THINK BEYOND

Intel International Science and Engineering Fair 2019 Program
May 12–17, 2019
Phoenix, Arizona
About the Intel ISEF

The Intel International Science and Engineering Fair (Intel ISEF), a program of Society for Science & the Public, is the world's largest international pre-college science competition. The Intel ISEF is the premier science competition in the world and provides a forum for more than 1,850 high school students from 80 countries, regions and territories to showcase their independent research annually. Each year, millions of students worldwide compete in local science fairs; winners go on to participate in Intel ISEF-affiliated regional, state and national fairs to earn the opportunity to attend the Intel ISEF. Uniting these top young scientific minds, the Intel ISEF provides the opportunity to finalists to display their talent on an international stage, while enabling them to submit their work for judging by doctoral-level scientists. The Intel ISEF awards nearly $5 million in prizes and scholarships annually.
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Dear Intel ISEF Finalists, Educators, Families, Fair Directors, and Special Guests:

Congratulations and welcome to the 2019 Intel International Science and Engineering Fair (ISEF) in Phoenix! We are very happy and excited to have you here. Many of you have traveled far and wide for this amazing experience and we hope you enjoy your time at this enriching experience.

We encourage you to make new friends, ask questions during the exciting sessions, and embrace the spirit of our theme to “THINK BEYOND” in the following three ways:

**BEYOND YOURSELF:** There is perhaps no greater collection of brainpower in one place than Intel ISEF! Innovation doesn’t happen in a vacuum, so take advantage of this chance to learn from your fellow Intel ISEF finalists as well as the judges, panelists, and Nobel Laureates. Step outside your focus area and take it all in!

**BEYOND DOUBT:** Our world faces many challenges, and it’s important to remember that the status quo defines only what hasn’t been discovered yet. The ideas that the Intel ISEF community are bringing into existence through hard work and collaboration will fundamentally change the world in ways that are impossible to imagine today. Think deeply about what impact your work can have on the planet, or just a single person. Believe in yourself—always!

**BEYOND BARRIERS:** You will meet people from many countries and cultures during this action-packed week. Take this opportunity to look beyond your differences of language or appearance and find what brings you together. Whether you’re a finalist or a fair director, you can build relationships and foster community that will enrich your perspective.

Also, I want to express my gratitude to you for helping to create this memorable experience, and to the many dedicated families, supporters, and volunteers who make the event possible.

As you continue your journey to build a better world, remember the great words of Intel’s co-founder, Robert Noyce, “Don’t be encumbered by history. Go off and do something wonderful.”

Welcome to 2019 ISEF,

Pia Wilson-Body
President, Intel Foundation
Welcome to the Intel International Science and Engineering Fair 2019!

Congratulations on being selected to compete at Intel ISEF! Tens of millions of students compete in science fairs every year around the globe, with only about 1,800 students invited to join us as a finalist. You are truly among an elite group. Alumni have gone on to win some of the most prestigious awards, including being named Nobel Laureates and MacArthur Prize winners, they have gone on to launch companies and they have gone on to academia to teach the next generation of scientists and engineers.

While you are here, I encourage you to take advantage of everything that Intel ISEF has to offer, including connecting with your fellow finalists. The nearly $5 million being given away in awards this week is not the only benefit of attending Intel ISEF. The real prize is the opportunity to connect with so many young scientists from around the world. Many Intel ISEF alumni stay in touch with one another, developing not only lifelong friendships, but also collaborating professionally later in life.

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

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

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

The Society for Science & the Public would like to thank Intel for their sponsorship, the many additional organizations that have provided support and awards, the volunteers from Phoenix and throughout the country who make this event possible, as well as the people who work so diligently to organize science fairs around the world.

I hope all of you have a wonderful time at Intel ISEF 2019, and we hope to see you all next in Anaheim, California, for ISEF 2020!

Sincerely,

Maya Ajmera
President & CEO
Society for Science & the Public
Publisher, Science News
May 2019

Welcome!

As Governor of the State of Arizona, I am pleased to welcome you to the 2019 Intel International Science & Engineering Fair (Intel ISEF). This will be the fourth time that ISEF has taken place in Arizona.

Innovation is a key component to economic development and prosperity. Every one of you, either as a finalist, a teacher, a scientist or as a student observer demonstrate a passion for innovation and exploring new solutions to the complex challenges our world faces today and in the future.

Arizona is a place for diverse opportunity and experiences with the Old West and Native American heritages blending traditional cultures by celebrating Arizona’s past and present. I hope that while you are here in our beautiful state, you will take time outside of the Phoenix Convention Center to enjoy all that Arizona has to offer.

I congratulate the finalists and all of the people who helped them get to the Intel ISEF. This is a well-earned and respected achievement. I wish you an exciting competition experience and an amazing visit to Arizona. Keep up the exceptional work!

Sincerely,

[Signature]

Douglas A. Ducey
Governor
State of Arizona
Phoenix is the cosmopolitan heart of Arizona and the sunniest metropolis in America. It is home to one of the most sophisticated convention centers in the country, and its urban core has been revitalized by new hotels, an entertainment district and a light-rail transportation system.

Yet, amid the big-city bustle, you'll still find rugged mountains, quiet trails and the kind of cactus most people see only in cartoons.

Phoenix's famously sunny weather lends itself to outdoor fun. Visitors can spy on coyotes from the basket of a hot-air balloon, float past wild horses on the Salt River, stroll through a botanical garden dedicated to the desert plants of the world, or learn racing skills at school for high-performance driving.

The Phoenix Convention Center is located in the heart of downtown Phoenix, which is where you’ll find indie restaurants, music halls and sports arenas. Downtown is home to buzz-worthy neighborhoods like Roosevelt Row and historical districts like Heritage Square. Billions of dollars of development—including a growing biomedical campus and Arizona State University’s journalism and law schools—have lured hot chefs, young artists and independent retailers into downtown, burnishing Phoenix’s reputation as one of the premier convention destinations in America.
Gordon E. Moore co-founded Intel Corporation in 1968, serving as president and CEO as well as Chairman of the Board before his retirement in 1997. With degrees in chemistry and physics from University of Pennsylvania, Berkeley (B.S.) and Caltech (Ph.D.), Moore is widely known for “Moore's Law,” the driving pulse of the semiconductor industry.

He and his wife, Betty Moore, have created the Gordon & Betty Moore Foundation and are among the world's most generous philanthropists. He is widely admired for his technical leadership and his role as one of the creators of today’s Silicon Valley, as well as for his ongoing philanthropic role supporting environmental efforts and science education and research.

The Gordon E. Moore Award recognizes the best of the Best of Category among the outstanding students from around the world who participate in the Intel International Science and Engineering Fair. The winning project is selected on the basis of outstanding and innovative research, as well as on the work's potential in the winner's field and on the world at large.

Intel Foundation is proud to present the Gordon E. Moore Award, as well as a prize of $75,000, to the Intel International Science and Engineering Fair 2019 winner.
Society for Science & the Public acknowledges with gratitude

Intel Corporation
and
Intel Foundation

for their support of the Intel ISEF 2019.

Intel has invested more than $1 billion, and Intel employees have donated over four million volunteer hours, to improve education in more than 80 countries, regions and territories.

Intel is actively involved in education programs, advocacy and technology access to help tomorrow's innovators.

Intel is proud to serve as the title sponsor of the Intel International Science and Engineering Fair.
As a result of their excellent performance at an Intel ISEF-affiliated fair at a local, regional or national level this year, nearly 1,850 students earned finalist status at the Intel ISEF 2019 in Phoenix.

Finalists will compete for nearly $5 million in awards and scholarships. They will be judged on their creative ability and scientific thought, as well as the thoroughness, skill and clarity shown in their projects.

**2019 GRAND AWARDS INCLUDE:**

**Gordon E. Moore Award**
Intel and Society for Science & the Public are pleased to present an award of $75,000 to the top Best of Category project.

The Gordon E. Moore Award recognizes the Best of the Best among the outstanding students from around the world who participate in Intel 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.

**Intel Foundation Young Scientist Award**
Intel and Society for Science & the Public will present $50,000 to two Best of Category projects. These finalists will be selected for their commitment to innovation in tackling challenging scientific questions, using authentic research practices and creating solutions to the problems of tomorrow.

**Craig R. Barrett Award for Innovation**
The Craig R. Barrett Award for Innovation is a new $10,000 Grand Award to be given to the finalist who best demonstrates an innovation in Science, Technology, Engineering and Math. The award will be designated as a scholarship to be applied by its winner to the educational institution of his or her choice.
Dudley R. Herschbach SIYSS Award
Three finalists will win an all-expenses paid trip to attend the Stockholm International Youth Science Seminar (SIYSS), which includes attendance at the Nobel Prize ceremonies in Stockholm, Sweden. This award is named for Dudley R. Herschbach, Harvard Professor and 1986 Nobel Laureate in Chemistry. He is the Emeritus Board Chair of Society for Science & the Public.

European Union Contest for Young Scientists Award
An all-expenses-paid trip enables attendance at the European Union Contest for Young Scientists to be held in Sophia, Bulgaria in 2019.

Intel ISEF Best of Category Award
Intel will present Best of Category project winners with $5,000. Additionally, a $1,000 grant will be given to the winner's school and the Intel ISEF-affiliated fair they represent.

Intel ISEF Grand Award
Presented in each of the 22 Intel ISEF categories, Grand Awards are given for:

<table>
<thead>
<tr>
<th>Place</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>$3,000 cash award</td>
</tr>
<tr>
<td>2nd</td>
<td>$1,500 cash award</td>
</tr>
<tr>
<td>3rd</td>
<td>$1,000 cash award</td>
</tr>
<tr>
<td>4th</td>
<td>$500 cash award</td>
</tr>
</tbody>
</table>

Monetary awards are allocated by project, not by number of finalists winning the award. For example, a three-person team project that wins first place will win $3,000, to be split evenly among the team members.
Society for Science & the Public and Intel thank the following organizations for their generous support of the Intel ISEF 2019 Education Outreach Day Program to be attended by more than 3,000 local middle and high school students and their teachers.

Asstavadhani Vidwan
Ambati Subbaraya
Chetty Foundation

Feng Zhang Fund
for STEM Education
and Research

Dr. Nelson Ying

The sponsors are proud to support the participating students and hope that the Intel ISEF Education Outreach Day Program will inspire the students, their teachers and parents, local scientists and community attendees.
Intel ISEF 2019 Special Award Organizations provide education scholarships, cash awards, summer internships, scientific field trips and equipment grants. Intel and Society for Science & the Public thank the following organizations for their support of the Intel ISEF.

Acoustical Society of America
Air Force Research Laboratory on behalf of the United States Air Force
American Chemical Society
American Committee for the Weizmann Institute of Science
American Geosciences Institute and the Geological Society of America
American Institute of Aeronautics & Astronautics
American Mathematical Society
American Meteorological Society
American Psychological Association
American Statistical Association
Arizona Public Service Company
Arizona State University
Ashtavadhani Vidwan Ambati Subbaraya Chetty Foundation
Association for Computing Machinery
Association for the Advancement of Artificial Intelligence
ASU Rob and Melani Walton Sustainability Solutions Initiatives
China Association for Science and Technology (CAST)
Drexel University
Drug, Chemical & Associated Technologies Association (DCAT)
Florida Institute of Technology
Fondazione Bruno Kessler
GoDaddy
IEEE Foundation
Innopolis University
Intel Foundation
International Council on Systems Engineering — INCOSE
K. Soumyanath Memorial Award
King Abdul-Aziz & his Companions Foundation for Giftedness and Creativity
Mu Alpha Theta, National High School and Two-Year College Mathematics Honor Society
National Aeronautics and Space Administration
National Anti-Vivisection Society
National Center — Junior Academy of Sciences of Ukraine
National Institute on Drug Abuse, National Institutes of Health and the Friends of NIDA
National Oceanic and Atmospheric Administration — NOAA
National Security Agency Research Directorate
National Taiwan Science Education Center
Office of Naval Research on behalf of the United States Navy and Marine Corps
Oracle Academy
Patent and Trademark Office Society
Ricoh USA, Inc
Shanghai STEM Cloud Center
Sigma Xi, The Scientific Research Honor Society
SPIE, the international society for optics and photonics
U.S. Agency for International Development
United States Environmental Protection Agency
United Technologies Corporation
University of Arizona
Wolfram Research, Inc.
All Intel ISEF 2019 events take place at the Phoenix Convention Center unless otherwise noted.

<table>
<thead>
<tr>
<th>Event/Group</th>
<th>Location</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Mixer</td>
<td>The Duce, 525 South Central</td>
<td>5/15</td>
</tr>
<tr>
<td>Excellence in Science and Technology Panel</td>
<td>North Halls A/B/C</td>
<td>5/14</td>
</tr>
<tr>
<td>Innovation and Entrepreneurship Panel</td>
<td>North Halls A/B/C</td>
<td>5/14</td>
</tr>
<tr>
<td>Student Mixer</td>
<td>North Halls A/B/C/D/E</td>
<td>5/15</td>
</tr>
<tr>
<td>Finalist Resource Center</td>
<td>North 126 A/B/C</td>
<td>5/12–5/14</td>
</tr>
<tr>
<td>Grand Awards Ceremony</td>
<td>North Halls A/B/C</td>
<td>5/17</td>
</tr>
<tr>
<td>Housing Information</td>
<td>Registration Complex</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>HUB (Center of Exhibit Hall)</td>
<td>North Halls 4/5</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>IB Testing</td>
<td>132 A/B</td>
<td>5/13–5/17</td>
</tr>
<tr>
<td>Intel ISEF 2019 Commons</td>
<td>West Hall 2</td>
<td>5/12–5/14</td>
</tr>
<tr>
<td>Intel Quad</td>
<td>West Hall 1</td>
<td>5/12–5/16</td>
</tr>
<tr>
<td>International/Volunteer Office</td>
<td>North 121 A/B/C</td>
<td>5/10–5/17</td>
</tr>
<tr>
<td>Locator Card Kiosk</td>
<td>Registration Complex</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>Lost and Found</td>
<td>HUB and Registration Complex</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>Movie Screening</td>
<td>AMC Theaters at the Arizona Center</td>
<td>5/13</td>
</tr>
<tr>
<td>Official Party Registration</td>
<td>Registration Complex</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>Opening Ceremony Dinner</td>
<td>North Ballroom 120 A–D</td>
<td>5/13</td>
</tr>
<tr>
<td>Opening Ceremony</td>
<td>North Halls A/B/C</td>
<td>5/13</td>
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<tr>
<td>Phoenix Information Booth</td>
<td>Lower Level Concourse</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>Press Room</td>
<td>129 A/B</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>Finalist Exhibits</td>
<td>North Halls 4/5</td>
<td>5/12–5/17</td>
</tr>
<tr>
<td>Public Visitation</td>
<td>North Halls 4/5</td>
<td>5/16</td>
</tr>
<tr>
<td>Retail Store</td>
<td>Lower Level Concourse</td>
<td>5/11–5/17</td>
</tr>
<tr>
<td>Scientific Review Committee (SRC)</td>
<td>North 127 A–C</td>
<td>5/12–5/3</td>
</tr>
<tr>
<td>Special Awards Ceremony</td>
<td>North Halls A/B/C</td>
<td>5/16</td>
</tr>
<tr>
<td>Student Observer Caucus</td>
<td>Hyatt Hotel, Regency Ballroom</td>
<td>5/15</td>
</tr>
<tr>
<td>Student Pin Exchange</td>
<td>Sheraton Hotel, Phoenix Ballroom</td>
<td>5/12</td>
</tr>
<tr>
<td>(Finalists and Student Observers Only)</td>
<td>West 101 A/B/C, 106B, 106C</td>
<td>5/13–5/16</td>
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</table>

Download the Intel ISEF app at the Apple App Store or Google Play Store or visit student.societyforscience.org/attendees for schedule updates throughout the week.

By entering the Intel International Science and Engineering Fair 2019 (Intel ISEF), you agree that you may be filmed or photographed for use in various promotional materials.

Please do not provide handouts or other materials at Intel ISEF, unless authorized in writing by the Society.
Open Daily

Exhibit Halls and the HUB
Sunday
  Finalist Project Set-up and D&S Inspections (OFP)  8:00 a.m.–8:00 p.m.
Monday
  Finalist Project Set-up and D&S Inspections (OFP)  8:00 a.m.–6:00 p.m.
Tuesday
  Finalists with Infractions only  7:30 a.m.–9:00 a.m.
  Finalists/Press/PR only  9:30 a.m.–11:00 a.m.
Wednesday
  Finalists & Judges only  8:00 a.m.–11:45 a.m., 1:15 p.m.–4:15 p.m.
Thursday
  Public Visitation Day
Friday
  Tear Down  End of Awards Ceremony–1:30 p.m.

Finalist Resource Center
Sunday–Monday
Tuesday

Intel Quad
Sunday
Monday
Tuesday

Intel ISEF Commons 2019
Sunday
Monday
Tuesday (continental breakfast served)

Judges’ Registration
Tuesday (SAO judges)
Tuesday (Grand Award judges)

Official Party Registration
Saturday
Sunday–Monday
Tuesday
Wednesday
Thursday
Friday

Phoenix Information Booth
Saturday–Thursday
Friday

Retail Store
Saturday
Sunday–Monday
Tuesday–Wednesday
Thursday
Friday

Volunteer/International Office
Saturday
Sunday–Monday
Tuesday
Wednesday–Thursday
Friday

North Halls 4/5

Hours

North 126 A/B/C

West Hall 1

West Hall 2

Registration Complex

Registration Complex

Lower Level Concourse

Lower Level Concourse

North 121 A/B/C

Sunday
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Auditorium Safety
Sticks and large flags are prohibited during all ceremonies and will be confiscated at the door. Please do not bring flags or state symbols on stage during the presentation of awards. Large bags are not permitted in the Ceremony Hall. Attendees are not permitted to reserve seats or place signs to reserve seats. Any signs placed by attendees will be removed and disposed of by Event Security.

Admission to all Intel ISEF functions at the Phoenix Convention Center is restricted to persons wearing an Intel ISEF name badge. Intel ISEF participants MUST wear their name badges to participate in fair activities and events. All Intel ISEF badges will be scanned at the entrance to all events and those without badges will be turned away at the door.

Hotel Safety
- Do not answer the door in a hotel room without verifying who it is. If a person claims to be a hotel employee, call the front desk and ask if someone from their staff is supposed to have access to your room and for what purpose.
- Do not say your room number in public.
- Always walk in groups.
- Always use your hotel's main entrance, especially late in the evening.
- Be observant, and look around before entering parking lots.
- Close the door securely whenever you are in your hotel room, and use the locks.
- Do not needlessly display guest room keys or convention badges in public.
- Do not carry large amounts of cash or expensive jewelry. Store valuables in the hotel's safe deposit box.
- Do not offer money or food to the homeless people who may loiter near the hotels.
- Do not invite strangers to your hotel room.
- Make sure sliding glass doors and any connecting room doors are locked.
- Report any suspicious activity to management.

Downtown Phoenix Partnership Ambassadors
Look for Ambassadors, who wear orange shirts and are stationed around the downtown area, to help answer your questions about Phoenix. They are on duty seven days a week from 8:00 a.m. until 11:00 p.m. and can help you find your way, give ideas about where to eat or where to find a pharmacy or a bank, and help you navigate public transportation.

<table>
<thead>
<tr>
<th>Hotels</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courtyard Downtown</td>
<td>132 S Central Avenue</td>
<td>602-603-2001</td>
</tr>
<tr>
<td>Embassy Suites Downtown North</td>
<td>10 E. Thomas Road</td>
<td>602-222-1111</td>
</tr>
<tr>
<td>Fairfield Inn and Suites Phoenix</td>
<td>2520 N. Central Avenue</td>
<td>602-716-9900</td>
</tr>
<tr>
<td>Hampton Inn - Phoenix/Midtown</td>
<td>160 W. Catalina Drive</td>
<td>602-200-0990</td>
</tr>
<tr>
<td>Hampton Inn &amp; Suites Downtown</td>
<td>77 E. Polk Street</td>
<td>602-710-1240</td>
</tr>
<tr>
<td>Hilton Garden Inn Midtown</td>
<td>4000 N. Central Avenue</td>
<td>602-279-9811</td>
</tr>
<tr>
<td>Holiday Inn Express &amp; Suites - Ballpark</td>
<td>620 N. 6th Street</td>
<td>602-452-2020</td>
</tr>
<tr>
<td>Hotel Palomar Phoenix</td>
<td>2 E. Jefferson Street</td>
<td>602-253-6633</td>
</tr>
<tr>
<td>Hotel San Carlos</td>
<td>202 N. Central Avenue</td>
<td>602-253-4121</td>
</tr>
<tr>
<td>Hyatt Regency Phoenix</td>
<td>122 N. 2nd Street</td>
<td>602-252-1234</td>
</tr>
<tr>
<td>Renaissance Phoenix Downtown</td>
<td>100 N. 1st Street</td>
<td>602-333-5000</td>
</tr>
<tr>
<td>Residence Inn Downtown</td>
<td>132 S. Central Avenue</td>
<td>602-603-2000</td>
</tr>
<tr>
<td>Sheraton Grand Phoenix</td>
<td>340 N. 3rd Street</td>
<td>602-262-2500</td>
</tr>
<tr>
<td>Springhill Suites by Marriott</td>
<td>802 E. Van Buren Street</td>
<td>602-307-9929</td>
</tr>
<tr>
<td>The Westin Phoenix Hotel</td>
<td>333 N. Central Avenue</td>
<td>602-429-3500</td>
</tr>
</tbody>
</table>

About the Phoenix Convention Center
The Convention Center is a smoke-free environment. Outside food and beverages are prohibited in the Convention Center.
Congratulations to past winners of the Intel International Science and Engineering Fair (Intel ISEF), a program of Society for Science & the Public. Finalists have gone on to do amazing things, such as start nonprofits around the world, win awards such as the MacArthur “Genius” award, start successful companies and become professors at major universities.

Intel’s commitment to education ranges from science competitions that encourage young thinkers, scientists and entrepreneurs, to collaborative programs with educational and governmental organizations.

By empowering students around the world, Intel isn't just enabling them to succeed in the global economy — we're creating the next great wave of world-changing innovators.

See what’s happening at Intel ISEF: intel.com/ISEF
6. Indian School Road/Central Avenue
   A Hilton Garden Inn Midtown – 3 blocks

7. Osborn Road/Central Avenue
   B Wyndham Garden Phoenix Midtown – 2 blocks

8. Thomas Road/Central Avenue
   C Hilton Suites Phoenix – ½ block
   D Hampton Inn Phoenix/Midtown – 1 block

9. Encanto Boulevard/Central Avenue
   E Fairfield Inn and Suites Phoenix – 1 block

12. Van Buren/Central Avenue – From the Airport
    Van Buren/1st Avenue – To the Airport
   F Hilton Garden Inn Downtown Phoenix – 1 block
   G Holiday Inn Express Phoenix Downtown – 7 blocks or
   H Hotel San Carlos – 1 block
   I Sheraton Grand Phoenix – 3 blocks
   J Springhill Suites by Marriott – 8 blocks or .8 miles
   K The Westin Phoenix Downtown – ½ block
13. Washington Street/Central Avenue – From the Airport
   Washington Street/ 1st Avenue – To the Airport
   Hotel Palomar Phoenix – 1 block
   Renaissance Phoenix Downtown Hotel – ½ block

14. 3rd Street/ Washington Street – From the Airport
    3rd Street/Jefferson Street – To the Airport
    Phoenix Convention Center
    Hyatt Regency Phoenix – 1 block

18. 44th Street/Washington Street
    Aloft Phoenix Airport – ½ block

* Distance are approximate
**SUNDAY, MAY 12**

See page 16–17 for hours and locations of daily recurring events and resources. All events take place in the Phoenix Convention Center unless otherwise noted.

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m.–5:00 p.m.</td>
<td>Project Drop–Off</td>
<td>North Halls 4/5</td>
</tr>
<tr>
<td>(Afterwards by appt.)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Finalists transporting their own projects may unload them only if registered. Each item must be clearly marked with the finalist's name, address, Booth ID, and fair ID number. Only Fair Officials are permitted on the floor before 8:00 a.m. Sunday.</td>
<td></td>
</tr>
<tr>
<td>8:00 a.m.–7:00 p.m.</td>
<td>Scientific Review Committee Interviews</td>
<td>North 127 A–C</td>
</tr>
<tr>
<td></td>
<td>Projects must be reviewed and cleared by the Scientific Review Committee (SRC) before they may be set up. An SRC project infraction list will be posted Saturday, May 11 at student.societyforscience.org/intel-isef/attendee.</td>
<td></td>
</tr>
<tr>
<td>8:00 a.m.–8:00 p.m.</td>
<td>Project Set-up/Display &amp; Safety Inspections</td>
<td>North Halls 4/5</td>
</tr>
<tr>
<td>1:00 p.m.–5:00 p.m.</td>
<td>Intel ISEF Commons</td>
<td>West Hall 2</td>
</tr>
<tr>
<td></td>
<td>Your chance to discover and learn more about top colleges and universities, research opportunities and scholarships. Plus, enter to win great prizes!</td>
<td></td>
</tr>
<tr>
<td>1:00 p.m.–6:00 p.m.</td>
<td>Intel Quad</td>
<td>West Hall 1</td>
</tr>
<tr>
<td></td>
<td>The Intel ISEF Quad is the place to GLOW — explore a world of illuminated activities. Create your own glow-in-the-dark art. Help construct our neon City of the Future. Fly a drone. Challenge another finalist to a dance off. Play in virtual reality. And get your face on the Think Beyond Wall. Join us in the Intel Quad to connect, refresh and recharge with your fellow finalists!</td>
<td></td>
</tr>
<tr>
<td>7:00 p.m.–9:00 p.m.</td>
<td>Student Pin Exchange</td>
<td>Sheraton Hotel, Phoenix Ballroom</td>
</tr>
<tr>
<td></td>
<td>This icebreaker event is only for finalists and student observers who are invited to trade pins and to meet new friends. There will be food, music, and good times for all.</td>
<td></td>
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</tbody>
</table>

**MONDAY, MAY 13**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m.–12:00 p.m.</td>
<td>Scientific Review Committee Interviews</td>
<td>North 127 A–C</td>
</tr>
<tr>
<td></td>
<td>Only for finalists whose projects have not been cleared.</td>
<td></td>
</tr>
<tr>
<td>8:00 a.m.–6:00 p.m.</td>
<td>Project Set-up/Display &amp; Safety Inspections</td>
<td>North Halls 4/5</td>
</tr>
<tr>
<td></td>
<td>All projects must be set-up and inspected no later than 6:00 p.m. Both the SRC and D&amp;S committees will conduct a final review of projects on Monday evening. At the conclusion of the Opening Ceremony, an Infraction List of project IDs of any projects that have problems will be posted. Finalists with project infractions must come to the Exhibit Hall on Tuesday at 7:30 a.m. No other persons will be allowed in the Exhibit Hall. A project cannot be judged unless it has been cleared by the SRC or D&amp;S by 9:00 a.m. on Tuesday, May 15.</td>
<td></td>
</tr>
<tr>
<td>8:45 a.m.–4:30 p.m.</td>
<td>Symposia</td>
<td>West 101 A/B/C, 106B, 106C</td>
</tr>
<tr>
<td></td>
<td>See full schedule on pages 32–43.</td>
<td></td>
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</tbody>
</table>
Dr. Zhang is a molecular biologist focused on developing tools to improve human health. He played an integral role in the development of two revolutionary technologies: optogenetics and CRISPR-Cas genome editing, including pioneering the use of Cas9 for genome editing as well as discovering new CRISPR systems such as Cas12 and Cas13 and developing them for therapeutic and diagnostics applications.

