Contact Angle Measurements of Superhydrophobicity in Dip-Coated Face Masks to Minimize Exposure to COVID-19 Sized Nanoparticles
Annika Maria Larsson Vaidyanathan, 16, Junior, Winter Springs High School, Winter Springs, Florida, T: Christopher Adamson

PLNT042 Minimizing Food Waste Using a Nature-Derived Coating – An Innovative Step Towards Addressing Global Food Security
Laboni Santra, 17, Senior, Oviedo High School, Oviedo, Florida, T: William Furioso

GEORGIA

Atlanta, USGA03, Atlanta City Science & Engineering Fair

CBIO057 Type 2 Diabetes and Ulcerative Colitis: Shared Gut Microbiome Dysbiosis, a Biomarker for Colorectal Cancer
Sara Kapasi, 16, Junior, The Westminster Schools, Atlanta, Georgia, T: Florence Sumner

ENBM102 Muscle Activity and Energetic Adaptation to Step Frequency
Wendy Nevarez-Sanchez, 18, Senior, South Atlanta High School, Atlanta, Georgia, T: Andrea Pendergrass
MATH044T  Using Advanced Predictive Modeling in a Nontraditional Discipline – The NFL Draft
Christopher Walker, 17, Junior, Nathan Rachwalski, 17, Junior, Henry W. Grady High School, Atlanta, Georgia, T: Rabieh Hafza

SOFT006  Towards a Greener AI: Structured Pruning of Convolutional Neural Networks at Initialization
Sydney Faux, 17, Junior, Pace Academy, Atlanta, Georgia, T: Christina Snyder

Stone Mountain, USGA04, Dekalb Science & Engineering Fair

SOFT002T  Utilizing the Heuristic A* Search Algorithm to Determine the Shortest Path Between Locations on a Floorplan
Avaye Raj Dawadi, 17, Junior, Sooriya Senthilkumar, 17, Junior, Alexander Charles Jovanovic, 17, Junior, Chamblee Charter High School, Chamblee, Georgia, T: Shaheen Begum

McDonough, USGA06, Henry County Science and Engineering Fair

EBED001  VR but Better: Using Geomagnetic Fields, Bodily Electric Fields, and Pressure Distributions in VR
Yashua Evans, 18, Senior, The Academy for Advanced Studies, McDonough, Georgia, T: Charlena Raines

ENMC002  Staying Dry: Notification System for Incontinence Underwear
Rebekah Grace Dorminy, 17, Senior, Sola Fide Home School, McDonough, Georgia, T: Ann Dorminy

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

CHEM004  Removing Permanent Marker
Laura Towner, 15, Sophomore, Georgia College Early College, Milledgeville, Georgia, T: Julia Reams

MCRO004  Acne Medication Against E. coli
Tiffani Arnina McClain, 15, Freshman, Jasper County High School, Monticello, Georgia, T: Caleb Fontaine

Savannah, USGA08, Savannah Regional Science and Engineering Fair

ANIM002  The Impact of Buildings on Loggerhead Sea Turtle Nests
Michael William Wood, 16, Sophomore, Islands High School, Savannah, Georgia, T: Megan Heberle

Griffin, USGA09, Griffin RESA Regional Science Fair

ENEV006  Sustainable Habitats for Crassostrea virginica
Emily Elizabeth White, 15, Sophomore, McIntosh High School, Peachtree City, Georgia, T: Seth Bishop

ENMC005  Recycling Plastic for 3D Printing
Cayden N. Shaffer, 16, Junior, Whitewater High School, Fayetteville, Georgia, T: Mary Clark

ROBO005  3D Depth Mapping Vision System Worthy of an Extraterrestrial
Marc van Zyl, 16, Sophomore, McIntosh High School, Peachtree City, Georgia, T: Seth Bishop

Warner Robins, USGA10, Houston Regional Science and Engineering Fair

BCHM009  The Effect of Pulsed Ultraviolet Light on the Color of Beef, Chicken, and Pork Surfaces.
Ishaan Vyas, 16, Junior, Northside High School, Warner Robins, Georgia, T: Leshan Ferguson

Suwanee, USGA11, Gwinnett Regional Fair

BMED004  Using Seaweed in order to Protect Skin Cells from UV Rays
Jessica Elise Borders, 16, Sophomore, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry
Finalist Directory

**EAEV066**  
*Galleria mellonella Biodegradation of Polyethylene by Digestion*  
Mireya Carolina Ramirez, 16, Junior, North Gwinnett High School, Suwanee, Georgia,  
T: Charles Daab

**ENBM007T**  
*Automated UVC Sanitizing of Money*  
Roshan Lukas Saigal, 15, Sophomore, Timothy Do Nguyen, 16, Sophomore, Nathaniel Morgan, 15, Sophomore, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry

**ENEV039**  
*Acetobacter Xylinum & the Development of an Alternative Biodegradable Textile*  
Ciara Ashley Mitchell, 17, Senior, Brookwood High School, Snellville, Georgia,  
T: Melissa Kim

**ENMC006T**  
*Portable Method of Detecting Oncoming Fires*  
Anika Mathur, 16, Sophomore, Kristina Yu, 16, Sophomore, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Joanne Shaw

**ENMC023**  
*Optimization of Navigating Intersections: A Research Project on Navigating Hallway Intersections During a Pandemic*  
Chandni Pari Jain, 18, Senior, Peachtree Ridge High School, Suwanee, Georgia,  
T: Patrick McClanahan

**Conyers, USGA12, Rockdale Regional Science & Engineering Fair**

**Eeve007**  
*Use of Tenebrio molitor in Plastic Biodegradation*  
Dylan Edward Burkey, 16, Sophomore, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Scott Bolen

**ENEV008**  
*The Application of Mycoremediation upon Cigarette Filter Waste*  
Nylah Lillian Ductan, 17, Junior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Lynette Clark

**MATS014T**  
*Comprehensive Analysis of Biomaterial for Medical Implementation*  
Madeline Lombard, 18, Senior, Ava Claire Bailey, 17, Senior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Scott Bolen T: Shelley Seagraves

**Atlanta, USGA13, Fulton County Regional Science & Engineering Fair**

**BEHA004**  
*VapeSafe: Device and Multi-Factor App to Prevent Nicotine Poisoning via Real-Time Behavioral Analysis and Alternate Compound Identification*  
Divya Vani Nori, 17, Senior, Milton High School, Milton, Georgia, T: Catherine Riley

**CHEM005**  
*Thriotel Oligomers: Microbe-based Demulsifiers for Oil Extraction*  
Tianyu Dong, 16, Junior, Northview High School, Johns Creek, Georgia,  
T: Rebecca Bingham

**ENBM008**  
*Autonomously Tracking Organisms at Microscopic Resolution in 3D*  
Priya Soneji, 17, Senior, Milton High School, Milton, Georgia, T: Catherine Riley

**Marietta, USGA14, Cobb/Paulding Regional Science Fair**

**MCRO005T**  
*Prophylactic and Therapeutic Roles of Glycyrrhiza glabra in the Prevention and Treatment of COVID19*  
Abhinav Kona, 16, Junior, Abhishek Kona, 16, Junior, George Walton Comprehensive High School, Marietta, Georgia, T: Tobie Hendricks

**MCRO006T**  
*Applications of Silver Nanoparticles to Flooring*  
Mehreen Sabah, 17, Senior, Cindy Pinedo, 17, Senior, Paulding County High School, Dallas, Georgia, T: Marc Pedersen

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

**ENBM017T**  
*How Can Vibration Detection Used to Determine Joint Health Monitoring?*  
Rodney Lamar Clark, 18, Senior, Deonte Antion Hambrick, 17, Senior, Martha Ellen Stilwell School of the Arts, Jonesboro, Georgia, T: Rajini Sundararaj
CONGRATULATIONS
TO OUR CATEGORY WINNERS

Systems Software

FIRST PLACE
Daniel Shen

SECOND PLACE
Aiden Yutong Bai
Shrinandan Krishna
Narayanan
Pravalika Gayatri Patalapattu

THIRD PLACE
Alice Louise Heiman
Alexander Lyons
Peyton Schales
Arvind Seshan

FOURTH PLACE
James Connor
Sydney Faux
Xuerui He
Jordan Levett
Haoyun Qin
Thomas Marshall Vielmetti

Microsoft applauds the finalists in Systems Software.
<table>
<thead>
<tr>
<th>Finalist Directory</th>
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<tr>
<td><strong>Athens, USGA50, Georgia State Science and Engineering Fair</strong></td>
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</table>
| **CELL039** Rewiring PAM Specificity of SpdCas9 for Gene Repression  
Michelle Li, 16, Sophomore, North Oconee High School, Bogart, Georgia,  
T: Matthew Shuman |
| **ENEV087** Protecting Critical Aquatic Ecology with Deep Learning  
Aesha Shah, 15, Sophomore, Northview High School, Johns Creek, Georgia,  
T: Rebecca Bingham |
| **MATS050** Year Two: Digital Light Processing Printing of Hierarchical Porous Carbon for Environmental Remediation and Water Desalination  
Howard Tang Hua, 18, Senior, Wheeler High School, Marietta, Georgia, T: Joel Howell |
| **TMED061** My Skin: A Deep Convolutional Neural Model for Skin Cancer Identification with Coarse-to-Fine Contextual Memory (CFCM)  
Ameya Jadhav, 17, Junior, Denmark High School, Alpharetta, Georgia, T: Shelby Cochran |
| **HAWAII** |
| Honolulu, USHI01, Hawaii Association of Independent Schools Science and Engineering Fair |
| **BMED026** Testing Fabric and Mask Particle Filtration Efficacy  
Logan Kekoa Lau, 17, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Gail Ishimoto |
| **ROBO058** An AI-aided Solution to Open-angle Glaucoma Screening in Developing and Rural Countries  
Jiacheng Dang, 19, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan |
| Waipahu, USHI02, Leeward District Science and Engineering Fair |
| **CBIO035** In silico Screening and Analysis of Inhibitory, Anti-prion Ligands for Prevention of Pathogenic Prion Conversion  
Emily Phanphongsa, 17, Junior, Waipahu High School, Waipahu, Hawaii, T: Tanya Cobbin |
| **ENMC030T** Improving Autonomous Underwater Vehicle (AUV) Glider Efficiency: Wingspan  
Antonio Samonte Velasco, 17, Junior, Lauren Kana Suzuki, 16, Junior, Pearl City High School, Pearl City, Hawaii, T: Anthony Ferro |
| **MATS015** Synthesizing c-Si3N4 from Extreme Temperature and Pressure Conditions  
Jeyan Francis Cornelio, 18, Senior, Waipahu High School, Waipahu, Hawaii, T: Tessie Ford |
| Wailuku, USHI03, Maui County Regional Science and Engineering Fair |
| **BEHA054** Studying the Effects of Mindfulness Meditations on Teens  
Kailani Ibanez, 15, Sophomore, Henry Perrine Baldwin High School, Wailuku, Hawaii, T: Amy Ancheta |
| **ENBM045** Biomedical Engineering: Coronary Artery Disease and the Design Process of Medical Implants and Devices  
Alara Berkmen, 16, Junior, Seabury Hall Upper School, Makawao, Hawaii, T: Moka Brown |
| Lihue, USHI04, Kauai Regional Science & Engineering Fair |
| **EAEV037** Identifying Climate Change Refugia for Hawaii’s Vulnerable Endemic Species with a Spatial-Temporal Model in GIS  
Kai Elliot Mottley, 16, Junior, Kauai High School, Lihue, Hawaii, T: Kevin Johnson |
| Hilo, USHI05, Hawaii District Science and Engineering Fair |
| **BCHM016** Investigating the Biochemical Activity of Organic Curcuma caesia and Curcuma longa (Turmeric) on Neuroblastoma Cancer Cells  
Maya C. Oishi, 17, Junior, Hilo High School, Hilo, Hawaii, T: Pascale Pinner |
| **MCRO033** Structural Deduction and Environmental Analysis of Novel Tirofiban and Coumarin Derivatives Originating from the Endophytic Isolate FM1005 (Xylaria sp.)  
Lela C. DeVine, 17, Senior, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki |
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<th>Location</th>
<th>Category</th>
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<th>Authors</th>
<th>Mentors</th>
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<tbody>
<tr>
<td>Kaneohe, USHI06</td>
<td>Windward District Science and Engineering Fair</td>
<td><strong>EGSD019 An Ocean Distillery for Distilled Water Run on Hydroelectric Power</strong></td>
<td>Desirae Jeffers, 18, Senior, Kailua High School, Kailua, Hawaii, T: Sara Anglin</td>
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<td><strong>ENMC031 Propeller Shroud Design: Testing the Effectiveness of Different Cambers</strong></td>
<td>Jack Keichi Saito, 16, Junior, James B. Castle High School, Kaneohe, Hawaii, T: Malia Vaughn</td>
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<td>Honolulu, USHI07</td>
<td>Central Oahu District Science and Engineering Fair</td>
<td><strong>CBIO044 High Accuracy Classification of Myopathy Electromyography Signals Using a ResNet50 Neural Network</strong></td>
<td>Blaise Austin Swartwood, 17, Junior, Mililani High School, Mililani, Hawaii, T: Nel Venzon</td>
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<td><strong>ENBM094 The Future of Prosthetics: Making Prosthetics with More Capabilities at a Lower Cost</strong></td>
<td>Connor Tetsuo Lee, 17, Junior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan</td>
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<td>Honolulu, USHI50</td>
<td>Hawaii State Science and Engineering Fair</td>
<td><strong>ANIM054 An Inventory of Forest Birds Along the 'Aiea Loop Trail, O'ahu, Hawai'i</strong></td>
<td>Kellen Apuna, 16, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Grant Yamashita</td>
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<td><strong>CHEM063 Column Purification of Hawaiian Grown Mamaki Tea Extracts and Investigation of Associated Compound Stability in Simulated Intestinal and Gastric Fluids</strong></td>
<td>Alanna Sun, 15, Sophomore, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki</td>
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<td><strong>ENEV080T Managing Oysters to Maintain Our Islands (MOMI)</strong></td>
<td>Andrew Kwon Dawson, 18, Senior, David Antonio Torres, 17, Senior, Ethan Hui, 17, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan</td>
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<td><strong>MATS048 Engineering an Invasive Algae and Taro Based Bioplastic</strong></td>
<td>Kelly Sanae Mukai, 18, Senior, Iolani School, Honolulu, Hawaii, T: Yvonne Chan</td>
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<td><strong>PHYS075 Determining the Detectability of Planets Transiting Stars of Extragalactic Origin</strong></td>
<td>Stephanie Naphat Yoshida, 18, Senior, Punahou School, Honolulu, Hawaii, T: Johannes Adams</td>
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<td><strong>TMED059 Identification of a Novel Anticancer Pathway in a Traditional Hawaiian Herb</strong></td>
<td>Rachel Tao, 15, Sophomore, Waiakea High School, Hilo, Hawaii, T: Whitney Aragaki</td>
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<tr>
<td>Coeur d'Alene, USID01</td>
<td>Northern Idaho Science &amp; Engineering Fair</td>
<td><strong>PLNT026 Manipulation of the Novel hsp23.8: ZmCLA4 Gene Construction to Avoid Leaf Hypostasis (Upward Leaf Bending) Caused by Heat Stress</strong></td>
<td>Nicole Li Xiao, 16, Junior, Moscow High School, Moscow, Idaho, T: Pat Blount</td>
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<td><strong>PLNT027T A Comparison of Growth in Solanum lycopersicum and Brassica oleracea Planted in Aquaponic and Hydroponic Systems</strong></td>
<td>Bailey Elizabeth Vanderwall, 17, Junior, Camden Kay Barger, 17, Junior, Grangeville High School, Grangeville, Idaho, T: Shaun Bass</td>
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</tbody>
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Boise, USID02, Western Idaho Science & Engineering Fair

MCRO037  Comparative Inhibition of E. coli Growth by Commercial and Homemade Hand Sanitizers
Jessica Lynn Douglass, 18, Senior, Emmett High School, Emmett, Idaho, T: Robin Wilson

ROBOO46  Efficient Music Genre Classification with Deep Convolutional Neural Networks
Wency Suo, 16, Sophomore, Boise High School, Boise, Idaho, T: Reid Spain-Strombom

Pocatello, USID03, Eastern Idaho Science & Engineering Fair

ENMC047  Mitigating Stresses to Migrating Ichthyoids Caused by Man-Made Obstructions
Seth L. Tuma, 15, Sophomore, Idaho Virtual Academy, Meridian, Idaho, T: Janna Privette

MCRO038  A Comparison of Bacterial Contamination of Nine Public Surfaces
Lindsey Holtom, 17, Junior, Hillcrest High School, Ammon, Idaho, T: Barbara Nelson

ILLINOIS

Chicago, USIL01, Chicago Public Schools Student Science Fair

BMED030  Investigating Bone Morphogenetic Protein 4 as a Potential Regulator of the Age Related Increase in Risk for Alzheimer’s Disease: The Regulation of the Unfolded Protein Response and Apolipoprotein E Expression in Astrocytes

BMED031  Treating Blindness: The Role of Autophagy in Diabetic Retinopathy
Nina Fonseca, 17, Junior, Whitney M. Young Magnet High School, Chicago, Illinois, T: Lynne Muhammad

EBED029  Using RFID to Enhance a 2-Piece Puzzle
Sydney Ella Curran, 15, Sophomore, Lane Technical College Prep High School, Chicago, Illinois, T: Daniel Law

MCRO027  mRNA-based Vaccine for the Prevention of Yellow Fever
Maya Joshi, 16, Sophomore, Walter Payton College Preparatory High School, Chicago, Illinois, T: Walter Kinderman

Edwardsville, USIL02, STEM Science and Engineering Research Challenge

MCRO067  To Dye or Not to Die: Bacterial Mutagenicity and Carcinogenesis
Tahlor Brené Johnson, 17, Senior, The Governor French Academy, Belleville, Illinois, T: Christine Stewart

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

EAEV079  Zooplankton Studies in Lentic Ecosystems: Phase V – Cyclomorphosis
Ashton Timothy Ryan, 16, Junior, Rochester High School, Rochester, Illinois, T: Lyndell Robinson

MCRO039  Effect of Bacteria and Fungal Interactions on Mosquito Egg Hatching
Jaday Lynne Henry, 18, Senior, Southeastern Junior/Senior High School, Augusta, Illinois, T: Sue Henry

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

EAEV099  Math Model on the Effect of Deforestation and Anthropization on the Transmission Rates of Bat-Related Diseases
Sharlene Faye Zabat Manlongat, 18, Senior, Niles North High School, Skokie, Illinois, T: Christine Camel

ENBM089  Using 3D Printing to Engineer a Microcentrifuge for Open-Source Research
Keegan Teal, 18, Senior, Barrington High School, Barrington, Illinois, T: Polly Foley

ENMC069  Effect of Geometric Manipulation on the Main Combustion Chamber of a Full-Flow Staged Rocket Engine
Joseph Rosario Cinquemani, 18, Senior, Niles Township West High School, Skokie, Illinois, T: Parin Patel
CONGRATULATIONS
TO THE FIRST PLACE CATEGORY WINNER

Translational Medical Science

TIENLAN SUN
Vancouver, Canada
TeleAEye: AI Fundus Camera for 2 Billion Eyes
Booth TMED047

Regeneron applauds the finalists in Translational Medical Science.
PHYS067  Effect of Surface Deformations on the Hydraulic Jump  
Emily Flora Hauser, 17, Senior, Evanston Township High School, Evanston, Illinois,  
T: Mark Vondracek

ROBO074  Automated Tracking of the Muscle Tendon Junction Using Modern Deep Learning  
Hassam Uddin, 18, Senior, Niles North High School, Skokie, Illinois, T: Richard Thielsen

INDIANA
Evansville, USIN20, Hoosier Science and Engineering Fair Region 1

CBIO061  Systematic Survey of Pathways Perturbed in Complex Diseases  
James Yang, 15, Sophomore, Carmel High School, Carmel, Indiana, T: Zhaohui Qin

CHEM040  Staphylococcus aureus Biofilm Dispersion: Computationally Analyzing Interactions between Nattokinase Binding-Partners via a Novel Stacked Generalization Machine Learning Approach  
Raghav Sriram, 15, Sophomore, Carmel High School, Carmel, Indiana,  
T: Jennifer Drudge

PHYS061  Jetting into the Future: Calculating Outlet Air Velocity to Optimize Convergent Nozzle Design for Subsonic Exhaust Flow Efficiency through Wind Tunnel Testing with Laminar Flow  
Matthew Allen Alcantara, 16, Sophomore, Carmel High School, Carmel, Indiana,  
T: Jennifer Alcantara

Fort Wayne/Angloa, USIN21, Hoosier Science and Engineering Fair Region 2

MATS028  Mechanical Properties of Crayfish Claws: Getting Inspiration from Nature  
Kunal Chawla, 14, Freshman, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Croy

TMED064  Identification of Predictive Biomarkers Against Cancer with Sparse Neural Networks  
Minnie Liang, 16, Sophomore, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Croy

Indianapolis, USIN22, Hoosier Science and Engineering Fair Region 3

BMED045  Which Cloth Is More Effective as a Mask?  
Sama Zahran, 14, Freshman, Eman Schools, Fishers, Indiana, T: Elsayed Zahran

CBIO075  A Deep Learning Approach to de novo Drug Design: Generating Multi-Target Drugs to Inhibit Amyloid-Beta with Applications in Neurodegenerative Disorders

## Sowmya Chundi, 17, Junior, Carmel High School, Carmel, Indiana, T: Craig Harper

Muncie, USIN23, Hoosier Science and Engineering Fair Region 4

ANIM041  The Effect of Different Protein Supplements on the Growth of Goat Kids  
Kelsie Marie Avery, 15, Freshman, Northwestern High School, Kokomo, Indiana,  
T: Linda Wilson

PLNT031  The Reduction of Tumors on Glycine max through the Application of Sulforaphane  
Aubrey Elaine Evilsizer, 16, Sophomore, Northwestern High School, Kokomo, Indiana,  
T: Linda Wilson

Notre Dame, USIN24, Hoosier Science and Engineering Fair Region 5

ANIM047  Feeding Modality and Saturation Response in the Jaws of New Zealand White Rabbits  
Talia Thornton, 17, Senior, Marian High School, Mishawaka, Indiana, T: Ken Andrzejewski

BCHM022  Nitrate Levels in Non-Organic and Organic Vegetables  
Allison Dew, 15, Freshman, Marian High School, Mishawaka, Indiana,  
T: Ken Andrzejewski

BEHA038  An Observational Study of Mask Usage in St. Joseph and Elkhart Counties  
Abigail Mackenzie Weaver, 15, Freshman, Marian High School, Mishawaka, Indiana,  
T: Ken Andrzejewski
Greencastle, USIN25, Hoosier Science and Engineering Fair Region 6

BEHA082 Analyzing Health Implications of Adverse Childhood Experiences (ACEs) on American Adults
Maiesha Shifa Rashid, 17, Junior, Greencastle High School, Greencastle, Indiana, T: Kristen Phillips

BMED066 Correlating Sugar Consumption with Hormone Production Using Shmoo Formation in S. cerevisiae
Samantha Winland, 18, Senior, Valparaiso High School, Valparaiso, Indiana, T: Heidi Krouse

PLNT040 The Power of Plants: Comparing the Antifungal Effects of Different Forms of Ocimum basilicum (Sweet Basil) Against Aspergillus niger
Mary Biggs, 18, Senior, Valparaiso High School, Valparaiso, Indiana, T: Heidi Krouse

West Lafayette, USIN26, Hoosier Science and Engineering Fair Region 7

BEHA039 Strenuous Sequencing: Exploring the Effect of Bilingualism on Executive Functioning in the Human Brain
Karina Renee Castaneda, 17, Senior, Frankfort High School, Frankfort, Indiana, T: Bret Rhea

CELL022 Does HYPE AMPylation Affect BiP Translocation to the Cell Surface?
Jashun Paluru, 16, Junior, William Henry Harrison High School, West Lafayette, Indiana, T: Scott Powell

CHEM038 Creating and Testing New Polymers to Remove the Environmental Toxin PFOA from Water
Andrew Lipton, 16, Junior, Lafayette Jefferson High School, Lafayette, Indiana, T: Alyce Myers

ROBO066 PanCan Diagnosed (a miRNA Approach): Using Feature Selection, Ensemble Algorithms, and Interpretability for the Early Diagnosis and Personalized Medicine of Pancreatic Cancer
Siya Goel, 16, Junior, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Croy

Valparaiso, USIN27, Hoosier Science and Engineering Fair Region 8

BCHM018 Comparative Effects of Various Flavonoids on Biofilm Formation of S. marcescens
Ryan Norden, 16, Sophomore, East Noble High School, Kendallville, Indiana, T: Mark Liepe

BMED046T The Creation of Manganese (IV) Oxide Nanosheets as a Inexpensive and Effective Method of Measuring Blood Glucose
Pol Berger Romeu, 17, Junior, Nathan Frank, 17, Junior, Carmel High School, Carmel, Indiana, T: Eric Rauch

EAEV068 The Effects of Different Turbine Blade Shapes on the Output of Hydroelectric Power
Sydney Elaine Hefty, 18, Senior, DeKalb High School, Waterloo, Indiana, T: David Hefty

ENMC050 Testing the Effectiveness of Wind-Resistant Construction Designs in Residential Settings
Christopher Isaac Schweitzer, 15, Freshman, DeKalb High School, Waterloo, Indiana, T: Kelsey Pierce

Indianapolis, USIN50, Hoosier Science and Engineering Fair

CBIO079 Comparing Outcomes of COVID-19 Positive Individuals with and without Chronic Kidney Disease Using Python and CoRDaCo
Safiya Sankari, 16, Senior, Eman Schools, Fishers, Indiana, T: Mia Sankari

EAEV075 Effect of Organic Materials Review Institute-Certified Bacillus thuringiensis Bio-insecticide on Daphnia magna Swimming Behavior
Madeline Phuong, 16, Sophomore, Homestead Senior High School, Fort Wayne, Indiana, T: Diana Cronk
ENMC063  Hay Waste: The Financial Impact Due to Poor Design
Matthias David Hefty, 15, Freshman, DeKalb High School, Waterloo, Indiana, T: David Hefty

MATS043  Magnetic Control of Arbitrarily Shaped Objects with Gallium-Based Transitional Ferrofluid
Jiashu Cheng, 18, Junior, Culver Academies, Culver, Indiana, T: Hongzhang Wang

ROBO048  Computational Design of Optimal Machine Learning Algorithm for Cancer Detection in Histopathologic & PET Scans
Aisha Kokan, 16, Junior, University High School of Indiana, Carmel, Indiana, T: Mercedes Muniz-Peredo

IOWA
Cedar Rapids, USIA01, Eastern Iowa Science and Engineering Fair
CELL020  Novel Mammalian Fibroblast Cell Culture Media Technique for Ultraviolet Cell Reduction
Jasmyn Mary Hoeger, 17, Junior, Beckman Catholic High School, Dyersville, Iowa, T: Cheryl Kluesner

MCRO024  Comparison of Nickel Chelator to Current Standard Triple Antibiotic Therapy to Treat Helicobacter pylori Infection
###  Meena Ramadugu, 17, Junior, John F. Kennedy High School, Cedar Rapids, Iowa, T: Bradley Horton

Fort Dodge, USIA02, Western Iowa Science and Engineering Fair
EAEV059  UVClean or SODISgusting: Comparing the Effectiveness and Efficiency of an Ultra-Violet C (UVC) Sanitizer Box and the Solar Water Disinfection (SODIS) Method
Kiersten Jean Knobbe, 16, Sophomore, Guthrie Center High School, Guthrie Center, Iowa, T: Alexa Groff

EAEV060  A New Treatment Option for Congenital Heart Defects, Phase 2
Justin David Reinhart, 16, Sophomore, Guthrie Center High School, Guthrie Center, Iowa, T: Alexa Groff

Ames, USIA50, State Science and Technology Fair of Iowa
ANIM038  Organic and Traditionally Grown Helianthus annuus Seeds as a Protein Supplement for Grain Based Rations
Grace Frances Helle, 16, Sophomore, Beckman Catholic High School, Dyersville, Iowa, T: Cheryl Kluesner

EAEV060  Predicting Harmful Algal Blooms in Green Valley Lake Using a Machine Learning Model
Claire Gu, 16, Sophomore, Valley High School, West Des Moines, Iowa, T: Karen Downing

EAEV071  Dendrochronological Data Analysis to Measure Climate Sensitivity and to Develop Paleoclimate Reconstructions
Shreya Khullar, 17, Junior, West High School, Iowa City, Iowa, T: Carolyn Walling

MCRO036  Efficacy of Antimicrobial Polylactic Acid Plastic Food Storage Films
Libby Mattea Knipper, 16, Sophomore, Beckman Catholic High School, Dyersville, Iowa, T: Cheryl Kluesner

TMED057  Phase II: Predicting Early Onset Alzheimer’s with Wearable Technology
#  Shristi Sharma, 17, Senior, Maharishi School of the Age of Enlightenment, Fairfield, Iowa, T: Asha Sharma

KANSAS
Wichita, USKS50, Kansas State Science and Engineering Fair
BMED047  Prolonged Opioid Use After Surgery
Amanda Christine Mouer, 18, Senior, Eureka High School, Eureka, Kansas, T: Kimberly Ring
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EAEV055  Per- and Polyfluoroalkyl Substances (PFAS) Uptake in Plants
Emma Noble, 16, Sophomore, Eureka High School, Eureka, Kansas, T: Anna Thornton

ENMC051  Space Junk: Cleaning Up Orbital Debris While Saving Rocket Fuel
Julius A. Neumann, 15, Sophomore, Manhattan High School, Manhattan, Kansas, T: Janet Hanson

TMED048  A Machine Learning Based Diagnostic Tool for the Early Detection of Colorectal Cancer
Abihith Kothapalli, 17, Senior, Blue Valley West High School, Overland Park, Kansas, T: Heather Hall

KENTUCKY

Louisville, USKY02, Louisville Regional Science and Engineering Fair

CBIO041  Does Brain Region Volume Change in Patients with Dementia?
Samyuktha S. Jaganathan, 16, Sophomore, Ballard High School, Louisville, Kentucky, T: Glenda Jones

CELL011  Characterization of Insulin-degrading Enzyme: Using Molecular Visualization Systems to Understand Substrate Recognition in Type 2 Diabetes and Alzheimer’s
Aditi Kona, 17, Junior, North Oldham High School, Goshen, Kentucky, T: Cristy McMahan

CHEM012  Novel Synthesis of Important Pharmaceutical Compounds Using Visible Light and a Photocatalyst
Jason Zhang, 17, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Cheryl Kirby-Stokes

EGSD010  An Algorithm to Estimate Lithium-Ion Battery Lifetime
Andrew Samuel Park, 17, Junior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Sam Park

MCRO013  The Discovery, Analysis, and Characterization of Novel Mycobacteriophage PetiteSangsue
Samirah Salifu, 16, Junior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Rodney King

Louisville, USKY03, DuPont Manual High School Regional Fair

CELL021  Atrazine vs. the Motor, Sensory, and Learning Behaviors of Planaria
Kate Elise Quinn, 14, Freshman, duPont Manual High School, Louisville, Kentucky, T: Valerie Conti

ENBM037  Using Polarized Light to Measure Blood Glucose Levels Non-invasively
Adam Josef Lapinski, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Belinda Hafell

ENBM054  SpeakUp: A Machine Learning-Based Speech Aid to Enable Real-Time Silent Communication for the Paralyzed by Translating Neuromuscular EMG Signals to Speech
Varun Chandrashekhar, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

ROBO031  NextCare: An Intelligent System for the Early Diagnosis and Remote Monitoring of Parkinson’s Disease Using Machine Learning, Signal Processing and a 3D Printed Wearable Device
Shreyas Kar, 16, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

TMED034  Mechanisms Responsible for the Greater Therapeutic Efficacy of Cardiac Mesenchymal Cells Cultured at Physiologic Oxygen Tension in Mice with Heart Failure Caused by Myocardial Infarction
Robi Abella Bolli, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Kathy Fries
Highland Heights, USKY04, Science and Engineering Fair of Northern Kentucky

ENMC016 The Effect of Wrapping Space on Pressure Required for Bending in Fiber Reinforced Soft Actuators
Natalie Justine Janzaruk, 16, Sophomore, Notre Dame Academy, Park Hills, Kentucky, T: William Stamm

Lexington, USKY05, Central Kentucky Regional Science and Engineering Fair

ENEV017 Rewriting the Industry: A Novel Approach to 100% Biodegradable Ink Production and Recyclability
Kiera Fehr, 15, Sophomore, Henry Clay High School, Lexington, Kentucky, T: Lora Thompson

ROBO043 Developing a Novel Autonomous Robot for Cleaning Oil Spills in Water
Varun Hariprasad, 15, Sophomore, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young

SOFT009 Natural Language Processing of Job Loss Related Tweets During the Pandemic
Benjamin Chen, 17, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young

Prestonsburg, USKY06, East Kentucky Regional Science and Engineering Fair

MATS026T Synthesis of Carbon Quantum Dots and How Their Characteristics Allow for the Detection of Metal Impurities in Water
Benjamin R Mcnamee, 18, Senior, Ryan Varney, 18, Senior, Belfry High School, Belfry, Kentucky, T: Haridas Chandran

Richmond, USKY50, Kentucky Science and Engineering Fair

EBED020 Preventing Elevated Indoor Carbon Dioxide Levels Using an Arduino Based IoT System
Aditi Arun Talegaonkar, 16, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

EGSD035 Generating Renewable Power by Harvesting Energy in Rainfall
Pranay Midha, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

ENBM086 Using Deep Learning to Categorize Abnormal Respiratory Sounds
Ishani Tarkar, 14, Freshman, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

PHYS043 The Effect of Annealing on Cluster Formation
James Dave Gonzalez, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Dennis Kuo

TMED038 The Effect of Over-the-Head Listening Devices on Noise-Induced Hearing Loss (NIHL)
Vedika Venkataramanan, 15, Freshman, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

TMED039 Addressing the Need for Remote Patient Monitoring Applications
Dylan Chen Li, 18, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young

LOUISIANA

Baton Rouge, USLA01, Louisiana Region VII-Science and Engineering Fair

CBIO022 An Algorithmic Approach to Simulating Human Cortical Bone Microstructure and Remodeling
Kalina Namikas, 16, Sophomore, Baton Rouge Magnet High School, Baton Rouge, Louisiana, T: Tiffany Moore
SOFT015  Designing a Flex Sensor-Based Posture Trainer and Determining Its Effect on Sedentary Posture  
Grace Anne Crifasi, 16, Junior, Saint Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia

Bossier City, USLA02, Bossier Parish Community College Louisiana Region I Science and Engineering Fair

ENBM020  Development and Optimization of a 3D Clinostat to Simulate Microgravity  
Joseph L Clary, 18, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana,  
T: Kris Clements

MATH018  Origami Knots  
Nhi Dao, 16, Sophomore, Caddo Parish Magnet High School, Shreveport, Louisiana,  
T: Kris Clements

PHYS021  Computing the Atmospheric Mass Loss of Exoplanets from Stellar Wind of Main Sequence Stars  
Ashini Ashish Modi, 17, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana,  
T: Kris Clements

Houma, USLA03, Terrebonne Parish Science Fair

ANIM010  What an Egg-Cellent Diet!  
Zack Michael Dupre, 16, Junior, South Terrebonne High School, Bourg, Louisiana,  
T: Chris Brown

BMED010  Face Masks: The Key into Stopping the Spread  
Yoselin Juliana Enriquez, 17, Junior, South Terrebonne High School, Bourg, Louisiana,  
T: Chris Brown

New Orleans, USLA08, Greater New Orleans Science and Engineering Fair

BMED011  Comparative Analysis of Genetic Mutations and Overall Survival in Patients with Glioblastoma Multiforme: A Retrospective Cohort Study  
Anita Rose Zahiri, 16, Junior, Benjamin Franklin High School, New Orleans, Louisiana,  
T: Teresa Burchette

EAEV017  The Effect of CAFO Proximity on Water Quality of Inland Recreational Lakes in Southwest Michigan  
Richard Lyle Usdin, 18, Senior, Benjamin Franklin High School, New Orleans, Louisiana,  
T: Sally Spahn

PLNT014  How Do Various Pesticides Affect Soil Health and Plant Development?  
Sophia Pilar Landry, 18, Senior, Isidore Newman School, New Orleans, Louisiana,  
T: David Kern

ROBO020  Hot Car Life Alarm  
Dylan Daves Bracey, 17, Junior, Brett Adam Steele, 18, Senior, Jesuit High School, New Orleans, Louisiana,  
T: Helen Swan

Baton Rouge, USLASO, Louisiana Science and Engineering Fair

BEHA079  Mask Usage of New Orleans During the Pandemic SARS-CoV-2  
Lia Pascale Bu, 18, Senior, Isidore Newman School, New Orleans, Louisiana,  
T: David Kern

PHYS074  A Direct Impact of Astrophysics on Astronauts' Exposure/Humans Presence in Low Earth Orbit  
Susana Fatima Cuadra, 16, Sophomore, St. Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia

PLNT045  The Investigation of the Effects of Excess Boron on the Root Growth of Arabidopsis thaliana and Schrenkiella parvula  
Katherine Winchester, 16, Sophomore, St. Joseph's Academy, Baton Rouge, Louisiana,  
T: Jacqueline Savoia
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This year, we are honored to recognize the achievements of Charikleia Moraitaki and Maria-Eleni Batatoudi.
MAINE
Orono, USME50, Maine State Science Fair

ANIM052 How Animals Talk: Understanding Silk Moth Communication through Detection of Pheromones with an Electronic Nose
Mateus Borgonovi Nascimento, 17, Junior, Brunswick High School, Brunswick, Maine, T: Susan Perkins

EBED033 Readily Implementable Fall Detection System for the Elderly Using Thermal Image Segmentation and Convolutional Neural Networks
Vetri Senthil Vel, 16, Senior, Bangor High School, Bangor, Maine, T: Barbara Stewart

ENEV079 Applications of Carbon Nanotube Based Sorbents for Removal of Arsenic from Polluted Well Water
Linh Nguyen, 18, Senior, Deering High School, Portland, Maine, T: Cyle Davenport

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

ENMC027T Biomedical Imaging with DVD OPU
Aaban Ali Syed, 17, Junior, Imaad A Syed#, 18, Senior, North County High School, Glen Burnie, Maryland, T: Angela Tatum

ENMC028T Project Aeolus: Modernizing and Automating Drone Fleets
Ryan Wans, 16, Sophomore, Jack Woods, 16, Sophomore, South River High School, Edgewater, Maryland, T: Meijao Chen

ENMC029 Getting into the Swing of Things
Rygel Tristen Daquigan Yance, 17, Junior, Chesapeake Science Point Public Charter School, Hanover, Maryland, T: Ashish Vadalia

MATS036 Spectral and Waveform Properties of 3D-Printed Violins and How to Improve Upon Them
Colin Franklin Daugherty, 16, Sophomore, South River High School, Edgewater, Maryland, T: Monica Morgan

Frederick, USMD02, Frederick County Science and Engineering Fair

ENBM050 Vest One: A Hidden Markov Machine Learning Model Enabled Vest to Support Independent & Safe Living Among Older Adults
Amogh Kashyap, 16, Sophomore, Urbana High School, Ijamsville, Maryland, T: George Shearer

ENMC040 SPIDER: Surface Probe Interplanetary Drill Exploring Regolith
Charlotte Paige Hively, 18, Senior, Urbana High School, Ijamsville, Maryland, T: Donna Hashemzadeh

Silver Spring, USMD03, ScienceMontgomery

ENBM052 WAV: A Novel Subvocalization Interpretation Device
Anjan Sesetty, 16, Sophomore, Poolesville High School, Poolesville, Maryland, T: Mark Estep

PHYS047 Periodicity Felicity: Identification of Binary Black Hole Candidates through Robust Light Curve Analysis
Rohan Imhotep Ojha, 15, Junior, Montgomery Blair High School, Silver Spring, Maryland, T: Angelique Bosse

PHYS054 Optimal Measurement of Field Properties with Quantum Sensor Networks
Timothy Chenglei Qian, 18, Senior, Montgomery Blair High School, Silver Spring, Maryland, T: Angelique Bosse

ROBO052 A Biologically Inspired Game Theoretic Adversarial Training Method
Simon Lee, 15, Sophomore, Whittle School And Studios, Washington, District of Columbia, T: Balakrishnan Selvakumar
Largo, USMD05, Prince George's Area Science Fair
BMED036  Effect of Scoliosis on a Swimmer's Performance
Athalia Groelsema, 17, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland, T: Sean Brady

CBIO036  Development of Transcriptomics Analysis Pipeline for mTOR Signaling in Human Cancer
Gabriela Catalina Holzer, 17, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland, T: Sean Brady

ENEV035  Deer Alert: A System to Reduce Deer-Related Crashes Using Motion Sensors in Areas with High Deer Traffic
Lauren Mae Labows, 16, Sophomore, Dr. James A. Forrest Career And Technology Center, Leonardtown, Maryland, T: Nathan Swick

Baltimore, USMD07, Morgan State University Science-Mathematics-Engineering Fair
BEHA083  The Effect of Saturated Lipid on Neurogenesis Following Acute Brain Injury
Ishani Ghosh, 15, Freshman, Centennial High School, Ellicott City, Maryland, T: Toni Ireland

MATH026  Analyzing the Accuracy of Pre-lockdown Daily Covid-19 Reports Using Benford's Law
Yeabkal Bekele Abeje, 15, Sophomore, Eleanor Roosevelt High School, Greenbelt, Maryland, T: Sean Brady

Massachusetts
Bridgewater, USMA01, Massachusetts Region V Science Fair
CELL029  Obtaining Highly Purified 3a NS5A Protein of Hepatitis C Virus
Woojoo Kim, 17, Junior, Wayland High School, Wayland, Massachusetts, T: Laura Kreutter

EAEV107  Identifying Invertebrate Fossils in the Field Utilizing Machine Learning with a Novel 3D Augmentation Approach
Christian Amari Nichols, 16, Junior, Brockton High School, Brockton, Massachusetts, T: David Mangus

Medford, USMA02, Massachusetts Region IV Science Fair
BMED058  Understanding Lung Cancer Survival Factors through Advanced Analytics
Daniel Opara, 18, Senior, Prospect Hill Academy Charter School High School, Cambridge, Massachusetts, T: Rachel Freedline

SOFT041T  Melatect: A Machine Learning Approach for Identifying Malignant Melanoma in Skin Growths
Vidushi Meel, 16, Junior, Asritha Bodepudi, 17, Junior, Lexington High School, Lexington, Massachusetts, T: Glenn Allen

Fall River, USMA03, Massachusetts Region III Science Fair
BMED087  Impact of Medicinal Herbs on Aging and Its Implications Towards Treating Age Related Illnesses
Aracely Adelina Alicea, 17, Junior, Taunton High School, Taunton, Massachusetts, T: Amanda Machado

North Adams, USMA04, Massachusetts Region I Science Fair
ENMC055  Improving the Aerodynamic Efficiency and Decreasing the Drag Coefficient of an F1 in Schools Race Car Based on Further Evaluation of Aerodynamic Principles and Designs
Ao Gai, 16, Junior, Deerfield Academy, Deerfield, Massachusetts, T: Jennifer Taylor
Finalist Directory

Worcester, USMA05, Massachusetts Region II State Science Fair

CBIO070  Network Biology Methods for Improved Drug Discovery in Brain Cancers
Shravya Anisetti, 16, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

EAEV085  The Effect of ZnO Nanoparticles on Arabidopsis Growth in Elevated CO2
Talia Ruth Smith, 17, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

TMED041  Development of an Innovative Alternative Model for Teratogenicity Testing: Effect of Hypervitaminosis A in Regenerating Planaria
Eva Bennet, 15, Freshman, Hopkinton High School, Hopkinton, Massachusetts, T: Kristen Murphy

Boston, USMA06, Massachusetts Region VI Science Fair

EAEV086  The Effect of Covid-19 on the Air Filtration Systems in the Train System
Alex Xu, 14, Freshman, Boston Latin School, Boston, Massachusetts, T: Scott Balicki

Cambridge, USMA50, Massachusetts State Science & Engineering Fair

BCHM026  Effects of Chaotropicity on the Efficacy of a DNA-Silica Adsorption Buffer
Justin Wang, 17, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Kevin Crowthers

CBIO095  QuantFold: Quantum Annealing with Turn Ancilla Encoding and Simulated Protein Folding for Drug Discovery Implications
Alice Liu, 17, Junior, Boston Latin School, Boston, Massachusetts, T: Scott Balicki

CELL032  Detecting Differential Transcription Factor Binding Using Single-Cell Sequencing
John Lin, 18, Senior, Boston Latin School, Boston, Massachusetts, T: Kathleen Bateman

CELL033  The Impact of Disrupted Circadian Rhythms on Learning and Short-Term Memory on a Drosophila melanogaster Model of Alzheimer’s Disease
Cara Mulcahey, 18, Senior, Saint Mark’s School, Southborough, Massachusetts, T: Lindsey Lohwater

EAEV110  Developing a 3D Trajectory Modeling System to Predict Ocean Floor Microplastic Aggregation Using a Voxel-Based Neural Network Approach
Anna Du, 15, Freshman, Phillips Academy, Andover, Massachusetts, T: Keith Robinson