Current research in the Zhang laboratory is centered on the discovery of novel biological systems and processes, discovering their mechanisms and developing them into high impactful molecular tools and therapies to study and treat human disease.

Dr. Zhang’s work on developing CRISPR-Cas systems has been recognized by numerous awards including the Canada Gairdner International Award, the Tang Prize and the Albany Medical Prize in Medical and Biomedical Research. Dr. Zhang won the 2017 Blavatnik National Award for Young Scientists. He is the co-founder of Editas Medicine. Dr. Zhang is also a member of both the National Academy of Sciences and the American Academy of Arts and Sciences.
<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m.–4:00 p.m.</td>
<td>Intel ISEF Commons</td>
<td>Learn about organizations offering scholarships and research opportunities. Meet representatives from leading colleges and universities. Enter to win a GoPro camera.</td>
</tr>
<tr>
<td>9:00 a.m.–6:00 p.m.</td>
<td>Intel Quad</td>
<td>West Hall 1</td>
</tr>
<tr>
<td>11:00 a.m.–3:30 p.m.</td>
<td>Movie Screening</td>
<td>AMC Theaters at the Arizona Center</td>
</tr>
<tr>
<td></td>
<td>Inventing Tomorrow and Science Fair</td>
<td>565 N. 3rd Street, Phoenix Intel ISEF attendees will have the opportunity to attend Inventing Tomorrow and Science Fair—winner of the audience award at Sundance and SXSW. Both documentaries focus on the finalists' journey to and experience at Intel ISEF in 2017. The movies will be shown simultaneously; please express which film you are interested in seeing at the AMC box office. Attendees must show their Intel ISEF badge to be admitted to the theater. Tickets are on a first come, first serve basis. Show times are 11:00 a.m. and again at 1:30 p.m. free of charge for Intel ISEF attendees only.</td>
</tr>
<tr>
<td>3:30 p.m.–6:30 p.m.</td>
<td>Opening Ceremony Dinner</td>
<td>North Ballroom 120 A–D All registered attendees are welcome. Intel ISEF name badges are required to enter.</td>
</tr>
<tr>
<td>6:30 p.m.–7:00 p.m.</td>
<td>Opening Ceremony Pre-Show</td>
<td>North Halls A/B/C Doors open at 6:15 p.m.—Casual Attire</td>
</tr>
<tr>
<td>7:00 p.m.–8:30 p.m.</td>
<td>Opening Ceremony</td>
<td>North Halls A/B/C Doors open at 6:15 p.m. Sponsored by Intel Corporation Keynote Speaker: Feng Zhang, Ph.D. The Intel ISEF Opening Ceremony Act kicks off the week of events for 2019.</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>Final Project Infractions List</td>
<td>Posted at Registration, outside of Exhibit Halls, and on student.societyforscience.org/intel-isef/attendee.</td>
</tr>
</tbody>
</table>

**TUESDAY, MAY 14**

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 a.m.–9:00 a.m.</td>
<td>Project Infraction Clearance</td>
<td>North Halls 4/5 Both the Scientific Review Committee and Display &amp; Safety Committee will have conducted a final review of all projects by Monday afternoon. If any problems with a project are identified during review, the finalist's booth number will be posted outside the Exhibit Halls on Monday, May 13. Only those finalists with infractions will be permitted in the Exhibit Halls beginning at 7:30 a.m. A project cannot be judged unless it has been cleared by the SRC or D&amp;S by 9:00 a.m., Tuesday, May 14.</td>
</tr>
<tr>
<td>8:00 a.m.–10:00 a.m.</td>
<td>Intel ISEF Commons</td>
<td>West Hall 2 Enjoy a free continental breakfast! This is your last chance to learn about great STEM programs at leading universities. Plus, enter to win a GoPro camera.</td>
</tr>
<tr>
<td>8:30 a.m.–1:00 p.m.</td>
<td>Symposia</td>
<td>West 101 A/B/C, 106B, 106C See full schedule on pages 32–43.</td>
</tr>
</tbody>
</table>
Don’t miss the
Innovation and Entrepreneurship Panel
presented by Society for Science & the Public
May 14, 2019
Phoenix Convention Center | North Halls A/B/C | 1:30 p.m.–2:30 p.m.

Adam Bly
Founder of stealth AI startup
1998 ISEF

Shantanu Gaur
Co-founder & CEO
Allurion Technologies
2003–2004 ISEF

Divya Nag
Special Projects, Apple
2007 and 2009 ISEF

Afton Vechery
CEO and Co-founder
Modern Fertility
2005 ISEF; 2007 STS

Maya Ajmera
Panel Moderator
President & CEO
Society for Science & the Public
Publisher, Science News
1985 STS
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m.–1:30 p.m.</td>
<td>Intel Quad</td>
<td>West Hall 1</td>
</tr>
<tr>
<td>4:00 p.m.–6:00 p.m.</td>
<td>Press/Public Relations Time with Finalists</td>
<td>North Halls 4/5</td>
</tr>
<tr>
<td>9:30 a.m.–11:00 a.m.</td>
<td>Innovation and Entrepreneurship Panel</td>
<td>North Halls A/B/C</td>
</tr>
<tr>
<td>All attendees are invited to a conversation with Society alumni.</td>
<td>All attendees are invited to a conversation with Society alumni.</td>
<td></td>
</tr>
<tr>
<td>1:30 p.m.–2:35 p.m.</td>
<td>The Journey from Young Scientist to Successful Entrepreneur, A Conversation with Dr. George Yancopoulos</td>
<td>North Halls A/B/C</td>
</tr>
<tr>
<td>2:35 p.m.–2:50 p.m.</td>
<td>Excellence in Science and Technology Panel</td>
<td>North Halls A/B/C</td>
</tr>
<tr>
<td>2:50 p.m.–4:00 p.m.</td>
<td>Intel ISEF Night at Chase Field</td>
<td>North Halls A/B/C</td>
</tr>
<tr>
<td>5:00 p.m.–9:30 p.m.</td>
<td>Intel ISEF Night at Chase Field</td>
<td>North Halls A/B/C</td>
</tr>
</tbody>
</table>

All finalists have the opportunity to come to the Exhibit Halls for scheduled press interviews, be available for impromptu visits from visiting sponsors and dignitaries and check their booth area.

**Innovation and Entrepreneurship Panel**  
*Presented by Society for Science & the Public — Casual Attire*

All attendees are invited to a conversation with Society alumni. Panelists include Adam Bly, Shantanu Gaur, Divya Nag, Afton Vechery. Society President & CEO, Maya Ajmera, will moderate the panel.

**The Journey from Young Scientist to Successful Entrepreneur, A Conversation with Dr. George Yancopoulos**

Dr. George Yancopoulos, Co-Founder, President and Chief Scientific Officer at Regeneron, joins Intel ISEF on the main stage after the Innovation and Entrepreneurship Panel to discuss his journey from young scientist to entrepreneur. The conversation will be moderated by Hala Mirza, Senior Vice President, Corporate Communications and Citizenship at Regeneron.

**Excellence in Science and Technology Panel**  
*Presented by Intel Foundation — Casual Attire*

All attendees are invited to a conversation with Nobel Laureates, MacArthur Fellows and National Medal of Science recipients. Panelists are Martin Chalfie, Elissa Hallem, Cato Laurencin and Dianne Newman. The panel will be moderated by NPR Science Correspondent and Society Trustee Joe Palca.

**Intel ISEF Night at Chase Field**  
*Gates open at 5:00 p.m., Game time 6:40 p.m.—Rain or Shine*

All registered Intel ISEF attendees are invited to see a Major League Baseball game as the Arizona Diamondbacks take on the Pittsburgh Pirates at Chase Field. This event will take place rain or shine (Chase Field has a retractable roof). In addition to the baseball game, there will be a specially designated area of the ballpark where Intel ISEF attendees will participate in activities provided by the Science of Sport such as the trajectory of baseball flight, football kicking accuracy, basketball dribbling, soccer corner kicks and more.

Admission will require your Intel ISEF name badge. Upon entry, each attendee will receive an Intel ISEF Arizona Diamondbacks baseball hat. You will also receive a ticket with your seat number and a card loaded with $25 in DBucks to be used at the concession stands for dinner. Guests who need a sealed Kosher meal should pick up their meal from the designated area. Show your badge to pick up your tickets at the tables on Jefferson Street. Enter through Gate A. Chase Field is just a few blocks from...
New Session

The Journey from Young Scientist to Successful Entrepreneur
A conversation with Regeneron's George Yancopoulos

May 14, 2019
Phoenix Convention Center | North Halls A/B/C | 2:30 p.m.

George Yancopoulos, M.D., Ph.D.
Co-Founder
President & Chief Scientific Officer
Regeneron
1976 Science Talent Search

Dr. George Yancopoulos joins Intel ISEF on the main stage after the Innovation and Entrepreneurship Panel to discuss his journey from young scientist to entrepreneur. The conversation will be moderated by Hala Mirza, Senior VicePresident, Corporate Communications and Citizenship at Regeneron.

George D. Yancopoulos, M.D., Ph.D., is the Founding Scientist, President and Chief Scientific Officer at Regeneron. George, together with key members of his team, is a principal inventor and developer of Regeneron's FDA-approved medicines as well as its foundational technologies. George developed the science-driven, collaborative and highly-productive R&D culture at Regeneron. Regeneron has repeatedly been named the number one company to work for in the biopharmaceutical industry by Science magazine and being named one of the most innovative companies in the world by Forbes magazine. George was the 11th most highly cited scientist in the world in the 1990s. In 2004, he was elected to the National Academy of Sciences.

George has driven Regeneron's extensive commitment to STEM education, which includes robust internship and mentoring programs, support for the Regeneron Westchester Science and Engineering Fair, the Regeneron Prize for Creative Innovation for top graduate and postdoctoral students, and the Regeneron Science Talent Search. He attended the Bronx High School of Science and received his M.D. and Ph.D. from Columbia University.
the Convention Center and is also on the Light Rail. The stops are located near all block hotels and are noted on the Light Rail map on pages 20–21.

WEDNESDAY, MAY 15

7:45 a.m.–3:30 p.m. **Student Observer Program**  Hyatt Hotel, Regency Ballroom
Anyone with a Student Observer badge may participate in several exciting STEM-based challenges. This event will be held at the Hyatt Regency from 7:45 a.m. to 2:30 p.m. Sessions will be presented by STEM professionals including, a Data & Analytics scientist from the Los Angeles Dodgers, a Science News for Students journalist, scientists from the Lowell Mineral Institute, educators from CREATE at the Arizona Science Center, and members of the Society’s Science Education Programs team. Observers who are volunteering for Thursday’s Education Outreach Day will participate in a training session immediately following Observer Experience Day programming until 3:30 p.m.

8:00 a.m.–11:45 a.m. **Exhibit Halls Open**  North Halls 4/5
Finalists at Projects for Interviews
Finalists and Judges only — Professional Attire

9:15 a.m.–3:45 p.m. **Symposia**  West 101 A/B/C, 106B, 106C
See full schedule on pages 32–43.

11:45 a.m.–1:00 p.m. **Lunch Break**
Concession stands and additional seating will be available. No outside food may be brought into the Convention Center.

1:15 p.m.–4:00 p.m. **Finalists at Projects for Interviews**  North Halls 4/5
Finalists and Judges only — Professional Attire

2:00 p.m.–5:00 p.m. **Intel Quad**  West Hall 1

6:00 p.m.–8:00 p.m. **Adult Mixer**  The Duce
525 South Central Avenue
This event takes place at a retro-chic warehouse housing a vintage camper serving American comfort food. Adults will dance through the night to a DJ and the high-energy blues sounds of The Sugar Thieves. The Duce includes games such as ping pong, duce bag, shuffleboard and foosball. Two drink tickets will be provided per person with a cash bar option. Adults will need their official Intel ISEF name badge to enter. The venue is close to the convention center. There are also pedi-cabs available for hire in the area. Look for the Phoenix downtown Ambassadors in the orange shirts to help guide you there.

6:00 p.m.–10:00 p.m. **Student Mixer**  North Halls A–E
Intel ISEF finalists and observers will be able to let loose after a day of judging. In Halls A-D, a DJ will be mixing sounds for high-energy dancing. Get your game on in Hall E in the game trucks,
Don't miss the
Excellence in Science and Technology Panel
presented by the Intel Foundation

May 14, 2019
Phoenix Convention Center | North Halls A/B/C | 2:50 p.m.–4:00 p.m.

Martin Chalfie
Columbia University
Nobel Prize in Chemistry, 2008

Elissa Hallem
University of California, Los Angeles
MacArthur Fellow, 2012

Cato Laurencin
University of Connecticut
National Medal of Technology and Innovation, 2016

Dianne Newman
California Institute of Technology
MacArthur Fellow, 2016
ISEF 1987–1988

Joe Palca
Panel Moderator
NPR Correspondent
Arcade area, and in the Escape Room trailer! Or visit the coffee house stage for softer music and coffee. There will be a variety of food options including some fun desserts. You **MUST** wear your Intel ISEF badge in order to attend.

**THURSDAY, MAY 16**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m.–1:00 p.m.</td>
<td>All Finalists Required at Projects North Halls 4/5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lunch vouchers will be provided to finalists for use at concession stands located in Hall 6 and around Halls 4 and 5. Finalists should note their assigned lunch time printed on their voucher, which will be found at your project booth.</td>
<td></td>
</tr>
<tr>
<td>9:00 a.m.–9:00 p.m.</td>
<td>Public Visitation Day North Halls 4/5</td>
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<td>Finalists' exhibits are open to the public.</td>
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<tr>
<td>9:00 a.m.–4:30 p.m.</td>
<td>Symposia West 101 A/B/C, 106B, 106C</td>
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<td></td>
<td>See full schedule on pages 32–43</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m.–5:00 p.m.</td>
<td>Intel Quad West Hall 1</td>
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<tr>
<td>7:00 p.m.–10:00 p.m.</td>
<td>Special Awards Ceremony North Halls A/B/C</td>
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<tr>
<td>Doors open at 6:30 p.m.</td>
<td>Professional Attire</td>
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<tr>
<td></td>
<td>Ceremony in which Special Award Organizations, academic institutions and government agencies give awards.</td>
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**FRIDAY, MAY 17**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>7:00 a.m.–3:00 p.m.</td>
<td>Bag Storage North 121 A/B/C</td>
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<tr>
<td></td>
<td>Attendees who are leaving Phoenix immediately after the Awards Ceremony may store their bags/suitcases in North 121 A/B/C. This service will be provided at no charge. Bags and suitcases are NOT permitted inside the Ceremony Hall nor left in open areas in the Convention Center.</td>
<td></td>
</tr>
<tr>
<td>9:00 a.m.–11:00 a.m.</td>
<td>Grand Awards Ceremony North Halls A/B/C (Doors open at 8:30 a.m.)</td>
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<td></td>
<td>Sponsored by Intel—Professional Attire</td>
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<tr>
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<td>All students are to be seated by 8:45 a.m.</td>
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<tr>
<td></td>
<td>Awards Ceremony where winners from each category as well as the top overall winners for Intel ISEF 2019 are announced.</td>
<td></td>
</tr>
<tr>
<td>Close of Awards Ceremony – 1:00 p.m.</td>
<td>Exhibit Halls Open for Project Teardown North Halls 4/5</td>
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</tr>
<tr>
<td></td>
<td>Finalists take down and pack projects for return home.</td>
<td></td>
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<tr>
<td></td>
<td>Any stored packing material will be at finalists’ project booths. Finalists transporting their own projects will load them upon completion of packing. Projects being shipped via UPS or GES/heavy freight must be packed and processed for shipping by 1:00 p.m. Intel ISEF 2019 name tags required at all times during dismantling—No exceptions.</td>
<td></td>
</tr>
</tbody>
</table>
Inventing Tomorrow

Movie Screening—Free admission with presentation of Intel ISEF badge

Monday, May 13, 2019
AMC Theaters at the Arizona Center
565 N. 3rd Street, Phoenix | 11:00 a.m. and 1:30 p.m.
Symposia sessions are an opportunity to share information with students, parents, teachers and fair directors, and do not imply endorsement by Society for Science & the Public. No fees have been paid.

MONDAY, MAY 13

8:45 a.m. to 9:45 a.m. | Room: West 101 A/B/C
When Researchers Apply to College
Chris Peterson, Massachusetts Institute of Technology, Cambridge, MA
Brenna Heintz, Swarthmore College, Swarthmore, PA
We will discuss strategies for approaching the (American) college search and admissions process as relevant to young researchers.
Type: Presentation; Audience: Students

8:45 a.m. to 9:45 a.m. | Room: West 106B
Teaching Current Research and Science Literacy with Science News in High Schools
Anna Rhymes, Society for Science & the Public, Washington, DC
The Society's Science News in High Schools program is offering ways to integrate current research and literacy-base learning into classroom curricula to make science more approachable and meaningful for students.
Type: Hands-on Workshop; Audience: Fair Directors, Teachers

8:45 a.m. to 9:45 a.m. | Room: West 106C
Funding the Future of YOUR Fair!
Kathleen Bethel, Southern Arizona Research, Science and Engineering Foundation, Tucson, AZ
Bruce Makous, Society for Science & the Public, Washington, DC
Identify new sources of funding, design sponsorship invitations and create sample letters that will guarantee donors. You will walk away with everything you need to fund next year's fair and travel to ISEF!
Type: Hands-on Workshop; Audience: Fair Directors, Teachers

10:00 a.m. to 11:00 a.m. | Room: West 101 A/B/C
Judging at Intel ISEF
Bill and Lorna Glaunsinger, Judging Chairs, Intel ISEF 2019, Phoenix, AZ
Robert Yost, Intel ISEF, Judging Ombudsman
Join us for a question-and-answer session about judging at Intel ISEF. The presenters will explain their roles to aid students during judging and provide an overview of the judging process for those new to Intel ISEF. (Exact same session to be given at 12:45 p.m. today).
Type: Presentation; Audience: Fair Directors, Teachers & Students

11:15 a.m. to 12:15 p.m. | Room: West 106C
Leveraging Your Science Fair Experience: Oh the Places You Can Go!
Maya Ajmera, Moderator, President and CEO, Society for Science & the Public, Washington, DC
Life after Science Fair! Bring your questions to a discussion with recent ISEF finalists. Hear about their triumphs, college and career choices, and how their science fair experience set them up for success. Panel of four alumni will share stores about their academic and career pathways, the impact of science fairs, and how current participants can leverage the opportunity to further their own academic and professional pursuits.
Type: Panel Discussion; Audience: Fair Directors, Teachers & Students
Science Fair

Movie Screening—Free admission with presentation of Intel ISEF badge

Monday, May 13, 2019
AMC Theaters at the Arizona Center
565 N. 3rd Street, Phoenix | 11:00 a.m. and 1:30 p.m.
12:45 p.m. to 1:45 p.m. | Room: West 101 A/B/C

**Judging at Intel ISEF**

*Bill and Lorna Glaunsinger, Judging Chairs, Intel ISEF 2019, Phoenix, AZ*

*Robert Yost, Intel ISEF, Judging Ombudsman*

Join us for a question-and-answer session about judging at Intel ISEF. The presenters will explain their roles to aid students during judging and provide an overview of the judging process for those new to Intel ISEF. (This is the exact same session that was given this morning.)

Type: Presentation; Audience: Fair Directors, Teachers & Students

1:00 p.m. to 2:00 p.m. | Room: West 106B

**To Use or Not to Use Calculators to Support Curriculum. That is the Question?**

*Caren Standfast, Blair Academy, Blairstown, NJ*

This forum will discuss the pros and cons of using calculators to prepare kids for college mathematics. Beginning with understanding the goals of teaching mathematics at high schools, we will discuss best practices behind calculator usage in math. Please bring your calculator!

Type: Hands-on Workshop; Audience: Teachers

2:15 p.m. to 3:15 p.m. | Room: West 101 A/B/C

**Navigating Intel ISEF — What You Need to Know to Steer Your Way Through the Week**

*Ingrid Weigand, Austin Science Education Foundation, Austin, TX*

Intel ISEF week overview for first time Fair Directors: what to expect each day, deadlines for certain tasks, how to prepare students for judging, events to attend and resources available.

Type: Presentation; Audience: Fair Directors

2:30 p.m. to 3:30 p.m. | Room: West 106B

**Applying to Highly-Selective Engineering Schools Outside of the United States**

*Stephen Johns, University of Toronto, Canada*

*Catherine Eames, Imperial College London, United Kingdom*

Advice and guidance for school counsellors and students from admissions representatives at two of the worlds’ leading engineering schools in Canada and the United Kingdom.

Type: Presentation; Audience: Teachers, Students

2:30 p.m. to 3:30 p.m. | Room: West 106C

**Protect Your Intellectual Property: Patents, Trademarks, Copyrights and Trade Secrets**

*Jorge L. Valdes, United States Patent & Trademark Office, Alexandria, VA*

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. (If you cannot make this session, Dr. Valdes will be holding the same session on Wed. at 11:15 a.m.)

Type: Presentation; Audience: Fair Directors, Teachers & Students

3:30 p.m. to 4:30 p.m. | Room: West 101 A/B/C

**Best Practices for Incorporating Statistics and Charts in Your Project**

*Cora Neal, Weber State University, Ogden, UT*

This presentation will help students, parents, and teachers learn about how to best incorporate statistical outcomes and charts into your science fair project.

Type: Presentation; Audience: Fair Directors, Teachers & Students
3:45 p.m. to 4:45 p.m. | Room: West 106B

**Applying to United States Colleges as an International Student**

*Tiffany Velez, Massachusetts Institute of Technology, Cambridge, MA*
*Brenna Heintz, Swarthmore College, Swarthmore, PA*

In this session, we will discuss admissions strategies for international students considering U.S. institutions of higher learning.

Type: Presentation; Audience: Students

3:45 p.m. to 4:45 p.m. | Room: West 106C

**Judging Day Tips, Tricks, and Help Crafting Your Pitch!**

*Liz Baker-Bowman, Southern Arizona Research, Science and Engineering Foundation, Tucson, AZ*

Get advice on judging from an ISEF winner and judge. Leave with a 30 second introduction to start each interview with confidence!

Type: Hands-on Workshop; Audience: Students

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**TUESDAY, MAY 14**

8:45 a.m. to 9:45 a.m. | Room: West 106B

**Exploring Asteroid Bennu with the OSIRIS-REx Mission**

*Dathon Golish, University of Arizona, Tucson, AZ*

The OSIRIS-REx spacecraft arrived at asteroid Bennu in December, 2018. Since then, we have taken thousands of beautifully detailed images of this previously unexplored asteroid. Come hear and learn about this exciting mission!

Type: Presentation; Audience: Fair Directors, Teachers & Students
8:45 a.m. to 9:45 a.m. | Room: West 106C

**Building Science Fair Culture in an Educationally Diverse Region**

*Mary Lou Ewald, Auburn University, Auburn, AL*

Successes and lessons learned from a five-year National Science Foundation supported initiative to increase the quantity and quality of science fair projects in a region of Alabama with some of the most under-resourced schools in the country.

Type: Presentation; Audience: Fair Directors, Teachers

9:30 a.m. to 10:30 a.m. | Room: West 101 A/B/C

**Admissions 101: Pursuing Science and Engineering at Highly-Selective Universities**

*Samantha Goldfarb, Columbia University, New York, NY*

An overview of college education in STEM, especially at highly-selective universities, plus insight into finding the best "fit" college and translating that into applications.

Type: Presentations; Audience: Teachers, Students

10:00 a.m. to 11:00 a.m. | Room: West 106B

**Simplistic Statistics for Secondary Students**

*Patricia Zalo, Manatee High School, Bradenton, FL*

M&M's can be used to provide hands-on activities to introduce four inferential tests: Chi-Square, z-score, t-tests, and Pearson product moment correlation coefficient.

Type: Hands-on Workshop; Audience: Fair Directors, Teachers & Students

10:00 a.m. to 11:00 a.m. | Room: West 106C

**Regeneron Science Talent Search: A Program of the Society for Science & the Public**

*Allie Stifel, Society for Science & the Public, Washington, DC*

Learn about the nation's oldest and most prestigious STEM competition (and a chance to win $250,000). The 2020 application will open June 1, 2019 for rising U.S. high school seniors.

Type: Presentations; Audience: Fair Directors, Teachers & Students

11:15 a.m. to 12:15 p.m. | Room: West 101 A/B/C

**Communicating Your Science — and Doing It Well!**

*Janet Raloff, Science News for Students and Society for Science & the Public, Washington, DC*

Let the professionals from the Society's Science News magazine show you how to write about and discuss your science in such a way that others will understand and care about the message you want to convey.

Type: Workshop, Presentation; Audience: Students

11:15 a.m. to 12:15 p.m. | Room: West 106B

**Crash Course: Quantifying Uncertainty and Why It Is Important**

*Paul Strode, Fairview High School, Boulder, CO*

We must learn to embrace uncertainty, understand how to use it, and know its limitations. Learning to calculate uncertainty by hand is the first step.