MCRO052  The Effect of Natural Antimicrobials on Ampicillin Resistant E.coli and E.coli K12
Kayla Isabella Parrett, 16, Junior, Taunton High School, Taunton, Massachusetts, T: Amanda Machado

MCRO056  Short-Chain Fatty Acid Production: Predictive Functional and Genomic Analysis of the Microbiota in Crohn’s Disease for Novel Plasmid-Based Therapy
Alice Khomski, 16, Junior, Boston University Academy, Boston, Massachusetts, T: Victoria Perrone

PHYS064  Direct Energy Conversion in a Portable, High-Energy Quantum-Nuclear Reactor Based on Electrohydrodynamic Power Cell Dynamics
Aakash Sunkari, 18, Senior, North Attleboro High School, North Attleboro, Massachusetts, T: Alexander Hatzberger

Jianglu Ping, 16, Sophomore, Northfield Mount Hermon School, Gill, Massachusetts, T: Haojun Jia

MICHIGAN

Detroit, USMIO2, Science and Engineering Fair of Metropolitan Detroit

BMED021  Evaluation of a Raman Spectroscopy Probe in the Diagnosis of Brain Tumors
Nicholas Kalkanis, 16, Junior, Detroit Country Day School, Beverly Hills, Michigan, T: Duha Fahmy
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- Working in Crisis and Conflict

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ENBM038  Can a Glove Prevent a Heart Attack?
Akshith Reddy Pulgam, 16, Junior, Pioneer High School, Ann Arbor, Michigan,
T: Stephen Armstrong

ENBM039T  Non-contact Continuous Cardiovascular Monitoring System
Angela J. Xu, 17, Junior, Ethan Chen, 17, Junior, Jonathan Chen, 15, Sophomore,
Troy High School, Troy, Michigan, T: Rebecca Brewer

ROBO032  Smart Robot to Purify, Humidify, and Disinfect the Air for Even Distribution
Mikul Saravanan, 16, Sophomore, Cranbrook Kingswood School, Bloomfield Hills,
Michigan, T: Stephanie Kokoszka

TMED016  Sputum-Based mRNA-Targeting Probes in Lung Cancer: A Noninvasive Early Diagnostic Tool
Diya Ramesh, 16, Sophomore, International Academy, Bloomfield Hills, Michigan,
T: Renee Kiriazis

TMED017  Investigating Differential Gene Regulation in the PBMC of Obese Adolescents
Pooja Kannappan, 15, Junior, Bloomfield Hills High School, Bloomfield Hills, Michigan,
T: Noelle Collis

TMED021  Developing an Opioid Painkiller Alternative Using the Epigenetic Correlation Between the Nav1 VGSC Family and miRNAs 30b & 182
#  Audrey Gunawan, 18, Senior, West Bloomfield High School, West Bloomfield, Michigan,
T: Inhan Lee

Flint, USMI03, Flint Regional Science & Engineering Fair

ANIM028  The Physiological Effects of Turmeric and Ginger on Oxidative Stress in C. elegans
Serena Syed Ahmad, 17, Senior, Saginaw Arts and Sciences Academy, Saginaw,
Michigan, T: Matthew Miller

CBIO049  Smartphone Capable Lightweight Convolutional Neural Network Model for Detecting COVID-19 in Chest X-rays: Addressing the Need of Resource-strapped Locations
Ayan Nair, 15, Sophomore, Okemos High School, Okemos, Michigan, T: Adam Alessio

EAEV052  The Great Lakes Nonmetal Concentrations: Potential Causes of Harmful Algal Blooms
Katherine Olivia McCarthy, 18, Senior, Saginaw Arts and Sciences Academy, Saginaw,
Michigan, T: Matthew Miller

ROBO042  Lung Segmentation in Chest X-rays with Res-CR-Net
#  Sinan Lal, 16, Junior, Port Huron Northern High School, Port Huron, Michigan,
T: Domenico Gatti

Kalamazoo, USMI07, Southwest Michigan Science & Engineering Fair

PLNT028T  Public Perception and Accuracy of GMO Labels in the Southwest Michigan Area
Alyssa Mariah Park, 16, Junior, Katherine Ann Opira, 16, Junior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Jennifer Richardson

PLNT034  The Effect of Elevated CO₂ and Nitrogen Deposition on Constitutive and Induced Phenolic Levels in Pole Bean (Phaseolus vulgaris)
Malee Hee Davis, 18, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: David Karowe

Detroit, USMI50, Michigan Science and Engineering Fair

EGSD015  Engineering Multi-Enzyme Whole-Cell Biocatalysts for Biofuel Production
Margaret Yang, 16, Junior, Cranbrook Kingswood School, Bloomfield Hills, Michigan,
T: Stephanie Kokoszka

ROBO033  Dilated Silhouette Convolutional Neural Network: A Novel Deep Learning Framework for Real-time Human Action Recognition
Michelle Hua, 16, Sophomore, Cranbrook Kingswood School, Bloomfield Hills, Michigan, T: Allwyn Cole
MINNESOTA

Bemidji, USMN01, Northern Minnesota Regional Science Fair
ENEVO32T Designing an Autonomous Solar Powered Robot Capable of Filtering out Excess Phosphorus and Nitrogen from Waterways to Naturalize the Process of Eutrophication
Abdullah J. Saidi, 16, Sophomore, Mohammed Omer, 15, Sophomore, Al-Amal School, Fridley, Minnesota, T: Hala Bazzi

Duluth, USMN02, Northeast Minnesota Regional Science Fair
ANIMO14 Tough Turkeys: What Effect Does Climate Change Have on the Home Range of Wild Turkeys in Northeast Minnesota?
Harmony Grace Tracy, 17, Junior, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh
ENEVO21 Wastewater Treatment: The Use of Mealworm Gut Bacteria (Tenebrio molitor) to Isolate and Identify Bacteria that Can Biodegrade Polystyrene
Rowan Elisabeth Rock, 16, Sophomore, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh
ENEVO22 The Use of Different Concentrations of Tannic Acid Powder, St. Louis River Water, and Non-resistant Staphylococcus aureus on the Bioremediation of Motor Oil Contaminated Aquatic Systems
Emily Grace Sapyta, 16, Sophomore, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh
PLNT010 Using Phytoaccumulation to End Mineral Deficiencies
Emelyn Claire Beaster, 16, Sophomore, East High School, Duluth, Minnesota, T: Cynthia Welsh

Mankato, USMN03, Southern Minnesota Regional Science and Engineering Fair
CHEM039 How Do Different Natural Dyes React with Variations in Fabric and pH?
Grace Moeller, 17, Junior, Lake Crystal Wellcome Memorial, Lake Crystal, Minnesota, T: Michelle Bergstad
ENMC015 How Does the Number of Blades on a Wind Turbine Affect Its Power Output?
Mitchel Lee Masters, 14, Freshman, Lake Crystal Wellcome Memorial, Lake Crystal, Minnesota, T: Michelle Bergstad

St. Paul, USMN04, Twin Cities Regional Science Fair
CBIO004T Upsurge of the Glycolytic Pathway in Cancer: A Dynamic Network Analysis of Oncogenic Mutations in Phosphofructokinase-1
Johnny Sheng Yue, 17, Junior, Sydney Peng, 17, Senior, Mounds View High School, Arden Hills, Minnesota, T: Damien Mathew
CBIO030 Distinctive Mutation Profiles of SARS-CoV-2 Spike Protein in Different Geographic Regions of the United States
T: Chunfang Spring Wang
PHYS010 Detection and Characterization of Astronomical Dwarfs using CatWISE
Tarun Kota, 16, Junior, Eastview High School, Apple Valley, Minnesota, T: Steve Meyer

Crookston, USMN05, Western Minnesota Regional Science Fair
MATH008 Investigations in Topdrops
Nathan Richard Krause, 17, Junior, Park Christian School, Moorhead, Minnesota, T: Krista Holter

Winona, USMN06, Southeast Minnesota Regional Science Fair
CBIO002 Determining the Relationship Between Cross-Cultural Interpersonal Distance Preferences and Early COVID-19 Case Frequency Using Multivariate Regression Analysis
Gwenyth Eichfeld, 18, Senior, Shattuck-St. Mary's School, Faribault, Minnesota, T: Maren LaLiberty
Rochester, USMN07, Rochester Regional Science & Engineering Fair

BMED012 Cure of Breast Cancer, Year 4: First Discovery of Target Therapy for Aggressive Hormonal Breast Cancer using Clinical Database and 3D Model
# Christine Song, 16, Sophomore, Mayo High School, Rochester, Minnesota, T: SeungBaek Lee

ENEV018 Where the Rubber Meets the Road: The Development of an Innovative, Reusable, and Energy-Efficient Filter for Microplastics Created through Tire Wear
Jennifer Oettinger, 18, Senior, Mayo High School, Rochester, Minnesota, T: Aaron Larson

St. Paul, USMN09, St. Paul Science Fair

BEHA012 Significant Zero: The Effect of Personality Questionnaires on Identity-Relevant Choices
Naci Konar-Steenberg, 16, Junior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker

EBED005T SPYGLASS: Eye-controlled Camera Glasses
Levi Preston Mellin, 18, Senior, Nikolas Liepins, 18, Senior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker T: Kate Lockwood

St. Paul, USMN10, Western Suburbs Science Fair

ANIM036T Fruit Fly Frenzy: Investigating the Development of Insecticide Resistance in *Drosophila melanogaster*
Simren Samba, 18, Senior, Fiona Kinney, 17, Senior, Breck School, Golden Valley, Minnesota, T: Kati Kragtorp

PHYS011 Analyzing the Impact of Drafting in Cross Country Skiing with Computational Fluid Dynamics
Austin James Hunter, 18, Senior, Minnetonka High School, Minnetonka, Minnesota, T: Kimberly Hoehne

TMED005 An Active Role for Machine Learning in the Diagnosis of Cardiac Arrhythmias, Year Two
# Quentin Xander Hughes, 17, Junior, Minnetonka High School, Minnetonka, Minnesota, T: Betsy Hughes

TMED008 The Spread of Macroscopic Droplets from a Simulated Cough with and without the Use of Masks or Barriers
Atreyus A. Bhavsar, 17, Junior, The Blake School, Minneapolis, Minnesota, T: Joseph Ruggiero

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

BMED076 Investigating the Effect of the Severity of Activity-Based Anorexia in *Drosophila melanogaster* on the Gut Microbiome
Peyton Isabella Crest, 18, Senior, Minnetonka High School, Minnetonka, Minnesota, T: Kimberly Hoehne

EBED032 WI-C.A.R.E: Wifi Computer-Assisted Remote Eldercare, Year 2
Shreshth Shrivastava, 14, Freshman, Eden Prairie High School, Eden Prairie, Minnesota, T: Princesa Hansen

EGSD033 Pathway to a Sustainable Future: Economic and Technical Feasibility of a Hydrothermal Carbonization (HTC) Processing Plant
Kyla Hoyan Fung, 16, Junior, Minnetonka High School, Minnetonka, Minnesota, T: Kim Hoehne

ENEV058 Treatment of Simulated Acid Mine Drainage with Desulfovibrio Desulfuricans
Jack Hlavka, 17, Junior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker

ENEV078 Testing the Waters: Engineering an Innovative Method of Water Health Analysis, Year II
# John Joseph Cardwell, 19, Senior, Breck School, Golden Valley, Minnesota, T: Kati Kragtorp
ENMC070T  A.L.M.E. Assistive Lifting Machine for Elders: Engineering a Solution to Fall-Recovery-Related Injuries in Seniors and Caregivers
George Konrad Richards, 18, Senior, William Joseph Sweeney, 17, Senior, Breck School, Golden Valley, Minnesota, T: Kati Kragtorp

MISSISSIPPI
Cleveland, USMS03, Mississippi Region III Science and Engineering Fair
ENEV051  Development of Filter Embedded with Silver Nanoparticles for Water Sanitation
Skylar Nguyen, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

Hattiesburg, USMS04, University of Southern Mississippi Region I Science and Engineering Fair
BEHA028T  The Analysis of the Differential Impacts of Material and Social Stressors on Mental Health During the COVID-19 Pandemic
Raied Ayman Kabir, 17, Junior, Vidhi Patel, 16, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

BMED084  Dietary Protein: Carbohydrate Ratio Impacts Development and Locomotion of Drosophila melanogaster
Emily Marie Hood, 17, Junior, Brookhaven Academy, Brookhaven, Mississippi, T: Leslie Hood

Jackson, USMS05, Mississippi Region II Science and Engineering Fair
CBIO015  Single-Cell Genomic Profiling of the Adult Human Heart and Transcriptomic Analysis of Differentially Expressed Genes (DEGs) in Myocardial Pathophysiology
Shanay Hitesh Desai, 17, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

MCRO007  Using Bacteriophage Therapy to Combat Antibiotic Resistance
Abigail Espinosa Calimaran, 17, Senior, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Price Chadwick

Mississippi State, USMS06, Mississippi Region V Science and Engineering Fair
CBIO020  A Novel Evolution-Based Technique for Generating Anticancer Peptides (Year 2)
Michael Lu, 18, Senior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

EAEV018  Reinforced Lignin Foams with Higher Adsorption Capabilities
Jessica Cindy Yan, 17, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

Oxford, USMS07, Mississippi Region VII Science and Engineering Fair
CBIO056  Potential Treatment Targets for Covid-19: A Virtual Screening
#  Keerthin Karthikeyan, 16, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson

ENMC043  Aircraft Redesigned: A Biomimicry Approach
#  Fawaz Ahmad, 18, Senior, Oxford High School, Oxford, Mississippi, T: Sarah Robinson

Cleveland, USMS50, Mississippi Science and Engineering State Fair
Aaron Wan, 17, Senior, Andrew Yu, 17, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

EAEV091  Removing Harmful Nitrates from Bodies of Fresh Water through Biosorption
William Wells Berry IV, 16, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson
MISSOURI
Cape Girardeau, USMO01, Southeast Missouri Regional Science Fair

CELL009  Tolerance and Cell Viability of N-Hexanoyl-L-Homoserine Lactone within CRL-3342 Cell Line
#  Mallorie Nicole Coffee, 18, Senior, Jackson Senior High School, Jackson, Missouri, T: Leanne Thele

CHEM014  Phase II: Towards the Total Synthesis of the Leishmanicidal Lindbergin E for the Development of an Enantioselective Phloroglucinol-Derived Polyketide Synthesis
##  Elijah Lee Jones, 18, Senior, Jackson Senior High School, Jackson, Missouri, T: Leanne Thele

CHEM015  Towards the Total Synthesis of the TRAIL-Resistance-Overcoming Cytotoxic Pannokin D for the Development of New Anticancer Pharmaceuticals and a Novel Regioselective Diprenylated Chromone-Derived Flavonoid Synthesis
  Hiren Parekh, 17, Junior, Saxony Lutheran High School, Jackson, Missouri, T: Brenda Etzold

Joplin, USMO03, Missouri Southern Regional Science Fair

EGSD054  Shaping the Future of Wind Energy: An Investigation of the Most Productive Blade Design for Horizontal Axis Wind Turbines
  Sydney Rachelle Stamps, 17, Senior, Thomas Jefferson Independent Day School, Joplin, Missouri, T: Christopher Rupar

Kansas City, USMO04, Greater Kansas City Science & Engineering Fair

ANIM055  A Comparison Between Merycoidedontodiea Skull Morphology and the Skull Morphology of Miniochoerus
  Andrew Jordan Paget, 18, Senior, Olathe North High School, Olathe, Kansas, T: Marsha Skoczek

CBIO097  The Dynamics of Brain Metastasis in Non-Small Cell Lung Cancer
#  Khushi Kohli, 17, Senior, Olathe North High School, Olathe, Kansas, T: Amy Clement

ENBM101  The Influence of Conductivity and Mechanical Properties on the Neurogenic Differentiation of Dental Pulp Stem Cells
  Samuel Liu, 18, Senior, Olathe North High School, Olathe, Kansas, T: Amy Clement

ENEV081  The Impact of Various Liquids on the Mobility and Energy Absorption of a Rotating Solar Tracker
  Demetrius Sean Bush, 17, Senior, Olathe North High School, Olathe, Kansas, T: Marsha Skoczek

Saint Charles, USMO05, Missouri Tri-County Regional Science and Engineering Fair

EGSD025  Efficiency of Laser-Induced HB11 Fusion Reaction Under Varying Methods of Kilotesla Magnetic Confinement
#  Ethan Joseph Dunsworth, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess

Springfield, USMO08, Ozarks Science and Engineering Fair

ENBM042  The Synthesis of Au-Fe3O4 Nanoparticles for the Purpose of Nonenzymatic Dopamine Sensing
  Jillian Bernabe, 17, Senior, Camdenton High School, Camdenton, Missouri, T: Christopher Reeves

MCRO020  Evaluating Cinnamaldehyde as an Antibacterial Agent in a Produce Wash for Leafy Greens
  Allison Waive Drennan, 17, Junior, Lebanon High School, Lebanon, Missouri, T: Ryne Emerick

Hillsboro, USMO09, Mastodon Art/Science Regional Fair

MCRO064  Effect of Aquaspirillum itersonii and Aquaspirillum serpens on Duckweed
  Brian Mills, 17, Senior, Maggie May Hopkins, 17, Junior, St. Clair High School, St. Clair, Missouri, T: Ben Martin T: Ben Martin
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PLNT049  Improving Sustainable Agriculture through Computer Generated Leaf Angle Measurements  
Daniel Wamsley, 15, Freshman, Timber Ridge Scholars, Pacific, Missouri,  
T: Pamela Wamsley

Fayette, USMO10, Central Methodist Eagles Science and Engineering Fair

BMED023  Combined Artificial Intelligence and Nano-cell Internalization to Predict Cancer Aggressiveness  
Akhilan Elangovan, 16, Junior, Columbia-Rock Bridge Senior High School, Columbia, Missouri, T: James Meyer

MONTANA

Billings, USMT01, MSU Billings Science Expo

BMED088T  How Music Affects Muscle Contractions  
Emily Shumaker, 17, Junior, Alex Katelyn Williams, 17, Junior, Baker High School, Baker, Montana, T: Linda Rost

Butte, USMT02, Montana Tech Regional Science and Engineering Fair

ANIM037  What Affects Bird Diversity in Urban-Rural Transition Zones?  
Braden Collard, 18, Senior, Hellgate High School, Missoula, Montana, T: Willow Affleck

ENEV016  Colonizing Bryophytes Used as a Post-Wildfire Ecosystem Stabilization Treatment in Montana  
Claire Anne Downing, 18, Senior, Helena High School, Helena, Montana, T: Tyler Hollow

Great Falls, USMT04, Great Falls College MSU Regional Science & Engineering Fair

BMED017  Regeneration Rates of Dugesia japonica Using Glucose Oxidase Enhanced Honey  
#  Jeena Marie Alborano, 18, Senior, North Toole County High School, Sunburst, Montana, T: Amanda Nix

EAEV026  Microplastic Contamination in Montana's Mountains  
Claire Yvonne Bucklin, 15, Freshman, North Toole County High School, Sunburst, Montana, T: Amanda Nix

Missoula, USMT50, Montana Science Fair

BEHA015  The Natural Occurrence of a Visual Midline Shift in the General Population  
Eden Rynn Maxwell, 15, Sophomore, Hellgate High School, Missoula, Montana, T: Willow Affleck

EAEV120T  Effect of Lemna minor on Caffeine Levels in Freshwater Ecosystems  
Emily Mitchell, 16, Sophomore, Kenna Renee Anderson, 15, Sophomore, Flathead High School, Kalispell, Montana, T: Renee Cordes

EGSD051  Harnessing Household Water Potential  
Wyatt Manthey, 17, Junior, North Toole County High School, Sunburst, Montana, T: Amanda Nix

MATS040  The Difference in Performance Between Sintered and Unsintered Ultra High Molecular Weight Polyethylene Runner Base  
Maria Anne Torgerson, 18, Senior, Bozeman High School, Bozeman, Montana, T: Summer Graber

NEBRASKA

Kearney, USNE01, Central Nebraska Science and Engineering Fair

ANIM042  Effects of 20-Hydroxyecdysonde and Calcium Supplemented Prednisone on the Body Length of Drosophila melanogaster  
Jenna Nicole Cecrle, 16, Sophomore, Adams Central Jr.-Sr. High School, Hastings, Nebraska, T: Jay Cecrle
CHEM032 Honey’s Effect on Watercolor, Acrylic, and Oil Paint
Jacie Boelhower, 16, Sophomore, Adams Central Jr.-Sr. High School, Hastings, Nebraska, T: Jay Cecrle

ENEV044 Efficacy of Algae Phytoremediation vs. Sand Filtration of Bisphenol-a Solution
Miah Gabrielle Therese Hoppens, 18, Senior, Ogallala High School, Ogallala, Nebraska, T: Jennifer Jones

Nebraska City, USNE02, Greater Nebraska Science and Engineering Fair

EAEV072 The Effect of Biochar on Phosphorus Leaching in Chicken Manure
Breanna Lynn Vaughan, 16, Sophomore, Central City High School, Central City, Nebraska, T: Chelle Gillan

MCRO040 Cross-species Transmission of *Drosophila melanogaster* Nora Virus in Other *Drosophila* Species and Effect on Geotaxis
Ella Grace Buhlke, 17, Junior, Central City High School, Central City, Nebraska, T: Chelle Gillan

NEVADA

Elko, USNV01, Elko County STEM Fair

ENMC048 Operation Uplift: Custom Elevator Build
Philip John Neff, 16, Junior, Elko High School, Elko, Nevada, T: Kristin Birdzell

SOFT026 Coding for Music Education
Marlea Martens, 16, Junior, Elko High School, Elko, Nevada, T: Kristin Birdzell

Las Vegas, USNV02, Beal Bank USA Southern Nevada Regional Science & Engineering Fair

EAEV041 Delineation of Capture Zones for Springs in Southern Great Basin Based on Modeling Results and Geochemical Data
Anya Han Zhang, 17, Junior, Ed W. Clark High School, Las Vegas, Nevada, T: Filomena Vine

TMED027 Minimizing Surface-Initiated Thrombogenesis in COVID-19 Patients Using the Fibronectin-Derived Peptide P12
Jang Choe, 17, Junior, Ed W. Clark High School, Las Vegas, Nevada, T: Miriam Rafailovich

NEW HAMPSHIRE

Concord, USNH50, New Hampshire Science & Engineering Expo

BCHM023 A Highly Selective and Sensitive Novel Biosensor Capable of Quantifying and Monitoring a Clotting Factor Elevated in Severe COVID-19 Cases
Jaden Yun, 16, Sophomore, Phillips Exeter Academy, Exeter, New Hampshire, T: Ji Lee

ENEV069 Testing and Comparing the Emissions of a Small Engine Running on Ethanol versus Gasoline
John Walter Horangic, 17, Junior, Bishop Brady High School, Concord, New Hampshire, T: Susan Seagroves