Type: Hands-on Workshop; Audience: Fair Directors, Teachers, & Students

11:15 a.m. to 12:15 p.m. | Room: West 106C

**Rocket-Launching Your Future in STEM: The Best Pro-tips to Make It Happen!**

*Anjali Bhatia, Crimson Education, San Francisco, CA*

Learn top tips for applying to your dream universities, focusing on STEM majors, engineering schools, and BS/MD programs + how to position yourself for rockin' careers.

Type: Workshop, Presentation; Audience: Fair Directors, Teachers, & Students
Get Involved.
Society for Science & the Public is proud to announce that the International Science and Engineering Fair will be held in Anaheim, California, May 10–15, 2020.

VOLUNTEER, JUDGE, OR INTERPRET

To learn more: student.societyforscience.org/ISEF2020

Congratulations 2019 ISEF Finalists!

NSA is proud to support ISEF as a Special Award Organization and we appreciate your achievements. We are confident in a better future because of the dedication of scientists like yourselves. Please visit our researchers in the expo hall. Good luck and have a great week.

Stop by our Symposium on Thursday, May 16, 3:30 p.m. to 4:30 p.m. | Room 106C
“Meet NSA’s Executive Director”
The Storage Tek Automated Cartridge System (ACS) National Cryptologic Museum
**WEDNESDAY, MAY 15**

8:45 a.m. to 9:45 a.m. | Room: West 106B

**The Science Behind Crime Scene Analysis**

*Melissa Beddow, Grand Canyon University, Phoenix, AZ*

Come find out how various scientific disciplines are used in gathering information from evidence found at crime scenes!

Type: Hands-on Workshop; Audience: Fair Directors, Teachers & Students

8:45 a.m. to 9:45 a.m. | Room: West 106C

**Teaching Students to Think Like Scientists**

*Paul Strode, Fairview High School, Boulder, CO*

Teaching students to think like scientists requires transforming the traditional science classroom into a place of constant inquiry and analysis. Here's how I do it!

Type: Presentation; Audience: Fair Directors, Teachers & Students

9:45 a.m. to 10:45 a.m. | Room: West 101 A/B/C

**SRC — 2020 Rules and Guidelines**

*Intel ISEF 2019 Scientific Review Committee*

Meet with members of the Intel ISEF Scientific Review Committee to learn of changes in the 2020 International Rules and Guidelines. A Q&A period will follow.

Type: Presentation; Audience: Fair Directors, Teachers & Students

10:00 a.m. to 11:00 a.m. | Room: West 106C

**Outreach and Equity Programs at Society for Science & the Public**

*Caitlin Sullivan, Society for Science & the Public, Washington, DC*


Type: Presentation; Audience: Fair Directors, Teachers

11:15 a.m. to 12:15 p.m. | Room: West 101 A/B/C

**Protect Your Intellectual Property: Patents, Trademarks, Copyrights and Trade Secrets**

*Jorge L. Valdes, United States Patent & Trademark Office, Alexandria, VA*

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.

Type: Presentation; Audience: Fair Directors, Teachers & Students

11:15 a.m. to 12:15 p.m. | Room: West 106B

**Using Science Coach in Your Fair to Increase 6th–12th Grade Project Quality and Quantity**

*Jill Malcom, Science Coach, Saint Louis, MO*

Implementing the non-profit Science Coach program equips, trains, and compensates teachers to coach 6th - 12th grade students to complete high-level research projects.

Type: Presentation; Audience: Fair Directors, Teachers
Sponsor of the Broadcom MASTERS® and founding member of the National STEM Funders Network & STEM Learning Ecosystems, Broadcom Foundation is proud to host the President’s Breakfast honoring

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Symposia Schedule

11:15 a.m. to 12:15 p.m. | Room: West 106C
**Using Comprehensive Outreach to Grow Your Fair's Size, Quality, and Impact**
Brooke Meyer, Southern AZ Research, Science and Engineering Foundation, Tucson, AZ

Use comprehensive educational outreach as the tool to grow your community's fair! You will evaluate your settings and look for ways to nurture science and engineering involvement of students, teachers and parents. The value of using a "Whole-Package" approach will be discussed.

Type: Presentation; Audience: Fair Directors, Teachers

1:00 p.m. to 2:00 p.m. | Room: West 106C
**Intel ISEF Display & Safety Rules**
Diane Hecht, Chair, Intel ISEF 2019 Display & Safety Committee

Come join the Display & Safety Committee to discuss infractions encountered this year as well as changes to the rules and guidelines for 2020. Bring your questions for the committee to answer.

Type: Panel Discussion; Audience: Fair Directors, Teachers

2:00 p.m. to 2:30 p.m. | Room: West 106B
**Competency-Based Instruction and Assessment in a High School Research Course**
Kim Hoehne, Minnetonka High School, Minnetonka, MN

Learn how competency-based skills spawn development, feedback, and assessment, shifting ownership of learning to students and creating a growth-mindset within a high school research course.

Type: Presentation; Audience: Teachers

2:30 p.m. to 3:30 p.m. | Room: West 106C
**How to Write an Effective Letter of Recommendation**
Chris Peterson, Massachusetts Institute of Technology, Cambridge, MA
Serena McCalla, iResearch Institute, Jericho, NY

We will provide advice on how to write an effective, compelling letter of recommendation on behalf of a young researcher specific to the college admissions context.

Type: Presentation; Audience: Teachers

3:00 p.m. to 4:00 p.m. | Room: West 106B
**Intel ISEF Scientific Review Committee — SRC Project Review**
Intel ISEF Scientific Review Committee

Meet with members of the Intel ISEF Scientific Review Committee to discuss project review by local and regional SRC’s and to review "sample" projects. English and Spanish speaking members will be in attendance. Preference given to those who have not previously attended.

Type: Workshop; Audience: Local & Regional SRC Members

**THURSDAY, MAY 16**

8:45 a.m. to 9:45 a.m. | Room: West 106C
**Supporting Students with the Regeneron Science Talent Search Application Process**
Allie Stifel, Society for Science & the Public, Washington, DC

This session will advise teachers and mentors on how to support high school students with the Regeneron STS process, review upcoming changes to the official rules and application, discuss promotional efforts, and demonstrate the new Rules Wizard. A previous session (Tuesday at 10:00 a.m.) will provide an overview of the Regeneron STS program; this is a follow-up session for adults.

Type: Presentation; Audience: Fair Directors, Teachers
Visit the Intel ISEF 2019 Commons
Phoenix Convention Center | West Hall 2

Discover and interact with top universities and other great organizations that can help guide your future in STEM.

Hours are:
- Sunday, May 12  1:00 p.m.–5:00 p.m.
- Monday, May 13  9:00 a.m.–4:00 p.m.
- Tuesday, May 14  8:00 a.m.–9:30 a.m.

*Free continental breakfast will be served.*

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USAID Science for Development Awards

The USAID Science for Development Awards will recognize Intel ISEF participants with First ($5,000), Second ($3,000), and Third ($2,000) place awards in the following categories, for a total of $40,000 in awards:

**Categories:**
1. Global Health
2. Energy & Water for All
3. Digital for Development
4. Humanitarian Assistance

USAID is the world’s premier international development agency and a catalytic actor driving development results. USAID’s work advances U.S. national security and economic prosperity, demonstrates American generosity, and promotes a path to recipient self-reliance and resilience.

Stop by our Symposium on Thursday, May 16, 11:15 am–12:15 pm, Room 106C

"Science and Technology: A Powerful Tool for International Development"
9:00 a.m. to 10:30 a.m. | Room: West 106B
**Taste of STEMAZing and #STEMontheCheap**
DaNel Hogan, Pima County School Superintendent's Office, Tucson, AZ
From $40 games you can “hack” for less than a dollar to wack-a-pack science, the physics ring and chain trick, the best nature of science activity of all time, and more! Get a taste of how The STEMAZing Project is empowering teachers to engage students using inexpensive materials for rich learning experiences. Each participating educator will walk away with new ideas and resources to further cultivate the STEM minds of their students!
Type: Hands-on Workshop; Audience: Teachers

10:00 a.m. to 11:00 a.m. | Room: West 101 A/B/C
**Expanding Access to Ecology and Evolution Science Fair Projects Using Traditional and Digital Museum Collections**
Alexis Mychajliw, La Brea Tar Pits & Museum, Los Angeles, CA
Museum collections harbor thousands of natural experiments. We will explore how teachers can partner with local museums and how students can study digitized collections remotely.
Type: Presentation; Audience: Teachers, Students

10:00 a.m. to 11:00 a.m. | Room: West 106C
**Broadcom MASTERS: Society for Science & the Public's National Middle School Science and Engineering Competition**
Raeva Ramadorai, Society for Science & the Public, Washington, DC
Learn about the Society's national middle school competition in this general information session. Former Finalists will answer questions and share advice.
Type: Presentation; Audience: Fair Directors, Teachers & Students

11:15 a.m. to 12:15 p.m. | Room: West 106B
**Modeling Science Research Methods with Simple Things: Engaging Students from the Start!**
Pascale Creek Pinner, Hilo Intermediate School, Hilo, HI
Come have some fun with hands-on solar energy experiments! See how simple investigations can be used to help students design their own science fair experiments.
Type: Hands-on Workshop; Audience: Teachers, Students

11:15 a.m. to 12:15 p.m. | Room: West 106C
**Science and Technology: A Powerful Tool for International Development**
Emmanuella Delva, U.S. Agency for International Development (USAID), Washington, DC
Join the U.S. Agency for International Development as they share how to support innovators in contributing their COOL IDEAS to solving challenges around the globe!
Type: Presentation; Audience: Fair Directors, Teachers & Students

1:30 p.m. to 2:30 p.m. | Room: West 101 A/B/C
**Research Ethics Training for Rising Researchers**
Eman Ghanem, Sigma Xi, The Scientific Research Honor Society, Research Triangle Park, NC
It's vital that researchers across disciplines are trained in responsible conduct of research. Learn the principles of research ethics and examine case studies on the topic.
Type: Hands-on Workshop; Audience: Teachers, Students
Ocean Modeling, Climate Change, and Supercomputers
Mark Petersen, Los Alamos National Laboratory, Los Alamos, NM
Ocean models are used for short-term weather forecasting and long-term climate research. Come learn how the laws of physics are recreated in computer programs that run on the world's largest supercomputers, in order to produce realistic simulations of the earth's climate.
Type: Presentation; Audience: Students

Cord Blood Stem Cell Therapies as Potential Treatment for Chronic Spinal Cord Injury
Charis Ober, Save the Cord Foundation, Tucson, AZ
Dr. Wise Young, M.D., Ph.D., Neuroscientist
Wise Young, M.D., Ph.D., world renowned neuroscientist, discusses his ground-breaking regenerative medicine research and clinical trials using cord blood stem cells to potentially treat spinal cord injury.
Type: Presentation; Audience: Fair Directors, Teachers & Students

Are Mushrooms the New Plastic?
Kate Anderson, Beyond Benign, Inc., Wilmington, MA
Explore how green chemistry principles are being used to invent the next generation of high performing, cost effective and safe materials from mushroom mycelium.
Type: Hands-on Workshop; Audience: Teachers, Students

From Exploration to Publication
Eman Ghanem, Sigma Xi, The Scientific Research Honor Society, Research Triangle Park, NC
Publishing scientific research is a challenging process. Learn how to convert your project into a manuscript and where to submit it for publication.
Type: Hands-on-Workshop; Audience: Fair Directors, Teachers & Students

Meet NSA’s Executive Director
Harry Coker, Jr., National Security Agency (NSA), Fort Meade, MD
Mr. Coker will present information about his professional background including his current role as NSA’s Executive Director. He will describe NSA’s mission and link the Agency’s academic outreach effort to events such as Intel ISEF.
Type: Presentation; Audience: Students

Are PAID Internships and Fellowships in Your Future?
Pascale Creek Pinner, Hilo Intermediate School, Hilo, HI
Learn about the amazing opportunities for STEM teachers and students offered through the federal workforce development programs (Department of Energy-DOE, National Science Foundation-NSF) and through the national labs.
Type: Presentation; Audience: Fair Directors, Teachers & Students
Society for Science & the Public thanks the dedicated members of the Phoenix Local Arrangements Committee who have worked hard in preparation for Intel ISEF 2019:

Jen Gutierrez, Chair
Liz Baker-Bowman
Kathleen A. Bethel
Christy Burton
Tom Caporello
Melissa Heinrich
Lisa Cobb
Julie Euber
Allison Ewers
Robin Flyte
Everett Greenli
Bill Glaunsinger
Lorna Glaunsinger
Katia Goldmuntz
Cynthia Hart
Bruce Jones
Marcus Jones
Renee Levin
Timothy Martin
Theresa Niemeyer
Ray Quackenbush
Carrie Repp
Chris RoDee
Kelly Saunders
Steve Zylstra
Society for Science & the Public and Intel thank the dedicated committee members of Intel ISEF 2019.

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Andrea Spencer

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In 1997, Intel became the title sponsor of Intel ISEF. Since then, it has raised the program’s visibility and made Intel ISEF the world-renowned competition that it is, with true international participation and excellence. Society for Science & the Public thanks Intel for its many contributions to Intel ISEF.

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President, Intel Foundation

**Natasha Martell Jackson**  
Intel ISEF Program Director  
Senior Program Director, Intel Foundation

**Alexa Korkos**  
Global Communications Manager, Intel Corporation

**Kelley Oliver**  
Event Marketing Manager  
Global Marketing and Communications, Intel Corporation

**Linda Qian**  
Communications Manager, Intel Corporation

And the hundreds of Intel employees who judge and volunteer at Intel ISEF.
Society for Science & the Public, Intel and the Phoenix Local Arrangements Committee recognize with gratitude the judges, volunteers, parents, teachers and fair directors who make Intel ISEF possible year after year. The following individuals, volunteers, and organizations are recognized for their special dedication to Intel ISEF.

May Albitar
Alina Bengert-Lombardi
Laura Branby
Charles Browning
Bill Chown
Bron Chown
Andrea Clinkenbeard
Glen Cook
Joel Cook
Michael Foy
Judy Hallinen
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Janet Vukotich
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Phoenix Local Arrangements Committee
Orange County Local Arrangements Committee
Northern Nevada International Center
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Society for Science & the Public (the Society), a nonprofit membership organization based in Washington, D.C., owns and has administered the ISEF since its inception in 1950. Through the Intel ISEF, the Society encourages students to apply their imagination to excel in the sciences while exploring their unique and personal visions of the future.

Maya Ajmera, President & CEO, Publisher, Science News
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Contact Allison Ewers for more details:
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<table>
<thead>
<tr>
<th>Countries, regions, and territories participating in Intel ISEF 2019</th>
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<tbody>
<tr>
<td>Each # next to the finalist’s name indicates previous Intel ISEF participation</td>
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<td>An * identifies non-competing projects</td>
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<td>T: precedes the name of the Teacher-Sponsor of the Finalist</td>
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<td>A T after the booth ID number indicates a Team Project</td>
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<tr>
<th>AMERICAN SAMOA</th>
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<tr>
<td>Pago Pago, American Samoa, TEAS01, American Samoa Science Fair</td>
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<tr>
<td>EAEV036 Reducing Water Turbidity Using Natural Coagulant Mangifera indica (Valencia Pride Mango)</td>
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<tr>
<td># Gloria Park, 17, Senior, Pacific Horizons School, Pago Pago, American Samoa, T: Jhoanna Dizon</td>
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<tr>
<td>Carl Daniel Torres Balaurro, 17, Senior, Fa’asao Marist High School, Pago Pago, American Samoa, T: Cassandra Garcia</td>
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<tr>
<td>TMED051 Identifying and Drug Susceptibility of Gram-Negative Bacteria Found in Bactrocera xanthodes (Pacific Fruit Fly)</td>
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<td>## Da In Myung, 18, Senior, South Pacific Academy, Pago Pago, American Samoa, T: Cecilia Tuionoula</td>
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<th>ARGENTINA</th>
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<tr>
<td>Córdoba, Argentina, ARG001, National Science Fair of Argentina</td>
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<tr>
<td>ENMC001T Axial Flow Rotor to Remove Seeds’ Appendages</td>
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<td>Estefania Nerina Tomas, 19, Senior, Francisco Manuel Panadeiro, 19, Senior, Escuela Provincial Educacion Tecnica Numero 7, Intendente Alvear, La Pampa, Argentina, T: Jose Rosiere</td>
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<th>AUSTRALIA</th>
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<tr>
<td>Melbourne, Australia, AUS003, BHP Billiton Foundation Science and Engineering Awards</td>
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<tr>
<td>EBED015T aWear: An Assistive Wearable System to Assist Nurses and Residents of Aged Care Homes</td>
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<tr>
<td>Mitchell Jeremy Torok, 18, Senior, Ivy Brain, 19, Senior, Rosny College, Hobart, Rosny, Australia, Launceston College, Launceston, Tasmania, Australia, T: Belinda Brannam, T: Ed Bastick</td>
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<tr>
<td>ENMC040 Phase 3: A High Performance Rowing Oar with Design Inspired by Biomimicry</td>
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<td>Lucy Annabelle Lake, 18, Senior, Barker College, Sydney, NSW, Australia, T: Phil Barden</td>
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<tr>
<td>MCRO021 The Effects of Sugar Alcohols on S. epidermidis and M. luteus</td>
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<tr>
<td>Josiah Cheng, 18, Senior, Queensland Academy for Science, Mathematics and Technology, Brisbane, Queensland, Australia, T: Helen White</td>
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<tr>
<td>PLNT021T Soil Biology: Is It the Missing Link in Pasture Production? Evaluating the Effects of Biological and Chemical Amendments on Soil Biology and Pasture Biomass Production</td>
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<td>Tiarra Meier, 17, Senior, Anne Renee Zimmerman, 15, Sophomore, Danthonia Home School, Elsmore, NSW, Australia, T: Christian Domer</td>
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| Sydney, Australia, AUS002, Young Scientist |
| ANIM047 The Use of Chickens (Gallus gallus domesticus) as Bio-recyclers of Household Organic Waste |
| # Emma Millie Serisier, 17, Senior, Bishop Druitt College, North Boambee Valley, NSW, Australia, T: Alison Hollier |
Use #IntelISEF
Share your photos and videos to join the conversation.

Remember to add @intelsnaps on @Snapchat for great snaps from #IntelISEF this week.

Enjoy all the best Intel ISEF highlights:

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BMED073  The Development of a Novel Treatment for Lactose Intolerance Using Synbiotic Formulations  
Eliza Martin, 17, Junior, PLC Sydney, Sydney, NSW, Australia, T: Maria Luisa Gutierrez Zamora Jimenez

EBED030  SARFISH: Safety Alert for Rock Fishing  
Isaac Heagney, 18, Senior, St Columba Anglican School, Port Macquarie, NSW, Australia, T: Justin Munro

ENEV076  Cilantro Leaf, Lead Relief: An Investigation into Which Form of Cilantro (Fresh Leaves, Fresh Stems or Dried Leaves) Is Most Effective in Removing Lead from Lead Contaminated Water  
Sophie Angus, 16, Junior, PLC Sydney, Sydney, NSW, Australia, T: Maria Luisa Gutierrez Zamora Jimenez

ENEV077  Autonomous Water Monitoring System  
Olivia Arvanitis, 16, Junior, Meriden School, Strathfield, NSW, Australia, T: Wendy Pan

ENEV081  Green to Clean: Algae: A Novel Method for Oil Spill Remediation  
Angelina Arora, 16, Senior, Sydney Girls High School, Sydney, NSW, Australia, T: Elizabeth O’Connor

ENMC062  Tru-Alert: A Smoke Alarm with Steam Sense Technology  
Kelvin Du, 18, Senior, Newington College, Stanmore, New South Wales, Australia, T: Craig Fitzsimmons

MATH041  Planetary Transfer Calculator  
Callum Lang Predavec, 17, Senior, Mosman High School, Sydney, NSW, Australia, T: Daniel Woods

TMED023  The SMART System: Magnetic Deflection and Absorption Shielding of Treatment Contaminants to Enhance Radiotherapy Cancer Patient Outcomes by Reducing Normal Tissue Injuries  
Macinley Neve Butson, 18, Senior, The Illawarra Grammar School, Mangerton, NSW, Australia, T: John Kennedy

AUSTRIA  
Vienna, Austria, AUT001, Vienna International Science and Engineering Fair

EGCH024T  FotoFlex  
Valentin Rezsnyak, 19, Senior, Boris Cergic, 19, Senior, HTL Dornbirn, Dornbirn, Vorarlberg, Austria, T: Rudolf Sams

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

CBIO007T  Bidirectional Promoters in Human Genome  
Seljan Nurullayeva, 15, Sophomore, Vagif Mammadzada, 17, Junior, School #177, Baku, N. Narimanov District, Azerbaijan, Lyceum Named after Academician Zarifa Aliyeva, Baku, Azerbaijan, T: Ilham Shahmuradov

EGPH004T  Rainergy  
Reyhan Jamalova, 16, Sophomore, Zahra Gasmizade, 16, Sophomore, School No. 283, Baku, Azerbaijan, Lyceum Named after Academician Zarifa Aliyeva, Baku, Azerbaijan, T: Nurali Yusifbayli

ENEV013  Lowering the Level of Toxic Wastes in the Environment with the Use of Ionisation Principles  
Nigar Bakhshaliyeva, 16, Sophomore, School-Lyceum 6, Baku, Azerbaijan, T: Arif Orujov

MATH004  New Proofing Method with Syllogism  
Zamin Huseynov, 16, Junior, Baku European Lyceum, Baku, Absheron, Azerbaijan, T: Bahman Mammadov

SOFT005  Stock Up: Connection of the Manufacturer with the Buyer Bypassing the Mediator  
Ruslan Bayramov, 16, Sophomore, Lyceum Named after Academician Zarifa Aliyeva, Baku, Azerbaijan, T: Alinazim Makhmudzadekh
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**BELGIUM**

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

**BEHA042**  
Collaborative Economy Suspended: The Legal Challenges of Uber and BlaBlaCar in Spain and the EU. Job Precarity? Unfair Competition?  
Gines Marin-Martinez, 18, Senior, IES Alcantara, Alcantarilla, Murcia, Spain, T: Salvador Navarro

**ROBO046**  
Creating Playlists with Artificial Intelligence  
Tobia Simon Ochsner, 19, Senior, Kantonsschule Schaffhausen, Schaffhausen, Schaffhausen, Switzerland, T: Ueli Manz

**SOFT003**  
Digital Image Denoising Based on Sphere-Constrained Total Variation Optimization with an Additional Noise Component  
Ivaylo Malinov Zhelev, 19, Senior, High School of Mathematics and Nature Sciences "Vasil Levski", Smolyan, Bulgaria, T: Krassimira Yurukova

**BRAZIL**

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

**BCHM003T**  
Study and Characterization of *Zea mays* Stigma Extract: An Alternative to Obtain Eugenol  
Muriel Schilling Krohn, 19, Senior, Maria Helena Ferreira, 19, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Maria Fracassi

**CHEM002**  
Determination of Iodate in Cooking Salt Using an Electrochemical Probe  
Rafael Alessandro Chioquetti De Lima, 17, Senior, Colegio Degraus, Jundiai, Sao Paulo, Brazil, T: Clarissa Basso

**EBED004T**  
PALMIO: Assistive Insole with Reading and Monitoring of Orthopedical Information  
Iuri Bernardi Ataide, 18, Senior, Eduardo Luís Marques, 17, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Marco Sauer

**ENMC008**  
Development of a Sample Collector Device Able to Access Hard-to-Reach Areas Using a Hexacopter Drone  
Gustavo Henrique Sanches, 17, Senior, Colegio Interativa de Londrina, Londrina, Puerto Rico, Brazil, T: Fabio Bruschi

**MATS001**  
Application of Biodegradable Polymer Materials Based on Manioc Starch in the Manufacture of Seedling Bags and Organic Fertilizers, Phase II  
Lucas Felipe Zenni, 18, Senior, Colegio Estadual Jardim Porto Alegre, Toledo, Brazil, T: Dioneia Schauren

**MATS004**  
Glass Foams Obtained Using Solid Waste and Its Characterization  
Maria Aparecida Trindade Da Silva, 19, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia de Mato Grosso do Sul - Campus Corumba, Corumba, Mato Grosso do Sul, Brazil, T: Felipe De Oliveira

**PHYS006**  
Investigation of Falling Parachutes  
Isabela Ticianelli Lopes, 18, Senior, Escola Suico - Brasileira De Sao Paulo, Sao Paulo, Brazil, T: Victoriano Fernandez

**PLNT002**  
Comparative Analysis of Animal Manure through Supplementary Heating: An Evaluative Study on the Quality of Agricultural Production  
# Caio Vinicius Lima de Souza, 17, Senior, Escola Estadual Gabriel Almeida Cafe, Macapa, Amapa, Brazil, T: Aldeni Oliveira

**ROBO007**  
Fast Braille: Multi-Function Printer to Assist the Writing of the Visually Impaired II  
Bruna Da Silva Cruz, 19, Senior, Fundacao Escola Tecnica Liberato Salzano Vieira da Cunha, Novo Hamburgo, Rio Grande do Sul, Brazil, T: Alexandre Giacomini

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

**BCHM024T**  
Agrochemicals and Neurological Diseases: A New Method for Searching Biological Process Networks through Molecular Docking Codes  
Jose Guilherme Matias, 16, Junior, Yanne Pinheiro, 17, Junior, Escola de Ensino Medio Joaquin de Figueiredo Correia, Iracema, Ceara, Brazil, T: Sebastiana Bezerra
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EBED024T  Alternative Communication Device for People with Amyotrophic Lateral Sclerosis
Evandro Moreno da Costa Junior, 17, Senior, Hillary Nunes Santos, 17, Senior, Saulo Marcos Silva Curty, 16, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia Baiano Campus Valenca, Valenca, Bahia, Brazil, T: Leandro Teixeira

ENEV060T  SAMIS: Corn Cob to Replace Polystyrene, Year II
Amanda De Souza Maloste, 17, Senior, Jessica Cristina Burda, 17, Senior, Sesi College in Campo Largo, Campo Largo, Parana, Brazil, T: Juliana Vidal

ENEV061T  ENDOPISEO: Reusing Cocus nucifera Endocarp Wood to Produce Alternative Floors
Cibele Nilse Furtado de Vasconcelos, 17, Senior, Nicolly Menezes de Oliveira, 15, Junior, Escola Estadual de Educacao Profissional Julio Franca, Bela Cruz, Ceara, Brazil, T: Francigleison Pontes

ENEV062  Moringa oleifera Seeds: A Solution to Eutrophication in Rivers and Lakes
Patricia Honorato Moreira, 19, Senior, SENAI Vila Canaã, Goiania, Goias, Brazil, T: Flamarion Moreira

MAT044  The Universe in a Nutshell: Bacterial Cellulose Membrane Using Macadamia Byproduct
Juliana Davoglio Estradioto, 18, Senior, Instituto Federal de Eduacaoo, Ciencia e Tecnologia do Rio Grande do Sul (IFRS) - Campus Osorio, Osorio, Rio Grande do Sul, Brazil, T: Flavio Santos Twardowski Pinto

PLNT045  Edible Coatings in Post Harvest of Oranges (Citrus sinensis)
Joao Pedro Silvestre Armani, 16, Junior, Colegio Gabriela Mistral, Palotina, Parana, Brazil, T: Carlise Debastiani

PLNT046  Allelopathic Effect of Leucaena leucocephala on Lactuca sativa Subsp. Crispa, Cecropia pachystachya and Campomanesia adamantium
Thailenny Dantas Rezende, 17, Senior, Escola Estadual Teotonio Vilela, Campo Grande, Mato Grosso do Sul, Brazil, T: Vagner de Almeida

TMED031  Bioactive Catheter to Prevent Systemic Infection Using Cashew Nut Shell Liquid (CNSL)
Ekariny Myrela Brito de Medeiros, 18, Senior, Escola Estadual Professor Hermogenes Nogueira da Costa, Mossoro, Rio Grande do Norte, Brazil, T: Luiza Kiara Lopes

Campinas, Brazil, BRA003, Escola Americana De Campinas

CELL037T  Observing the Advancement of a Mitotic Index on Allium cepa L. Root Cells whilst Exposed to Diethyl Phthalate
Maria Jose de La Concha, 17, Junior, Alicia Andaluz Ribeiro, 16, Junior, Escola Americana de Campinas, Campinas, Sao Paulo, Brazil, T: Melina Leite

EBED014  Technological Aid for the Visually Impaired
Henrique Monaci de Pauda, 17, Junior, Escola Americana de Campinas, Campinas, Sao Paulo, Brazil, T: Douglas Takeuti

EGCH014  The Effects of Temperature on Hydrogen Fuel Cell Efficiency
Vitor di Garcia Therezo, 14, Freshman, Escola Americana de Campinas, Campinas, Sao Paulo, Brazil, T: Douglas Takeuti

BULGARIA
Sofia, Bulgaria, BGR001, Bulgarian Science and Innovation Fair

CBIO001  Brain Cells Phenotyping via Unsupervised Machine Learning Using Autoencoder and Clustering
Nikolaj Asenov Pashov, 18, Senior, 91. High School of German Language "Professor Konstantin Galabov", Sofia, Bulgaria, T: Anna Tsaneva

MATH001  Evaluation of the Complexity of Fully Homomorphic Encryption Schemes in Implementations of Programs
Dimitar Atanasov Chakarov, 17, Junior, Model High School of Mathematics "Akademik Kiril Popov", Plovdiv, Bulgaria, T: Vasil Simeonov

SOFT006  Distributed Creation of Machine Learning Agents for Blockchain Analysis
Zvezdin Borisov Besarabov, 18, Senior, National School of Mathematics and Natural Sciences, Sofia, Sofia-City, Bulgaria, T: Neli Georgieva
CANADA

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

ENBM070  Project ATTIS: An Assistive Aid for Parkinson's Patients Using Vibrational White Noise to Reduce Resting Tremors
Anne Jing, 17, Senior, Assumption College School, Brantford, Canada, T: David Page

ENEV097  TLC - Tigernut Liquid Coagulant: An Undiscovered Biocoagulant for Water Turbidity Reduction
Sabrina Evangelina Mogus, 14, Freshman, White Oaks Secondary School, Oakville, Ontario, Canada, T: Rachael Bakker

MATS070  Tardigrade Mech: Boron Nitride Nanotube Composites for Space Radiation Protection
Arielle Ese Ainabe, 18, Senior, Garth Webb Secondary School, Oakville, Ontario, Canada, T: Joshua Sanderson

ROBO076  Robotic Revolution in the Construction Industry: An Autonomous Roof Shingling Robot
Joseph Carmelo Saturnino, 16, Sophomore, Bishop Ryan Catholic Secondary School, Hannon, Ontario, Canada, T: George Geczy

Pickering, Canada, CAN002, Youth Science Canada – Team Canada

CBIO024  NMF-based Machine Learning for Alzheimer's Disease Biomarker Identification and Diagnosis
Aaron Varughese Abraham, 17, Senior, Webber Academy, Calgary, Alberta, Canada, T: Bogusia Gierus

CBIO025  A Novel Computational Model to Predict Subcellular Protein Localizations
Kevin S Hu, 17, Junior, Sir John A. Macdonald Secondary School, Waterloo, Ontario, Canada, T: Bonnie Barrick
ENBM036 Improving Spinal Fusions: Redesigned Pedicle Probe to Prevent Vertebral Breaches
Nicolas Paolo Fedrigo, 18, Senior, Claremont Secondary School, Victoria, British Columbia, Canada, T: Sean Hayes

MCRO046 The Use of Yeast to Prevent Fungal Diseases in Horticultural Produce
Michelle Song, 16, Junior, Horton High School, Greenwich, Nova Scotia, Canada, T: Jason Fuller

PHYS033 Improving Particle Classification in WIMP Dark Matter Detection Experiments Using Neural Networks
Brendon Franz Matusch, 15, Junior, Lo-Ellen Park Secondary School, Sudbury, Ontario, Canada, T: Daniel Monti

PLNT040 NanoAOX: Localization of Antioxidants via Nanoparticles to Enhance Plant Growth
Dheiksha Sivasheerayayasankar, 14, Freshman, Sir Winston Churchill Secondary School, St. Catharines, Ontario, Canada, T: Julie Bedard

PLNT041T The Effect of Surface Tension on Plant Growth in Fogponics
Sabrina Zaidi, 17, Senior, Kamron Zaidi, 17, Senior, Richmond Hill High School, Richmond Hill, Ontario, Canada, T: James Wengle

ENBM045 Flash Life
Dylan Raimundo Ribeiro, 15, Freshman, Laval Senior Academy, Laval, Quebec, Canada, T: Heather McPherson

MATS045 Lighting Up the Brain: Development of a Novel Molecular Probe for the Early, Minimally-invasive Diagnosis and Treatment of Alzheimer's Disease
Shaan Baig, 18, Senior, Dawson College, Montreal, Quebec, Canada, T: Wilson Wong

SOFT044T The Fifth Sense: A Novel Aid Device for Visually Impaired People, Translating Computer Vision into Surround Sound for Obstacle Detection
Ian Benjamin Kaspi Langleben, 18, Senior, Liana Martins-Medina, 18, Senior, Dawson College, Westmount, Marianopolis College, Westmount, Quebec, Canada, T: Wilson Wong

CHILE
Santiago, Chile, CHL001, EXPLORA National Youth Science Conference

EAEV014T Analysis of the Concentration of Particles by Air Pollution due to the Port Activity in the Sector of the Bellamar Promenade in the District of San Antonio
Stephania Vergara, 15, Freshman, Valentina Osorio, 15, Freshman, Colegio Fenix, San Antonio, Chile, T: Diego Iriarte

SOFT019T E.S.-Deaf: Home Emergency Device for the Deaf
Mario Mayorga, 16, Sophomore, Fernanda Munoz, 16, Sophomore, Liceo Bicentenario San Jose UR, Puerto Aysen, Chile, T: Patricio Antiman

CHINA
China, CHN001, China Adolescents Science and Technology Invention Contest

ANIM007 Mosquito Fecundity and Parasite Transmission: Influence of TOR Pathway
Shiqi Yang, 17, Junior, The Second Middle School Attached to Fudan University, Shanghai, China, T: Yunsong Han

ANIM014 Study on a Novel Analgesic Peptide from the Digestive Juice of Land Leeches
Chenxi Zeng, 17, Junior, The First High School of Changsha, Changsha, Hunan, China, T: Jianjun Gao

BMED012 Effect of Flavonoids (ZGM1) on the Aggregation of Beta-amyloid Peptides and Mechanisms
# Xiwen Zhang, 16, Junior, Beijing No. 161 High School, Beijing, China, T: Chen Wang

CHEM008 Controllable Synthesis and Photocatalytic Degradation to Organic Pollutants of Heterogeneous CuO-Au-TiO2 Nanocomposite
Jiajun Ren, 17, Junior, The High School Affiliated to Xian Jiaotong University, Xian, Shaanxi, China, T: Quanming Liu
CHEM010  Synthesis of Topological-Insulator Enhanced Heteronanostructure for Bifunctional Water Splitting  
Chenyang Li, 16, Junior, Hefei No.1 High School, Hefei, Anhui, China, T: Gongming Wang

EBED013  "Wand" for the Upper Limbs Limitations: A Voice and Motion Recognition Based Remote Control  
Yuhan Xiao, 17, Junior, Beijing 101 Middle School, Beijing, Beijing, China, T: Lixia Ma

EGCH005  Highly-dispersed Ni Supported by N-doped Carbon Derived from Silk for Electrocatalytic CO Reduction  
Shicheng Hu, 17, Junior, Shanghai Foreign Language School Affiliated to SISU, Shanghai, China, T: Gengfeng Zheng

EGCH006  Nature-inspired Biomass Material: from Cr-containing Wastewater Purification to Efficient Energy Storage  
Yutong Wang, 17, Junior, The High School Affiliated to Renmin University of China, Beijing, Beijing, China, T: Keke Fan

ENEV014  When Graphene Combines Cotton: Study on Synthesis of Adsorption Materials for the Removal of Marine Hazardous Chemicals  
Yumeng Cheng, 16, Junior, No. 2 High School of East China Normal University, Shanghai, Shanghai, China, T: Feng Qian

ENMC010  Smart Nest for Birds  
Guo Li, 14, Freshman, Beijing No. 166 High School, Beijing, China, T: Yue Qin

ENMC016  Miniature Underwater Bridge Pier Cleaning Robot  
Jingke Hu, 18, Junior, Hangzhou Xuejun High School of Zhejiang Province, Hangzhou, China, T: Xiaotian Shen

MATH003  Optimal Bounds for a Gaussian Arithmetic-Geometric Type Mean by Quadratic and Contraharmonic Means  
Junxuan Shen, 16, Junior, Hangzhou Foreign Languages School, Hangzhou, Zhejiang, China, T: Xingjiang Lu

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<tr>
<th>Code</th>
<th>Title</th>
<th>Name(s)</th>
<th>School(s)</th>
<th>T:</th>
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</thead>
<tbody>
<tr>
<td>MATH005</td>
<td>The Mathematical Method to Construct Time‐distance Maps for Analyzing Transportation and Economy</td>
<td>Peiru Xu, 18, Senior, High School Affiliated to Fudan University, Shanghai, China</td>
<td>T: Zongmin Wu</td>
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<tr>
<td>MATS008</td>
<td>Flexible Polymer Electrolyte for All‐Solid State Lithium Batteries</td>
<td>Zihao Huang, 16, Junior, Shanghai Jianping High School, Shanghai, Shanghai, China</td>
<td>T: Wei Wei</td>
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<tr>
<td>MATS013T</td>
<td>Atomic Engineering on Water Wetting: Life‐Like Superhydrophobicity and Temperature Control</td>
<td>Xuechun Wei, 17, Sophomore, Hao Fang, 15, Sophomore, Beijing Zhongguancun High School, Beijing, Beijing 101 Middle School, Beijing, Beijing, China</td>
<td>T: Sheng Meng</td>
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<tr>
<td>PHYS008</td>
<td>The Properties and Rate of Stars with Blazhko Effects from Gaia and OGLE Surveys</td>
<td>Nan Jiang, 16, Junior, Beijing No. 2 Middle School, Beijing, China</td>
<td>T: Hong Chang</td>
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<tr>
<td>PHYS011</td>
<td>Faraday Heaping Unravelled: Study of Heaping Behavior of Granular Materials under Vertical Vibration</td>
<td>Qingyi Wang, 17, Junior, No. 2 High School of East China Normal University, Shanghai, Shanghai, China</td>
<td>T: Zhentang Wang</td>
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<tr>
<td>PHYS012</td>
<td>Research and Application of Micro‐Nano Structure of Mosquito Leg and Mouth</td>
<td>Xinyi Ba, 17, Junior, The High School Attached to Northwest Normal University, Lan Zhou, Gan Su, China</td>
<td>T: Shun Li</td>
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<tr>
<td>PHYS014</td>
<td>A Networked Body Temperature Monitoring System Based on Single Chip and Reverse Carnot Cycle</td>
<td>Tang Jing, 16, Sophomore, Peiyuan Middle School, Quanzhou, China</td>
<td>T: Chen Weina</td>
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<tr>
<td>PLNT003</td>
<td>Natural Antioxidants Reduce the Toxic Effect of Heavy Metals on the Growth of Rice (<em>Oryza sativa</em> L.)</td>
<td>Hongjia Yang, 17, Junior, High School Affiliated to Shanghai Jiao Tong University, Shanghai, Shanghai, China</td>
<td>T: Qian Shao</td>
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<tr>
<td>ROBO014</td>
<td>Cross‐Modal Text‐Image Retrieval Algorithm Based on Model Transfer Learning</td>
<td>Muyao Li, 17, Junior, Chengdu No. 7 High School, Chengdu, Sichuan, China</td>
<td>T: Yukun Zhang</td>
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<tr>
<td>ROBO015</td>
<td>Smart Keyboard/Mouse Switch Robot</td>
<td>Pengrun Chen, 17, Senior, The High School Affiliated to Renmin University of China, Beijing, Beijing, China</td>
<td>T: Xiao Zheng</td>
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</tr>
<tr>
<td>SOFT008</td>
<td>Blockchain Optimization Model Based on Consistent Hash Algorithm</td>
<td>Chang Su, 17, Junior, Shimen Middle School, Nanhai, Guangdong, China</td>
<td>T: Xiao Ma</td>
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<tr>
<td>SOFT009</td>
<td>Automatic Mosaic and Real-time Measuring System for UAV Images</td>
<td>Zeqing Yuan, 17, Junior, Xiamen No.1 High School of Fujian, Xiamen, Fujian, China</td>
<td>T: Jundai Wang</td>
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<tr>
<td>SOFT014</td>
<td>Enhanced Image Caption Using Scene‐Graph Generation</td>
<td>Feiyu Zhu, 17, Junior, The High School Affiliated to Renmin University of China, Beijing, Beijing, China</td>
<td>T: Dan Wan</td>
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<tr>
<td>SOFT016</td>
<td>It's Break Time: An Iris‐Based Eye Fatigue Monitor</td>
<td>Yufeng Sun, 17, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China</td>
<td>T: Yingfei Hu</td>
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</tr>
</tbody>
</table>

**BMED006T** Sleep Deprivation and Ganwei Medication Rescue Resistance to Oxidative Stress and Alter Reproductive Output in *Drosophila melanogaster* with Alzheimer's Disease
Tina Mengting Liu, 17, Junior, Lili Peng, 16, Junior, Shanghai High School International Division, Shanghai, China, T: Lin Chen
ENEV008  The Impact of Soluble Calcium on Phosphate Uptake Efficiency of *Pistia stratiotes*
Emily Christine Song, 16, Junior, Shanghai American School–Puxi Campus, Shanghai, Shanghai, China, T: James Linzel

ENMC002  Permanent Magnet Synchronous Motor with Innovative Stator-Rotor Structure to Extend Torque and Speed Range
Haosong Zhong, 17, Junior, Boren Sino-Canadian School, Jiangmen, Guangdong, China, T: Jinhua Lu

MCRO002  Novel Combination Treatment of Protease, DNase I, and Antibiotic for Biofilm-Involved *Staphylococcus epidermidis* Infections
Vincent Zhong Xin, 15, Freshman, Shanghai American School–Puxi Campus, Shanghai, Shanghai, China, T: Lee Halpert

ROBO003  A Novel, Self-balanced Robot with Leading Technology in Crossing All Angles of Transmission Lines
Bradley Jiping Xu, 16, Sophomore, Shanghai American School - Pudong Campus, Shanghai, Shanghai, China, T: Timothy Boyer

CHINA, HONG KONG SPECIAL ADMINISTRATIVE REGION
Hong Kong, China, Hong Kong Special Administrative Region, HKG001, Hong Kong S&T Invention Contest

ANIM012T  Aliens Invade Hong Kong: First Record of the New Guinea Flatworm (*Platydemus manokwari*) as an Invasive Species in Hong Kong, China
Muhua Yang#, 17, Junior, Elysia Ruo Yan Ye#, 16, Junior, St. Joseph's College, Hong Kong, China, Chinese International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Zhouyang Yu

BCHM008T  The Development of Lactase Hydrogel to Alleviate Lactose Intolerance from Dairy Beverages
Verena Yiu, 17, Senior, Ngai Ming Maisie Luk, 18, Senior, St. Paul's Convent School, Hong Kong, China, Hong Kong Special Administrative Region, T: Claudia Ng

EGCH008  A Novel Method in the Fabrication of Dye-Sensitized Solar Cells Using Spin Coated Ordered Mesoporous Carbon as Effective Counter Electrodes
Jong Min Choi, 18, Senior, Hong Kong International School, Hong Kong, China, Hong Kong Special Administrative Region, T: Joanne Brown

Thank you to the Richard F. Caris Foundation for your generous support of the judges and their activities at 2019 Intel ISEF.
ENBM009T  A Breakthrough Body-Powered Prosthetic Hand
Yuet Tung Cheung, 15, Sophomore, Ka Man Ng, 16, Sophomore, Tung Laam Leung, 15, Sophomore, Shk Li Ping Secondary School, NT, China, Hong Kong Special Administrative Region, T: Kin Yip Ho

ENMC022T  The "iWheel": A Motorized Assisting Device for Manual Wheelchair
Yee Ting Ho, 19, Senior, David Ng, 17, Junior, Buddhist Wong Wan Tin College, Shatin, China, Hong Kong Special Administrative Region, T: Kai Fan Leung

SOFT018  A New Algorithm for Generating Gray Code: Chinese Rings Approach
Tsz Tung Tsei, 17, Sophomore, Maryknoll Fathers’ School, Hong Kong, China, Hong Kong Special Administrative Region, T: Yuen Man To

CHINA, MACAO SPECIAL ADMINISTRATIVE REGION
Macao, China, Macao Special Administrative Region, MAC001, Macao Region Science Fair
ENMC072T  A Pinocular: An Autonomous Mobile Robot for Aircraft Inspection
Su Fong, 15, Freshman, Hei I Lei, 15, Sophomore, Pui Ching Middle School, Macao, Macao, China, Macao Special Administrative Region, T: Haonian Min

MATS066T  Gas Sensor Research Based on Insect Wing Hierarchical Microstructure
Man Lei Lam, 19, Senior, Zheng Zhong, 18, Senior, The Affiliated School of the University of Macao, Macao, China, Macao Special Administrative Region, T: Yan Long Lin

TMED046T  An Automated Microfluidic Platform for Food Safety and Human Allergy Analysis
Hoi Ian Hui, 16, Sophomore, Chun Hei Fong#, 15, Sophomore, Pui Ching Middle School, Macao, Macao, China, Macao Special Administrative Region, T: Hio Fai Io

CHINESE TAIPEI
Taipei, Chinese Taipei, TWN001, Taiwan International Science Fair
BEHA015  The Neural Mechanisms Underlying the Other Race Effect for Expression Perception
Tsung-Tien Hsiiung, 17, Junior, Taipei First Girls High School, Taipei, Chinese Taipei, T: Chien-Chung Chen

BMED019  Methylated Glutamic-Oxaloacetic Transaminase-2: A Therapeutic Target for Pancreatic Cancer
Bo-Rong Chen, 17, Senior, Taichung First Senior High School, Taichung, Chinese Taipei, T: Wei-Chien Huang

CELL015  EpCAM Enhances Gefitinib-induced Drug Resistance in Colon Cancer Cells
Yun-Chi Chen, 18, Senior, Taipei First Girls High School, Taipei, Chinese Taipei, T: Han-Chung Wu

CHEM021T  Morphology Effects of Electrocatalytic Carbon Dioxide Reduction onto Copper/Silver Bimetallic Nanostructures
Yu-Hsien Chang, 17, Junior, Wei-Ying Chien, 17, Junior, Taipei First Girls High School, Taipei, Chinese Taipei, T: Hao-Ming Chen

EAEV021T  Remote Heavy Rainfall from Tropical Cyclone
Chieh-Hsiang Fan, 18, Senior, Bo-Jhih Hsiao, 18, Senior, The Affiliated Senior High School of National Taiwan Normal University, Taipei City, Chinese Taipei, T: Chin-Hua Wang

EGPH006  Bamboo as a New Thermoelectric Material
Chih-I Luo, 18, Senior, Taipei Fuhsing Private School, Taipei, Chinese Taipei, T: Ma-Hsuan Ma

ENMC024  The Development and Application of Harvesting Kinetic Energy from Marine Fish
Huale-Pu Chen, 16, Junior, Keelung Municipal Anle Senior High School, Keelung City, Chinese Taipei, T: Yu-Hsi Huang

MATH014  Finding Chebyshev-Type Functions
Zong-Hong Cheng, 17, Senior, The Affiliated Senior High School of National Taiwan Normal University, Taipei City, Chinese Taipei, T: Chen-Yu Chi

MATH028T  Jump Return Problem on the Circle
Pin-Hsien Yang, 17, Senior, Wei-Lun Chang, 17, Senior, National Feng-Shan Senior High School, Kaohsiung City, Taiwan, T: Pei-Yu Huang
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+ Standardized Testing Tutoring
+ Essay Development
+ Extracurricular and Leadership Mentoring
+ Career Mentorship

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- Babson
- UPenn
- Cornell
- Duke
- NYU

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MATS017  Novel Luciferase-Fluorescent Nanodiamond Assay for Cytotoxic Evaluation of Chemotherapy Drugs in Cancer and Mesenchymal Stem Cells
Shu-Yun Cheng, 17, Junior, Taipei Fuhsing Private School, Taipei, Chinese Taipei, T: Ma-Hsuan Ma

COLOMBIA
Medellin, Colombia, COL001, Colombia Science & Engineering Fair
MATS036T  Superhydrophobic Textile
Matheo Munoz Bentancur, 16, Junior, Yuliana Yadira Morales, 17, Junior, María de la Paz Lopera, 17, Junior, Institucion Educativa Colegio Loyola para la Ciencia y a Innovacion, Medellin, Antioquia, Colombia, T: William Perez

COSTA RICA
San Jose, Costa Rica, CRI002, National Engineering Expo
MATS030  Making a Bio-Polymer from Starch of a Sweet Potato (Ipomea batata)
Baulegard Variety that Germinates Seeds
Gipsy Nayceth Duran Araya, 16, Sophomore, Colegio Tecnico Profesional de Turruabares, Turruabares, San Jose, Costa Rica, T: Jose Herrera-Mesenen

CZECH REPUBLIC
Olomouc, Czech Republic, CZE001, Students' Professional Activities (SPA)
BMED001  Inhibition of Glutamate Excitotoxicity in Glaucoma by Liposomes
Alexandr Zarivnij, 19, Junior, Cirkevni Gymnazium Nemeckeho Radu, Olomouc, Czech Republic, T: Klara Cernikova

ENMC035T  Adaptive Elevation Device for Wheelchairs (AEWheelchair)
Hazal Bolanos/Alfaro, 16, Junior, Daniela Murillo Rodriguez, 18, Junior, Roy Fernandez Rojas Santamaria, 17, Junior, Colegio Cientifico de Costa Rica Sede San Carlos, San Carlos, Alajuela, Costa Rica, T: Luis Esquivel Sancho

EAEV008  What Can Lead Tell Us about Celtic Life? Tracing the Origin of Lead in Celtic Artifacts Using Mass Spectrometry
Vojtech Hybl, 19, Junior, Gymnazium Dr. Josefa Pekare, Mlada Boleslav, Stredocesky Kraj, T: Veronika Bulcikova

BMED079  The Effect of FGF2 in Chronic Wound Healing
Zuzana Sevcikova, 18, Junior, Gymnazium Brno-Reckovice, Brno, Jihomoravsky Kraj, Czech Republic, T: Katerina Cibulkova

PHYS065  Asteroid Families Mechanics with Application to the Family Eunomia
Adam Krivka, 18, Junior, The St. Cyril and Methodius Comprehensive School and Pedagogical High School Brno, Brno, Brno-Mesto, Czech Republic, T: Veronika Svobodka

SOFT058  Colorizing Grayscale Photographs with a Neural Network
Jaroslav Urban, 19, Senior, Stredni Prumyslova Skola Strojnik a Elektrotechnicka a Vyssi Odborna Skola, Liberec, Czech Republic, T: Marek Pospichal
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DENMARK
Copenhagen, Denmark, DNK001, Unge Forskere

CBIO002 Modelling Differences in Protein Interactions Caused by Familial Hypercholesterolemia for Personalised Medicine
Frederik Steensgaard Gade, 19, Senior, Odense Tekniske Gymnasium, Odense, Fyn, Denmark, T: Marianne Oestergaard-Nielsen

ENMC009T SafeSwim: Lifesaving Swimwear that Makes You Swim Safe
Katrine Markoev, 19, Senior, Christian Buur Kej, 19, Senior, Odense Tekniske Gymnasium, Odense, Fyn, Denmark, T: Kirsten Frandsen

ROBO029 The Higgs Boson: Improving the Detection of Fundamental Particles Using Neural Networks
Kasper Fredenslund, 19, Senior, Ringkjoebing Gymnasium, Ringkobing, Denmark, T: Tonny Hansen

EGYPT
Delta, East & Upper Egypt, Egypt, EGY001, Egypt Science and Engineering Fair – Cairo & Upper Egypt

BMED088T Dia-Subsisto
Gana Khaled Desouky, 16, Junior, Radwa Rabie ElNour, 16, Junior, Maadi STEM School for Girls, Cairo, Egypt, T: Sohair Fahmy

EBED042 The Integration System
Manar Mahmoud Salama, 16, Senior, Maadi STEM School for Girls, Cairo, Egypt, T: Tamer Abdelhady Darwesh

EBED043T Laseric Messenger
Mostafa Magdy Hassan, 16, Junior, Omar Wael Ayyad, 16, Junior, The Red Sea STEM High School, Hurghada, Red Sea, Egypt, T: Ekramy Eldesoky

EGCH044T From Waste to Watts
Abdulrahman Ashraf Mahmoud, 17, Junior, Abdulrahman Sayed Soliman, 16, Junior, 6 of October STEM Egypt School, Giza, Egypt, T: Israa Mohammed

ENBM062T Scan Your Skin
Mostafa Abdelfattah Ayyad, 16, Junior, Mohamed Atef Abohadid, 16, Junior, Menofya STEM School, Sirs Eel Lian, Menofya, Egypt, T: Haytham Makshat

MATS072T Throw It: A Separation System to Synthesize Biodegradable Plastic from Organic Wastes and Plastic Concrete from Plastic Wastes
Omar Ezzat Sayed, 18, Senior, Ahmed Abdelkader Elsayed, 17, Senior, 6 of October STEM Egypt School, Giza, Egypt, T: Israa Mohammed

SOFT068 EducationGo
Saad Makhal Mankarious, 17, Junior, Assuit Science, Technology, Engineering and Mathematics High School, Assuit, Mankabad, Egypt, T: Ramadan Hussien

BCHM031 Improve Algae Biotechnology
Roumany Ashraf Sefin, 18, Senior, Industrial Advanced Technical School, Port Said, Port Fuad, Egypt, T: Usama Abdel Azeem

EAEV081T Absorb Heavy Metals from the Polluted Soil by Using Zeolite Till Reach the Required Value of Heavy Metals
Asmaa Shawky Abdel Salam, 17, Junior, Amany Awad Abd El Khalik, 17, Junior, Dakahlia STEM School in Egypt, Gamasa, Dakahlia, Egypt, T: Alaa Eldin Hassaneen

ENEV078T Zero Lost Drop
Abdel Rahman Mohamed Hanafy, 17, Senior, Salma Fawzy Lateef, 18, Senior, STEM School of Alexandria, Alexandria, Egypt, T: Nadia Osman

MATS059T Novel Membrane for Wound Dressing Applications
Fares Alaa Fathy, 17, Junior, Ganna Allah Atef Khedr, 17, Junior, STEM School of Alexandria, Alexandria, Egypt, T: Anas Abdel Halem

SOFT065T Computer Vision: To Control Computers’ Cursors
Gasser Mohamed Galal, 15, Sophomore, Mostafa Ahmed Abdelmohaimn, 16, Sophomore, Elnasr Boys' School, Alexandria, Egypt, T: Effat Nasr
126,000 paid hours of undergraduate research. What will you create?
Mechanical engineering major Aubrey Woern 3-D prints flexible objects—like skateboards—in the open source lab. His lab group worked with re:3D, INC. to develop Gigabot X, an industrial printer that also produces kayak paddles and snowshoes. Aubrey leads the Open Source Hardware Enterprise—one of 25 student teams that work with faculty and industry on real projects—and is co-founder of a company that turns recyclable plastic (think water bottles and milk jugs) into 3-D filament.