MATS042 Optimization of Pressure Sensitive Adhesive Properties through Incorporation of Moisture-Absorbing Particles
Lina Huang, 16, Junior, Phillips Exeter Academy, Exeter, New Hampshire, T: Erol Sancaktar

NEW JERSEY

Murray Hill, USNJ01, Nokia Bell Labs North Jersey Regional Science Fair

BMED050 Differential Expression Analysis and Transcriptomic Characterization of Glioma Progression
Matthew Lee, 15, Sophomore, East Brunswick High School, East Brunswick, New Jersey, T: Marilyn Ryan
BMED051 Identification of Synovial Tissue Biomarkers in Late-Onset Rheumatoid Arthritis Patients
Shruti Tyagi, 16, Junior, Middlesex County Academy for Allied Health and Biomedical Sciences, Woodbridge, New Jersey, T: Ravinder Tyagi

CBIO063 V-BIND: Deep Geometric Transformers for SARS-CoV-2 Treatment Design
Ryan Samuel Park, 16, Junior, Millburn High School, Millburn, New Jersey, T: Susan Arrigoni

CELL023 Immunohistochemical Analysis Suggests a Role for Tmem131 in Thymic Epithelial Cell Differentiation
Hannah Park, 16, Junior, Tenafly High School, Tenafly, New Jersey, T: Anna Rubenchik

MATH034 Lebesgue Measure Preserving Thompson’s Monoid
William Li, 18, Senior, Delbarton School, Morristown, New Jersey, T: Brian Theroux

SOFT036T Improving Upon Quantum Cryptography Protocols Using Entanglement and Quantum Signatures
Rohan Rajendra Kulkarni, 17, Senior, Ansh Girish Sharma, 17, Senior, Montgomery High School, Skillman, New Jersey, West Windsor-Plainsboro High School South, West Windsor Township, New Jersey, T: Jason Sullivan

Jersey City, USNJ02, Jersey City Medical Center/Barnabas Health STEM Showcase

BMED063 Comparing the Efficacy of Dietary Fibers vs a Sap from Acacia Tree: Gum Arabic
Rebeca Kristina Fernando, 17, Junior, Jose Marti STEM Academy, Union City, New Jersey, T: Grishma Patel

ENBM073 Transforming Telemedicine: Engineering Thermoelectric Health Check System
Ashita Birla, 16, Sophomore, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey, T: Maria Osoria

Lawrenceville, USNJ03, Mercer Science and Engineering Fair

ENEV054 Innovative Climate Change Emissions Reduction: The Cargo Ship Flettner Rotor Centrifugal Vortex Exhaust Scrubber
Charlotte Lenore Michaluk, 15, Freshman, Hopewell Valley Central High School, Pennington, New Jersey, T: Stefanie Ribecca

PLNT037 A Novel Assay to Quantitatively Detect Bacterial Endotoxin by Harnessing PAMP-Triggered Immunity of FRK1-LUC Arabidopsis thaliana
Aravind Murali Krishnan, 18, Senior, Hillsborough High School, Hillsborough, New Jersey, T: Minh Dang

Hackensack, USNJ04, BCA Research Expo

BMED022 Schwann Cell Support as a Novel Approach to Peripheral Nervous System Demyelinating Disease: A Phase Two Study
Kannammai O. Pichappan, 16, Junior, Bergen County Academies, Hackensack, New Jersey, T: Donna Leonardi

CBIO027 OrphaDrGL: A Novel Graph Deep Learning-based Drug Repositioning Approach for Orphan Diseases
Remington Kim, 16, Sophomore, Bergen County Academies, Hackensack, New Jersey, T: Donna Leonardi

CELL015 Unmasking Tumor Heterogeneity: SOX9 Regulates EMT in a Novel High-Plasticity Cell State
Seton Thomas Liu, 16, Junior, Bergen County Academies, Hackensack, New Jersey, T: Donna Leonardi

NEW MEXICO

Albuquerque, USNM01, Central New Mexico Regional Science and Engineering Challenge

BEHA047 Statistical Analysis of Stress Level Differentiation Based on an Individual's Brain Dominant Hemisphere
Rakin Raunaq Faruk, 17, Senior, Albuquerque Institute for Math and Science, Albuquerque, New Mexico, T: Reginald Tyler
EBED014 A Novel AI-Based GPS Anti-spoofing System with Subspace Differential Direction-of-Arrival Estimation and Deep Learning Against Dynamic Spoofers

Milidu Jayaweera, 16, Junior, La Cueva High School, Albuquerque, New Mexico, T: Lena Eddings

ENMC057 Just Passing Through: Use of Hemispheric Sensing with Trajectory Prediction for Satellites to Mechanically Dodge Small Space Debris

McKenna Collins, 18, Senior, Albuquerque Institute for Math and Science, Albuquerque, New Mexico, T: Reginald Tyler

MATS020 A Liquid-Liquid Extraction to Purify Magnetite Nanoparticles

Isaac Zier Huber, 15, Sophomore, Eldorado High School, Albuquerque, New Mexico, T: Lesha Harenberg

Farmington, USNM02, San Juan New Mexico Regional Science and Engineering Fair

BCHM020 Identification of the Artificial Synthesis of Aromatic Amino Acid Tyrosine, Based on Pi-to-Pi* Absorbance Peaks

Jordyn Begay, 15, Freshman, Navajo Preparatory School, Farmington, New Mexico, T: Yolanda Flores

MCRO030 Isolation of Enterobacter aerogenes and Micrococcus luteus Bacteriophages from Environmental Sample

Nathaniel Elliot Jobe, 18, Senior, San Juan College High School, Farmington, New Mexico, T: Geizi Dejka

Grants, USNM03, Four Corners Regional Science and Engineering Fair

BMED034 The Toxic Truth, Part 2

Nicole Janae Puderbaugh, 18, Senior, Grants High School, Grants, New Mexico, T: Shelby Alexander

MCRO050 Dissecting the Black Walnut

Alexia Lynn Munson, 15, Freshman, Grants High School, Grants, New Mexico, T: Shelby Alexander

Las Vegas, USNM05, Northeastern New Mexico Regional Science and Engineering Fair

ENEV088 Nature Breathe: Natural Plant Material HVAC Filter for Nanoparticle Filtration

Benjamin Varos, 14, Freshman, Taos Academy Charter School, Taos, New Mexico, T: Laura Tenorio

ENMC067T Developing the Technology for a Combat Drone

Daniel Kim, 13, Freshman, Andres Iturregui, 14, Freshman, Los Alamos High School, Los Alamos, New Mexico, T: Stephanie Meyer

Mescalero, USNM07, Southwest/Southeast New Mexico Regional Science Challenge

ENBM104T Size Adjustable Prosthetic Forearm

Vincent Joel Carpio-Torres, 18, Senior, Yoo Younggun, 19, Senior, Ryan Hyungjoo Lee, 17, Junior, New Mexico Military Institute, Roswell, New Mexico, T: Frank Kimbler

ENEV089 Produced Water Treatment and Reuse to Mitigate the Environmental Impact of Oil and Gas Production

Haoyu Bradley Wang, 15, Sophomore, Centennial High School, Las Cruces, New Mexico, T: Lisa Weinbaum

MCRO066 Antimicrobial Use of Pecan Shells, Prickly Pear, Oakwood Aqueous Extracts as a Hand Sanitizer

Ivan Stanislavovich Belyaev, 16, Sophomore, Jaejoon Lee, 18, Junior, Kyunghoon Yeom, 19, Senior, New Mexico Military Institute, Roswell, New Mexico, T: Demvia Maslian

Socorro, USNM50, New Mexico Science and Engineering Fair

ANIM063 Climate Change on Crocodilians: Modeling the Effects of Phenological Shifts

Karin Ruth Ebey, 17, Senior, Los Alamos High School, Los Alamos, New Mexico, T: Stephanie Meyer
EAEV125 Using Machine Learning to Combat Air Pollution by Forecasting Tropospheric Ozone Levels
Eliana Kai Juarez, 16, Sophomore, V. Sue Cleveland High School, Rio Rancho, New Mexico, T: Angelica Olivas

PHYS079T Nondestructive Analysis of Geological Sites through Muon Transmission Imaging
Phillip Ionkov, 17, Junior, Anthony Lestone#, 17, Senior, Los Alamos High School, Los Alamos, New Mexico, T: Alison Renner

ROBO047 Neuroromorphic Computing: Simulating the Brain's Visual Cortex for a Faster, More Efficient Computer
Robert Strauss, 16, Junior, Los Alamos High School, Los Alamos, New Mexico, T: Stephanie Meyer

SOFT054T Entropy in Evolutionary Algorithms—Statistical Mechanics Bearing Insight into Evolution
Lucas Quinn Blakeslee, 16, Sophomore, Aengus Owen McGuinness, 14, Sophomore, Santa Fe High School, Santa Fe, New Mexico, T: Anita Nugent

NEW YORK
Poughkeepsie, USNY01, Dutchess County Regional Science Fair

BEHA044 Investigating Correlations Between Internalized Homophobia and Transphobia in Adolescents and Environmental and Demographic Factors
Ditte Isak, 17, Senior, Pawling High School, Pawling, New York, T: Gillian Rinaldo

BEHA045 Effect of an Interactive Mobile Game on the Movement in a Queue Line at an Amusement Park
Lauren Tocci, 17, Senior, Pawling High School, Pawling, New York, T: Gillian Rinaldo

Long Island, USNY02, Long Island Science and Engineering Fair

ANIM048 The Effect of EGCG on Oxidative Stress in C. elegans
Maiya Ali Raghu, 18, Senior, Syosset High School, Syosset, New York, T: Veronica Ade

BEHA051 Education During a Pandemic: Exploring the Effectiveness of Synchronous versus Asynchronous E-learning from a Teacher’s Perspective
Carly Sara Friedman, 18, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Raymond Tesar

BEHA056 The Analysis of the Use of Color in Pandemic Artwork Using Digital Quantifications
Nethmi Withanage, 17, Senior, Smithtown High School East, St. James, New York, T: Maria Zeitlin

BEHA057 Seeing through the Scan: The Impact of fMRI Evidence on Juror Satisfaction and Verdicts
Isabella Souza, 17, Senior, Syosset High School, Syosset, New York, T: Veronica Ade

BMED061 Curcumin and Capsaicin Synergistically Suppress Neuroblastoma Development
Yifang Zha, 17, Senior, The Wheatley School, Old Westbury, New York, T: Donald Paulson

BMED067 The Role of Bone Lineage Cells During Digit Tip Regeneration in Adult Mice
Samantha Rose Radinsky, 17, Senior, Paul D. Schreiber High School, Port Washington, New York, T: Nicole LoPinto

CBIO077 A Game-Theoretic Model of the Resting-State Brain
Danielle Lauren Gruber, 18, Senior, John L. Miller Great Neck North High School, Great Neck, New York, T: Alan Schorn

CBIO080 Novel Prediction of Adverse Drug Reactions and Underlying Pathological Mechanisms via Hierarchical Classification
Catherine Kim, 18, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

CELL030 The Effect of IL-22 Stimulation on Paneth Cell Granule Morphology and Epithelial Cell Proliferation
Neil Mehta, 18, Senior, Ward Melville High School, East Setauket, New York, T: Marnie Kula
CHEM053 Evaluating the Efficacy of Repurposed and Modified Traditional Eastern Medicinal Compounds on Coronavirus Family Specific Target Structures
Brian Insohp Lee, 18, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Raymond Tesar

EAEV101 Aquatic Habitat Nitrate Levels on Long Island: The Effect of High Nitrate Levels on Anuran Species Abundance
Ashley Katherine Roth, 18, Senior, Lynbrook Senior High School, Lynbrook, New York, T: Charles Vessalico

EAEV102 Harnessing Deep Learning to Assess Coral Reef Health through Crowd-sourced Efforts
Rithika Narayan, 18, Senior, Elwood John Glenn High School, Elwood, New York, T: Arnold Kamhi

EBED026 An Autonomous Wildfire Detection and Containment System
Margaret Anne Gates, 17, Senior, Wantagh High School, Wantagh, New York, T: Carol-Ann Winans

ENEV065 The Optimization of Desalination and Ion-Removal Rate through the Engineering of Novel Turbulent Modular Designs in an Electrodialysis System
Julius Yoh, 17, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger

MCRO046 FD028: A Bifunctional HIV-1 Inactivator Acts Before Host Cell Entry
Giselle Rasquinha, 17, Senior, Syosset High School, Syosset, New York, T: Veronica Ade

PHYS062 Analyzing the Photometry of Star Cluster Messier 39: Creation of Color Magnitude Diagram, Age Calculation, and Distance Measurement
Kathryn Postiglione, 17, Senior, Lynbrook Senior High School, Lynbrook, New York, T: Charles Vessalico

PLNT035 Lipopolysaccharide (LPS) and Galactose Induce Cell Death in Prothallial Cells of Gametophytes of Ceratopteris richardii

ROBO067 CET-CNN: Modular Hierarchical Image Classification Using Conditional-Execution Tree CNNs
Ethan Joseph Horowitz, 18, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger

SOFT044 Attributing State-backed Information Operations on Twitter through Machine Learning
James Connor, 18, Senior, Northport High School, Northport, New York, T: Bryan Horan

TMED051 Direct Inhibition of NF-kB Subunits by 9-chloro-8-(hexyloxy)-2H-chromeno[2,3-d]pyrimidine-2,4(3H)-dione (IT-848)
Janice Kirti Rateshwar, 17, Junior, Jericho High School, Jericho, New York, T: Serena McCalla

New York City, USNY03, Terra New York City STEM Fair

ANIM058 Utilizing Hydrostatics to Describe the Paleoecology of Orthoceras, an Extinct Fossil Nautiloid
Ellie Anna Vaserman, 17, Senior, Staten Island Technical High School, Staten Island, New York, T: John Davis

BEHA046 Attention Span Experiment: Do Racing Games Have Effects on Attentional Control?
Mazyar Azmi, 17, Junior, Horace Mann School, Bronx, New York, T: Christine Leo

BEHA049 Demystifying 'Fake News': Evaluating Media-Borne Misinformation through the Novel Application of AI Powered Sentiment Analysis
Arjun Pal Mazumdar, 18, Senior, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov
BMED052 Investigating Racial Disparities in Cancer by Assessing Transcriptomic and Proteomic Biomarkers in Various Carcinomas using TCGA Database and Web-based Analysis Tools
Brian Lei, 16, Junior, Hunter College High School, New York, New York, T: Philip Frankel

CELL024 Correlation Between Odor Composition and Neuron Response in the Olfactory Cortex of Mice
Gary Shteyman, 16, Junior, Staten Island Technical High School, Staten Island, New York, T: John Davis

CELL025 Save Our Sons: Exploring RNAi-mediated Intragenomic Conflict in D. sim through Genetic Assays and Testis Cytology
Jaeah Kim, 17, Senior, Hunter College High School, New York, New York, T: Philip Frankel

CHEM043T Development of a Novel Machine Learning Algorithm in Biomolecules and Drugs for Measuring Molecular Surface Area: Applications in Long QT Syndrome and Neurodegenerative Diseases
Shawn B. Lokshin, 17, Junior, Nouraldeen Ibrahim, 16, Junior, Staten Island Technical High School, Staten Island, New York, T: John Davis

ENBM062 Revolutionizing Computer Vision Algorithms in Cancer Pathology: The Use of Comprehensive Toolkits to Overcome Machine Learning Obstacles in the Digital Pathology Field
Benjamin Ling-Wen Chan, 17, Senior, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

MATH035 Quadratization of ODEs: Monomial vs. Non-Monomial
Foyez Alauddin, 18, Senior, Trinity School, New York, New York, T: Gleb Pogudin

MCRO043 Distinguishing Bacterial Motion Quantitatively: A Diagnostic Method for Intestinal Disease
Neha Mani, 17, Senior, Hunter College High School, New York, New York, T: Gilana Reiss

PHYS049T Crater Correlations: A Morphological Analysis on Lunar and Mercurian Simple Impact Craters
Jasmine Palma, 16, Junior, Michelle Wu, 16, Junior, Townsend Harris High School, Flushing, New York, T: Katherine Cooper

PLNT032T The Effects of Increased CO₂, Soil Acidification, and Drought on Aperture, Density, and Potential Conductance Index of Stomata Demonstrated by Buckwheat Plants (Fagopyrum esculentum) and Pea-plants (Pisum sativum)
Behruz Mahmudov, 17, Junior, Kayla Wang, 16, Junior, Forest Hills High School, Queens, New York, T: Matthew Woo

SOFT052 Intra-procedural Prostate MRI Registration: A Data-efficient Siamese Neural Network (SNN) Design
Alexander Lyons, 18, Senior, Columbia Grammar and Preparatory School, New York City, New York, T: Ilya Yashin

Westchester, Putnam, Sullivan Counties, USNY05, Regeneron-Westchester Science and Engineering Fair

ANIM027 Examining the Predatory Relationship Between the Invasive Green Crab (Carcinus maenas) and the Indigenous Blue Mussel (Mytilus edulis) in the Gulf of Maine
Bryce Lewis Jacobs, 17, Senior, Hastings High School, Hastings-on-Hudson, New York, T: Melissa Shandroff

ANIM034 The Impact of Anthropogenic Effects on North American River Otter (Lontra canadensis) Behavior at Latrine Sites
Caroline P. Bayer, 18, Senior, Dobbs Ferry High School, Dobbs Ferry, New York, T: Erica Curran

BEHA031 The Impact of Covid-19 on PTSD
Natalia Sofia McMorris, 16, Junior, New Rochelle High School, New Rochelle, New York, T: Jeff Wuebber
The Davidson Fellows Scholarship Program congratulates the ISEF 2021 Finalists!

The Davidson Fellows Scholarship awards $50,000, $25,000 and $10,000 college scholarships to students working on STEM or Humanities projects.

**New for ’22, teams of 2!**
2-person teams are now eligible to apply for the Davidson Fellows Scholarship!

For information on the 2022 scholarship cycle including category requirements, eligibility and deadlines, please visit DavidsonFellows.org.
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<th>Finalist Directory</th>
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| BEHA032 | Gender Bias in Online Patient Healthcare Reviews  
Amanda Cao, 17, Junior, New Rochelle High School, New Rochelle, New York, 
T: Jeff Wuebber |
| BMED024 | Deep Neural Network Analysis of Clinical Variables Predicts Escalated ICU Care in COVID-19 Patients  
Joyce Lu, 16, Junior, Ardsley High School, Ardsley, New York, T: Jieun Yoo |
| BMED032 | Epigenetic Editing of Cdk5 Leads to Sexually Dimorphic Stress Responses  
Mia Nicole Dittrich, 18, Senior, Byram Hills High School, Armonk, New York, 
T: Caroline Matthew |
| BMED033 | Elucidating Mechanisms & Impacts of Age-related Alterations in Blood-CNS Barriers: A Transcriptome Study of the Aging Blood-brain Barrier & the Dry Age-related Macular Degeneration Retina  
Luke Briody, 18, Senior, Byram Hills High School, Armonk, New York, 
T: Caroline Matthew |
| BMED038 | An Ensemble Method for Ranking Cancers to Target KIF19  
Isabelle Balachandran, 17, Junior, New Rochelle High School, New Rochelle, New York, 
T: Jeff Wuebber |
| BMED039 | Abnormalities of PTPN2 Increases BETA-cell Apoptosis in PP2-Beta Cells Derived from hESCs  
Xia Saavedra, 18, Senior, Ossining High School, Ossining, New York, T: Valerie Holmes |
| CBIO051 | FlyRNAi Enrichment Tool: Tissue Preferred Expression Analysis for Drosophila  
Tiffany Chao, 16, Junior, Blind Brook High School, Rye Brook, New York, 
T: Michele Sugantino |
| CBIO052 | Do Bainbridge-Ropers Syndrome Causing ASXL3 Mutations Influence Transcript Stability and Exon Exclusion/Inclusion by Disrupting Exonic Splicing Enhancer Sequences?  
Kaylee Oppenheimer, 18, Senior, Hastings High School, Hastings-on-Hudson, New York, 
T: Melissa Shandroff |
| CELLO16 | Discovering Long-Lasting Novel Epigenetic Mechanisms Associated with Cocaine Addiction: The Role of the SWI/SNF Remodeling Complex in the Nucleus Accumbens  
Meagan Ryan, 17, Senior, Ossining High School, Ossining, New York, T: Valerie Holmes |
| CELLO18 | Immunopeptidomics of Non-small Cell Lung Carcinomas (NSCLC) for the Discovery and Validation of Novel Peptides for Targeted Immunotherapy  
Maya Sarina Weitzen, 18, Senior, Sleepy Hollow High School, Sleepy Hollow, New York, 
T: Michele Zielinski |
| EAEV038 | Year-Long Salinization of Groundwater and Surface Waters of Hudson River Watersheds due to Chronic Road Salt Application  
Nicole Ann Camilliere, 17, Senior, Ossining High School, Ossining, New York, 
T: Valerie Holmes |
| EAEV046T | A Profile of Heavy Metal Contamination in Lower Hudson Valley Tributaries  
Jack Richard Dougherty, 18, Senior, Daniel Dusevic, 18, Senior, Pelham Memorial High School, Pelham, New York, T: Steven Beltecas |
| EAEV047 | Street Trees: An Analysis of Undergrounding Power Lines in the Northeastern Suburbs  
Lucia Anne Lavallée, 18, Senior, Pelham Memorial High School, Pelham, New York, 
T: Steven Beltecas |
| EAEV048 | Determining Effective Locations of Seagrass to Prevent Coastal Erosion  
Brett Carolyn Bober, 17, Senior, Pelham Memorial High School, Pelham, New York, 
T: Steven Beltecas |
| ENBM049 | The Effects of Scaling on Muscle Force Production in Biological Machines  
Tessa Schwartz, 18, Senior, Byram Hills High School, Armonk, New York, T: James Gulick |
ENBM074 Predicting Mutation Status and Recurrence Free Survival in Non-Small Cell Lung Cancer: A Hierarchical CT Radiomics – Deep Learning Approach
Divek Patel, 16, Junior, Hackley School, Tarrytown, New York, T: Andrew Ying

TMED058 Combating Alzheimer’s Disease: An Exploration of Resveratrol Treatment and Early Disease Detection Using Drosophila melanogaster and Machine Learning
Elizabeth Seowon Chun, 17, Senior, Ardsley High School, Ardsley, New York, T: Jieun Yoo

Syracuse, USNY06, Central New York Science and Engineering Fair

BMED037T A Novel Efflux Pump Inhibitor Improves Chemotherapeutic Efficacy Against P-glycoprotein-expressing Glioblastoma Stem Cells
Samuel David Lustig, 16, Sophomore, Sravan Krishna Kodali, 15, Sophomore, Christian Brothers Academy, Syracuse, New York, T: Mariano Viapiano

ENEV057T Robotic Development for Cleaning Coastlines: Coastline Cleanliness
Yakina Sika-Amoah, 15, Freshman, Theodore Samuel Simon, 14, Freshman, Syracuse Academy of Science, Syracuse, New York, T: Amy Ay

Troy, USNY07, Greater Capital Region Science and Engineering Fair, Inc.

CBIO028 A Differential Gene Expression and Alternative Splicing Analysis of ALS-Causing Mutations
Cristina Corynne DeMeo, 18, Senior, Saratoga Springs High School, Saratoga Springs, New York, T: Peter Robinson

EAEV045T A New Approach To Ecology: Using Machine Learning to Predict the Spread of Invasive Species
Avi Vikram Bagchi, 16, Junior, Ayaan Bargeer, 17, Junior, Shaker High School, Latham, New York, T: Nathaniel Covert

ENMC041 Retrofitting of a Creality Ender 3 to Allow for 5 Axis Motions
Owen Scott Emerich, 16, Junior, Burnt Hills-Ballston Lake High School, Burnt Hills, New York, T: Regina Ay

Utica, USNY08, Utica College Regional Science Fair

PHYS071 Aw, Snap: Testing Wood Laminates
Dennis Albert Francis van Hoesel, 16, Sophomore, Rome Free Academy, Rome, New York, T: Robert Wood

Rochester, USNY09, Terra Rochester Finger Lakes Science & Engineering Fair

MCRO060 Structural Changes of the SARS CoV-2 Spike Protein in Varying Salt Concentrations
Amy Feng, 17, Junior, Pittsford Sutherland High School, Pittsford, New York, T: Peng Zhang

St. Bonaventure, USNY12, Twin Tiers Regional Science Fair

BEHA080T The Effects of Sleep on Optimism and Memory
Estella Guerin, 17, Junior, Bethany Poirier, 17, Senior, Franklin Academy High School, Malone, New York, T: Denise Rogers

Queens, USNY50, New York State Science and Engineering Fair

BEHA035 Evaluating the Effects of Perinatal Fluoxetine in Mice in Response to Fear Stimuli
Alexander Kesin, 17, Senior, George W. Hewlett High School, Hewlett, New York, T: Terrence Bissomondial

BMED043 The Identification and Validation of Novel Targets and Pathways of Alzheimer’s Disease through Integrated System Approaches
Michael Zichao Zhong, 16, Junior, Ardsley High School, Ardsley, New York, T: Jieun Yoo

BMED053 AcuRe: Third-Generation Machine Learning Cancer Detection Model Using Nanopore Read Alignments
Natalia Pahlavan, 15, Sophomore, Jericho High School, Jericho, New York, T: Serena McCalla
BMED068  Phenotypic Behavioral Expression of Different Genetic Lines of *Drosophila melanogaster* as Measured by the Negative Geotaxis Assay & Their Response to Lithium Chloride: A Pharmacogenomics Study
Arwen Fernandez O'Brien, 17, Senior, Harrison High School, Harrison, New York, T: Allison Blunt

CBIO081  Creation of a Machine Learning App to Facilitate Pancreatic Cancer Prediction
Reid Fleishman, 18, Senior, William A. Shine Great Neck South High School, Great Neck, New York, T: Carol Hersh

CBIO082  CoronaXNet: Using Convolutional Neural Networks to Automate the Detection COVID-19 from Chest X-Ray Images
Michael Chu, 18, Senior, Syosset High School, Syosset, New York, T: Veronica Ade

CELL026  Synergy of Treatment: Therapeutic Vulnerabilities in Small Cell Lung Cancer
Miah Christina Margiano, 16, Sophomore, Saint Anthony’s High School, Melville, New York, T: Paul Paino

CHEM054  Simulation of Solar-Powered Capacitive Deionization (CDI) for the Removal of Bacteria, Viruses, and Heavy Metals from Water
Sanjna Kedia, 18, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger

EAEV103  Analyzing Water Contaminants through Image Processing of Chlorophyll-a
Angela Mao, 17, Senior, Syosset High School, Syosset, New York, T: Veronica Ade

EGSD046  Size Optimization of Gold Nanoparticles Functionalized on PEMFC Interfaces to Increase Power Efficiency
Benjamin Alex Sherman, 17, Junior, George W. Hewlett High School, Hewlett, New York, T: Terrence Bissoondial

ENBM078  MRgRT and Delta Radiomics: Early Prediction of Survival in Pancreatic Cancer
Alice Zhaoyi Chen, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

MCRO041  Avian Paramyxovirus Serotype 4 (APMV-4) Promotes Greater Rates of Apoptotic Cell Death & Stimulated Immune Responses in Malignant Melanoma and Relapse Cancers with Regards to Newcastle Disease Virus (NDV): The Characterization of a Novel Oncolytic Virus
Christopher Edward Alexander, 18, Senior, Elmont Memorial Junior-Senior High School, Elmont, New York, T: Michelle Flannory

PHYS063  Analyzing Historical Polarization and Orbit Data from Relativistic Heavy Ion Collider (RHIC) Runs
Taylor Fox, 18, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger

ROBO068  Assessing the Impact of Robust Stochastic Operators on Q-learning Efficiency in an OpenAI Gym Environment with a Large Observation Space
Henry Demarest, 17, Senior, Irvington High School, Irvington, New York, T: Nadia Parikka

SOFT048  Identification of Correlated Qubit Errors for Quantum Computing Error Correction
Peyton Schales, 17, Junior, Ardsley High School, Ardsley, New York, T: Jieun Yoo

NORTH CAROLINA
Charlotte, USNC01, Charlotte-Mecklenburg Regional Science Fair

EAEV002  Rethinking Our Roads: The Ability of Porous Concrete to Reduce Surface Runoff of Tire Wear Particles (TWP)
Mason Brandt Sufnarski, 17, Junior, Marvin Ridge High School, Waxhaw, North Carolina, T: Steven Wilson

MATH002  Novel Methods for Shape Classification, Analysis, and Synthesis Using the Isoperimetric Profile and Mathematical Morphology
Dev Mayur Chheda, 17, Senior, Ardrey Kell High School, Charlotte, North Carolina, T: Mayur Chheda
Durham, USNC02, North Carolina Central Region III Science Fair

**SOFT012**  
**Development of an AI-Powered Powered Facial-cue Control Module**  
Daniel Shen, 17, Junior, William G. Enloe High School, Raleigh, North Carolina,  
T: Lori Kubik

Durham, USNC03, North Carolina Science Fair Region 3B

**ENBM001T**  
**ARTHETA-O: An Innovative, Affordable Approach to the Onsite, Rapid 3D Printing of Artery Stents, Parameterized to Fit Individual Patients' Needs**  
Connor Brannon Mitchell, 17, Junior, Prabuddha Ghosh Dastidar#, 17, Junior,  
North Carolina School of Science and Mathematics, Durham, North Carolina,  
T: Jonathan Bennett

**ROBO044**  
**BrCaVision: Predicting Breast Cancer Prognosis by Detecting Mitosis, Identifying Histological Tumor Subtypes, and Scoring HER2 in Whole Slide Tissue Images Using Deep Learning**  
Dheepthi Mohanraj, 16, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Robert Gotwals

Raleigh, USNC50, North Carolina State Science Fair

**ANIM033**  
**Seeing in a New Light: Adaptive Changes in Opsin Proteins in Antarctic Icefish**  
Ella Yoder, 16, Sophomore, Research Triangle High School, Research Triangle Park, North Carolina, T: Alex Dornburg

**CBIO068**  
**A Versatile Population Dynamics Model of Bacterial Resistance, Tolerance, and Persistence**  
Melissa Xin Du, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Amy Sheck

**CHEM036**  
**Rare-Earth-Free Silicon-Based Organic Molecules for Solid-State Lighting Applications**  
Lisa Peng Zhang, 17, Junior, Providence High School, Charlotte, North Carolina, T: Margaret Kocherga

**EAEV064**  
**Assessing and Predicting Wildfire Severity in California Based on Relationships Between Wildfires and Drought Using Machine Learning**  
Angela Chen, 15, Sophomore, William G. Enloe High School, Raleigh, North Carolina, T: Chad Ogren

**EGSD027**  
**The Computational and Experimental Study of Cellulose in Ionic Liquids and Water for Finding an Optimal Solvent for Biofuel Production**  
Nicholas Boyer, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Tim Anglin

**ENBM053**  
**Immunoinformatic Design and Evaluation of a Multi-Epitope Peptide Vaccine Targeting SARS-CoV-2 Structural and Nonstructural Antigens**  
Berk Timothy Yalcinkaya, 18, Junior, Forsyth Country Day School, Lewisville, North Carolina, T: Heather Yalcinkaya

**ENEV048**  
**Identifying Natural Flocculating Proteins for Affordable Anti-Microbial Sand Filters**  
Sahil Azad, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Michael Bruno

**ENEV052T**  
**Designing a Bioplastic Material to Replace Polystyrene and Polypropylene in Single-Use Hard Plastics that Rapidly Degrades in Landfill, Freshwater, and Saltwater Environments**  
Kaitlyn Lee Zuravel, 17, Junior, Lauren Gail Zuravel, 15, Freshman, Terry Sanford High School, Fayetteville, North Carolina, T: Deborah Vajner

**PLNT036**  
**Tropicalization of Temperate Ecosystems: How Climate Change Can Influence**  
Regan Williams, 16, Sophomore, John T Hoggard High School, Wilmington, North Carolina, T: Webster Guthrie
ROBO075  CoMET: A Novel Graph-based Machine Learning System for Predicting Topological Features of Dynamic Covert Networks with Applications in Counterterrorism
Paarth Tara, 17, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Robert Gotwals

TMED030  Assessing the Effectiveness of the Hericium Erinaceus Extract as Acetylcholinesterase Inhibitors
Chayse Skyler Chandler, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Kim Monahan

TMED031  Using Automated Infant Posture Recognition to Reduce SIDS Risk
Isha Narang, 16, Sophomore, Ardrey Kell High School, Charlotte, North Carolina, T: Meryl Thomas

NORTH DAKOTA
Mandan, USND01, Southwest Central North Dakota Regional Science and Engineering Fair
BEHA033  The Credibility of Eyewitness Memories
Blake John Bernhardt, 17, Junior, Wing Public School, Wing, North Dakota, T: Joy Marimon

ROBO086  Language Recognition with Machine Learning
Isaac Muth, 17, Sophomore, Mandan High School, Mandan, North Dakota, T: Ciera Kroh

Fargo, USND03, Southeast North Dakota Regional Science and Engineering Fair
EAEV053  An Analysis of Agricultural Tile Drainage and the Impact of Crop Residue Retention
Gavin Donald Kratcha, 15, Freshman, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha

EAEV114  Soil Farms: A New Approach to Cropland Restoration
Emma Pearl Kratcha, 17, Junior, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha

Grand Forks, USND05, Northeast North Dakota Regional Science and Engineering Fair
ENBM066  The Brace Cap: An Orthodontic Bracket Covering Ligature Tie
Sudiksha Singhal, 16, Sophomore, Red River High School, Grand Forks, North Dakota, T: Sonalika Singhal

Williston, USND06, Northwest North Dakota Regional Science Fair
BEHA055  Does Gender Affect One's Response to Frustration?
Adeline Norgaard, 18, Senior, Tioga High School, Tioga, North Dakota, T: Debra Moe

EAEV084  Manure to Energy
Brooke Evelyn Vachal, 15, Freshman, Tioga High School, Tioga, North Dakota, T: Debra Moe

TMED042  How Effective Are Face Masks?
Lindsey Vachal, 17, Junior, Tioga High School, Tioga, North Dakota, T: Debra Moe

Grand Forks, USND50, North Dakota State Science and Engineering Fair
ENEV084  Design of Novel Scaffolds for Water Filtration by Using Benign and Agriculture Based Precursors
Shrimayi Nikhil Patel, 17, Senior, Red River High School, Grand Forks, North Dakota, T: Lorraine O'Shea

PHYS058  The Science of Rocketry
William Kuizon Hejtmanek, 15, Freshman, Milnor High School, Milnor, North Dakota, T: Christina McCleary

TMED060  Use as Directed
Alora Kroh, 15, Freshman, Caiden M. Bellie, 15, Freshman, Mandan High School, Mandan, North Dakota, T: Ciera Kroh
OHIO

Athens, USOH01, Southeastern Ohio Regional Science and Engineering Fair

PLNT050 The Effects of Exogenously Applied L-Tryptophan on the Nodulation and Overall Development of Soybeans Grown in Acidic Soil
Joonwoo Park, 15, Freshman, Athens High School, The Plains, Ohio, T: Andrea Anderson

Cleveland, USOH02, Northeastern Ohio Science and Engineering Fair

CBIO040 Analyzing Patterns of Gene Expression in Inflamed Microglia Stimulated with a Pro-inflammatory Molecule (TNF Alpha)
Aditya Kalahasti, 17, Junior, Solon High School, Solon, Ohio, T: Saba Valadkhan

CHEM027 Gelatinization and Hysteresis of Organic Compounds to Create Edible Shelf Stable Adhesives
Ryan McGinnis, 17, Junior, West Geauga High School, Chesterland, Ohio, T: Kristin Gregory

ENMC036 Supporting a Wing with Hexagons to Make It Lighter
Alexander Michael Kmetko, 16, Junior, University School, Chagrin Falls, Ohio, T: Sara Laux

PHYS032 A Novel Method for Identifying Kepler Exoplanet Habitability Using Python-Based Analysis of Standardized Transit Light Curves and Calculated Parameter Values
Michelle Seoyeon Park, 17, Junior, Solon High School, Solon, Ohio, T: Dustin Schroeder

TMED025 The Effects of the COVID-19 Pandemic and Vaccine Knowledge on Vaccine Hesitancy in Adolescents
Claire English, 17, Junior, Mentor High School, Mentor, Ohio, T: Lori Cohen

Shaker Heights, USOH05, Hathaway Brown Upper School Fair

CBIO055T Descriptive Epidemiology on Vestibular Schwannomas from 2004-2016
Kaitlyn Mary Elizabeth Greppin, 17, Junior, Kailey Ines Takaoka, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

CELL007 Removing Brakes of Tumor-Resident Myeloid Cells as a Novel Cancer Immunotherapy
Shruthi Ravichandran, 17, Senior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

ENBM019 Regenerative Treatment of Stress Urinary Incontinence by Allogenic Macrophage Therapy
Snigdha Cingireddi, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

TMED007 The cGAS-STING Pathway in Rhabdomyosarcoma and Osteosarcoma
Anjali Dhanekula, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller

Archbold, USOH06, Northwest Ohio Science and Engineering Fair

PLNT015 Engineering a Modified Brewbaker and Kwack Medium for Cucurbita pepo
Joseph Ryan Reamsnyder, 18, Senior, Hilltop High School, West Unity, Ohio, T: Cristin Hagans

PLNT019 Rhizofiltration Potential of Cyanocobalamin in Lactuca sativa var. Capitata to Increase B12 Concentration
Jacob William Zajkowski, 18, Senior, Anthony Wayne High School, Whitehouse, Ohio, T: Whitney Short

Marion, USOH07, Marion Area Science and Engineering Fair

PLNT041T Lemna minor Fertilizer as an Alternative to Commercial Fertilizer for the Growth and Runoff Quality of Glycine max
Caylee Bree Combs, 17, Senior, Brynn Eleanora McGrail, 18, Rutherford B. Hayes High School, Delaware, Ohio, T: Jane Kovatch
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<tbody>
<tr>
<td>ROBO071</td>
<td><strong>HealthDrone: An Autonomous, Offline Medical UAV For Advanced Biometric Collection and Analysis Using Deep Learning</strong></td>
<td>Nithin Naikar, 15, Freshman, Olentangy Liberty High School, Powell, Ohio, T: Rachel Waltman</td>
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<td><strong>Columbus, USOH50, Buckeye Science and Engineering Fair</strong></td>
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<td>BMED056</td>
<td><strong>The Effect of Deferoxamine and Ferrostatin-1 Treatments on Total ROS in HK-2 Cells</strong></td>
<td>Haroon Lughmani, 17, Junior, Sylvania Northview High School, Sylvania, Ohio, T: Rachel Waltman</td>
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<tr>
<td>BMED057</td>
<td><strong>Examination of Human Colon Organoids for Phenotypic Anomalies in Patients with Ulcerative Colitis</strong></td>
<td>Ameya Saraf, 17, Junior, William Mason High School, Mason, Ohio, T: Karen Young</td>
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<tr>
<td>CBIO067</td>
<td><strong>In silico Mapping of the 14-3-3zeta and TRAF Protein Interactions</strong></td>
<td>Anish Umesh Gupta, 16, Junior, Sylvania Northview High School, Sylvania, Ohio, T: Kathryn Nelson</td>
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<tr>
<td>EAEV087</td>
<td><strong>Removing Chromium (VI) from Contaminated Water Using a Low-Cost Chitosan Coated Diatomaceous Earth</strong></td>
<td>Johan DeMessie, 16, Sophomore, William Mason High School, Mason, Ohio, T: Karen Young</td>
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<tr>
<td>EBED017</td>
<td><strong>Developing a New, Lightweight, Hands-Free Personal Safety System for Female Runners</strong></td>
<td>Lisa Jean Sebastian, 18, Senior, Bethel High School, Tipp City, Ohio, T: Alisha Gross</td>
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<td>EBED022</td>
<td><strong>Computing at the Speed of Light: Development of a 2-bit Multi-modal Photonic Integrated Circuit (PIC) for Highly Computational Tasks</strong></td>
<td>Mihai Crisan, 17, Junior, Upper Arlington High School, Upper Arlington, Ohio, T: Curt Bixel</td>
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**OKLAHOMA**

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<tr>
<td>OKLAHOMA</td>
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<tr>
<td>Alva, USOK01</td>
<td><strong>Change in Lung Volume with Recovery Positions</strong></td>
<td>Kenzie Doane, 18, Senior, Northwest Technology Center, Fairview, Oklahoma, T: Shawn Cusack</td>
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<td>BMED083</td>
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<tr>
<td>ENMC080T</td>
<td><strong>You're Hot Then You're Cold</strong></td>
<td>Crawford Xan Fuzzell, 18, Senior, Kenzie Mackenzie Madrid, 18, Senior, Northwest Technology Center, Fairview, Oklahoma, T: Shawn Cusack</td>
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<tr>
<td>Bartlesville, USOK02</td>
<td><strong>Downtime; The Consequences of Excessive Screen Use</strong></td>
<td>Liam Hiroyasu Wisner, 17, Junior, Bartlesville High School, Bartlesville, Oklahoma, T: Betty Henderson</td>
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<tr>
<td>BEHA017</td>
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<td>ENEV038T</td>
<td><strong>Conserving Water through the Recycling and Filtering of Greywater through a Domestic System</strong></td>
<td>Bryce Adley Goodin##, 17, Senior, Colton Micheal McCullough##, 18, Senior, Caleb Joel Cochran, 18, Senior, Bartlesville High School, Bartlesville, Oklahoma, T: Betty Henderson</td>
<td></td>
</tr>
<tr>
<td>PHYS018</td>
<td><strong>Finding the Optimal Water Fraction for Maximum Launch Height of Compressed-Air Bottle Rockets</strong></td>
<td>Emma King, 15, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman</td>
<td></td>
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<tr>
<td>Muskogee, USOK05</td>
<td><strong>Environmentally Friendly Edible Water Pods</strong></td>
<td>Thi Alexis Grizzle, 16, Junior, Muldrow High School, Muldrow, Oklahoma, T: Danni Powell</td>
<td></td>
</tr>
<tr>
<td>CHEM037</td>
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</tr>
</tbody>
</table>
Tulsa, USOK10, Tulsa Regional Science Fair

ENEV003  A Novel Carbon Dioxide Filtration Device Utilizing Calcium Hydroxide and Chlorophyta to Remediate the Impact of Global Climate Change on Aquatic Ecosystems  
Ashlynn Milford, 17, Junior, Cascia Hall Preparatory School, Tulsa, Oklahoma,  
T: Sally Fenska

MATS001T  Testing the Safety and Viability of a Cross-linked Starch-Based Bioplastic in Food Packaging and Food Industry Applications  
Peyton Elise Carter, 18, Senior, Erin Rose Coulon, 18, Senior, Cascia Hall Preparatory School, Tulsa, Oklahoma,  
T: Chaunna Steen

Stillwater, USOK50, Oklahoma State Science and Engineering Fair

ENBM064  Development of Biomimetic Biopolymers for Healing Early Osteoarthritis  
Angelina Mao, 17, Senior, Norman North High School, Norman, Oklahoma,  
T: Yan Li

MCRO051  Characterizing the Role of PA2803 Protein in Antibiotic Resistance in Bacteria  
Anna Alexandra Khanov, 17, Junior, Stillwater High School, Stillwater, Oklahoma,  
T: Marianna Patrauchan

SOFT040  Analysis of Public’s Concerns on Covid-19 Using Twitter Posts  
Maxim Khanov, 17, Junior, Stillwater High School, Stillwater, Oklahoma,  
T: Esra Akbas

OREGON

Gresham, USOR01, Gresham-Barlow Science Expo

CHEM018  A Novel Approach for Nuclear Waste Curation: A Manganese and Uranium Coupled Biogeochemical Cycle  
Dev Rishi Udata, 17, Junior, Jesuit High School, Portland, Oregon,  
T: Lara Shamieh

PLNT011  The Effect of Mycorrhizae Inoculant on Plant Growth  
Jordynn Michael, 17, Senior, Gresham High School, Gresham, Oregon,  
T: Julie Trisel

TMED015  A Novel Machine Learning Based Identification Tool (ELECT) for Early Colorectal Cancer Detection through Advanced Microbiome Composition Analysis  
Alan Peijun Ma, 16, Sophomore, Jesuit High School, Portland, Oregon,  
T: Lara Shamieh

Hillsboro, USOR04, Beaverton-Hillsboro Science Expo

EBED010T  Project Mashiro: Synthetic Aperture Radar Imaging with Inertial Sensor Fusion Using Custom FMCW Hardware and Extensible DSP  
Pranav Sehgal, 16, Junior, Tim C Solberg, 17, Junior, Beaverton Academy of Science and Engineering, Hillsboro, Oregon,  
T: Melissa Shell

ENBM043  CODONIFY: A Recurrent-Neural-Network-based Codon Optimization Tool to Improve Protein Expression Towards Efficient Vaccine Manufacturing  
Rishab Jain, 16, Sophomore, Westview High School, Portland, Oregon,  
T: Georgianne Harris

EAEV008  Developing a User-Friendly System for Predicting Harmful Levels of Marine Biotoxins  
Lila Schweinfurth, 18, Senior, Oregon Episcopal School, Portland, Oregon,  
T: Bettina Gregg
EBED011  Polaris: A Radiation Source Location Visualization System Using Gamma-Geometry Calculation
Pun Siripun, 16, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