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ESTONIA
Tallinn, Estonia, EST001, Estonian Young Scientist Contest

SOFT004 Lava Lamp Based User Authentication in Chat Room
Marten Reinaas, 16, Freshman, Rapla Kesklonna Kool/ Rapla Basic School, Rapla, Rapla County, Estonia, T: Kadri Laup

FINLAND
Helsinki, Finland, FIN001, Finland National Science & Engineering Fair

ENBM065 A Lumbar-Spine Motion Capture Suit for Physiotherapeutic Use in Sports
Petteri Haverinen, 17, Junior, Lahden Lyseo, Lahti, Paijat-Hame, Finland, T: Esa Palkio

PHYS063 A Research of Cooling Characteristics of Liquid in Different Containers
Ville Ilmari Rosendahl, 16, Freshman, Rantakylan Yhtenaiskoulu, Mikkeli, Etela-Savo, Finland, T: Merja Kankaanpaa

SOFTWARE57 Mobile Keyboard Optimized for Two Fingers
Vihutori Sova, 17, Junior, Jaakko Takala, 17, Junior, Paivola School of Mathematics, Valkeakoski, Finland, T: Esa Lappi

FRANCE
Paris, France, FRA001, Olympiades de Physique

MATS002 Complete Study of Viscosity Influence on the Heating Power of Superparamagnetic Nanoparticles
Alice Marguerite Suzanne Rousseau, 17, Senior, Marine Claire Daniele Tellier, 17, Senior, Lucille Marin, 17, Senior, Lycee Polyvalent Marie-Louise Dissard Francoise, Tournefeuille, France, T: Marlene Garrow

GEORGIA
Tbilisi, Georgia, GEO002, Leonardo da Vinci Fair

BMED061 Menu with Calories: One Step Toward Healthy Eating
Nino Makasarashvili, 19, Senior, Erekle Tabagari, 19, Senior, Tamari Dekanoidze, 15, Sophomore, LEPL Sachkhere Ilia Chavchavadze #2 Public School, Sachkhere, Imereti, Georgia, T: Eliso Abramishvili

PHYS069 Hand-Held Detector with Retro-Reflective Mosaic Screens to Visualize Optical Inhomogeneities
Dea Ilarionova#, 18, Senior, Shorena Gudzhabidze#, 17, Senior, Marina Gudzhabidze#, 18, Senior, Cervantes Gymnasium AIA-GESS, Tbilisi, Georgia, T: Teimurazi Chichua

ROBO073 Universal Device for the Blind
Mariam Bakhtadze, 15, Sophomore, Anna Kalandarishvili, 15, Sophomore, Milana Gagulia, 16, Sophomore, St. Alexi Shushania's School-Gymnazium, Senaki, Samegrelo Zemo-Svaneti, Georgia, T: David Songulashvili

GERMANY
Darmstadt, Germany, DEU001, Jugend Forscht

CELL002 Chemotaxis of the Slime Mold Physarum polycephalum and the Interaction with Different Molds
Anna Lia Schicktanz, 17, Junior, Florian Merx, 17, Junior, Mara-Sophie Montag, 16, Junior, Albert-Schweitzer-Gymnasium, Erfurt, Thuringen, Germany, T: Yvonne Bottger

CHEM005 Synthesis and Characterization of Complex-Forming Properties of Imino Pyranoses
Konstantin Urban, 19, Senior, Martin-Andersen-Nexo-Gymnasium, Dresden, Sachsen, Germany, T: Steffen Schafer

EBED002 Particulate Raindrop Analysis for More Accurate Storm Forecasts
Max von Wolff, 19, Senior, Mégina Gymnasium Mayen, Mayen, Germany, T: Michael Sexauer

ENEV007 ReUse in Space: Waste Recycling on Interplanetary Stations
Lara Maria Neubert, 19, Senior, Adrian Schorowsky, 19, Senior, Leni Termann, 19, Senior, Gymnasium Reutershagen, Rostock, Germany, T: Kirsten Mantau

ENMC007 Construction and Control of a Mobile Platform with Omnidirectional Drive
Vincent Voigtlaender, 19, Senior, Martin-Andersen-Nexo-Gymnasium, Dresden, Germany, T: Carsten Knoll
MATS003 The Flash Shade: Directional Darkening Technology
Adrien Chen-Wei Jathe, 17, Junior, Metropolitan School Frankfurt gGmbH, Frankfurt am Main, Germany, T: Markus Jathe

PHYS004 Development of an Interdisciplinary Test Stand to Unravel the Myth of Rubber Powered Flight
Noah Philipp Dormann, 17, Senior, Chiemgau-Gymnasium Traunstein, Traunstein, Germany, T: Michael Gotzinger

PLNT001T The Intelligent Plant: Electrophysiology of the Venus Flytrap
Christoph Schutze, 16, Junior, Sarah Schnoge, 17, Junior, Fabian Obermair, 16, Sophomore, Holty-Gymnasium Celle, Celle, Niedersachsen, Germany, T: Herbert Schutze

SOFT001 Development of a Highly Parallel BEM-Solver
Robin Tobias Christ, 18, Senior, Lessing Gymnasium Lampertheim, Lampertheim, Hessen, Germany, T: Thomas Feser

TMED004 Process Development for Thermographic Breast Cancer Diagnostics
Jule Helena Thaetner, 19, Senior, Elisabeth-Knipping-Schule Kassel, Kassel, Germany, T: Felix Kreyer

GHANA Accra, Ghana, GHA001, MISE Research Program
ROBO018 Optimizing Driving Algorithms for High Speed Autonomous Ambulances
Kwadwo Osafo, 17, Junior, United World College International School of Asia, Karuizawa, Japan, Karuizawa, Japan, T: Vincent Mai

GUAM Mangilao, Guam, TEGU01, Guam Island-Wide Science Fair
MATS065 Novel Graphene Nanoplatelet and Ketjenblack Embedded Pigmentless Acrylic Emulsions for Next Generation Flexible Electronics
 Daniel Zion Kang, 17, Junior, John F. Kennedy High School, Tamuning, Guam, T: Sanjay Sharma
HUNGARY
Budapest, Hungary, HUN001, Innovation Contest for Young Scientists
MCRO028 Innovative Approach to the Antibacterial and Prebiotic *Lycium barbarum* Extract: Solution after the Antibiotic Era

INDIA
New Delhi, India, IND001, Initiative in Research and Innovation in Science
BCHM030 QuitPuff: A Point-of-Care Diagnostic for Early Risk Detection of Oral Pre-Cancer and Cancer in Chronic Smokers
Nikhiya Shahid Shamsher, 16, Junior, Greenwood High International School Bangalore, Bangalore, Karnataka, India, T: Aloysius D'Mello
BEHA045 A Card and Board Game to Reduce Gender-Based Implicit Biases Using Perspective-Taking and Counter Stereotyping and Other Methods of Influence
Prerna Magon, 18, Senior, Police DAV Public School, PAP Campus, Jalandhar, India, Jalandhar, Punjab, India, T: Vani Sharma

HUNGARY
Budapest, Hungary, HUN001, Innovation Contest for Young Scientists
MCRO028 Innovative Approach to the Antibacterial and Prebiotic *Lycium barbarum* Extract: Solution after the Antibiotic Era

INDIA
New Delhi, India, IND001, Initiative in Research and Innovation in Science
BCHM030 QuitPuff: A Point-of-Care Diagnostic for Early Risk Detection of Oral Pre-Cancer and Cancer in Chronic Smokers
Nikhiya Shahid Shamsher, 16, Junior, Greenwood High International School Bangalore, Bangalore, Karnataka, India, T: Aloysius D'Mello
BEHA045 A Card and Board Game to Reduce Gender-Based Implicit Biases Using Perspective-Taking and Counter Stereotyping and Other Methods of Influence
Prerna Magon, 18, Senior, Police DAV Public School, PAP Campus, Jalandhar, India, Jalandhar, Punjab, India, T: Vani Sharma

CBIO043 A Computational Model of the Stimulus Response of *Mimosa pudica*
Anantharaman Subramanyam Iyer, 14, Freshman, National Public School, Bengaluru, Karnataka, India, T: Amit Vutha

EAEV076 Augura: Flood Risk Prediction Using Machine-Learning and Geographic Information Systems
# Sagnik Anupam, 17, Junior, Delhi Public School, R. K. Puram, Delhi, New Delhi, India, T: Padmini Pani

EAEV076 Augura: Flood Risk Prediction Using Machine-Learning and Geographic Information Systems
# Sagnik Anupam, 17, Junior, Delhi Public School, R. K. Puram, Delhi, New Delhi, India, T: Padmini Pani

EBED032 Ambient Computing Based Approach to Help in Device Diagnostics, Create Opportunities to Reduce Power Consumption and Carbon Footprint
# Sayli Pankaj Bande, 15, Sophomore, JSS Public School, Bangalore, Karnataka, India, T: Pankaj Bande

EGPH021T Harnessing Energy from Random Vibrations Using the Triboelectric Effect: A Novel Approach
Stuti Lohani, 16, Senior, Aryaman Trivedi, 17, Senior, Amity International School, Noida, Noida, Uttar Pradesh, India, Amity International School, Mayur Vihar, Delhi, New Delhi, Delhi, India, T: Neeraj Khare, T: Anshu Agrawal

ENBM056T Fishiotherapy: Providing Affordable Physiotherapy Using Mixed Reality
Yashish Manish Mohnot, 16, Junior, Aayush Hemesh Shah, 16, Junior, Pace Junior Science College, Mumbai, Maharashtra, India, T: Aasha Sundararajan

ENBM067 GATTII: Wearable Portable Screening Device for Gait Analysis
Sidharth Shekhar Jain, 15, Freshman, Jamnabai Narsee International School, Mumbai, Maharashtra, India, T: Reetu Jain

ENEV067 SWARN: An ICT Based International Collaborative Business Model for Limiting Generation, Disposal and Ensuring Public Participatory Management of Waste
Rishu Kumar, 16, Junior, Jawahar Navodaya Vidyalaya, Vrindavan, West Champaran, Bettiah, Bihar, India, T: Ajai Saxena

ENEV073 Eco-Friendly Insulator and Packing Material Using Natural Waste
Anusha N, 14, Freshman, St. Philomena Aided High School, Puttur, Dhaksina Kannada, India, T: Clement Pinto

MATH044 Mersenne Primes: An Exploratory Study of Patterns and Some New Conjectures
Rajat Lohan, 17, Senior, Delhi Public School, Hapur, Uttar Pradesh, India, T: Kapil Kumar

PLNT052 NanoSide: A Potential New Insecticide for Controlling Hairy Caterpillar in Jute
Aranyo Ray, 16, Sophomore, Auxilium Convent School Barasat, Kolkata, West Bengal, India, T: Chinmay Biswas

PLNT064T Novel Suction-Bait Trap to Manage Infestation of Melon Fruit Flies in Cucurbits
Richard Joseph, 16, Junior, Manya M. Kumar, 17, Senior, Kendriya Vidyalaya No.1 Naval Base Kochi, Kochi, Kerala, India, T: Ajith S R
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<tr>
<td>ROBO074</td>
<td>Positively Identifying Species Using CNNs and Hypernetworks to Aid Wildlife Conservation Efforts</td>
<td>Aditya Radhakrishnan, 16, Sophomore, Suguna PIP School, Coimbatore, Tamil Nadu, India, T: Radhakrishnan Purushothaman</td>
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<td>SOFT046</td>
<td>Go0: Reimagining Data, Privacy, and the Internet with Zero-Knowledge Computing and Distributed Systems</td>
<td>Mohammed Suhail Chinya Salimpasha, 18, Senior, The Learning Centre, Mangalore, Karnataka, India, T: Vijay Moras</td>
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<td>SOFT059</td>
<td>Recovering History: A Multifaceted System to Enhance, Classify and Reconstruct Broken Parts of Artifacts by Using a Custom Machine Learning Ensemble</td>
<td>Raghav Puri, 17, Junior, Delhi Public School, Dwarka, Delhi, India, T: Meetu Sobti</td>
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<td>SOFT060</td>
<td>Periphery Sweep Algorithm: Conquering A* Algorithm at Graph Traversal Solutions</td>
<td>Richik Vivek Sen, 18, Senior, Delhi Public School - Vasant Kunj, New Delhi, Delhi, India, T: Meenakshi Mehrishi</td>
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<td>TMED040</td>
<td>A Novel Peptide Drug as a Therapeutic in Sickle Cell Anemia</td>
<td>Rutik Santosh Thorat, 18, Senior, Dayanand Anglo Vedic Public School, Navi Mumbai, Maharashtra, India, T: Manjusha Rani</td>
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<td>TMED047T</td>
<td>Kanna: A Deep Learning Approach for Screening Amblyopia Using Facial Images</td>
<td>Viswesh Krishna, 18, Senior, Vrishab Krishna, 16, Sophomore, National Public School, Indiranagar, Bangalore, Karnataka, India, T: Kaushik Murali</td>
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<td>INDONESIA</td>
<td>Jakarta, Indonesia, IDN001, Youth Science Competition</td>
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<td>BEHA018T</td>
<td>TEMEN (Terapi Autism Online) : An Online Autism Therapy with YouTube</td>
<td>Angeline Freshbi Chesa Halim, 18, Senior, Anglila Siddha Paramarthastr, 18, Senior, Yogyakarta 8th State Senior High School, Yogyakarta, Daerah Istimewa Yogyakarta, Indonesia, T: Ezra Setiawan</td>
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<td>EAEV022T</td>
<td>Potential Identification and Application of the <em>Rhizophora apiculata</em> and <em>Sonneratia alba</em> as a Bio Antifouling Agent for Antifoulant Paints</td>
<td>Wiratathya Putramas I Made, 17, Junior, Carolline Mathilda Nggebu, 18, Senior, Denpasar 3rd State Senior High School, Denpasar, Bali, Indonesia, T: Rai Made</td>
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<td>ENMC027</td>
<td>Reducing Wingtip Vortex by Adjusting Wingtip Angle: Experimental and Computational Analysis</td>
<td>William William, 17, Senior, Santa Laurensia Senior High School, Tangerang Selatan, Banten, Indonesia, T: Gregorius Bryan</td>
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<td>MATS018</td>
<td>Gold Nanoring Sensing Membrane Application for Hydrogen Peroxide Detection as Myocardial Marker Study</td>
<td>Gardin Muhammad Andika Saputra, 17, Senior, Boyolangu 1st State Senior High School, Tulungagung, Tulungagung, East Java, Indonesia, T: Lilik Suryani</td>
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<td>PLNT019</td>
<td>C-Rice: Computational and Experimental Design Development of Transgenic Rice to Fulfill the Nutritional Demand of Carnosine in Human</td>
<td>Michaela Samanta, 18, Senior, Smak Penabur, Tangerang, Banten, Indonesia, T: Imaduddin Burhan</td>
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IRAQ
Erbil, Iraq, IRQ001, INPO (Iraq National Project Olympiad)
EGCH045T The Plasma Battery
# Mustafa Fadhil Kamal#, 17, Junior, Mohammed Nasir Hamagareeb, 15, Junior, Erbil Ishik Boys College, Erbil, Iraq, T: Shivan Majeed
ENMC077T Fire Retardant
Ibraheem Saad Ismaiel Shakarchi, 16, Sophomore, Ayoob Mohammed Alaade, 14, Freshman, Baghdad Ishik Boys College, Baghdad, Iraq, T: Erdal Er
ENMC080T ESEG (Environment Saving Electric Generator)
Laith Emad Hachim, 17, Junior, Omar Ali Al-Bayati, 17, Junior, Kirkuk Cag Boys College, Kirkuk, Iraq, T: Mehmet Atayoglu

IRELAND
Local, Regional and National (Dublin), Ireland, IRL002, SciFest
SOFT049 Improved Gate Level Simulation of Quantum Circuits
Adam Kelly, 17, Junior, Skerries Community College, Co. Dublin, Ireland, T: Louise Sullivan

ISRAEL
Jerusalem, Israel, ISR001, The Israeli Young Scientists Contest
BEHA024 Is Consciousness Necessary for Semantic Integration to Occur? An EEG Study
Shir Sagy, 17, Senior, Ben Gurion Regional School, Emek Heffer, Kfar Monash, Israel, T: Ariela Polonsky
EAEV028 A New Experimental Approach for Study Metasomatism of Peridotite in the Earth's Mantle
Tal Blonder, 16, Junior, Midrashiya Hartman, Jerusalem, Israel, T: Shira Hirsh
EGCH026T Hybrid Battery: Super–Capacitor Electrode Combined of Mo6S8 (Chevrel Phase) and Ti3C2 (MXene)
Aviad Menachem Gvili, 17, Senior, Daniel Markovich, 17, Junior, Amit Kfar Batya, Ra’anana, Israel, Israel, Tamar Ariel (Shapira) School, Netanya, Israel, T: Netanel Shpigel Gvili, T: Izik Gvili
PHYS024 VIVID: A 3D Visualization Tool for Computer Simulations
Naftali Deutsch, 17, Senior, The Hebrew University Secondary School, Jerusalem, Israel, T: Shira Hirsh
ROBO034 Machine Learning Approach for Harmonizing Songs
Tommy Winetraub, 17, Junior, Eylon Holon, Holon, Israel, T: Ronit Broder

ITALY
Milano, Italy, ITA001, I Giovani e le Scienze
CHEM037T Colors in the Dark
Manuela Ficco, 17, Junior, Linda Grainca, 17, Junior, Margherita Tarocco, 16, Junior, Istituto Tecnico Industriale G. Omar, Novara, Italy, T: Celestino Fontaneto
CHEM043T Leonardo’s Eternal Last Supper
Beatrice Alparone, 18, Senior, Elisa Cuozzo, 18, Senior, I.I.S. Carlo Emilio Gadda, Paderno Dugnano, Milan, Italy, T: Mariolina Cappadonna T: Mariolina Cappadonna
ENEV056T RICE.R. CO2: Raw Materials from Rice Husk to Capture CO2
Arianna Berardi, 17, Senior, Daniele Dalla Bona, 18, Senior, Matteo Pesarini, 17, Senior, Istituto Tecnico Industriale G. Omar, Novara, Italy, T: Celestino Fontaneto
PHYS035 Quantum Calculator: Investigating How a Quantum Computer Works through Simulation
Rebecca Amatucci, 17, Senior, Liceo Scientifico Galileo Ferraris, Torino, TO, Italy, T: Annalisa Gratteri
PLNT044T Green Network: Solutions for Supply Chain Traceability and Monitoring of Environmental Parameters to Support Agriculture and to Improve Product Quality
Marco Salvatore, Francesco Morelli, 18, Senior, Alessio Piva, 18, Senior, Istituto Superiore “Enrico Fermi”, Mantova, Mantova, Italy, T: Mauro Grandi
JAPAN
Tokyo, Japan, JPN001, Japan Students Science Awards

ANIM011T  Adaptive Significance of the Experimentally Obtained Diploid Male Fertility in the Japanese Bumblebee *Bombus ignitus* with Complementary Sex Determination
Rintaro Mori, 17, Junior, Tazuru Kobayashi, 17, Junior, Akito Yoshida, 16, Sophomore, Yasuda Gakuen Junior and Senior High School, Sumida-ku, Tokyo, Japan; T: Naoki Kojima

ANIM021  Reproductive Strategy for a Surf Clam, *Chion semigranosa* (Dunker), Accumulating in the Intertidal Zone of Exposed Sandy Beach in Summer in Tsu, Mie Prefecture, Japan
Yuko Nakano, 15, Freshman, Kogakkan High School, Ise-City, Mie, Japan; T: Tamaki Nakano

CHEM012  Formation of Large Sized Aragonite Crystals by Using Gel Method
Miu Muto, 17, Junior, Shibaura Institute of Technology Kashiwa Junior and Senior High School, Kashiwa, Japan; T: Kiichi Yamamoto

EAEV016  Long-Term Visual Monitoring Revealed Importance of Sea Wind in Causing Sudden Showers in Japanese Mountain Basin
Aihisa Kamijo, 17, Junior, Matsumoto Fukashi Senior High School, Matsumoto-City, Japan; T: Tomonaga Iguchi

PHYS017  Sound Velocity in Corrugated Pipes
Rinka Kai, 17, Junior, Hiroshima Prefectural Fuchu High School, Fuchu-City, Hiroshima, Japan; T: Junpei Okamoto

ROBO016  Extension of the Disease Detection Method of Lung Using Deep Learning with Visualization
Sean Ishiyama, 17, Junior, Meihokan High School, Shinagawa, Tokyo, Japan; T: Kyoei Hirai

Tokyo, Japan, JPN002, Japan Science & Engineering Challenge

ANIM015T  Bird Environmental DNA from the Air
Yuma Okamoto, 17, Junior, So Tsukamoto, 17, Junior, Shizuoka Prefectural Kakegawa-Nishi High School, Kakegawa City, Shizuoka Prefecture, Japan; T: Takeya Suzuki

Yui Tamada, 17, Junior, Ayana Miyazaki, 17, Junior, Haruka Hinami, 17, Junior, Nagasaki Prefectural Nagasaki Nishi High School, Nagasaki-City, Nagasaki-Pref., Japan; T: Tetsuya Nagashima

BCHM009T  Discovery of a Remarkable Oscillatory Color Change in the Iodine Starch Reaction during the Early Stage of Acid Hydrolysis of Potato Starch
Momoko Hayashida, 18, Senior, Hayato Shoyama, 18, Senior, Shintaro Yamamoto, 19, Senior, Fukuoka Prefectural Meizen High School, Kurume, Japan; T: Shuichi Nakashima

MATSO14  Development of the Gypsum Board Materials Containing Eggshell Aiming at the Solution of Sick Building Syndrome
Taito Tanaka, 19, Senior, National Institute of Technology, Yonago College, Yonago-City, Tottori-Pref., Japan; T: Naoki Tanifuji

PHYS019T  Making Microbubbles with Spiral Method
Keita Watanabe, 18, Senior, Yuta Koshobu, 18, Senior, Ryotaro Ishiko, 19, Senior, Hiroshima University High School, Hiroshima, Japan; T: Kosei Kajiyama

PLNT014  Development of the Lucky Clover: Effects of Phosphate and Auxin on the Number of Leaflets in White Clover
Minori Mori, 17, Junior, Meikei High School, Tsukuba, Ibaraki-Pref., Japan; T: Tomoko Suzuki

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

BEHA011T  Clinical Approach to Predict Cognitive Disorders in Multiple Sclerosis: The Use of Biomarkers Generated by Eye Movement Disorders
Lana Mahmoud Alakhras, 16, Junior, Raseel Eyad Shwaiki, 17, Junior, Al-Hasaad Al-Tarbawi School, Amman, Amman, Jordan; T: Roweida Abushusheh
<table>
<thead>
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<th>Finalist Directory</th>
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<tr>
<td><strong>BEHA012</strong></td>
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<td><strong>CHEM015</strong></td>
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<td><strong>TMED015T</strong></td>
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**KAZAKHSTAN**

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

**MATS061** | **Preparation of Nanostructured Silicon with Optimal Optical Parameters** |
| | Amelie Shakim, 16, Sophomore, Nazarbayev Intellectual School of Physics and Math, Almaty, Kazakhstan, T: Margulan Ibrahimov |

**KENYA**

Nairobi, Kenya, KEN001, Kenya Science and Engineering Fair

**CBIO051T** | **A Web Based Mobile Healthcare System that Aims to Reduce Under 5 Child Mortality Rate (USCM) and Maternal Deaths in Kenya: A Case Study Dadaab Refugee Camp** |
| | Supraja Sayee Srinivasan, 15, Sophomore, Kunjal Bharatkumar Dhokiya, 15, Sophomore, Shree Cutchi Leva Patel Samaj School, Nairobi, Kenya, T: Laban Chweya |
EBED006T  The Sensor Embedded Cane for the Visually Impaired
Terry Wanjiku Njogu, 17, Senior, Mary Kavuu, 17, Senior, Maryhill Girls’ High School, Thika, Kiambu, Kenya, T: George Mwangi

EBED045T  Essameter: A Noble Device for the Visually Impaired and the Deaf Learners for Measuring Length
Esther Amimo Anyanzwa, 18, Senior, Salome Njeri, 19, Senior, Keriko Mixed Day Secondary School, Nakuru, Rift Valley, Kenya, T: Peter Tabichi

ENEV092T  An E-Waste Management Initiative for Developing Countries: Using Acrylonitrile Butadiene Styrene, High Impact Polystyrene, Polypropylene, Polyvinyl Chloride, Rubber and Aluminosilicate Glass to Make a Composite Material
Harnil Kaur Jham, 14, Freshman, Isha Shilen Jobanputra, 15, Sophomore, Shree Cutchi Leva Patel Samaj School, Nairobi, Kenya, T: Laban Chweya

ENEV096T  An Industrial Water Quality Management System that Enhances Water Quality Monitoring for Developing Countries
Mohana Vamsi Varahabhatla, 14, Sophomore, Manav Amit Patel, 15, Sophomore, Shree Cutchi Leva Patel Samaj School, Nairobi, Kenya, T: Laban Chweya

KUWAIT
Kuwait, Kuwait, KWT001, Kuwait Science and Engineering Fair
BCHM039  Organic Charcoal for Industrial Dyes
Farah AlMutawa, 16, Sophomore, Alrawda High School, Hawally, Kuwait, T: Faten Khalil

EAEV062  Natural Air Filters
Dana Alkandari, 15, Sophomore, Qurtoba High School, Kuwait City, Kuwait, T: Nabeel Al Khulaifi

LATVIA
Riga, Latvia, LVA001, National Centre for Education of the Republic of Latvia
CHEM067T  Crystallization Studies of Pharmaceutically Active Substance Apremilast
Arina Manukova, 18, Senior, Gunita Paidere, 18, Senior, Riga State Gymnasium No. 1, Riga, Latvia, T: Krista Suta

ENEV94  Development of New Thermal Insulating Materials from Naturally Structured Materials
Roberts Krists Jaunarajs-Janvaris, 19, Senior, Liepaja Rainis 6 High School, Liepaja, Kurzeme, Latvia, T: Uldis Zaimis

LUXEMBOURG
Luxembourg, Luxembourg, LUX001, National Contest “Jokin Fuerscher”
SOFT055  An Interactive Tool for Self-Studying or Teaching the Inner Workings of a Simple 8-Bit Central Processing Unit
Henri Ahola, 15, Freshman, European School Luxembourg 1, Luxembourg, Luxembourg, T: Satu Lahdesmaki

MALAYSIA
Federal Territory Putrajaya, Malaysia, MYS001, National Schools Science Innovation and Engineering Competition
CHEM052T  Cassia Cinnamon Crude Extract as a Novel, Cost Effective and Eco-Friendly Mosquito Larvicide
Melwin Choon Lei Cheng, 16, Sophomore, Yong Shiang Tham, 16, Sophomore, Chung Ling High School Penang, Georgetown, Malaysia, T: Whey Cheng Heah

EAEV061T  Papainor: A Novel Eco-Friendly Organic Fabric Softener
Krisada Shen Yang Ooi, 15, Sophomore, Netaji Rao Murali, 15, Sophomore, Penang Free School, Penang, Malaysia, T: Linda Toh

ENMC061T  Amphibious House Modeling to Overcome Flash Flooding Problem (Noah’s Ark 2.0)
Mandy Pei Yi Low, 17, Junior, Tzy Ying Tung, 17, Junior, Kai Wern Wong#, 17, Senior, Heng Ee High School, George Town, Penang, Malaysia, Heng Ee High School, George Town, Penang, Malaysia, T: Sze Hui Chung
MATS060  Smart ComBoo Using Nanofillers for Aerospace Structural Applications
Yan Nian Chok, 16, Senior, Sekolah Menengah Abdul Rahman Talib, Kuantan, Malaysia, T: Mohd Fakharudin Mahmod

MATS069T  Egg Shell Plaster
Muhammad Syukur Amin Mohd Badrulsham, 16, Junior, Muhammad Alif Haidar Ahmad Khalil, 16, Junior, Mohamad Firdaus Danial Anuar, 16, Junior, Penang Free School, Penang, Malaysia, Penang Free School, Penang, Georgetown, Malaysia, T: Linda Toh

ROBO075T  Underwater Budget Drone
Ahmad Zafran bin Faisal, 17, Junior, M. Bahari Muhammad Adib Syahmi Bin, 17, Senior, Sekolah Sultan Alam Shah, Putrajaya, Wilayah Persekutuan, Malaysia, T: Samsiah binti Radiman

Kuala Lumpur, Malaysia, MYS002, MRSM Young Scientist

EAEV063T  Eniac Se’avarador: Providing Safe Water for Agriculture Use
Farah Wadhah Rosli, 16, Senior, Puteri Irdina Sofea Jazlan Arif, 17, Junior, MRSM Tun Abdul Razak, Pekan, Pahang, Malaysia, T: Nurul Afiqah Mohamd Tahir

EGCH037  Supercapacitor Electrodes Synthesised from Aquilaria Malaccensis Bagass
Ariff Haziq Ahmad Fahidin, 16, Junior, MRSM Langkawi, Kuah, Langkawi, Malaysia, T: Mimi Syadzlina Shabi

ENBM058T  Acellular Treatment from Clarias sp. Collagen for Skin Loss
Muhammad Haziq Afnan Hamizi, 17, Junior, Muhammad Haiqal Syahmi Muhammad Helmi, 17, Junior, MRSM Langkawi, Kuah, Langkawi, Malaysia, T: Nurul Izzah Abd Halim

MEXICO

BEHA008  Teaching Physics in Middle School
Julio Cesar Lopez Lopez, 17, Senior, Preparatoria UAS Guamuchil, Guamuchil, Salvador Alvarado, Sinaloa, Mexico, T: Clara Vizcarra Lopez

CHEM017T  Mineral Paper Production Using Calcium Carbonate Obtained from Eggshells Mixed with Recycled Polyethylene
Susana Jahsari Esquivel Murillo, 16, Junior, Sara Alondra Juarez Ortega, 16, Sophomore, Preparatoria Oficial No. 19 San Martin De Las Piramides, San Martin de Las Piramides, Mexico, T: Patricia Rivero Ramirez

EAEV013T  POLIPLASTIK: From Waste to a Sustainable Biopolymer
Cristian Isaia Lorenzo Aldana, 17, Junior, Alex Roberto Hernandez Gil, 16, Junior, Colegio de Bachilleres del Estado de Hidalgo, Actopan, Hidalgo, Mexico, T: Freddy Hernandez Espinosa

ENEV020T  System of Retention and Transformation of Polluting Substances Generated by Gasoline Automobiles
Sarah Michelle Diaz Martinez, 19, Senior, Martin Morales Trejo, 18, Senior, Centro de Bachillerato Tecnologico Industrial y de Servicios No. 118, Corregidora, Queretaro, Mexico, T: Maria Rubio Navarro

MATS005T  GREENROAD Panel
Luis Alberto Rojas Lara, 18, Senior, Emilio Anguiano del Castillo, 18, Senior, Colegio Carol Baur, Queretaro, Mexico, T: Susana Alonso Sierra

MATS006T  Design and Formulation of Food Coating Based on Vegetable Waste
Monserrat Paola Alva Brito, 17, Junior, Paula Selina Roque Sanchez, 16, Junior, Preparatoria Oficial No. 19 San Martin De Las Piramides, San Martin de Las Piramides, Mexico, T: Hector Juarez Martinez

MCRO008  Germicidal
Vanessa Paola Cordova Heraldez, 18, Senior, Centro de Bachillerato Tecnologico Industrial y de Servicios No. 132, Hermosillo, Sonora, Mexico, T: Milagros Canizares Navarro

PLNT010T  Adubater: Biofertilizer Derived from Aquatic Weeds
Cesar del Carmen Garcia Zequera, 14, Sophomore, Brian Foster Garcia, 15, Sophomore, Escuela Secundaria Estatal Quetzalcoalt, Balancan Tabasco, Mexico, T: Alan Cupil Diaz
Finalist Directory

**ROBO008T** MIKE: Autonomous Multi-Species Robotic Sower Using Our Own Database and GPS Location to Determinate the Type of Vegetation
Jesus Misael Resendiz Cruz, 17, Senior, Miguel Angel Verdi Resendiz, 18, Senior, Angel Enrique Vazquez Servin, 17, Senior, Centro de Bachillerato Tecnologico Industrial y de Servicios No. 118, Corregidora, Queretaro, Mexico, T: Jose Varela Herrera

**ROBO009T** Braille Translator
Max Eduardo Garcia Esquivel, 17, Junior, Jaime Ismael Hernandez Adame, 17, Junior, Universidad Autonoma de la Laguna, Torreon, Coahuila, Mexico, T: Ricardo Aguirre Barousse

**SOFT007T** Visual Control
Jose Gaspar Garcia Ibarra, 17, Senior, Cristian Rodriguez Castillo, 18, Senior, Juan Enrique Perez Martinez, 18, Senior, Colegio de Estudios Cientificos y Tecnologicos del Estado de Coahuila, Allende, Coahuila, Mexico, T: Rolando Lopez Vargas

**TMED026T** Phytoderm sunscreen
Alejandro Garcia Colorado, 19, Senior, Gabriela Marin Martinez, 17, Senior, Centro de Bachillerato Tecnologico Industrial y de Servicios No. 165, Coatepec, Veracruz, Mexico, T: Manuel Guevara Huerta

**NETHERLANDS**
**Rotterdam, Netherlands, NLD001, INESPO: International Environmental and Sustainability Project Olympiad**
**ENMC066** A Research into and the Designing of the 'Ideal' Hydrofoils for a Laser
Tycho Melles, 18, Senior, Het 4e Gymnasium, Amsterdam, Noord Holland, Netherlands, T: Sven Aerts

**NIGERIA**
**Benin City, Nigeria, NGA003, Genius National Science Expo**
**EBED038T** Safety and Communication Device for Motorbike
Isaac Ayomide Olufunminiyi, 11, Freshman, Princess Chigo Ubaezuonu-Christian, 12, Freshman, Doregos Private Academy, Lagos, West Africa, Nigeria, T: Oluseyi Lawal

**EBED039** Students' Monitor and Anti-Kidnapping Device
Saddam Babatunde Bakare, 15, Junior, Doregos Private Academy, Ipaja, West Africa, Nigeria, T: Oluseyi Lawal

**ENMC067T** Ultrasonic Aided Cutter
Olayinka Johnson Ojuolape, 17, Junior, Favour Oluwaseyifunmi Akintunde, 15, Junior, Zee Excellent Schools, Atan-Ota, West Africa, Nigeria, T: Adeyemi Lawal

**TMED044** Ficus exasperata Vahl: A Health Resource for Diabetes
Balikis Ize Lawal, 15, Junior, Doregos Private Academy, Lagos, West Africa, Nigeria, T: Oluseyi Lawal

**NORTHERN IRELAND**
**Belfast, Ulster, Northern Ireland, NFK001, Sentinus Young Innovators**
**ANIM003T** Developing Novel, Low-Cost Methods to Support Citizen Scientists in the Conservation of Bat Species
Richard Douglas Beattie, 17, Junior, Dylan Andrew Bagnall, 17, Junior, The King's Hospital, Dublin 20, Leinster, Ireland, The King's Hospital, Dublin, Leinster, Ireland, T: Ciaran O'Connor

**NORTHERN MARIANA ISLANDS**
**Saipan, Northern Mariana Islands, NMI001, Northern Mariana Islands Science & Engineering Fair**
**ENMC078** Bridge Design
Shouyu Du, 15, Junior, Agape Christian School, Saipan, Northern Mariana Islands, T: Ramiro Trinidad
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NORWAY
Oslo, Norway, NOR001, Norwegian Contest for Young Scientists

ANIM040  A Minecraft Project
Oeystein Vidarsson Haukaas, 19, Senior, Ole Vig Videregående Skole, Stjoerdal, Troendelag, Norway, T: Johan Vikan

ENMC028  Doppler Effect in Circular Motion on an Angled Plane: Investigate How the Angle of the Plane of Rotation Influences the Shift in Frequency of a Wave Source
Yash Ramchandani, 18, Senior, United World College Red Cross Nordic, Flekke, Norway, T: Chris Hamper

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

ANIM056T  Plant Pesticide to Combat Termites
Lamya Hamed Al Handhali, 14, Freshman, Marwa Khalifa Al Handhali, 14, Freshman, Al Ghubra School, Ibra, Oman, T: Aseela Al Sibayi

ENMC082T  The Frozen Iron Machine
Israa Suod Al Kindi, 15, Sophomore, Arwa Mohammed Al Yahmadi, 16, Sophomore, Um Waraqah Al Ansaryah (8-10), Muscat, Mabeelah, Oman, T: Bushra Al Yahmadi

PAKISTAN
Islamabad, Pakistan, PAK001, Intel Science Fair

CHEM013  Evaluating the Efficacy of Smoke-Water towards the Ripening of Banana
Rameesha Khursheed, 16, Sophomore, Siddeeq Public School, Rawalpindi, Punjab, Pakistan, T: Sana Siddiq Baba

CHEM036  Smog Buster
Hibba Muhammad Hanif Thara, 17, Senior, Aga Khan Higher Secondary School, Karachi, Sindh, Pakistan, T: Muhammad Pervaiz

EAEV039  Bagasse Fibers Used in Construction
Rabail Rafique Palijo, 15, Sophomore, PakTurk International Schools and Colleges, Gulshan-e-Iqbal Girls Campus, Karachi, Sindh, Pakistan, T: Shaista Mehmood

EGCH007  Garbage Fermentation Fuel Cell: Participant of Electricity Generation and Soil Pollution Control
Mian Affan Anwar, 16, Sophomore, Siddeeq Public School, Rawalpindi, Punjab, Pakistan, T: Samreen Aruge

EGPH013  Dual-Purpose Highway Turbine
Sadaf Naushad, 18, Junior, PakTurk International Schools and Colleges, Karachi, Sindh, Pakistan, T: Sani Hammad

ENEV034  Effective Utilization of Transparent Waste as Thermal Insulation for Heating and Energy Saving
Farheen Munir Shaikh, 13, Freshman, PakTurk International Schools and Colleges LUMHS Jamshoro, Jamshoro, Sindh, Pakistan, T: Usama Ahmed

ENMC034T  Is Amplification of Rays Better than Creating New Light Sources?
Usaid Ahmed, 14, Freshman, Ahmed Zafar, 15, Freshman, Generation's School, Karachi, Sindh, Pakistan, T: Nikhat Husnain

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

BEHA048T  Hope Glasses for Blind
Mohammed Y. M. Owda, 15, Sophomore, Qossay A. M. Rida, 15, Sophomore, Qusra Secondary School for Boys, Nablus, South Nablus, Palestine, T: Dima Zeineddin

ENBM066T  Do I Need an Antibiotic?
Majd Fawaz Ayyad, 15, Sophomore, Haya ibrahim Abuhlal, 14, Freshman, The Orthodox School of Bethany, Bethany, Palestine, T: Riham Hilal

ENBM072T  The Mobile Ammunition
Yasmin J. H. Daik, 15, Freshman, Nada R. M. Hamada, 15, Sophomore, Banat Omran Basic School, Jericho, Palestine, T: Aseel Johar
A safety-protection structure will be added to prevent the robot from falling in case it falls in the sky;
- The influence of wind and vibration on the robot will be explored;
- Pressure sensors will be installed for the robot to automatically adjust to various cables;
- Jobs such as cleaning and painting can be carried out;
- The integration of various sensors will be explored to achieve automatic detection of rotation damages.

References
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<th>Number</th>
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<th>Author, School, City, Region, T:</th>
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<tr>
<td>ENEV090</td>
<td>Water Pollution Indicator</td>
<td>Fatima M. S. Quirie, 16, Sophomore, The Orthodox School of Bethany, Bethany, Palestine, T: Sana Jaber</td>
</tr>
<tr>
<td>SOFT061</td>
<td>Photon Robot: Developed Algorithms that Turns Light to Data that the Blind's Brain Can Process</td>
<td>Lama Alaa Abed, 17, Junior, Al- Najah Secondary School, Al-Bireh, Ramallah and Al-Bireh, Palestine, T: Manar Samara</td>
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<td>ANIM002T</td>
<td>Diurnal Butterflies Population as Indicator Environmental Quality of the Natural Park &quot;San Francisco,&quot; Torti, Panama</td>
<td>Janai Mislet Dominguez, 17, Junior, Genisis Zarahi Almanza, 17, Junior, Centro Educativo Bilingue de Torti, Panama, Panama, T: Jose Antonio Aguilar</td>
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<tr>
<td>MCRO036T</td>
<td>Pathogens and Biocontrol: Fungi Associated to Theobroma cacao in Guna Yala, Panama</td>
<td>Lianne Marie Francis, 18, Senior, Carla Liz Chanis, 18, Senior, Smart Academy Panama, Panama, Panama, T: Ivonne Torres</td>
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<td>TMED003T</td>
<td>Reaction of Mast Cells in the Presence of Particulate Matter from Panama City Air Samples</td>
<td>Paula Patricia Palacios, 18, Senior, Natalia Carolina Cassino, 16, Senior, Colegio Real de Panama, Panama, Panama, T: Ivonne Torres</td>
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<td>ANIM018T</td>
<td>Study of the Achupalla Worm (From the Schistotheca Family) in the Biodegradation of Low Density Polyethylene (LDPE)</td>
<td>Johan Suclli Machacca, 14, Freshman, William Aguilar Paucar, 17, Sophomore, Daniel Estrada Perez, Quispicanchs, Cusco, Peru, T: Joaquin Guzman Farfan</td>
</tr>
<tr>
<td>ANIM019T</td>
<td>Evaluation of the Biodegradable Effect of Tenebrio molitor &quot;Flour Worm&quot; in the Polystyren e&quot;Styrofoam Residues&quot; to Reduce the Environmental Pollution and Generate Conscience to the Population of Huanuco 2018</td>
<td>Fabrisicio Raul Camera Caldas, 16, Sophomore, Perla Miraval Cano, 16, Sophomore, Isaac Newton, Huanuco, Peru, T: Edith Bravo Jara</td>
</tr>
<tr>
<td>BEHA016T</td>
<td>Indigenism in Peru of the XX Century</td>
<td>Fiorella Lizeth Manosalva Diaz, 16, Sophomore, Antonella Sonaly Paredes Aquino, 16, Sophomore, High Performance College of Cajamarca, Cajamarca, Peru, T: Carlos Torres Jave</td>
</tr>
<tr>
<td>BEHA017T</td>
<td>Tambomachay: Rock Art of the Archaic Man of Qanchis</td>
<td>Pamela Marisol Vargas Cabrera, 16, Sophomore, Yorch Efrain Quispe Condori, 13, Freshman, Julio Alberto Ponce Antunez De Mayolo, Canchis, Cusco, Peru, T: Adrian Pocco Caceres</td>
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<td>EGCH012T</td>
<td>Second Generation Biofuel from the Reuse of Discarded Citrus Fruits</td>
<td>Claudia Jazmin Santisteban Rodriguez, 15, Sophomore, Juan Carlos Armas Santisteban, 15, Sophomore, Benjamin Franklin, Ascope, La Libertad, Peru, T: Carlos Santisteban Alvarado</td>
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<tr>
<td>PLNT015T</td>
<td>Comparison of Substrates in Sexual Propagation of the Quina Tree (Cinchona officinalis)</td>
<td>Stefany Nicole Vasquez Meza, 13, Freshman, Marlitt Karen Barboza Hernandez, 15, Sophomore, Jose de San Martin, Bongara, Amazonas, Peru, T: Luz Quispe Sanchez</td>
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1–13 JULY or 5–17 AUGUST

*Times Higher Education World University Rankings 2019
* QS Best Student Cities 2018
PLNT016T Isolation of Native Soil Bacteria that Solubilizes the Phosphorus: A New Approach to Formulate an Agricultural Biofertilizer
Frederick Donovan Baca Pena, 14, Freshman, Victor Raul Llatance Novoa, 13, Freshman, San Agustin, Zarumilla, Tumbes, Peru, T: Sandra Ruiz Cruz

SOFT021T Classroom 2.0
Karen Vanesa Huaman Quintana, 16, Sophomore, Jhorch Quispe Laura, 17, Sophomore, Luis Alberto Sanchez, Chincheros, Apurimac, Peru, T: Juan Huaman Quintana

PHILIPPINES
Pasig City, Philippines, PHL001, Philippines Science Fair
BMED078 Evaluation of Muntingia calabura Linn. as a Natural Antidiabetic and Antioxidant
Maria Isabel Lim Layson, 16, Sophomore, Iloilo National High School, Iloilo City, Philippines, T: Ronilo Aponte

EAEV074 Solar Powered Arduino Based Deforestation Alert System (Device) for Real Time Forest Monitoring
Maryjoise Karla Amor Buan, 16, Sophomore, Pangasinan National High School, Lingayen, Pangasinan, Philippines, T: Gerald Soriano

Nathaniel Navela Reyes, 16, Junior, Quezon National High School, Lucena City, Quezon Province, Philippines, T: Jeric Ilao

POLAND
Gdynia, Poland, PLD001, E(x)plory Science Fair
EGPH001 The Influence of Various Biological and Chemical Properties on the Efficiency of Nanocrystalline Solar Cells
Anna Aldona Skierska, 17, Junior, II Liceum Ogólnokształcące im. Mieszka I w Szczecinie, Szczecin, Zachodniopomorskie, Poland, T: Jolanta Wolska

EVEV002 The Prototype of a Vehicle which Takes Preventive Measurement of Soil Conditions Autonomous
Piotr Lazarek, 18, Junior, Zespol Szkol Ogólnokształcacych Filomata, Gliwice, Słask, Poland, T: Bozena Brozyna

EVEV003 The Biodegradation of Styrofoam Using Invertebrates – The Third/Fourth Research: The Impact of Superworms (Zophobas morio) on the Biodegradation of Different Types of Styrofoam
Agata Sa,awa Monot, 19, Senior, I Liceum Ogólnokształcące imienia Adama Mickiewicza w Stargardzie, Stargard, Wojewodztwo Zachodniopomorskie, Poland, T: Piotr Bebas

ENMC012T AMSD (Autonomic Modular Scouting Drone): In Services for Society
Jakub Jan Jurzak, 19, Senior, Szymon Stanislaw Stasik, 19, Senior, Liceum Ogólnokształcące nr I im. Marii Skłodowskiej-Curie w Suchej Beskidzkiej, Sucha Beskidzka, Matopolska, Poland, T: Lucjan Palcar
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PORTUGAL
Porto, Portugal, PRT001, Portuguese Contest for Young Scientists

EBED017T Children's Monitoring and Safety in Indoor Environment
Manuel Antonio Correia Nunes, 18, Senior, Ruben Eduardo Freitas Vieira, 19, Senior, Vania Marisa Mendes Ferreira, 18, Senior, Escola Profissional de Felgueiras, Felgueiras, Portugal, T: Helder Marcio Lopes Sampaio

ENEV050T From Waste to Bioplastic: Sustainable Production of Bioplastic
Joao Pedro Gama Silva Gomes, 18, Senior, Patricia Maria Silva Cruz, 18, Senior, Maria Miguel Lopes de Castro, 18, Senior, Escola Secundaria Julio Dinis, Ovar, Portugal, T: Julia Pereira

ENEV053T Tenebrio molitor as a Bioreactor for Synthetic Polymers Biodegradation
Patricia Varela Gaivoto Ferreira Silva, 18, Senior, Sophie Lenehan, 18, Senior, Ines Isabel Gomes de Oliveira, 18, Senior, Escola Secundaria Dr. Manuel Candeias Goncalves, Odemira, Baixo Alentejo, Portugal, T: Ana Paula Ferreira Canha

PUERTO RICO
San Juan, Puerto Rico, TEPR01, Puerto Rico Math Fair

MATH019 Analysis of Pythagorean Triples and a Generating Formula
Hector Manuel Lugaro, 15, Freshman, Centro Residencial de Oportunidades Educativas de Mayaguez, Mayaguez, Puerto Rico, T: Heriberto Monroig

MATH020 Loop Spaces, P-Curvature, and Homotopy
Daniel Alejandro Santiago, 17, Junior, Centro Residencial de Oportunidades Educativas de Mayaguez, Mayaguez, Puerto Rico, T: Edwin Benvenutti

MATH022 Performance of Quantum-Inspired Matrix Completion: The Impact of Sampling Strategies
Sophie Lu, 16, Sophomore, Centro Residencial de Oportunidades Educativas de Mayaguez, Mayaguez, Puerto Rico, T: Edwin Benvenutti

Arecibo, Puerto Rico, TEPR02, Arecibo Regional Science Fair

ENMC041 Alternate Vehicular Traffic Direction System Utilizing Solar Energy
Sebastian Jose Medina Maysonet, 15, Sophomore, Brígida Alvarez Rodriguez Mathematics and Science High School, Vega Baja, Puerto Rico, T: Rosalyn Gonzalez

ENMC052T Warning Device to Alert Driver in Case a Child Is Forgotten within a Vehicle
Claudia Isabel Colon, 16, Sophomore, Natalia Sofia Herrera, 15, Sophomore, Colegio Evangélico Capitán Correa, Arecibo, Puerto Rico, T: Kiomary Rodriguez

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

BMED044 The Effect of Annona muricata (Soursop) Leaf Extract on Colon Cancer Cells
Jaime Gabriel Dominguez, 17, Senior, Jose Rojas Cortes, Orocovis, Puerto Rico, T: Merlys Rodriguez

ENEV036 Optimized Homemade Water Purification System: The Solution to the Worldwide Potable Crisis
Jeancarlo Cortes Melendez, 18, Senior, Jose Rojas Cortes, Orocovis, Puerto Rico, T: Merlys Rodriguez