EGSD006  Development of Optimum Design Parameters for an Algae Based Martian Oxygen Production System
Kara Gaiser, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

PHYS035  Musical Harmony and Dissonance: The Mathematical Quantification and Analysis of Two-Note Intervals on the Piano
Maxwell Tsai, 15, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

ROBO016  The Role of Income in Hospital Pricing: Using Regression Models to Predict Hospital Markup
Frances Claire McConnell, 16, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

Wilsonville, USOR06, CREST-Jane Goodall Science Symposium

BEHA023  Video Game Reward Systems and Their Impact on Players’ Behavior in the Iterated Prisoner’s Dilemma
Madeline Audrey Santoso, 14, Freshman, West Linn High School, West Linn, Oregon, T: Jennifer Howe

CBIO039  Novel Evolutionary Artificial Intelligence Methods for de novo Drug Design
Anish Goswami, 16, Sophomore, West Linn High School, West Linn, Oregon, T: Brian Delfatti

CHEM034  Detection of Nitrogen Levels in Sample Using Novel, Accessible, Cost Effective, Accurate, Safe, Simple, Reusable Method
Aditi Bhaskar, 16, Sophomore, Wilsonville High School, Wilsonville, Oregon, T: Sophie Kirscht

MATS017T  Testing the Tensile Strength of Student Engineered Starch-Based Bioplastic
Jadyn Rain Sherry, 18, Senior, Linnea J Collett, 18, Senior, Wilsonville High School, Wilsonville, Oregon, T: Jay Schauer T: Danielle Grenier

Salem, USOR07, Central Western Oregon Science Expo

EBED019  Preventing Hot Car Deaths by Monitoring CO₂ and Temperature Levels to Alert Parents and Affect a Series of Life Saving Interventions in the Car
John William Madland, 16, Sophomore, South Salem High School, Salem, Oregon, T: Mark Madland

PHYS012  Radio Emissions of Anomalous X-ray Pulsars
Leon Garcia, 16, Sophomore, Corvallis High School, Corvallis, Oregon, T: Sue Ann Heatherly

Bend, USOR08, Central Oregon Community College Regional Science Expo

ENEV028  Removing Carbon Dioxide from Coal Exhaust via an Olivine and Sodium Hydroxide Filter
# Teaghan Rose Knox, 17, Junior, Bend Science Station, Bend, Oregon, T: David Bermudez

ROBO030  Mean Green Recycling Machine: Robotic-Assisted Recycling Using Neural Networks
## Jacob Jiaxu Zhao, 18, Senior, Bend Science Station, Bend, Oregon, T: David Bermudez

Portland, USOR50, Northwest Science Expo

ANIM060  Predicting Knee Luxation Force for Various Gallinaceous Bird Species Using Musculoskeletal Measurements of the Leg
Madison Susanne Nicole Carson, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Bettina Gregg

EAEV124T  Progression of Sea Star Wasting Syndrome on the Oregon Coast
Anna L Nielsen, 17, Senior, Sophia L. Nielsen, 17, Senior, West Linn High School, West Linn, Oregon, T: Nancy Monson
ENBM090 Optimizing the Holter Diagnostic Process Using a Real-time, Machine Learning-Powered, Ambulatory Event Monitor
Ronald Lin, 15, Sophomore, International School of Beaverton, Beaverton, Oregon, T: Jaimie Yee

ENBM100 An Innovative Microcontroller-Driven Illumination System to Correct Moderate to Severe Color Vision Deficiency
Vladimir Mamchik, 15, Sophomore, Jesuit High School, Portland, Oregon, T: Lara Shamieh

ENMC076 A Predictive Model for Prevention of Hydroplaning Related Car Crashes Using Piezoelectric Sensors and Autoencoder Neural Networks
Ishan Ahluwalia, 15, Freshman, Jesuit High School, Portland, Oregon, T: Lara Shamieh

MATH037 Generalizing Kirchhoff Laws for Signed Graphs
Peter Ye, 17, Junior, Catlin Gabel School, Portland, Oregon, T: Joey Grissom

PENNSYLVANIA
Harrisburg, USPA01, Capital Area Science and Engineering Fair
EAEV030 Which Is the Best Spotted Lanternfly Trap?
Samuel Koda, 15, Sophomore, Hershey High School, Hershey, Pennsylvania, T: Jason Sibbach

ENBM034 A Step Towards Solving Foot Pain: A Novel Shoe with Customizable Magnetic Levitation to Reduce Ground Reaction Forces through Pronation-Targeted Computer Vision Pose Estimation, Year 3
Dev Lochan, 18, Senior, Cumberland Valley High School, Mechanicsburg, Pennsylvania, T: Mike Floreck

ENBM035 Employing Adversarial Machine Learning and Computer Audition for Smartphone-Based Real-Time Arrhythmia Classification in Heart Sounds
Aditya Kendre, 17, Senior, Cumberland Valley High School, Mechanicsburg, Pennsylvania, T: Mike Floreck

Lancaster, USPA02, North Museum Science and Engineering Fair
EAEV092 Using Bivalve Mollusks to Detect Water Contaminate
Joshua Matthew Rennekamp, 18, Senior, Conestoga Valley Senior High School, Lancaster, Pennsylvania, T: James Hovan

EGSD045 The Effect of Ground Composition on the Efficiency of Solar Pavers
Lilly Ann Heilshorn, 18, Senior, Hempfield High School, Landisville, Pennsylvania, T: Neal Kuhn

Philadelphia, USPA03, Delaware Valley Science Fairs
ANIM051 Breakthroughs in Honey Bee Health: Continuous-Release Mist Diffusion of Thymol-Based Essential Oils
Kaitlyn Nicole Culbert, 15, Freshman, Toms River High School North, Toms River, New Jersey, T: Christine Girtain

BCHM028 Stem Cell Behavior and Osteogenic Differentiation on Plant-Derived Scaffolds
Maya Sonal Butani, 16, Junior, Moorestown High School, Moorestown, New Jersey, T: Sean Watson

BCHM029 Effects of Bioactive Compounds in Berry Seed Extracts on Cariogenic and Periopathogenic Bacteria
Giovanna Marie Onofrietti, 17, Senior, Toms River High School North, Toms River, New Jersey, T: Christine Girtain

BEHA074 Demonstrating a Potential Causative Link Between Dendritic Degeneration and Hydrocephalus Using Par3 Conditional Knockout Mouse Models
Bill Zhang, 17, Senior, Holmdel High School, Holmdel, New Jersey, T: Josephine Blaha
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<thead>
<tr>
<th>Project Number</th>
<th>Title</th>
<th>Team Members</th>
<th>Tutors</th>
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<tbody>
<tr>
<td>BMED077</td>
<td>Chronic Sleep Deprivation Induces Brain Inflammation via CCR2-mediated Peripheral Monocyte Infiltration</td>
<td>Jason Wang, 17, Junior, Germantown Academy, Fort Washington, Pennsylvania,</td>
<td>T: Philip Rittenhouse</td>
</tr>
<tr>
<td>BMED082T</td>
<td>Effects of Grape Seed Extract (GSE) Consumption on Egg Production in Drosophila melanogaster Adults</td>
<td>Maria Hromcenco, 16, Junior, Cassandra Hung, 17, Junior, Pennsylvania Leadership Charter School–University Scholars Program, West Chester, Pennsylvania,</td>
<td>T: Katherine Przeworski</td>
</tr>
<tr>
<td>CBIO091</td>
<td>The SLED (Shelf Life Expiration Date) Tracking System: Combating Food Waste and Food Borne Illnesses from Expiration Using Machine Learning</td>
<td>Srilekha Mamidala, 14, Freshman, Garnet Valley High School, Glen Mills, Pennsylvania,</td>
<td>T: Brenda Frost</td>
</tr>
<tr>
<td>ENBM093</td>
<td>Novel Fully MRI Compatible Nonmagnetic and Dielectric Pneumatic Servo Motor for MRI Guided Surgical Robotics</td>
<td>Leo Wylonis, 16, Junior, Conestoga High School, Berwyn, Pennsylvania,</td>
<td>T: Scott Best</td>
</tr>
<tr>
<td>PHYS073</td>
<td>The Study of the Effect of Topspin on the Trajectory of a New Tennis Ball</td>
<td>Jue Gong, 15, Sophomore, High Technology High School, Lincroft, New Jersey,</td>
<td>T: Craig Queenan</td>
</tr>
<tr>
<td>ROBO078</td>
<td>SPOTNET: A Novel End-to-End Algorithm that Utilizes Convolutional Neural Networks to Recognize Potholes in Two-Dimensional Monocular Images</td>
<td>Riya Sikand, 15, Freshman, Ranney School, Tinton Falls, New Jersey,</td>
<td>T: Roxanne Spencer</td>
</tr>
<tr>
<td>ROBO082</td>
<td>Autonomous COVID-19 Screening Using Deep Learning and Low-cost Thermal Imaging</td>
<td>Yash V Prabhu, 16, Sophomore, North Penn Senior High School, Lansdale, Pennsylvania,</td>
<td>T: Melody Leithold</td>
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<tr>
<td>Pittsburgh, USPAO4</td>
<td>Pittsburgh Regional Science &amp; Engineering Fair</td>
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<td>BMED040</td>
<td>Activation of Pregnane X Receptor for Xenobiotic Detoxification: A Novel Approach to Targeting Pollution-Related Diseases</td>
<td>Rajan T. Reddy, 17, Senior, Winchester Thurston School, Pittsburgh, Pennsylvania,</td>
<td>T: Graig Marx</td>
</tr>
<tr>
<td>BMED042</td>
<td>Interleukin-33 Promotes Th17 Cell Clonal Expansion in the B16 Tumor Microenvironment</td>
<td>Andrew Warren Ni, 17, Junior, Pine-Richland High School, Gibsonia, Pennsylvania,</td>
<td>T: Ann Gollapudi</td>
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<tr>
<td>BMED059</td>
<td>Activation of Novel Autophagy Pathways to Protect Hepatocyte Injury by Chloroquine</td>
<td>Michael Ziqi Gao, 16, Sophomore, North Hills High School, Pittsburgh, Pennsylvania,</td>
<td>T: Nicholas Hand</td>
</tr>
<tr>
<td>CBIO059</td>
<td>Data Mining to Identify Therapeutic Targets for Transplant Rejection</td>
<td>Zoe Shira Lakis, 15, Junior, Fox Chapel Area High School, Pittsburgh, Pennsylvania,</td>
<td>T: Justin Patterson</td>
</tr>
<tr>
<td>EAEV065</td>
<td>Examining the Effects of Marine Microplastics on Porifera Microbial Filtration</td>
<td>Natalie McGee, 16, Junior, Mt. Lebanon High School, Pittsburgh, Pennsylvania,</td>
<td>T: Kyle Tilger</td>
</tr>
</tbody>
</table>
EGSD028  Optimizing Nannochloropsis Growing Conditions for Biodiesel Production through Analysis of Lipid Content
Steven Diwen Liu, 17, Junior, Shady Side Academy, Pittsburgh, Pennsylvania, T: Devon Renock

SOFT030  Enabling High-Accuracy Human Activity Recognition with Fine-Grained Indoor Localization
Arvind Seshan, 16, Sophomore, Fox Chapel Area High School, Pittsburgh, Pennsylvania, T: Justin Patterson

Reading, USPA05, Reading and Berks Science and Engineering Fair
ENMC066  The Engineering and Construction of a Large-Capacity CNC Router for Inexpensive Computerized Manufacturing
Holden E. Rice, 16, Sophomore, Conrad Weiser High School, Robesonia, Pennsylvania, T: John Siefert

MCRO053  Presence of Wolbachia in Wild Adult Lycorma delicatula
Erin Marie Horack, 17, Senior, Conrad Weiser High School, Robesonia, Pennsylvania, T: John Siefert

RHODE ISLAND
Warwick, USRI50, Rhode Island Science and Engineering Fair
BMED069  Butyrate: Bridging Bench to Bedside – Bringing Hope for Better Diagnostic and Therapeutic Options for Peanut Allergies
### Isabella Mary Lillian Heffernan, 17, Senior, Saint Mary Academy Bayview, Riverside, Rhode Island, T: Janell Johnson

CELL027  Utilizing Alloferon Peptide to Improve Growth Performance and Survival Rate of Mealworms (Tenebrio molitor) in Mass-Scale Insect Farming
David Shon, 18, Junior, Portsmouth Abbey School, Portsmouth, Rhode Island, T: Stephen Zins

SOUTH CAROLINA
Aiken, USSC01, Central Savannah River Area Science and Engineering Fair
ANIMO23  Effects of Embryological Exposure to Cortisol on Gene Expression during Tailfin Regeneration in Adult Zebrafish
Krish Mathur, 17, Junior, Lakeside High School, Evans, Georgia, T: Charlotte Smith

Bluffton, USSC02, Sea Island Regional Science Fair
BEHA036  I've Got Bias on the Brain: An Investigation Regarding the Relationship between an Individual's Pre-existing Bias and Their Perception
Kathleen Kaye Hammett, 15, Freshman, John Paul II Catholic School, Ridgeland, South Carolina, T: Alice Wood

BMED044T  How Do Various Controlled Substances Affect Daphnia magna?
# Jacqueline Grace Sullivan, 16, Sophomore, Jared Parker Reuben#, 17, Junior, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: Janet Sullivan

ENMC073  Engineering a Program to Locate Intruders Inside a Building by Comparing Recorded Audio to Predicted Decibel Levels from Computer Simulations
Nathaniel Lee Abrams, 16, Sophomore, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: Janet Sullivan

MCRO045  Probiotics in the Fight Against Stony Coral Tissue Loss Disease
Anabella Platt, 15, Freshman, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: Janet Sullivan

Charleston, USSC03, Low Country Science Fair
EAEV128  A Novel Low-Cost Filtration System for Removing Arsenic and Improving Health in Rural Populations
### Ishraq Haque, 18, Senior, Academic Magnet High School, North Charleston, South Carolina, T: Katharine Metzner-Roop
Columbia, USSC04, USC Central South Carolina Region II Science and Engineering Fair

BMED070 The Effect of Ayurvedic Plant Extracts —*Mucuna pruriens* and *Brassica oleracea*— on the Alleviation of Motor Symptoms in PINK1 *Drosophila melanogaster*: A Model of Parkinson's Disease
Sanjana Parise, 16, Junior, Spring Valley High School, Columbia, South Carolina, T: Michelle Spigner

ROBO069 Partially Speaker-Dependent Automatic Speech Recognition Using Deep Neural Networks
Christopher Li, 17, Junior, Spring Valley High School, Columbia, South Carolina, T: Michelle Spigner

Spartanburg, USSC07, Piedmont South Carolina Region III Science Fair

BCHM015T Should Drinking Water Be Disinfected with Monochloramine?
Cam Srivastava, 16, Sophomore, Logan Sean Kusher#, 16, Junior, Spartanburg Day School, Spartanburg, South Carolina, T: Jason Lonon

SOUTH DAKOTA

Aberdeen, USSD01, Northern South Dakota Science and Math Fair

ANIM032 The Effects of Pulsed Electro-Magnetic Fields on Bovine Semen Phase II
Avery Miles, 15, Sophomore, Doland High School, Doland, South Dakota, T: Melissa Knox

MCRO042 Recombinant Bacteria Capable of Expressing Type I Collagen Proteins
Simon Maxwell Bickford, 18, Senior, Roncalli High School, Aberdeen, South Dakota, T: Donna Herrick

PHYS044T Go with the Flow
Madeline Knox, 17, Junior, Brody Leisinger, 17, Junior, Highmore Harrold, Highmore, South Dakota, T: Jackie Knox

Brookings, USSD02, Eastern South Dakota Science and Engineering Fair

ANIM062T Are Your AI Cattle Having a Better Growth Rate than Your Bull Bred Calves?
Carissa Scheel, 15, Freshman, Avery A. Orth, 15, Freshman, Wessington Springs, South Dakota, T: James Kruse

BEHA070 A Multifaceted Insight into Addiction Treatment Programs in the Midwest: Identifying Factors Influencing Treatment Participation and Retention
Aditya Tummala, 16, Junior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

CBIO066 Determining Factors that Improve the Efficiency of Capture-Recapture
Alexa Grace Sees, 18, Senior, Avon High School, Avon, South Dakota, T: Paul Kuhlman

MCRO057 Romaine Calm: Using a Phage-Enzyme Combination to Treat *E. coli* Contamination in Produce
William Vincent Hummel, 17, Junior, Brookings High School, Brookings, South Dakota, T: Laura Hummel

Rapid City, USSD03, High Plains Regional Science and Engineering Fair

BEHA058T The Effects of Social Conformity
Tuffy Lee Simon, 18, Senior, Dustin Jacob Kraft, 18, Senior, Timber Lake High School, Timber Lake, South Dakota, T: Louise Lindskov

EGSD047 Wind Turbine Blades: Cleaner Materials for Cleaner Energy
Ethan Jaye Johnston, 18, Senior, Timber Lake High School, Timber Lake, South Dakota, T: Luann Lindskov
TENNESSEE

Chattanooga, USTN01, Chattanooga Regional Science and Engineering Fair

CHEM072
Developing a High Protein Vegan Meal Replacement
Vaidehi Rathod, 17, Junior, Chattanooga School for the Arts and Sciences, Chattanooga, Tennessee, T: Kelly Davis

ROBO090
Developing a Fish Image Classification System for Mouse Creek, Cleveland, TN Using Machine Learning
Rishi Soni, 17, Junior, Cleveland High School, Cleveland, Tennessee, T: Jeannie Long

Knoxville, USTN04, Southern Appalachian Science and Engineering Fair

EAEV100
Spatial Pattern and Correlation Analysis to Understand the Relationship of City Structure on the Urban Heat Island (UHI) Intensity Across the US
Ridhima Singh, 15, Sophomore, Farragut High School, Knoxville, Tennessee, T: Matthew Milligan

ROBO061
Jarvis: A Robotic Companion
Jackson Everett Moody, 16, Junior, L&N STEM Academy, Knoxville, Tennessee, T: Bryan Schultz

Memphis, USTN05, Memphis-Shelby County Science and Engineering Fair

MATS051
Controlled Release of Statin Drugs via Hydrogel Implants
Naisha Anaum Chowdhury, 17, Junior, Pleasant View School, Memphis, Tennessee, T: Farhana Chowdhury

Nashville, USTN06, Middle Tennessee Science and Engineering Fair

EBED030
Off Target: Improving the Electrical Sabre
Charlotte Landman, 15, Freshman, Brentwood High School, Brentwood, Tennessee, T: Franklin King

ENMC077T
Automatic Basketball Return Chute that Uses Color Tracking to Rebound the Ball to the Player as They Move around the Court
Elijah Platter, 17, Junior, Wills Stoddard Kookogey, 17, Junior, The Academy Tutorial, Hermitage, Tennessee, T: Anne Elise Napier

TEXAS

Dallas, USTX01, Beal Bank Dallas Regional Science and Engineering Fair

BEHA002
ParkinSensor: Computer Vision and Ensemble Machine Learning-Based Incipient Diagnosis for Parkinson’s Disease Using Neuromuscular Biomarkers
Sidhya Venkata Peddinti, 16, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

CBIO004
Tackling Tau: Identifying a Novel Inhibitor for the MSUT-2 Protein based on Quantum Machine Learning for the Identification of Treatments of Neurodegenerative Diseases
Rithvik Ganesh, 17, Junior, Plano West Senior High School, Plano, Texas, T: Emily Sharma

CHEM001
Biodegradable Plastics Made from Waste Biomethane
Kevin Sun, 15, Sophomore, Jasper High School, Plano, Texas, T: Vashka Desai

EBED012
A New Paradigm for the Visually Impaired Spectrum Based on a LiDAR System
Nethra Srikanth Krishnan, 16, Junior, Plano West Senior High School, Plano, Texas, T: Emily Sharma

EBED013
A Crash and an Airbag: Creating a Algorithm for an External Airbag System
Abhinav Malkoochi, 16, Sophomore, Jasper High School, Plano, Texas, T: Vashka Desai

ENBM004
Happy Feet: A Low-Cost Smart Shoe Utilizing Temperature, Pressure, Humidity, and Alcohol Levels to Detect and Monitor Common Foot Problems
Vishnu Vasudev, 15, Sophomore, Liberty High School, Frisco, Texas, T: Holley Mosley
<table>
<thead>
<tr>
<th>Project Title</th>
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<th>Student(s)</th>
<th>School(s)</th>
<th>Teacher(s)</th>
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<tr>
<td>Project TetreNet: Augmenting Wildfire Mitigation With Rapid-Scale Deployment of Low-Cost Nanosatellite Networks Driven by Computer Vision Analysis</td>
<td>Abhinav Bichal, 18, Senior, Rohan Chimalapati, 17, Senior, Sarvesh Sathish, 16, Junior, Lebanon Trail High School, Frisco, Texas, Texas Academy of Mathematics and Science, Denton, Texas, T: Derek McDowell</td>
<td>EnEV010T</td>
<td>Finalist Directory</td>
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<tr>
<td>Generating a Non-toxic, Multi-pathway Targeted Cocktail Treatment Composed of N- Acetylcysteine, Carvacrol, and DNase to Inhibit Pseudomonas Biofilm Proliferation in vitro</td>
<td>Shriya Prakash Bhat, 16, Sophomore, Plano East Senior High School, Plano, Texas, T: Julie Baker</td>
<td>MCRO002</td>
<td>Finalist Directory</td>
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<tr>
<td>DocAide: A Collaborative AI Medical Assistant Using Novel Autonomous Learning</td>
<td>Harshal V. Bharatia, 16, Junior, Plano Senior High School, Plano, Texas, T: Elizabeth Carson</td>
<td>ROBO003</td>
<td>Finalist Directory</td>
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<tr>
<td>Feel It in Your Heart: The Effects of Caffeinated Drinks on the Daphnia Heart</td>
<td>Isabella Chavez Miranda, 17, Senior, Maxine L. Silva Magnet High School for Health Care Professionals, El Paso, Texas, T: Sandra Rivera</td>
<td>BCHM032</td>
<td>El Paso, USTX02, Sun Country Science Fair</td>
<td></td>
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<tr>
<td>The Effects of Various Disinfection Agents on the Germination of Phaseolus vulgaris</td>
<td>Andrew Mayne Grine, 15, Sophomore, Coronado High School, El Paso, Texas, T: Brian Gillis</td>
<td>PLNT022</td>
<td>El Paso, USTX02, Sun Country Science Fair</td>
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<tr>
<td>The Effect of Red 40 on the Aggression of Subsequent Generations of Drosophila melanogaster</td>
<td>Isabella Rene Sanchez, 17, Junior, Granbury High School, Granbury, Texas, T: Priscilla Lumberras</td>
<td>ANIM015</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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<tr>
<td>Molecular Dynamics Investigation of Poly [ADP-Ribose] Polymerase 1 Inhibitors as Treatment for V762A Single-Nucleotide Polymorphism Correlated with Ovarian Cancer, Lung Cancer, and Follicular Lymphoma</td>
<td>Neel Shanmugam, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls</td>
<td>BCHM007</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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<tr>
<td>Don't Trip: TRIPP! The Effect of a Virtual Reality Meditation Environment on Stress and Mindfulness</td>
<td>Stefan Alek Salaices, 17, Junior, Colleyville Heritage High School, Colleyville, Texas, T: Sonya Loughran</td>
<td>BEHA024</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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<td>Pressure-Driven C-H Activation through Non-Bonding Anagostic Interactions for Petroleum Hydrocarbon Transformation</td>
<td>Carly Yang, 16, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls</td>
<td>CHEM019</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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<tr>
<td>Developing a Free Energy Parameter Model for the Prediction and Mapping of the Uptake of Hazardous Organic Pollutants by Plant Cuticle Membranes</td>
<td>Jennifer Mengzhu Huang, 17, Senior, Shrika Eddula, 17, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls</td>
<td>EAEVo29t</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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<td>The Analysis of Chitosan in Reducing the Initial Burst Effect in Electrospun Nanofiber-Based Drug Delivery Systems (DDS)</td>
<td>Sunehra Rahman Chowdhury, 17, Junior, Colleyville Heritage High School, Colleyville, Texas, T: Sonya Loughran</td>
<td>MATS011</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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<td>Using Post-Illumination Pupil Response as a Novel Biomarker for Parkinson's Disease</td>
<td>Allen Chau, 16, Junior, Brianna Chan, 16, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Mark Albert T: Samuel Earls</td>
<td>TMED013T</td>
<td>Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair</td>
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</table>
Brownsville, USTX04, Rio Grande Valley Regional Science and Engineering Fair

EAEV019 The Hurricane Engine: Identifying the Correlation Between Ocean Eddies and the Development and Intensification of Hurricanes
Michelle Arguello, 17, Junior, James Pace High School, Brownsville, Texas, T: Dora Lopez

ROBO021 Submergible Robotic System Used to Clean Calm Bodies of Water
Benjamin Ian Gracia, 17, Senior, James Pace High School, Brownsville, Texas, T: Dora Lopez

TMED009 Human iPSC-Derived Cardiomyocyte Model Reveals the Transcriptomic Bases of SARS-CoV-2 Infection Induced Myocardial Injury
Kashish Kumar, 17, Junior, Science Academy of South Texas, Mercedes, Texas, T: Tim Sears

TMED010 Developmental Neurotoxicity of Artificial Sweeteners and Ethanol in Danio rerio Embryos
# Rianna Rachel Trevino, 17, Junior, Gaddiel Alejandro Garcia#, 17, Junior, Homer Hanna High School, Brownsville, Texas, T: Phebe Martinez-Fuentes

Houston, USTX05, Science Engineering Fair of Houston

Pranav Somani, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Joseph Ewbank

CBIO019 Effect of Smoking on TGF-beta Signaling in Breast Cancer Patients
Maegha Tipirneni, 15, Sophomore, Friendswood High School, Friendswood, Texas, T: Dawne Welch

CHEM011 Keep Our Water Away from FOG
# Zhi-Wei Steven Zeng, 18, Senior, Zeng Homeschool, Katy, Texas, T: Ying Feng

EGSD011 Bio-Power
Sohan Kureti, 15, Freshman, Harmony School of Advancement, Houston, Texas, T: Yen Nguyen

ENBM022 Developing a Cost-Effective Visual Aid Device to Mitigate the Effects of Retinitis Pigmentosa
Ganesh Venu, 16, Sophomore, Friendswood High School, Friendswood, Texas, T: Dawne Welch

ENEV019 An Automated Differentiation Method of Recyclable Textiles via Hyperspectral Imaging
Zoe Yu, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Sara Fox

ENMC020T Designing an Aerospike Nozzle
Max Oberg, 18, Senior, Logan Murray, 17, Senior, College Park High School, The Woodlands, Texas, T: Katrina Cantrell

ENMC034 Stable Shores: An Experimental Set-Up to Test Economical Alternatives to Conventional Coastal Erosion Control
Ved Xi Ganesh, 16, Sophomore, Dulles High School, Sugar Land, Texas, T: Kristin Mathew

MATH017 Negative Binomial Regression to Model Dengue Cases Using Weather Factors
Sanuja Dilanka Manage, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Katrina Cantrell

MATS004 Scalable and Sustainable Synthesis of a Novel, Bio-Based Polyurethane Foam System Incorporating Industrial Byproducts and Waste
# Sohi Sanjay Patel, 15, Sophomore, College Park High School, The Woodlands, Texas, T: Sara Fox
PLNT004  The Effectiveness of *Pontederia cordata* in the Phytoremediation of Copper Sulfate  
Cindy Shen, 14, Freshman, College Park High School, The Woodlands, Texas, T: Sara Fox

SOFT027  **StockSy: A Stock Prediction and Analysis Toolkit Using Nonparametric Regression**  
Daniel Konstantin Yamakov, 17, Senior, College Park High School, The Woodlands, Texas, T: Joseph Ewbank

Kilgore, USTX06, East Texas Regional Science Fair

BCHM003  Testing the Efficiency of Alternative Source of Cellulase to Break Down Cellulose from Biomass Compared to Commercial Cellulase  
Christopher Alan Acker, 18, Senior, Lufkin High School, Lufkin, Texas, T: Charlotte Stover

Laredo, USTX07, United Independent School District Regional Science Fair

BCHM014  Investigating Absorption of iron(II) by Apo Lactoferrin Using pH  
Daniel Alejandro Musquiz, 16, Junior, John B. Alexander High School, Laredo, Texas, T: Veronica Villarreal

Lubbock, USTX08, South Plains Regional Science and Engineering Fair

PHYS016  Modeling Type Ia Supernovae Hydodynamics Using Walking Droplets  
Rafael Amato Regis de Farias, 18, Senior, Lubbock High School, Lubbock, Texas, T: Milene de Farias

PLNT005  Evaluation of In-Ground Irrigation Systems on Homeowner's Lawns  
Michael (Mac) Andrew Chaloupka, 16, Junior, Christ the King Cathedral School, Lubbock, Texas, T: Alicea Chaloupka

Odessa, USTX09, Permian Basin Regional Science Fair

EVA008  The Investigation of Photobiomodulation as a Factor to Impact Physical Damage, Psychological Behavior, and Metabolic Activity Following a Traumatic Brain Injury in *Drosophila melanogaster*  
Joanna Sohn, 14, Freshman, Keystone School, San Antonio, Texas, T: Jason Nydegger

BEHA007  Evaluating Perceptions of High School Students and Faculty on Covid-19 Forced Remote Learning via Mixed Methods Study Design for Developing Novel Pedagogies  
Sharanya Sharma, 15, Sophomore, Health Careers High School, San Antonio, Texas, T: Ramaswamy Sharma

BEHA018  The Genetics of Human Aging: Predicting Age and Age-Related Diseases by Deep Mining High Dimensional Biomarker Data  
Hannah Guan, 15, Sophomore, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Maia Bland

CBIO008  Using Artificial Intelligence to Predict Survival in Patients with Prostate Cancer  
Shreya Chaudhary, 17, Junior, Keystone School, San Antonio, Texas, T: Jason Nydegger

CBIO016  mRNA Vaccine Sequence Design Using Discrete Optimization Techniques Applied to the SARS-CoV-2 Virus  
Sarah Cross, 16, Sophomore, Keystone School, San Antonio, Texas, T: Jason Nydegger

ENBM015  Wearable Electrochemical Sweat Sensor for Patients with Chronic Kidney Disease, Year II  
Suran Upul Somawardana, 17, Junior, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Maia Bland
Waco, USTX12, Central Texas Science and Engineering Fair

EAEV073 Determining the Natural Microbial Flora Found on the Stem Surfaces of Aquatic Plants and Their Connection to Water Filtration
Madelyn Machelle Kirklin, 15, Freshman, Live Oak Classical School, Waco, Texas, T: Katherine Pitts

ENMC049T Engineering an Environmentally Friendly 3D-Printed Rocket Engine
## Caleb Wilson Chakmakjian, 18, Senior, John Blanton Lewis, 17, Senior, Live Oak Classical School, Waco, Texas, T: Katherine Pitts

Austin, USTX13, Austin Energy Regional Science Festival

BCHM010 Using Hodgkin-Huxley Differential Equations to Determine the Inhibitory Effects of Potent Neurotoxins that Lead to the Damaging of Voltage-gated Channels in Mammalian Neuron Cells Leading to Multiple Sclerosis
Rajvi Rakesh Babaria, 15, Sophomore, Vista Ridge High School, Cedar Park, Texas, T: Rhonda Christman

CBIO037 Refinement of SNP Mutations of Atopic Dermatitis Related Filaggrin through Existing R Packages
Aniket C. Naravane, 17, Junior, Lake Travis High School, Austin, Texas, T: Lauren Taylor

EAEV039 Larvicidal “Trojan-horse”: Experimentally Developing a Novel Low-Cost and Eco-Friendly Mosquito Vector Control Treatment
Aseel Rawashdeh, 16, Junior, L C Anderson High School, Austin, Texas, T: Vincent Wrencher

EGSD020 Developing a Wearable Triboelectric Nanogenerator to Sustainably Power Biosensors
Armaan Verma Srireddy, 16, Sophomore, Westwood High School, Austin, Texas, T: Christin Key

PHYS029 Predicting the Impact of Stellar Kinematics and Dynamics on Habitability in the Milky Way
## Camille Chiu, 18, Senior, College Station High School, College Station, Texas, T: Casey Akin

PHYS031T A Mathematically Driven Physical Analysis into Exoplanet Detection Confirmation Surveys Using Bayesian Inferential Statistics, Machine Learning/Linear Algebra Sklearn and TensorFlow Techniques, the BATMAN Python Programming Library, 3D Printing Techniques, and a Custom-made Python Processing Pipeline for Image Analysis and Lightcurve Detection
Pratham Babaria, 17, Junior, Ethan Chandra, 16, Junior, Harmony School of Endeavor, Austin, Texas, T: Joseph Kat

Laredo, USTX14, Laredo Independent School District Science Fair

ENMC009 Hydroloop II: Magnetohydrodynamic Loop
# Ken Yaguchi, 17, Junior, Hector J. Garcia Early College High School, Laredo, Texas, T: Lorena Madriaga

Corpus Christi, USTX15, Coastal Bend Regional Science Fair

CBIO006 Experimental Detection System for Senile Dementia- A Novel, Systematic Approach Using Metabolomics, Bioinformatics, and Circuitry to Develop a Biosensor through Metabolomic Electrical Resistance Analysis for Detection of Early Onset Alzheimer’s
Priyam Ryan Kumar, 15, Sophomore, Santa Gertrudis Academy High School, Kingsville, Texas, T: Veronica Alfaro

ENBM013 Max Health: A Smart Textile Biosensor System for Remote Health Monitoring and Anomaly Detection
### Ibrahim Samhar Al-Akash, 18, Senior, Veterans Memorial High School, Corpus Christi, Texas, T: Porifirio Zamora
College Station, USTX50, Texas Science and Engineering Fair

**ANIM061T** The Effect of Protease-Activated Receptors (PAR- 4) on the Fertility and Progeny of *C. elegans* as a Potential Therapeutic Agent for Hereditary Chronic Inflammatory Diseases  
# Swetha Velayutham, 16, Junior, Vyshnavi Poruri#, 16, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

**CBIO096T** A Non-Invasive Ear-EEG Hearing Aid to Address the Cocktail Party Problem via Cloud-Based Deep Learning  
# John Rho, 18, Senior, Govardhan Thirumurthy Poondi#, 18, Senior, Plano West Senior High School, Plano, Texas, T: Jerry Pruett

**CELL037** The Neuro-Protective Role of Select Transcription Factors in a PINK1 Loss-of-Function Based Model of Neurodegeneration in *Drosophila melanogaster*  
Parisa Aryana Vaziri, 18, Senior, Plano East Senior High School, Plano, Texas, T: Julie Baker

**EAEV106T** GLAS: A Global Landslide Analytics System  
Shrey Joshi, 16, Junior, Ishaan Javali, 17, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

**EAEV121T** A Third Year Study on the Bioremediation of Tetracycline Polluted Soils: How Antibiotic Resistance Can Reduce Antibiotic Pollution in the Environment and a Solution to Antibiotic Pollution-Related Crop Failure  
# Sanjana Hiremath, 17, Junior, Sriya Teerdhala#, 16, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

**EBED028** Smart Parkinson's Strap: To Dynamically Detect and Mitigate the Tremors of Parkinson's Patients  
Anushka Dhaya Sridhar, 15, Freshman, Plano East Senior High School, Plano, Texas, T: Julie Baker

**ENBM077** FallWatch: A Novel Approach for Through-Wall Fall Detection in Real-Time for the Elderly Using Artificial Intelligence  
Aditya Chebrolu, 16, Junior, Independence High School, Frisco, Texas, T: Derek McDowell

**MATS049** Carbon Dioxide Conversion to Hydrocarbon Fuel Utilizing Metal Catalyst  
# Christopher Changhoon Huh, 16, Junior, Westwood High School, Austin, Texas, T: Christin Key

**PHYS072** A Population of Planetary Systems on Aligned Orbits with Wide Binary Companions  
Sam Christian, 17, Senior, Liberal Arts and Science Academy, Austin, Texas, T: Neno December

**PLNT051** The Longevity of Plant-Based Bioremediation in Water: An Investigation on the Longevity of the Flocculating Capabilities of *Moringa oleifera* Lam. Seed Extracts in Water Purification  
Zach Vazhekatt, 17, Senior, Coppell High School, Coppell, Texas, T: Holly Anderson

**ROBO060** Using Convolutional Neural Networks (CNN) Image Recognition to Program the Artificially Learned C3BO: Cancer Blood Oncologist  
Leonardo Amato Regis de Farias, 16, Sophomore, Lubbock High School, Lubbock, Texas, T: Milene de Farias

**TMED053T** ProteCount: An AI-Based Reader for Rapid Protein Quantification  
Sridatta Vinay Teerdhala, 18, Senior, Sameer Parameshwar, 17, Senior, Venu Madhav Poruri, 18, Senior, Plano East Senior High School, Plano, Texas, T: Julie Baker

**UTAH**

Farmington, USUTO1, North Davis Area Science and Engineering Fair

**BMED074T** Mask Up  
Kalimilani Crockett, 16, Sophomore, Tymaoko Crockett, 16, Sophomore, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin
ENMC046  Beneficiation of Clayey Soils Using Aggregate Blending and Cement Stabilization
Adam Zachary Guthrie, 18, Senior, Timpview High School, Provo, Utah, T: Joy Petrucka

TMED035  Testing the Use of Phage Andhra at Five pH Levels to Treat Skin Infections Caused by Three Strains of the Bacteria Staphylococcus epidermidis and Identifying Strains with the CRISPR-Cas9 System
Summer Aspen Moulder, 16, Junior, Pleasant Grove High School, Pleasant Grove, Utah, T: David Van Dijk

Salt Lake City, USUT05, University of Utah Science and Engineering Fair
BEHA026  Grasping Gestures: An Analysis of the Aesthetics of Dance through the Lens of Physics and Computer Science
Malavika Singh, 17, Junior, West High School, Salt Lake City, Utah, T: Enrique Larreta

BEHA027  Mental Health during COVID-19: The Role of Knowledge and Information Sources
Yvonne Jaeyou Kim, 17, Junior, West High School, Salt Lake City, Utah, T: Seung-Hee Son

CBIO031  Predicting Molecular Phenotypes with Single Cell RNA Sequencing: An Assessment of Unsupervised Machine Learning Models
Anastasia Dunca, 17, Junior, West High School, Salt Lake City, Utah, T: Enrique Arce-Larreta

CELL014  How Do Specific Mutated Genes Affect Metabolic Functioning in Prochlorococcus?
Aiden John Pasinsky, 17, Junior, Beehive Science and Technology Academy, Sandy, Utah, T: Kerrie Upenieks

EAEV033  Locking Down: The COVID-19 Pandemic and Air Pollution in Salt Lake City
Caleb Matthew Grow, 18, Senior, Jordan High School, Sandy, Utah, T: Heather Gooch

ROBO034  Use of Collaborative Robotics in Mass Production of Freehand Components
Nathaniel Loveless, 16, Sophomore, West High School, Salt Lake City, Utah, T: Enrique Arce-Larreta

Ogden, USUT07, Harold W. & Helen M. Ritchey Science and Engineering Fair of Utah
EAEV096  Abrupt Change in Ice Loss Rate of Alaska's Glaciers Observed from GRACE and GRACE-FO Data
Junsung Park Lee, 16, Sophomore, Logan High School, Logan, Utah, T: Christina Howell

EAEV097  Minimum Slope Required for Liquefaction Induced Lateral Ground Displacement to Occur in a Confined Soil Mass Subject to a Simulated Seismic Shock
Rosemary A. Yahne, 17, Junior, Northern Utah Acadamy for Math, Engineering and Science, Layton, Utah, T: Nickole Brooks

MATH042  Dynamic Paired Comparison Prediction Using Modified Elo Ratings
Julien Grijalva, 16, Junior, Northern Utah Acadamy for Math, Engineering and Science, Layton, Utah, T: Nickole Brooks

MCRO049  Creating Highly Efficient Auxin-Producing Soil Bacteria to Promote Crop Growth
Gary Zhan, 16, Junior, Logan High School, Logan, Utah, T: Christina Howell

VERMONT

Northfield, USVT50, Vermont Science, Technology, Engineering and Mathematics Fair
EAEV105  Functional Roles of Mysis and Amphipods Between Lake Basins Faced by Two Different Stressors: Zebra Mussels and Cyanobacteria Blooms
Hiba Ali, 17, Junior, South Burlington High School, South Burlington, Vermont, T: Nathaniel Moore

MCRO058  Evaluation of Phosphatase Genes in Aspergillus fumigatus for Viability as Novel Therapeutic Targets, Year Two
Emily Ann Dean, 17, Senior, Woodstock Union High School Middle School, Woodstock, Vermont, T: Vanessa Cramer
EAEV088 Detection of Coliforms in Adam’s Canyon Watershed
Thanaphone Glenn Shields, 15, Freshman, West Point Junior High School, West Point, Utah, T: Haylie Tracy

ENMC058 A Robotics Assistive Device Application in Minimizing Manibus Tremors in Persons Afflicted with Bradykinesia: Phase V
# Shaylee Stanger, 17, Junior, Clearfield High School, Clearfield, Utah, T: Jana Barrow

MCRO031 PCR Pandemonium: A Study of Thermophilic Bacteria DNA Polymerases and Their Application in PCR
# Sierra Lutz, 18, Senior, Farmington High School, Farmington, Utah, T: Jana Barrow

PHYS059T Transportation of the Future: How the Variance of Diamagnetic Properties Apply to Transportation
Jaci Moss, 16, Sophomore, Joshua Hilbig, 15, Sophomore, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin

PLNT029 Conducting Research for the Benefit of Agriculture: Separating Phaseolus vulgaris Seeds into Groups
Abbigail Dawn Matthews, 14, Freshman, West Point Junior High School, West Point, Utah, T: Haylie Tracy

Cedar City, USUT02, Southern Utah Science and Engineering Fair

BMED065 Effects of Brewing Conditions on the Antioxidant Capacity of Artemisia tridentata
Tyneeshia Amber Shortman, 17, Junior, South Sevier High School, Monroe, Utah, T: Deborah Morgan

EAEV093 The Burning Effects of Sunscreen on Coral Algae (Zooxanthellae)
Adrie Earl, 17, Junior, Success Academy DSU, St. George, Utah, T: Megan Liljenquist

MATS039 Manganese Nanoparticle Synthesis Using Various Capping Agents and the Effects of Nanoparticles on Raphanus sativus: A Second Year Study
# Taytum Oakden Stratton, 16, Sophomore, Canyon View High School, Cedar City, Utah, T: Cassy Sandoval

PLNT039 Effects of Hydroponic Growth on Antioxidant Levels of Lactuca sativa
Beth Mace Robinson, 15, Freshman, South Sevier High School, Monroe, Utah, T: Deborah Morgan

Ogden, USUT03, Weber Area Science and Engineering Fair

BEHA014 How Diverse Learning Environments Impact Students’ Overall Well-Being
Lucianna Katherine Davis, 16, Sophomore, Fremont High School, Plain City, Utah, T: Robert Riley

EAEV013 Environmental Impact of Batteries on Animal and Human Health through Soil and Groundwater Contamination
McKayla J. Tingey, 18, Senior, Weber High School, Pleasant View, Utah, T: Colten Smith

EAEV014 Comparative Analysis of the Effectiveness of Cetyl Alcohol (Hexadecan-1-ol) and Shade Balls in Preventing Evaporation of Water
Alyse Amelia Radle, 15, Freshman, North Ogden Junior High, North Ogden, Utah, T: Lareen Radle

PHYS015 The Effects of Mass and Grade on Cycling Effort
Lucas Joseph Staten, 15, Freshman, Bonneville High School, Washington Terrace, Utah, T: Benjamin Sherman

Provo, USUT04, Central Utah STEM Fair

ANIM039 Connections Between Wing Color and Color Vision Among the Monarch Butterfly and the Rare White Morph, Danaus plexippus nivosus
Kyri Forman, 18, Senior, Timpanogos High School, Orem, Utah, T: Josh Heward

ANIM040 Comparison of Same-Hen Yolk and Serum Antibody Levels Using the Elisa Test Following Vaccination with Typical Vaccines Used in Commercial Laying Hens
## Jesse Shepherd, 17, Junior, Spanish Fork High School, Spanish Fork, Utah, T: Brad Warren
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Become that someone at Saint Francis University.