MCRO040 The Use of Manihot esculenta Starch for Inhibition and Prevention of Bacterial Growth
Raphael Gabriel Acevedo Rivera, 17, Senior, Escuela Superior Especializada Vocacional Agrícola de Corozal Pablo David Burgos Marrero, Corozal, Puerto Rico, T: Enid Rodriguez

Caguas, Puerto Rico, TEPR04, Caguas Regional Science Fair

BMED054T The Plant Chamaecostus cuspidatus (Costus igneus) and Its Properties, by the Infusion Method, in Blood Glucose Levels for Patients with Diabetes Mellitus Type 2
Angel J. Zayas, 18, Senior, Yulimar Bonilla, 15, Sophomore, Specialized School of Science and Mathematics Genaro Cautino Vazquez, Guayama, Puerto Rico, T: Yolanda Serrano
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ENEV042  Analysis of the Bioremediation Potential of the Microbial Communities Isolated from Termites "Nasutitermes genus" and Ruminants "Capra aegagrus hircus", in Selective Media and Bioassays of Carboxymethylcellulose (CMC) with β-D-Glucose, Phase II
Jovangelis Paolina Gonzalez Del Toro, 17, Junior, Superior Vocacional Benjamin Harrison, Cayey, Puerto Rico, T: Myrna Figueroa Bermudez

MCRO045T  The Varying Effects of Different Concentrations of Colloidal Silver on Bacteria
Alison Reyes, 17, Junior, Paloma Sofia Santiago Walker, 17, Junior, American Academy, Inc., Juncos, Puerto Rico, T: Sara Rivera Marquez

CHEM027  Comparative Study on the Properties of Magnetsized Water versus Tap Water
Roberto Orlando Rodriguez-Garcia, 16, Junior, Florencia Garcia High School, Las Piedras, Puerto Rico, T: Mayra Cancel

EGCH028  The Effectiveness of Biomass in the Production of Biogas
Abner Gonzalez Hernandez, 17, Junior, Ramon Quinones Medina, Yabucoa, Yabucoa, Puerto Rico, T: Carmencita Rodriguez

ENBM024  Interaction of Brilliant Cresyl Blue with Gold Nanoparticles Modified with β-cyclodextrin as a Sensor for Warfarin
Amee Lee Lopez-Rodriguez, 18, Senior, Ramon Power y Giralt, Las Piedras, Puerto Rico, T: Sharaie Bonilla-Alamo

BCHM022  Analysis of the Anthocyanin of Vaccinium myrtillus as an Effective Anti-Inflammatory in Human Primary Cells of Asthmatic Bronchial Smooth Muscle
Patricia Coral Rodriguez Rodriguez, 16, Junior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Kathia Rodriguez Negron

BMED026  The Cure in an Algae: Arthrosphira spirulina as a Suppressive Substance of Cell Line SKOV3 of Ovarian Cancer through Photodynamic Technique
Fabiola Nahir Moreu Muniz, 17, Senior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Kathia Rodriguez Negron

ENBM023  The First Treatment with Silica Nanoparticles (SiO2) Loaded with Ruthenium (Ru(bpy)32+) to Eliminate Pancreatic Cancer Cells
Kevin Isaac Torres Rios, 18, Senior, Dr. Pedro Albizu Campus, Ponce, Puerto Rico, T: Jonatan Plaza Plaza

San Juan, Puerto Rico, TEPR07, San Juan Archdiocesan Region Science Fair

BMED048T  The Neuromodulatory Effect of Rosmarinic Acid on Spinal Locomotor Activity
Claudia Sofia Morales-Diaz, 18, Senior, Andrea Sophia Diaz-Pacheco, 14, Freshman, Colegio Marista, Guaynabo, Puerto Rico, T: Solmary Fernandez

ENBM037T  Design of a Forearm Cumulative-Trauma-Disorder Risk Detector Using EMG Sensor Data Sent through an Arduino to a Mobile Application via Bluetooth
Dania Maraliz Villafuerte Gonzalez#, 18, Senior, Larissa Raquel Cortes-Morales, 18, Senior, Colegio Mater Salvatoris, San Juan, Puerto Rico, T: Gretchen Rivero

ENEV054  Improved Energy Production in Microbial Fuel Cells by Means of Organic Mediation
Sean Michael Deresh, 17, Senior, Colegio San Ignacio de Loyola, San Juan, Puerto Rico, T: Carol Gonzalez

Mayaguez, Puerto Rico, TEPR08, Mayaguez Regional Science Fair

CBIO022T  Computational Study of Amyloid Fibril Inhibition Mechanism by Hydrogen Sulfide
Wester Jose Aldarondo Torres, 16, Senior, Ana Sofia Santiago-Russe, 17, Senior, Centro Residencial de Oportunidades Educativas de Mayaguez, Mayaguez, Puerto Rico, T: Brenda Cabrera

MATS039  Selective Phase Corrosion of Al-Cu Alloys to Fabricate Porous Metals
Natalia Isabel Arroyo, 16, Junior, Centro Residencial de Oportunidades Educativas de Mayaguez, Mayaguez, Puerto Rico, T: Brenda Cabrera
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San Juan, Puerto Rico, TEPR09, San Juan Regional Science Fair

ANIM032  The Effect of Rosmarinic Acid and the Pesticide Thiamethoxam on the Survival and Circadian Rhythm of Honey Bees (Apis mellifera) in Puerto Rico
Alejandra Gruber, 17, Junior, University Gardens High School, San Juan, Puerto Rico, T: Xavier Pagan

MCRO042T  The Bacteriostatic Effect of Illicium verum and Citrus X Limon in Staphylococcus aureus and Beta-hemolytic Streptococcus (GBS)
Willmary Santana, 16, Junior, Bryan Ariel Rosado, 16, Junior, University Gardens High School, San Juan, Puerto Rico, T: Xavier Pagan

Mayaguez, Puerto Rico, TEPR10, SESO Regional Science Fair

SOFT002  A Brain-Computer Interface Application for the Assessment of Cognitive Aging
Saraswati Venkatasai Sridhar, 15, Sophomore, Southwestern Educational Society, Mayaguez, Puerto Rico, T: Evelyn Montalvo

Cayey, Puerto Rico, TEPR11, Radians Science & Engineering Fair

EGCH019  The Best Electrode Spacing for the Generation of Hydrogen as a Clean Energy Source
Gabriel Antonio Lopez, 16, Junior, Radians School, Cayey, Puerto Rico, T: Luz Burgos

San Juan, Puerto Rico, TEPR12, Puerto Rico Metropolitan Science Fair

ANIM033  Hypoxia Inducible Factor-1 in the Sea Cucumber Holothuria glaberrima
Carlos Manuel Ortiz-Quintana, 17, Senior, Escuela Secundaria Especializada en Ciencias, Matematicas y Tecnologia, Caguas, Puerto Rico, T: Milagros Carire

BMED045  Acute Effects of Cocaine on the Respiratory Function of Mitochondria in the Brain
Jorge Felipe Garcia-Baez, 18, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Marisol Garcia-Flores

MATH040  Predictive Analytics Algorithm for the Health System
Alanis Zoe Perez-Montalvo, 14, Freshman, Escuela Especializada en Ciencias, Matematicas y Tecnologia, Caguas, Puerto Rico, T: Milagros Carire

MATS041  Development of a Modern Design for Roads and Highways Made from GFRC (Glass Fiber Reinforced Concrete)
Camilo Andres Cordero-Correa, 18, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Ivangs Rivera-Aponte

MCRO041  Study of the Effect of Different Concentrations of Solanum torvum on Staphylococcus aureus
Nimar I. Cisneros Figueroa, 16, Junior, Colegio Puertorriqueno de Ninas, Guaynabo, Puerto Rico, T: Aracelis Troche

SOFT040  Mad Mind Mazes: Video Game to Improve the Academic Performance of Kids Diagnosed with ADHD
Gianni Alejandro Plaza-Pizarro, 17, Senior, The San Juan Math, Science and Technology Center, San Juan, Puerto Rico, T: Ivangs Rivera-Aponte

QATAR

Doha, Qatar, QATO01, The National Student Research Fair

BMED074T  The Effect of Silver Nanoparticles Socks on the Treatment of Diabetic Foot
Abdulahi Jaber Jabal, 18, Senior, Hareth Omar, 15, Sophomore, Jassim Hamad Independent Secondary School for Boys, Doha, Qatar, T: Sherif Elseverwy

EBED040T  A Prototype for a Smart School Uniform to Manage Stress in Autistic School Children

ENEV087  Value Added Sensors from Environmental and Industrial Waste
Ajlun Mohammed Al-Kaabi, 17, Senior, Omar Bin Al-Khattab Secondary School, Doha, Qatar, T: Emad Abu Yousef

PLNT071T  Increasing the Efficiency and Sustainability of Aquaponics
Meshaal Mosallam Al-Dosari#, 15, Freshman, Khalid Al-Naama, 13, Freshman, Qatar Science and Technology Secondary School for Boys, Doha, Ain Khalid, Qatar, T: Mohammed Shazidur Rahman
SOFT054T Creating a Technological Device that Enhances Autistic Children's Communication Skills
Sama Ayoub, 16, Sophomore, Khadija Ahmed Elmagarmid, 16, Junior, Qatar Academy Doha, Doha, Qatar, T: Jason Maraku

REPUBLIC OF MOLDOVA
Chisinau, Republic of Moldova, MDA001, Moldova Science and Engineering Fair
ENEV032T Development of Biodegradable Potato Starch Based Biopolymers
Olga Prosianchina, 18, Senior, Alexei Adamco, 17, Junior, Theoretical Lyceum Dimitrie Cantemir, Balti, Republic of Moldova, T: Ludmila Gorobet
MCRO018T Natural Alternative to Synthetic Drugs: Juglone-Sodium Alginate Binary Systems
Anastasia Zdrobau, 17, Senior, Catarina-Severina Martin, 18, Senior, Theoretical High School "Orizont, Durlești," Chisinau, Republic of Moldova, T: Ilker Ozer

ROMANIA
Suceava, Romania, ROM001, Romania Science and Engineering Fair
EBED001T Material Study with Carmen Sylva Spectometric Device – CSSD
Ana Maria Olteanu, 16, Sophomore, Alina Luminita Negastra, 16, Sophomore, Delia Stefania Eremia, 16, Sophomore, Carmen Sylva High School, Eforie Sud, Constanța, Romania, T: Florin Serbu
EGPH002T Generation of Giant Energy Using Nanomembranes
Daria Ioana Radu, 17, Senior, Alexandru Cornel Abrudan, 18, Senior, Mihai Viteazul National High School, Bucharest, Romania, Tudor Vianu National High School of Computer Science, Bucharest, Romania, T: Mircea Ignat
ENBM003T Research Theme Regarding Contributions in the Microsurgical Domain
Luca Andrei Glavan, 17, Junior, David Nicolae Voicu, 17, Junior, Colegiul National "Spiru Haret", Bucharest, Romania, T: Mircea Ignat
ENMC003 Unconventional Microaccelerometers for Nanosatellite-Specific Attitude Control Systems
Stefan Ursu, 17, Sophomore, Colegiul Nicolae Titulescu, Brasov, Romania, T: Mircea Ignat
ROBO001 Study of the Flagellar Movement in Biology with Applications in MEMS and Micro Robotics
Alexandru Constantin, 17, Junior, Tudor Vianu National High School of Computer Science, Bucharest, Romania, T: Mircea Ignat

RUSSIAN FEDERATION
Nizhny Novgorod, Innopolis City, Russian Federation, RUS001, ROST
EAEV001 Well-Being of Large Forest Ecosystems: Ask Aphyllophoroid macromycetes
Ivan Sergeevich Artamonov, 16, Freshman, Municipal Lyceum # 3, Sarov, Nizhny Novgorod Region, Russian Federation, T: Marina Makeeva
PHYS001 High-Accuracy Measurements of Gas Velocities in Regions of Star Formation
Mikhail Zolotavin, 17, Junior, Municipal School # 45, Nizhny Novgorod, Russian Federation, T: Alexander Lapinov
PHYS018 Study of the Influence of Terahertz Radiation and a Magnetic Field on Blood Characteristics
Illa Zagurskii, 17, Senior, Municipal Autonomous Educational Institution "Lyceum No. 28 Named After Academician Boris Korolyov", Nizhny Novgorod, Nizhny Novgorod Oblast, Russian Federation, T: Anton Sedov
ROBO002T Third-Eye Driver Assistant
Maksim Bushuev, 17, Junior, Gleb Gorkaev, 16, Freshman, School of Computer Science VECTOR++, Sarov, Russian Federation, T: Igor Utochnikov

Moscow, Russian Federation, RUS002, Junior–I
CHEM056 Rearrangements of Fluorinated Cyclopropylboronates as a Novel Approach towards Fluoroalkene-Based Peptidomimetics
Igor Alexandrovich Mezentsev, 17, Junior, Moscow South-Eastern School Named After V.I. Chuikov, Moscow, Russian Federation, T: Maxim Novikov
CHEM057 T  New Diethylenetriaminepentaacetic Acid-Derived Lanthanide Tags for NMR Screening in Drug Discovery
Vasily Miturich, 17, Sophomore, Mikhail Alekseevich Boym, 16, Sophomore, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation, T: Alexander Rudenko

EBED033 T  Multifunctional Orientation System
Inna Olegovna Larina, 17, Junior, Nataliya Dmitrievna Ivlieva, 17, Junior, University Lyceum No. 1511, Moscow, Russian Federation, T: Mikhail Chmykhov

PHYS047 T  Laser Processing of AlN Ceramics for Obtaining a Conductive Low-Resistance Metallized Layer
Ivan Maraev, 17, Junior, Iurii Batrakov, 18, Junior, Lyceum A– 1511 Affiliated with MEPHI, Moscow, Russian Federation, T: Alexandr Schekin

MATH002  Testing Chebyshev’s Bias for Prime Numbers Up to $5 \times 10^{15}$
Andrey Sergeevich Shchebetov, 18, Junior, Lomonosovskaya School, Moscow, Russian Federation, T: Natalia Lokalova

MATH010  Geodesics in the Discrete Heisenberg Group
Ruslan Magdiev, 17, Junior, School 564, St. Petersburg, Russian Federation, T: Ilia Alekseev

MATH011  On Stallings Geodesic Braids Conjecture
Geidar Mamedov, 18, Junior, School 564, St. Petersburg, Russian Federation, T: Ilia Alekseev

MATH012 T  Geometric and Algebraic Properties of Twin Groups
Daniil Kudriavtsev, 17, Junior, Aleksei Krivovichev, 17, Junior, School 564, St. Petersburg, Russian Federation, T: Ilia Alekseev

SOFT020  Myelofon: Way of Expressing Thoughts for the People with Speech Disorders
#  Daniil Kazantsev, 16, Sophomore, Municipal Lyceum #12, Ekaterinburg, Russian Federation, T: Irina Mankova

CHEM016 T  Synthesis of Enantiomerically Pure Tryptamine Derivatives, Potential Antitumour Drugs
Pavel Evgenievich Gurevich, 17, Sophomore, Andrei Konstantinovich Zaitsev, 17, Junior, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation, T: Rinat Salikov

MATH018  Geodesic Lines on Archimedean Solids
Stepan Akinshin, 15, Freshman, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation, T: Yaroslav Abramov

SOFT027  Through Computer Experiment to Understanding Neural Networks
Oleg Kashurin, 16, Sophomore, State Budgetary Educational Institution of the City of Moscow "School No. 777 Named after the Hero of the Soviet Union E. V. Mikhailov", Moscow, Russian Federation, T: Olga Zavgorodnyaya

CHEM025  Synthesis of Dyes for DSSC’s with a Novel Type of Acceptor Moiety: An Attractive Way to Low Cost and Eco-Friendly Energy Production
Olga Chechekina, 18, Junior, Moscow South-Eastern School Named After V. I. Chuikov, Moscow, Russian Federation, T: Rinat Salikov

EAEV048  Hydrothermal Synthesis and Treatment of Jadeite
Varvara Grigorieva, 17, Junior, School #1553 Named after V. I. Vernadskiy, Moscow, Russian Federation, T: Olga Dimitrova

EAEV054  Application of Biotechnologies for Receiving Nano-Dimensional Pigments
Oleg Zagorulko, 17, Junior, Belgorod Engineering Youth Boarding School, Belgorod, Russian Federation, T: Daria Amelina

ENMC056  Pneumatic Cannon for Emergency Delivery of Light Goods over Short Distance
Egor Belashov, 16, Sophomore, Advanced Educational Scientific Centre, A.N.Kolmogorov Boarding School, Moscow, Moscow, Russian Federation, T: Sergei Pankov
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MATS028 Magneto-Optical Modulation of Signals Using Colloidal Strontium Hexaferrite Nanoplatelets
Danila Deiankov, 17, Junior, Advanced Educational Scientific Centre, A.N.Kolmogorov Boarding School, Moscow, Moscow, Russian Federation, T: Evgeny Anokhin

ROBO045 Auto Arranger Based on Deep Learning Methods
Petr Shumnov, 17, Junior, Lyceum 1533 of Information Technologies, Moscow, Russian Federation, Russian Federation, T: Nikolay Zavriev

SOFT039 3D Drawer
Artem Ageev, 17, Sophomore, Summer Camp LANAT, Moscow, Russian Federation, T: Andrey Isachenko

SAUDI ARABIA
Riyadh, Saudi Arabia, SAU001, Mawhiba Science & Engineering Fair

ANIM026 A Novel Approach to Challenge the Mutualistic Symbiosis between Algae and Sea Anemones
Lina Showqi Al-Alshaikh, 18, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Manuel Aranda

ANIM028 Visual Monitoring of Neural Activity in Hydra
Zainab Mohammed Almuallim, 17, Senior, Second High School, Safwa, Saudi Arabia, T: Hiroshi Shimizu

BMED027 Spatiotemporal Characterization of Ligand-Receptor Interactions in Blood Stem Cell Rolling Assay
Zaina Abdulla Alabandi, 17, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Arshia Zaheer

CHEM028 Selective Hydrogen Production from Formic Acid with a Ruthenium Catalyst for Power Generation in Automobiles
Mohammed Hisham Alkhurisi, 17, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Chao Guan

CHEM030 CuO Nanostructure Incorporated Epoxy for Building Blocks of Antimicrobial Efficient Water Pipes and Kitchen Countertops
Rowaid Ali Baamer, 18, Senior, Al-Aqsa Private Schools, Jeddah, Saudi Arabia, T: Ahmed Al-Shahri

EBED019 Portable Laser-Based Sensor for Low-Concentration Benzene Detection in Ambient Air
Bakur Mazin Madini, 17, Senior, Dar AlFikr Schools, Jeddah, Makkah, Saudi Arabia, T: Aamir Farooq

EGCH020 Enhanced High-Performance, Rechargeable Aqueous Zinc Ion Batteries Using V2O5/PEDOT as a Cathode
Maryam Yaseen Alshaikh, 18, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Husam Alshareef

EGCH021 Optimizing the Production of Biodiesel from Marine Algae Using Novel Carbonaceous Acid Catalysts
Aseel Medhat Bukhari, 16, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Chanbasha Basheer

EGCH022 Fabrication of Light Responsive Super Capacitor for Energy Harvesting & Energy Storage Applications
Woud Raed AlSadoun, 17, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Muhammad Hassan

EGPH010 Determine the Efficiency of Novel Non-fullerene Acceptor Material in Organic Solar Cells
Masarah Khalid AhmedHussain, 17, Senior, Dar Al-Tarbia Al-Hadetha, Jeddah, Saudi Arabia, T: Abeer Taher

ENEV039 Removing Hydrocarbons/Organic Contaminants from Water Using a Novel Ultrahydrophobic/Oleophilic Self-Cleaning Polypropylene Material
Abdullah Mohammad Alsinan, 17, Junior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Twfik Saleh

ENEV040 Visible-light Responsive Multifunctional Membrane for the Separation of Oil-Water Mixtures and Simultaneous Water Decontamination Supported by Theoretical Models
Shouq Faisal Madani, 16, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Talal Qahtan
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ENEV041 Improving the Performance of WO$_3$ for the Photodegradation of Organic Dyes in Wastewater
Deemah Mobarak Almulhim, 16, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Redhwan Alsamee

MATS031 Novel Surface Passivated CsPbCl$_3$ Perovskite Nanocrystals for UV-Photodetectors
Nora Najj Aldossary, 18, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Omar Abdelsaaboor

MATS032 Direct Color Tuning of Pure CsPbBr$_3$ Nanocrystals as a Potential Material for LEDs with Bright Emissions
Faisal Suliman Aldabesh, 17, Senior, Manarat Al-Riyadh, Riyadh, Saudi Arabia, T: Omar Abdelsaaboor

MATS033 Characterization of InGaN LEDs for Higher Efficiency Optical Devices
Arwa Fahad Albalta, 18, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Daisuke Iida

MATS034 Improving the Efficiency and Stability of Perovskite Based Photodetectors by Using 2D/3D Perovskite Single Crystals
Lena Mohammed Alabduwahab, 16, Junior, KFUPM Schools, Dhahran, Eastern Province, Saudi Arabia, T: Muhammed Younas

PLNT028 Using Zaxinone to Postpone Leaf Senescence in Rice Plants
Haya Bakr Altuwaijry, 18, Senior, Riyadh School for Boys and Girls, Riyadh, Saudi Arabia, T: Muhammad Jamil

PLNT029 Engineering the Rice Genome via CRISPR/Cas9 to Achieve Herbicide Resistance
Abdulrahman Tawfik Almulla, 18, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Magdy Mahfouz

SOFT031 Utilizing High Performance Computing to Implement a Compressed Sensing Algorithm to Better Analyze Exoplanet Data
Yosef Ali Alsuaibani, 17, Senior, Manarat Al-Riyadh, Riyadh, Saudi Arabia, T: David Keyes

SINGAPORE
Singapore, Singapore, SG001, Singapore Science and Engineering Fair

ENMC030 Origami Paper Parachutes in HADR Operations
Natalie Elizabeth Yam, 17, Senior, Anglo-Chinese School (Independent), Singapore, Singapore, T: Sharmila Saralkar

MATS020 Effectiveness of Detergents Analysed Using Rotating Magnetic Nanoparticles
Jovan Yap, 18, Senior, Dunman High School, Singapore, Singapore, T: Wei Keong Lee

MATS023T Graphene-Enabled Templating Synthesis of Metal Origami for Next-Generation Soft Robotics
Harish Kumaar, 18, Senior, Clive Choong, 17, Senior, Elden Yi Tern Yap, 18, Senior, NUS High School of Mathematics & Science, Singapore, Singapore, T: Murali Krishnaswamy

MATS027T Zinc Oxide-Capped Carbon Nanoforest: Novel Method of Defects Engineering via Focused-Laser-Beam Modification
Zhong Wei Isaac Kwek, 17, Senior, Valerie Tan Yi Jie, 17, Senior, Dunman High School, Singapore, Singapore, T: Wei Keong Lee

MCRO023 Nature Inspired Bactericidal Nanotextured Surfaces with ZnO Nanostructures
Yee Lin Tan, 18, Senior, National Junior College, Singapore, Singapore, T: Allan Goh

ROBO024 Data Analytics for Fake News Detection
Haohui Liu, 17, Junior, Raffles Girls School (Secondary), Singapore, Singapore, T: Shaun De Souza

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

ENBM001 Detection of Influenza Virus by Impedimetric Biosensor
Aneta Anna Dunajova, 17, Junior, Grammar School of St. Cyril and Methodius, Snina, Presov, Slovakia, T: Milana Buhajova
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MATS040T  Replacement of Synthetic UV-Absorbents by Lignin
Jan Matufka, 19, Senior, Peter Skripko, 19, Senior, Grammar School of St. Nicholas, Presov, Preaiovsky, Slovakia, T: Miriam Feretova

SLOVENIA
Ljubljana, Slovenia, SVN001, Slovenia Science and Engineering Fair
EBED034T  Undocumented Instructions in Microprocessors
Vid Smole, 17, Senior, Urban Meznar, 17, Senior, Upper Secondary School of Electrical and Computer Engineering and Technical Gymnasium Ljubljana, Ljubljana, Slovenia, T: Ales Volcini

PHYS046  Solving the Tyranny of the Rocket Equation: A Theoretical and Experimental Study of Laser Propulsion
Natan Dominko Kobilica, 19, Senior, Gimnazija Bezigrad, Ljubljana, Slovenia, T: Peter Gregoric

SOUTH AFRICA
Boksburg, Gauteng, South Africa, ZAF001, Expo for Young Scientists - South Africa
CHEM060  Organic Biodegradable Alternative to Plastic
Shaziyah Laher, 16, Junior, Nizamiye Al Azhar Institute, Port Elizabeth, Eastern Cape, South Africa, T: Huseyin Yilirim

EGCH031  Effect of Grilling Time on the Generation of Benzo [a] pyrene in Meat Using Different Fuels
Pearl Mangwanelo Mayilule, 15, Sophomore, Maphokwane High School, Phalaborwa, Limpopo, South Africa, T: Cynthia Lebetha

EGPH025  Improving the Harnessing of Solar Energy Using a Hybrid Photovoltaic Thermal System
Hritik Mitha, 16, Sophomore, Bryanston High School, Johannesburg, Gauteng, South Africa, T: Megan Lester

EGPH026  The Transfer of Electricity Using Induction Coils
Keira Van Niekerk, 15, Sophomore, Northcliff High School, Northcliff, Johannesburg, Gauteng, South Africa, T: Tracey Fairless

ENBM063  Catheter Design Using Transmission of Antimicrobial Blue Light to Fight Catheter Related Infections
Sana Shaik, 16, Junior, Star College Girls’ High School, Durban, KwaZulu Natal, South Africa, T: Tahir Denli

PHYS064  Using Dimple Technology to Optimise the Aerodynamics of Heavy Motor Vehicles
Rune Edeling, 18, Senior, Eunice High School, Bloemfontein, Free State, South Africa, T: Inus Wessels

TMED033  Investigating the Use of Pelargonium sp. in Haemostatic Wound Dressing to Decrease Platelet Activation Time in Swine Blood
Lerissa Brits, 17, Junior, Diamantveld High School, Kimberley, Northern Cape, South Africa, T: Anneli Fourie