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VIRGINIA

Arlington, USVA01, Northern Virginia Science and Engineering Fair

CELL031 Single-cell RNA Sequencing Analysis of Human Neural Grafts Revealed Unexpected Cell Type Underlying the Genetic Risk of Parkinson’s Disease
Susan (Yingshan) Wang, 17, Junior, Episcopal High School, Alexandria, Virginia, T: Gang Wu

EAEV094 Development of a Zeolite Composite Material for the Simultaneous Removal of Pharmaceuticals, Personal Care Products (PPCPs), and Perfluorinated Alkyl Substances (PFAS) in Water Treatment
James Licato, 18, Senior, Washington-Lee High School, Arlington, Virginia, T: Lourdes Sotomayor

Charlottesville, USVA02, Virginia Piedmont Regional Science Fair

BEHA052 Analyzing Political Polarization through Agent-Based Modeling
Samuel Perry Rosner, 17, Junior, Albemarle High School, Charlottesville, Virginia, T: Kevin Huff

ROBO088 A Fall Detection and Prevention Shoe for the Elderly and Balance Impaired
Anna Rosner, 15, Sophomore, Albemarle High School, Charlottesville, Virginia, T: Kevin Huff

Fairfax, USVA03, Fairfax County Regional Science and Engineering Fair

ANIM026 What’s All the Buzz? Drosophila melanogaster as a Unique Model for Addiction Disorders and Physiology After Traumatic Brain Injury (TBI)
Shan Lateef, 17, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Jennifer James

BCHM011T Protein Secondary Structure Assignment (SSA) by Clustering Amino Acid Residues in the Space of Topological Descriptors
Sumanth Ratna, 16, Junior, Sagar Gupta, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Dan Tra

BCHM013T Managing Hyperlipidemia: Algae as Lipase Inhibitors
Gitali Bhanot, 16, Junior, Sana Ashlyn Friedman, 16, Junior, Oakton High School, Vienna, Virginia, T: Grace Wang

CHEM024 The Effect of the Mass of Sodium Bicarbonate on Endothermic Reactions
Kiara Adrianna-Stephenson Fenn, 16, Sophomore, Fairfax High School, Fairfax, Virginia, T: Sara Hubbart

CHEM025 New Methods for Computing the Configurational Entropy of Deeply Supercooled Liquids with the Potential Energy Landscape
Kaien Yang, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Brian Kennedy

ENBM044 An Ultra-Low Cost, Brain-Controlled Transhumeral Prosthesis Operated via a Novel EEG/Gesture-Based Approach
Benjamin Choi, 16, Junior, The Potomac School, McLean, Virginia, T: Isabelle Cohen

PHYS030T Modeling Coronal Faraday Rotation of Radiation from Extragalactic Radio Sources
Aditi Jayaram Chandrashekar, 18, Senior, Vance Kreider, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Kelsey Stuart

SOFT024 DORC: Dynamic Operating Room Companion for Gallbladder Removal Surgery Workflow Verification
Pravalika Gayatri Patalapattu, 16, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Shane Torbert

TMED022 PANDwriting: An Accessible Parkinson’s and Alzheimer’s Novel Diagnostic Framework Using Vision-Based Handwriting Kinematic Analysis and Machine Learning
Ron Nachum, 16, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: John Zacharias
TMED024  A-EYE: Utilizing Multistage Neural Networks and Landmark Localization for Fundus Image Disease Detection
Thomas Ka-Chun Chia, 17, Junior, Chantilly High School, Chantilly, Virginia, T: Corey Porter

Harrisonburg, USVA04, Shenandoah Valley Regional Science and Engineering Fair
ANIM035  Jumping Spiders Perform Head Saccades During Prey Tracking
Nathalie Schelin, 17, Junior, Mountain Vista Governors School, Middletown, Virginia, T: Corey Cleland

EAEV040  Eastern Skunk Cabbages: A Natural and Sustainable Solution for Combating Bank Erosion
Chelsea Hu, 15, Freshman, BASIS Independent McLean, McLean, Virginia, T: Raymond Wright

Lynchburg, USVA05, Central Virginia Regional Science Fair
EGSD029  Using Piezoelectricity to Create a Self-Powered Calculator
Jade Axele Personna, 16, Junior, Central Virginia Governor's School for Science and Technology, Lynchburg, Virginia, T: Jeff Steele

PLNT018  The Effect of Added Polyamines on Glycine max Responses to Drought
Beverly Eborn, 16, 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
ANIM057  Evaluating the Benefits of Selected Medicinal Herbs on the Regeneration Rate of D. dorotocephala
Agnes Eunbin Cho, 16, Sophomore, Osbourn Park High School, Manassas, Virginia, T: Julia Renberg

CBIO071T  Augmenting 3D, T1-Weighted, Magnetization-Prepared Rapid Acquisition with Gradient-Echo (MP-RAGE) Sequenced MRIs through Gaussian Filters and Skull Stripping for Alzheimer’s Disease Diagnosis via 3D CNNs
Khoi Anh Nguyen, 18, Senior, Anish Chandra Pothireddy, 17, Senior, Governor’s School at Innovation Park, Manassas, Virginia, T: Ales Psaker

Ashburn, USVA07, Loudoun County Science and Engineering Fair
CBIO058  Molecular Docking Analysis of Novel SARS-CoV-2 Inhibitors Based on Structural Homology
Jonah Han, 17, Senior, Independence High School, Ashburn, Virginia, T: Benjamin Kagan

PHYS045  Identification of Albedo Variegations on Asteroid Surfaces through Comparisons Between Optical and Infrared Datasets
Jack Nowinski, 17, Junior, Academies of Loudoun, Leesburg, Virginia, T: Ethan Kantz

ROBO045  Uncovering of Aged Sanskrit/Devanagari Documents Utilizing Generative Adversarial Networks and Tomography to Multidimensionally Reconstruct Missing Elements
Srivatsa Krishnamurthy, 16, Junior, Rock Ridge High School, Ashburn, Virginia, T: Dermot McGee

SOFT032T  Automatic Music Generation with Deep Learning
Adelynn Crim Jones, 17, Senior, Jaehee Kim, 18, Senior, Academies of Loudoun, Leesburg, Virginia, T: Tobie Juleau

Roanoke, USVA08, Western Virginia Regional Science Fair
EAEV044  Analysis of Microbial Diversity in PCB-Contaminated Environments
Eleanor Thompson Little, 16, Sophomore, Roanoke Valley Governor’s School for Science and Technology, Roanoke, Virginia, T: Joanne Villers

ENMC056T  Rotating Weekly Pill Dispenser
Sydney Elizabeth Vokus, 17, Junior, Kierstyn Alise Stanley, 17, Senior, Roanoke Valley Governor’s School for Science and Technology, Roanoke, Virginia, T: Andrew Hurst
MCRO023T  The Effect of *Trametes versicolor* Infused Bandages on *Staphylococcus epidermidis*
Emma Kathleen Greer, 18, Senior, Cynthia Kaitlyn Lin, 17, Junior, Jennie Pham, 18, Senior, Roanoke Valley Governor’s School for Science and Technology, Roanoke, Virginia, T: Joanne Villers

Norfolk, USVA09, Tidewater Science and Engineering Fair

CBIO078T  Application of Deep Learning in Target Identification through Determining the Mechanism of Action Given Cellular Signature Data
Omar Abul-Hassan, 16, Junior, Ayush Jain, 17, Junior, Ocean Lakes High School, Virginia Beach, Virginia, T: Babette Shoemaker

EAEV069  Rapid Intensification of Hurricanes in the Atlantic Basin
Cameron Blake Carter, 18, Senior, Ocean Lakes High School, Virginia Beach, Virginia, T: Allison Graves

Radford, USVA10, Blue Ridge Highlands Regional Science Fair

MATH023  Modeling COVID-19: Simulating the Effects of Waning Immunity Using a New Multi-Compartment Epidemiological Model
Shoshana Sarah Elgart, 15, Freshman, Blacksburg High School, Blacksburg, Virginia, T: Lauren Childs

MCRO018  Diversity of Arctic Ice Bacteria in Relation to Position and Distance from the Shore
Katelyn Idella Elizabeth Collett, 18, Senior, Southwest Virginia Governor’s School, Pulaski, Virginia, T: Rebecca Philips

Richmond, USVA11, Metro Richmond STEM Fair

EAEV063  Aero2Aqua: A Novel Bioinspired Atmospheric Water Harvester
Cameron Sharma, 17, Junior, Mills E. Godwin High School, Henrico, Virginia, T: Heather Martin

ENBM091  The Effect of Rat Brain Phantom Construction on Mimicry of the True Brain Model
Chirayu Sachin Nimonkar, 17, Junior, Mills E. Godwin High School, Henrico, Virginia, T: Samantha Cope

MCRO028  The Effect of Coronavirus Species on the Binding Strength to a Neutralizing Antibody
Monona J. Zhou, 14, Freshman, Mills E. Godwin High School, Henrico, Virginia, T: Samantha Cope

ROBO077  A Novel Integrative WSI-Based Deep Learning Framework for Breast Cancer IMS Classification
Laasya Konidala, 16, Sophomore, Mills E. Godwin High School, Henrico, Virginia, T: Dana Delano

Roanoke, USVA50, Virginia State Science and Engineering Fair

CBIO088  Automated Bias Reduction in Deep Learning Based Melanoma Diagnosis Using a Semi-Supervised Algorithm

ENMC045  A Self-Replicating 3D Printer
Brian Minnick, 17, Senior, Academies of Loudoun, Leesburg, Virginia, T: John Chapin

MATS038  Surface Modifications of Cellulose Acetate Film for the Applications of Face Shields

ROBO089T  SoundScape: Real-Time 3D Sound Localization and Classification with Sensory Substitution for the Deaf and Hard of Hearing
**Regeneron International Science and Engineering Fair 2021**

**Finalist Directory**

TMED050  Identification of Fluoxetine as a Direct NLRP3 Inhibitor to Treat Atrophic Macular Degeneration: Molecular Modeling, Mechanism, Morphometry, and Meta-analysis (Year 2)

# Meenakshi Ambati, 16, Junior, Albemarle High School, Charlottesville, Virginia, T: Bradley Gelfand

**WASHINGTON**

Kennewick, USWA01, Mid-Columbia Regional Science and Engineering Fair

BEHA037  Analysis of COVID-19 Misinformation Origin and Cure Narratives

Anika Halappanavar, 16, Sophomore, Richland High School, Richland, Washington, T: Dale Ingram

CBIO038  Predicting the Risk of Other Species Susceptibility to SARS-COV-2 by Analyzing ACE2 Protein Sequences

Daniel Piao Li, 17, Junior, Hanford High School, Richland, Washington, T: Brian Palmer

EGSD021  Modeling of Ion Uptake to Understand Molecular Level Interactions of Pyrrole/Nafion and Aniline/Nafion Bipolar Membranes for Fuel Cell Use

## Nikhita Amrutha Bontha, 16, Junior, Hanford High School, Richland, Washington, T: Brian Palmer

Tacoma, USWA02, South Sound Regional Science and Engineering Fair

CHEM033T A Perovskite Crystal Structure Prediction and Screening System Using Complex Machine Learning Methods

# Smriti Manickam Somasundaram, 16, Junior, Sathvik Nallamalli##, 17, Senior, Olympia High School, Olympia, Washington, T: Paul Rae

EAEV058  New Estimates of Nitrogen Fixation on Early Earth

Madeline Eve Christensen, 18, Senior, Bellarmine Preparatory School, Tacoma, Washington, T: Dave Degroot

ENMC054T Study Comparison: Avalanche Snow Probes versus Conventional Snow Pit in Determining Avalanche Danger

Luke Jouflas, 18, Senior, Henry Connor Jacobson, 18, Senior, Bellarmine Preparatory School, Tacoma, Washington, T: Dave DeGroot

ROBO057  Phytoplankton Detection Using Machine Learning and a Mobile Application

Jordan Alexander Janakievski, 18, Senior, Bellarmine Preparatory School, Tacoma, Washington, T: Dave DeGroot

Bellevue, USWA03, Central Sound Regional Science & Engineering Fair

BEHA065  High Accuracy Neural Network Based Deep Learning Solution For Non-Intrusive Early Diagnosis of Dementia

Kosha Upadhyay, 14, Freshman, Bellevue Senior High School, Bellevue, Washington, T: Snehal Upadhyay

CBIO060  Predicting Cancer Stem Cell Biomarkers with Machine Learning

Julia Liu, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

EAEV057  Path Dependence of Atlantic Meridional Overturning Circulation Weakening: A Geostrophic Shear Approach

Yuchen Li, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

PHYS037 Data-Driven Approaches to Pulsar Glitch Triggers, Evolution, and Universality

## Christine Ye, 16, Junior, Eastlake High School, Sammamish, Washington, T: Casey Green

TMED032 Apply Machine Learning to Identify Unique Patient Clusters and Associated Key Biomarkers in Rheumatoid Arthritis Developing a Point of Care Test with a Multi Biomarker Panel for RA Patient Classification and Disease Progression

Gabriella Lui, 16, Junior, Newport Senior High School, Bellevue, Washington, T: Michelle Neises
Vancouver, USWA04, Southwest Washington Science and Engineering Fair

**BCHM005**  Apoptotic Proteins
Fahmid Rahman, 18, Senior, Mountain View High School, Vancouver, Washington, T: Alison Nightingale

**CBIO024**  MRI-based Diagnosis of Alzheimer’s Disease Using Deep Learning with CycleGAN for Data Augmentation
Sunny Wang, 17, Junior, Camas High School, Camas, Washington, T: Brianna Abraham

**MATS013**  The Neptune by Hydrosolve: A Water-Soluble Facial Mask Combating Oceanic Plastic Pollution
Liyu Huang, 18, Senior, Jace Twyman Creech, 17, Senior, Bianca Luana Bucerzan, 18, Senior, Skyview High School, Vancouver, Washington, T: Mahenrika Malixi

**SOFT031**  Lucia: Creating Performance-Focused Web Applications
Aiden Yutong Bai, 16, Sophomore, Camas High School, Camas, Washington, T: Brianna Abraham

Spokane, USWA05, Eastern Washington Regional Science and Engineering Fair

**ANIM019**  The Effect of Sugar Concentration Found in Popular Soft Drinks on Armadillidium vulgare’s Innate Behavior Patterns
Rohini P. Kilaru, 17, Senior, Lewis & Clark High School, Spokane, Washington, T: Eric Strate

**EGSD009**  The Use of Fluorescent Proteins GFP and EBFP2-BFP for Enhanced Solar Energy Production through the Usage of Magnifiers
Ainsley Honora McCollum, 18, Senior, Joel E. Ferris High School, Spokane, Washington, T: Darci Hastings

**ENBM031**  Customized 3D Printing of Live Cells for Novel Bio-circuitry
Emily Elizabeth Scrupps, 16, Junior, Odessa High School, Odessa, Washington, T: Jeff Wehr

**ENBM085**  Engineering a Clinical Force Measuring Walker for Patients with Restricted Upper Extremity Weight Bearing
Ansel Kinney LaPier, 17, Junior, Central Valley High School, Spokane Valley, Washington, T: Kimberly Cleary

**ROBO051**  ComposeGAN: A Conditional GAN Approach to Symbolic Music Style Transfer
Conan Lu, 16, Junior, Redmond High School, Redmond, Washington, T: Shlomo Dubnov

**TMED040**  Determining the Prognostic Value of the DNA Methylation of the GYPC, NME1, and SLIT2 Genes in Human Lung Adenocarcinoma
Uma Paul, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender
WEST VIRGINIA

Keyser, USWV01, Eastern Panhandle Science and Engineering Fair

ENMC038 Creating a One-Thousand Dollar Supercomputer
Bronte Lea Stump, 16, Sophomore, Spring Mills High School, Martinsburg, West Virginia, T: Alexis Emch

PHYS036 The Effect of a Paper Airplane’s Wing Shape on the Distance the Paper Airplane Can Fly
Makaylee Haynes, 15, Freshman, Hedgesville High School, Hedgesville, West Virginia, T: Andrew Ferber

Fairmont, USWV50, West Virginia State Science and Engineering Fair

ANIM045 Chasing Fireflies: Creating a Firefly Sanctuary to Increase the Firefly Population
Alexandria Amaria Harper, 15, Freshman, Riverside High School, Belle, West Virginia, T: Robert McCloud

ROBO070 Automated Recognition of Autism Based on Visual Analysis with Artificial Intelligence Techniques
# Alice Guo, 17, Junior, Morgantown High School, Morgantown, West Virginia, T: William Gibson

WISCONSIN

Glendale, USWI02, Nicolet Science and Engineering Fair

SOFT055 Enterprise Scale Inventory Optimization: Building a Modern Web Application to Improve Inventory and Supply Chain Optimization by Incorporating Advanced Analysis and Business Intelligence into Existing Techniques with a Cohesive, User-friendly Solution.
Thomas Marshall Vielmetti, 17, Junior, Nicolet High School, Glendale, Wisconsin, T: Stephanie Rasmussen

Milwaukee, USWI03, University School of Milwaukee – Science Fair

BCHM004 Computer-Aided Investigation of Methoctramine-ExoU Interactions
Mya Lynneese Johnson, 18, Senior, University School of Milwaukee, Milwaukee, Wisconsin, T: Greg Marks

BMED007 A Review of Shiga Toxin-producing E. coli-induced Convulsions/Seizures Effects on the Expressions of Drosophila melanogaster
Jordan Lee Thomas, 15, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

ROBO009 Novel Implementation of Deep Learning for Breast Cancer Detection Using Convolutional Neural Networks and Transfer Learning
# Buwei Chen, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

Madison, USWI04, Capital Science and Engineering Fair

ENEVO09 An Investigation into the Removal of Dyes and Plastic Microfibers from Wastewater
Anna Wang, 16, Junior, West High School, Madison, Wisconsin, T: Eric Gettrust

ENMC008T Method for Reducing Carbon Emissions from Small Two-Stroke Engines
Aidan Blenker, 17, Senior, Luke Foye, 18, Senior, Muskego High School, Muskego, Wisconsin, T: Karen Lindholm-Rynkiewicz

Milwaukee, USW150, Badger State Science and Engineering Fair

CELL038 Discovery of Novel Dual Phosphatase Kinase Regulating Pyocyanin Secretion in Pseudomonas aeruginosa
Riju Dey, 16, Junior, Shorewood High School, Shorewood, Wisconsin, T: Sam Nadolsky
Finalist Directory

ENEV082  The Dispersion of Micron-Sized Aerosolized Particles Under Variable Air Environments: Implications in Respiratory Disease Transmission
Max Cole Watchmaker, 16, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

MATS018  The Effects of Lattice Structure on SLA 3D Printed Piezoelectric PVDF
Ethan Mark Zentner, 16, Sophomore, Nicolet High School, Glendale, Wisconsin, T: Stephanie Rasmussen

WYOMING
Laramie, USWY50, Wyoming State Science Fair

EBED008  Smart Caretaker: A Health Band to Assist in the Care of Alzheimer's Patients
Zoya Khan, 14, Freshman, Cheyenne Central High School, Cheyenne, Wyoming, T: Julie Calkins

MATS012  Utilization of a Polystyrene-Dense Metal Matrix to Reduce Radiation Exposure and Weight Characteristics
Seamus Bercher, 18, Senior, Greybull High School, Greybull, Wyoming, T: Joel Kuper

UNITED STATES VIRGIN ISLANDS
St. Croix, United States Virgin Islands, TEVI02, Good Hope Country Day School Science Fair

BMED081  Beat the Heat
Aidan Joseph Fitzgerald, 15, Freshman, Good Hope Country Day School, Kingshill, United States Virgin Islands, T: Jane Coles

ENMC075  Using Programming to Create Images into Tactile 3D Objects
Nick Turk, 15, Freshman, Good Hope Country Day School, Kingshill, United States Virgin Islands, T: Sara Dykstra

VIETNAM
Ha Noi City, Vietnam, VNM001, Ha Noi Science Fair

BEHA066T  High School Students’ Psychological Difficulties in Online Learning
Phuc Viet Hoang, 16, Sophomore, Mai Phuong Vu, 17, Junior, Lao Cai High School for Gifted Students, Lao Cai, Lao Cai, Vietnam, T: Pham Hue

BMED062T  Marine Microalgae: Natural Nutritious Food Source for Clam Larvae (Meretrix meretrix)

CHEM052T  Optimize Peptide Polybia-MP1 as Potential Anticancer Agents
Anh Thuy Mai, 15, Sophomore, Tam Duc Do, 15, Sophomore, Lam Son High School for the Gifted, Thanh Hoa, Vietnam, T: Phuong Mai

ENBM072T  Manual Function Rehabilitation Device for Post-Stroke Patients
Man Minh Huynh, 16, Junior, Khoi Dinh Mai, 17, Junior, Le Hong Phong High School for the Gifted, Ho Chi Minh, Vietnam, T: Triet Do

ENMC060T  Robotic Arms for Paralyzed Arms
Linh Duc Pham, 16, Junior, An Duc Nguyen, 16, Junior, Han Thuyen High School, Bac Ninh, Vietnam, T: Tien Ngo

MATH039T  Stimulating Mathematical Thinking through the System of Geometric Exercises and Games Designed by Scratch Programming
Khoa Dang Huynh, 14, Freshman, Chau Anh Le, 14, Freshman, Nguyen Tri Phuong Lower Secondary School, Hue, Thua Thien Hue, Vietnam, T: Trang Tran
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MATS029T On-Demand Release of Drug from Magnetic Nanoparticle-Loaded Alginate Beads
Minh Nguyet Nguyen, 15, Sophomore, Minh Duc Vu, 15, Sophomore, Nguyen Tat Thanh
Lower and Upper Secondary School, Hanoi, Vietnam, T: Duc Tran

ZIMBABWE
Harare, Zimbabwe, ZWE001, Zimbabwe National Science Fair

CELL005 Yeast to Milk Technology
Taidaishe Nenyasha Mbizvo, 16, Sophomore, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: James Takaendesa

CHEM010 Algae-Based Sol-Gel Technology: A Novel Approach to the Bioremediation of Wastewater
Vivian Clarissah Chinoda, 19, Senior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Knowledge Chikundi

EAEV012 Climate Clock: A Window of Hope—Our Most Critical Time Window to Take Bold, Transformative Action to Protect Our Climate for All Generations
Marlvern Chimbwanda, 19, Senior, Mufakose 1 High School, Mufakose, Harare, Zimbabwe, T: Solomon Kembo

EGSD007 The Profitable Catalytic Converter: Making a Converter that Stops the Emission of a Greenhouse Gas to Make a Fuel
Shammah Ruvimbo Tayengwa, 16, Junior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Knowledge Chikundi

EGSD008 Waste Heat Recovery Cooking Pot
Tanaka Chirara, 16, Sophomore, ZRP High School, Harare, Zimbabwe, T: Richard Ngomanyuni

EGSD030 Portable Self Powered Generator that Uses Magnetic Induction to Generate Electricity
Adrian Friend Machingura, 18, Senior, Mother Touch High School, Harare, Harare Province, Zimbabwe, T: Blessing Chipembere

ENEV013T Home Based Portable Water Purifier: A Water Quality Enhancement System
Panashe Muzite, 18, Senior, Macfaden Ngoni Tanaka Munyoro, 18, Senior, Nyatsime College, Harare, Harare, Zimbabwe, T: Cladius Choto

ROBO024 The Keeper
Blessings Lethubuhle Mary Ncube, 18, Senior, Plumtree High School, Plumtree, Matabeleland South, Zimbabwe, T: Mercy Nyandoro
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We especially want to express our thanks to those individuals from around the globe who stepped forward to volunteer at this year’s virtual Regeneron ISEF 2021. We recruited:

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