SOUTH KOREA
Seoul, South Korea, KOR001, Korea Olympiad in Informatics
EBED037T  Arduino-Based Self-Guided Satellite Recovery System
Seungmin Shin, 16, Junior, Haneulbit Kim, 16, Junior, Bundang High School, Seongnam-si, Gyeonggi-do, South Korea, T: Seonguk Cha

ROBO069T  Maximizing the Potential of a Recycling Machine Using Image Classification
Alvin Dongyeon Kang, 18, Senior, Jee Soo Baik, 16, Junior, Sejong Science High School, Seoul, South Korea, T: Eunkyung Kim

SOFT063T  Wearable One-Handed Typing System: ANAX
Seon Yong Oh, 16, Junior, Seongwon Yang, 18, Junior, Daykey High School, Jeju-si, South Korea, North London Collegiate School Jeju, Seogwipo-si, Jeju-do, South Korea, T: Minjae Kim
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Seoul, South Korea, KOR002, YSC (National Science Research Competition)

BCHM021T  Application of Supercharged Protein to Allow Secretion-Based Production of a Broad Range of Recombinant Proteins through the ABC-Transporter System
Jiheun Ha, 17, Junior, Hongwook Lee, 18, Senior, Seungmin Kim, 18, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Junghoon Ahn, T: Hyun-Jeong Choi

BMED067T  The Novel Value of Omija as a Material of Functional Cosmetics
Sumin Kim, 18, Senior, Yeongseo Kim, 17, Senior, Da Ye Jeong, 17, Senior, Mungyeong Girls' High School, Mungyeong-si, Gyeongsangbuk-do, South Korea, T: Eun A Jung

EAEV055T  How Can We Make Local Plants Grow Well in Severe Environment?
Jihyun Kim, 14, Freshman, Huigyeong Kim, 15, Freshman, Jiwon Eom, 14, Freshman, Seokjeong Girls' Middle School, Yeongwol, Yeongwol, South Korea, T: Byeonghak Jung

EGPH028T  Approach to Reduce Reverberation Time of Korean Traditional Drum, Jang-gu
Su Bin Hwang, 16, Junior, Ji Hyun Hwang, 17, Junior, Jin Seo Park, 18, Senior, Ilsan Daejin High School, Goyang City, South Korea, T: HyeonJoo Choi

ENBM048T  Application of Physical Properties of Purple Sea Urchin Barb Structure to Medical Suture Devices
Chae Ryeon Lee, 17, Sophomore, Esther Ji Young Lee, 16, Junior, Jaewoo Song, 16, Sophomore, Incheon Posco Academy, Incheon, South Korea, T: Chang Hoon Lee

ENEV035T  Production of CFH Filter Using Discarded Chicken Feather and Cotton Fabric
Jiwung Lee, 18, Senior, Dohun Kim, 17, Senior, Taewon Eum, 18, Senior, Chung-Buk Science High School, Cheongju-Si, Chungcheongbukdo, South Korea, T: Heesu Kim

ROBO023  Development of Efficient Vision Processing Algorithm Using Color Border Recognition
Jin Kwon, 17, Senior, Cheonan Shindang High School, Cheonan, South Korea, T: Han Beum Park

SOFT047T  Design of Analytic Application for Music Therapy Focused on Function between EEG and Sound Using Machine Learning Approaches

#  Hyogi Kim, 16, Sophomore, Dongyeong Kim#, 15, Sophomore, Minseo Eun, 16, Sophomore, Ewha Womans University High School, Seoul, Korea Digital Media High School, Ansan-si, Gwangyang Jecheol High School, Gwangyang-si, South Korea, T: Jin Kwon Kim

Seoul, South Korea, KOR003, Korea Science Fair

CHEM053T  A Study on the Solution of Cold Damages by Finding Optimal Conditions of Antifreeze Protein
Jinah Jeon, 17, Senior, Gwanwoo Baek, 17, Senior, Eunjae Jo, 17, Senior, Gyeongnam Science High School, Jinju-si, Gyeongsangnam-do, South Korea, T: Minjung Jung

EGPH020  "Harvesting Friction to Shine a Light": Study on the Transparent & Flexible Triboelectric Energy Harvesting Device Using Bilayer Graphene
Jihye Heo, 15, Freshman, Seoul International School, Seoul, South Korea, T: Alyssa Shelby

EGPH024T  SHOWPAM: System of High-efficiency Ocean Wave Power with Acoustic Metamaterial
Jooyoung Lee, 17, Senior, Mincheol Park, 18, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Jongrim Lee

ENBM061T  Quantification of Spastic Ankle Joint Based on Parameter Optimization Algorithm
Jooyoung Lee, 17, Senior, Gun Hee Park, 17, Senior, Korea Science Academy of KAIST, Busan, Busan, South Korea, T: Won Seok Shin

ENEV083T  A Suggestion for Optimal Fine Dust Removal Model Using Acoustic Levitation
Dohyun Kim, 18, Senior, Junsung Lee, 17, Senior, Sejong Academy of Science and Arts, Sejong, Chungcheong, South Korea, T: Yunhwa Jung
unleashing innovation
creating opportunities
inspiring ingenuity
ENEV084T Porous Xylem Plastic (P.X.P)
Chaerin Kim, 17, Senior, Yedam Lee, 17, Senior, Gaheyon Cho, 17, Senior, Boyoung Girls' High School, Dongducheon-si, Kyeonggi-do, South Korea, T: Seongho Song

MATS063T Implementation of Hydrophobic Surface by Simulating Microstructure of Bird Feathers
Yurim Kim, 17, Junior, Jun Hyeok Sim, 17, Junior, Chanjoo Lee, 18, Junior, Changwon Science High School, Changwon-si, Gyeongsangnam-do, South Korea, T: Donghyuk Kwon T: Dong Hyuk Kwon

PHYS059 The First Hard X-Ray Survey of the Central 30 Parsecs of the Galactic Center Searching for Faint High Mass X-Ray Binaries
Jung Kyu Jang, 18, Senior, Chadwick International School, Incheon, South Korea, T: Kurt Amundson

PLNT066T Development of Food Poisoning Resistant Lettuce Using Endophytes in Petasites japonicus Leaves
Yoonji Kim, 18, Senior, Jihyun Ra, 17, Senior, Kangwon Science High School, Wonju, South Korea, T: Hang Seok Choi

ROBO070 sEMG Classification and Prosthetic Hand
# Yeom Jangun, 17, Junior, Gyeongsin High School, Daegu, Gyeongsang, South Korea, T: Eun Jun ug

SPAIN
Spain, SPN001, Exporecerca Jove

BMED021T How Does the Level of Pungency from Pepper Extract of the Solanaceae Family Affect the Rate of Growth of Bacterial Colonies?
Malena Gronda, 15, Freshman, Marta Beatrice Pantin, 15, Freshman, American School of Madrid, Madrid, Spain, T: Susan Wall

MCRO024 Food Preservation, Not Perversion: Development of a New Preservation Method for Alimentary Products
Maitane Alonso Monasterio, 18, Senior, Avellaneda Ikastetxea, Sodupe (Guenes), Spain, T: Elena Sevillano Pena

SRI LANKA
Colombo, Sri Lanka, LKA001, Sri Lanka Science & Engineering Fair

EAEV019T Effect of Acidity on Seed Germination of Selected Varieties of Paddy
Ramanayakage Sandalu Ransika Senevirathna, 19, Senior, Hikkaduwa Lokuge Chanuth Denuwa Hashela, 18, Senior, Sandaradura Sachin Ravinath De Silva, 19, Senior, Gnanodaya Maha Vidyalaya, Kalutara, Western Province, Sri Lanka, T: Nirosha Udawatta

EBED026 Safe Gas Regulator
Wahalamuni Arachchilage Kavith Budwin Udapola, 16, Junior, Sandalankawa Central College, Sandalankawa, North Western Province, Sri Lanka, T: D P Dassanayaka

ENMC045 Innovative Tree Branch Removing Device
Mohamed Zamny Mohamed Ayyash, 16, Junior, Zahira College–Mawanella, Mawanella, Sabaragamuwa Province, Sri Lanka, T: Thalibdeen Nisa

SWEDEN
Stockholm, Sweden, SWE001, Utstallningen Unga Forskare

PHYS053 The Hunt for the Shadow of an Asteroid: Observation of 479 Caprera’s Occultation of HIP33753
Fabian Egon Anders Lundell, 19, Senior, Backangsgymnasiet, Boras, Vastergotland, Sweden, T: Camilla Larsson

PHYS054 Quantifying Asymmetries in Supernovae: A Study on the Deaths of Massive Stars
Miranda Viktoria Jaderling, 19, Senior, Blackebergs Gymnasium, Stockholm, Sweden, T: Leena Arvanitis

PHYS055 On Detecting Cherenkov Radiation with a Cellphone: A Proposal for a New, Cheaper and Simpler Method for Detection of Cherenkov Radiation
Ellen Julia Hammarstedt, 19, Senior, Kitas Natur, Gothenburg, Sweden, T: Anders Crona
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**PHYS057**  Searching for Hidden Black Holes: An Investigation of Chaotic Regimes in Non-Linearly Coupled Harmonic Oscillators  
Rebecka Mikaela Mahring, 19, Senior, Viktor Rydbergs Gymnasium Odenplan, Stockholm, Sweden, T: Bo Sundborg

**SWITZERLAND**  
*Bern, Switzerland, CHE001, Swiss Youth in Science*  
**CHEM051**  Silica Aerogels and Silica Aerogel–Carbon Composites for Adsorption of Micropollutants  
Francesca van Swaaij, 19, Senior, Liceo Cantonale di Lugano 2, Savosa, Ticino, Switzerland, T: Carlo DeVittori

**PHYS026**  Forecasting International Space Station Transits of the Sun  
Trevor Winstral, 19, Senior, Schweizerische Alpine Mittelschule Davos (SAMD), Davos Platz, Grisons, Switzerland, T: Andre Van der Graaff

**THAILAND**  
*Bangkok, Thailand, THA001, SST-NSM National Science Projects Competition*  
**ANIM046T**  Nesting Behavior of Baya Weaver (*Aves: Ploceidae*): Implications for Local Conservation Practice  
Sunisa Phuetphanphaisan, 16, Sophomore, Napaporn Phoncharoen, 17, Junior, Takhampittayakom School, Phanatnikom, Chonburi, Thailand, T: Panuphong Pootawang

**EGCH036T**  Novel Alternative Energy: Seawater Electric Generator Improved by the Catalyst from Waste Lard  
Chawit Kaewnrurtchadasorn, 18, Senior, Puttaranun Boonchit, 18, Senior, Putuchon Vongvorakul, 18, Senior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Panuphong Pootawang

**EGPH022T**  Development of Novel Wind Turbines Hybridized between Permanent Magnet Disks and Additional Motor/Generator for Extending Operating Range and Enhancing Conversion Efficiency  
Rungsiman Kulpetjira, 18, Senior, Jittapon Khajonpirom, 18, Senior, Phitsanulok Pittayakom School, Phitsanulok, Thailand, T: Suwit Kiravittaya

**ENEV074T**  Modernize Packaging Mimic from Pill Millipede Integrated with Honeycomb  
Kanyarat Samphan, 17, Junior, Jiranant Phoolsawat, 17, Junior, Chutinan Sriphetpool, 17, Junior, Suratpithaya School, Muang Suratthani, Suratthani, Thailand, T: Chalermporn Pongtheerawan

**ENEV075T**  The Greenovation of Low Cost Super-Adsorbent Polymer for Co-Treatment of Industrial Wastewater  
Supaporn Klaklaydee, 18, Senior, Yutthapichai Aiadthum, 17, Junior, Princess Chulabhorn's College Nakhon Si Thammarat, Nakhon Si Thammarat, Thailand, T: Sutap Nusen

**MATH035T**  Convex Hull of Intersection of Conic Sections and Random Points  
Kanyawee Kamkongkaew, 18, Senior, Methat Phophli, 18, Senior, Chutiphan Charoensuk, 18, Senior, Princess Chulabhorn Science High School Phetchaburi, Cha-Am, Phetchaburi, Thailand, T: Pitsinee Kongsubun

**MATH036**  The Study of Moment of Inertia of any Polyhedron by the Use of Mass Projection of the Polyhedron  
Phurich Teerakosone, 17, Junior, Nakhon Sawan School, Nakhonsawan, Thailand, T: Samai Chanlung

**PLNT056T**  Environmental Friendly Seedling Nursery Balls from Cow Dung  
Sutthida Iamsaard, 18, Senior, Thirakarn Wannakarn, 18, Senior, Phanomsarakham "Phanom Adun Witthaya" School, Chachuengsao, Thailand, T: Niran Luangsawan

**PLNT057T**  Saponin Hydrogel for Controlling Snail Invasion  
Phan-Anong Chuenchokchai, 18, Senior, Ramita Chueamuangphan, 18, Senior, Natthamon Sriprom, 18, Senior, Damrongratsongkroh School, Muangchiangrai, Chiangrai, Thailand, T: Sutipong Jaikaw
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PLNT058T  Coating Highland Rice Seeds with Local Spondias pinnata Gum Can Reduce Seedling Mortality Caused by Water Deficit during Rain Delay
Namphung Panya, 18, Senior, Jetsada Sittikhankaew, 18, Senior, Phirachat Kochanil, 18, Senior, Damrongratsongkroh School, Muangchianrai, Chiangrai, Thailand, T: Kiettisak Inrajsadon

SOFT050T  Approximating the Weight of Sweet Corn Kernels from Digital Images Using Washer Integration
Chanikarn Prompat, 18, Senior, Pornchanun Mangmeethanapiboon, 18, Senior, Neeranuch Sudcharoen, 18, Senior, Princess Chulabhorn Science High School Phetchaburi, Cha-Am, Phetchaburi, Thailand, T: Jirakoon Erbim

ANIM048T  Adaptive Features of Semiaquatic Mass Migrating Shrimp Macrobrachium dienbienphuense
#  Atid Techanitisawad#, 17, Junior, Piwat Suppawittaya, 15, Sophomore, Bangkok Christian College, Bangkok, Thailand, T: Chanan Keatsirisart

CHEM048T  Chloramine Test Kits for an Efficient Process of Swimming Pools' Disinfection
Napat Sajjamongkol, 17, Junior, Athicha Santilinon, 17, Junior, Natprawee Pattayawij, 17, Junior, Mahidol Wittayanusorn School, Nakhon Pathom, Thailand, T: Kiattroop Rodpun

EGCH038T  Green and High-Performance Supercapacitor Prepared by NiO Embedded Carbon and Nanocellulose from Corn Wastes
Chayutapon Punyaratayuenyong, 16, Sophomore, Methasit Tantiplubtong, 16, Sophomore, Mancharat Tangtrongkijcharoen, 16, Sophomore, Kamnoetvidya Science Academy, Rayong, Thailand, T: Panupong Pootawang

MATH037T  Private-Key Cryptosystem Using p x p x p Rubik's Cube Group
Pasawat Viboonsunti, 18, Senior, Sirada Rungruengsakorn, 18, Senior, Kamnoetvidya Science Academy, Rayong, Thailand, T: Wasanont Pongsawat

MATS057T  Bio-TiO₂ Nanoparticle-Impregnated Bacterial Cellulose for Water Treatment
Nicharee Pasuntaviroj, 17, Sophomore, Salisa Apiwatgaroon, 17, Sophomore, Kamnoetvidya Science Academy, Rayong, Thailand, T: Sakol Warintaraporn

MATS058T  Oil Absorbent Material Based on Natural Rubber
Punpom Sukjuntra, 17, Junior, Apisara Chaisawat, 17, Junior, Demonstration School of Prince of Songkla University, Mueang Pattani, Pattani, Thailand, T: Nabil Hayeemasae

TUNISIA
Tunis, Tunisia, TUN001, Tunisia Science and Engineering Fair
EBED003  Natural Phenomena Early Warning System
#  Aziz Hanafi, 15, Freshman, International School of Carthage, Tunis, Carthage, Tunisia, T: Sonia Ben Kraiem

ROBO004  An Intelligent Security System for High-Terrorism-Risk Cities: Real-Time Prediction, Weapon Detection and Instant Solution (ISTC)
#  Hedi Ben Daoud, 16, Junior, Bourguiba Pioneer High School, Tunis, Tunisia, T: Sihem Cherif

ROBO005  SmartCap
Bacem Etteib, 18, Junior, Pioneer Prep School Medenine, Medenine, Tunisia, T: Zied Tayeb

TURKEY
Ankara, Turkey, TUR002, Tubitak Fair
BEHA019T  Paper Characters: An Educational Game Material
Sudenur Bulut, 16, Junior, Sinemis Isik Ilday, 17, Junior, Adana Bilim ve Sanat Merkezi, Cukurova, Adana, Turkey, T: Hacer Moduk

CBIO010T  A Novel Approach on G6PD Enzyme Deficiency Treatment: Drug Repurposing
Ipek Ak yol, 16, Junior, Nilufer Kemer, 17, Junior, Izmir Ozel Ege Lisesi, Izmir, Bornova, Turkey, T: Onur Akpinar
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Michael Oladosu
B.S. Biological Sciences ’20
**EAEV017T**  
**Mobile Weather Station and Databank**  

**EGCH040**  
**Alternative of Renewable Energy Resources Microbial Fuel Cells**  
Umut Atacan Pamuk, 18, Senior, Ankara Ozel Zafer Fen Lisesi, Ankara, Baglica, Turkey, T: Onur Aydogmus

**ENBM041**  
**Kabantagc: An Electronic Ring that Helps Visually Impaired to Sense 2D Pictures via Vibrations**  
Bahadır Alp Alp Selay, 16, Junior, Izmir Atatürk High School, Izmir, Turkey, T: Zerrin Hepsogutlu

**MATH033**  
**A New Rule on Divisibility by (c - 1) * c^k and Its Application in Cryptology**  
İbrahim Muhammed Çevik, 18, Senior, Tofas Fen Lisesi, Nilüfer, Bursa, Turkey, T: Hakan Özkaynak

**ROBO019**  
**PIC-TALK: Creating a Digital Ecosystem that Consists of Open Source Hardware and Software Products for Visually Impaired People**  
Musa Sadık Unal, 19, Senior, Kartal Anadolu Imam Hatip High School, Istanbul, Turkey, T: Ersin Er turbk

**SOFT022T**  
**Sign Language Translator**  
Arda Mavi, 18, Senior, Zeynep Dikle, 17, Senior, Ayrancı Anadolu Lisesi, Ankara, Nazmi Arakan Fen Bilimleri High School, Ankara, Cankaya, Turkey, T: Sinan Dag

**Ukraine**

**Kyiv, Ukraine, UKR001, Intel-TechnoUkraine**

**ENEV051**  
**Cleaning Up the Environment from Plastic by Encapsulated Bacteria**  
Dmytro Solomianiu, 17, Junior, Lviv Lyceum of Technology, Lviv, Ukraine, T: Vasyl Postrilonyi

**ROBO043**  
**Fast Technology of Automatic Markup and Teaching a Robot to Recognize Objects**  
Serhii Lysin, 16, Sophomore, Polytechnic Lyceum NTUU "KPI", Kyiv, Ukraine, T: Sergii Kravtsov

**ROBO047**  
**ExploreYourMind: Software for Harmonic Combination of Video and Music**  
Nazar Ponochevnyi, 16, Junior, Specialized School #52 in Kyiv with In-depth Study of Information Technology, Kyiv, Kyivs’ka Oblast, Ukraine, T: Ganna Saryboga

**SOFT038**  
**The Method of Automatic Analysis of Information Understanding**  
Artem Agvanian, 16, Sophomore, Mariupol Technical Lyceum, Mariupol, Donetsk’ oblast, Ukraine, T: Andrii Bykov

**Kyiv, Ukraine, UKR002, Intel–EcoUkraine**

**BMED083**  
**Expansion of Hematopoietic Stem Cells from Cord Blood in Culture in vitro**  
Natalia Maluik, 16, Junior, Ukraininan Medical Lyceum National Medical University the Name of O. O. Bogomolets, Kyiv, Ukraine, T: Serafima Tarasevich

**CHEM064**  
Sofiia Rusakevych, 15, Sophomore, Chemical Ecological Lyceum, Dnipro, Dnipropetrovsk Region, Ukraine, T: Vadym Kovalenko

**PLNT039**  
**How Plants Respond to Heavy Metal: Insights from Genes and Metabolites**  
Anna Volkova, 17, Junior, Gymnasium #2, Chernivtsy, Ukraine, T: Irina Panchuk

**TMED048**  
**DOPA Reaction with Vacuum Filtration as a New Method for Diagnosing of Circulating Melanoma Cells and Metastasis**  
Olha Khazarakh, 17, Junior, Mariupol Technical Lyceum, Mariupol, Ukraine, T: Viacheslav Ponomarchuk
UNITED ARAB EMIRATES
Abu Dhabi, United Arab Emirates, ARE002, Think Science Competition

CHEM072T  Absorption of Heavy Metals from Industrial Effluents Using Fish Scales
          Shaima Alhammadi, 17, Senior; Fatima Alsuwaidi, 16, Junior; Al Resalah
          International School of Science, Sharjah, United Arab Emirates; T: Naheeda Awan

ENBM075  Aroma Virtual Reality
          Fatma Arif Albastaki, 16, Senior; Dubai National School—Al Barsha, Dubai,
          United Arab Emirates; T: Nafissa El Jabban

ENBM076T  Smart Shoes and Exosuit
          Sara Fekri, 17, Senior; Hessa Ibrahim, 15, Junior; Dubai National School—
          Al Barsha, Dubai, United Arab Emirates; T: Nafissa El Jabban

ENEV102T  Automated Electrocoagulation Ozone Technology for Wastewater
          Treatment
          Ahmed AlHammadi, 17, Senior; Sultan AlHammadi, 17, Senior; Applied
          Technology High School - Fujairah, Fujairah, United Arab Emirates;
          T: Asma Oudat

MATS077T  Refushields
          Dhabia Alhosani, 17, Senior; Reem Alhajeri, 18, Senior; Aamena Almarzooqi,
          17, Senior; Al Mawaheb School, Abu Dhabi, United Arab Emirates;
          T: Dalia Eissa

MATS078T  Tougher Boats Made from Local Fiber
          Hamad Alyammahi, 17, Senior; Waleed Alnaqbi, 17, Junior; Hussain Abdelnabi,
          16, Junior; Secondary Technical School - Fujairah, Fujairah, United Arab
          Emirates; T: Khalid Ahmed

UNITED KINGDOM
London, United Kingdom, GBR001, The Big Bang: UK Young SEF

CBIO018  A Novel Method for Skeletal Age Estimation Based on Cranial Suture
          Analysis
          Andrey Gizdov, 18, Senior; Ackworth School, Pontefract, Ackworth, United
          Kingdom; T: Stanislav Harizanov

CHEM031  Investigating the Effect of Activated Charcoal on the Absorption of
          Medicines
          Maeve Jessie Stillman, 16, Sophomore; St. Mary’s College, Derry,
          Londonderry, United Kingdom; T: Ann Blanking

ENMC047  MotorMate: A Multi-Terrain Device to Aid the Transport of Boat Outboard
          Engines
          Jack Davies, 19, Senior; Ysgol Uwchradd Aberteifi, Cardigan, Ceredigion,
          United Kingdom; T: Emyr James

UNITED STATES OF AMERICA
ALABAMA
Auburn, USAL01, Greater East Alabama Regional Science and Engineering Fair

EGCH018  Flexible and High-Powered Supercapacitor from Low-Cost and Simple
          Building Method
          #
          Brayden Noh, 17, Sophomore; Auburn High School, Auburn, Alabama;
          T: Jacque Middleton

ROBO027  Development and Comparison of Pathfinding Algorithms in Topographic
          Mapping
          Benjamin Thomas Davis, 15, Sophomore; Auburn High School, Auburn,
          Alabama; T: Jacque Middleton

Birmingham, USAL02, Central Alabama Regional Science and Engineering Fair

CELL018  The Effect of Inhibiting DNA-Protein Kinase and ADP-Ribose Polymerase
          on Head and Neck Squamous Cell Carcinoma Survivability
          Eric Cheng, 17, Senior; Alabama School of Fine Arts, Birmingham, Alabama;
          T: Jessica Mayne

CHEM023  Liposome Nanoparticle for the Treatment of Vascular Diseases
          Claire Jun, 16, Sophomore; Hoover High School, Hoover, Alabama;
          T: Bill Woodruff
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<table>
<thead>
<tr>
<th>Finalist Directory</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAEV031</td>
<td>Utilizing Native Hyper-Accumulators to Determine Efficient Methods for Heavy Metal Phytoremediation</td>
<td>Sid Singh, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Jameson Ware</td>
</tr>
<tr>
<td>ENBM017</td>
<td>Automatic Traumatic Injury and Concussion Alert System (ATICAS)</td>
<td>Reagan Elizabeth Shoop, 18, Senior, Hewitt Trussville High School, Trussville, Alabama, T: Jason Dooley</td>
</tr>
<tr>
<td>BCHM013T</td>
<td>Optimizing Bone Marrow Cryopreservation for Primitive Hematopoietic Stem Cell Compartment Studies Using Flow Cytometry Analysis</td>
<td>Dongwon Lee, 18, Senior, Yewon Lee, 15, Freshman, James Clemens High School, Madison, Alabama, T: Leah McRae</td>
</tr>
<tr>
<td>BCHM016</td>
<td>Development of a Method Towards the Metabolic Monitoring of TCA Cycle Compounds Observed in Rat Urine Using NMR Spectroscopy</td>
<td>Sai Sumedha Bobba, 16, Junior, James Clemens High School, Madison, Alabama, T: Leah McRae</td>
</tr>
<tr>
<td>PHYS025</td>
<td>Capital X: Designing and Testing a Procedure for Building an Inexpensive X-ray Generator</td>
<td>Catherine Elise Blevins, 17, Junior, Covenant Christian Academy, Huntsville, Alabama, T: Rhonda Lisauckis</td>
</tr>
<tr>
<td>BMED029</td>
<td>The Effect of Different Dilutions of Pomegranate Juice, Pineapple Juice, Orange Juice, and Coconut Milk on the Growth of HT29 and OVCAR8 Cell Lines</td>
<td>Raj Vipul Mehta, 17, Senior, W.P. Davidson High School, Mobile, Alabama, T: Emily Hosford</td>
</tr>
<tr>
<td>EBED020</td>
<td>MADSA: Musical Accuracy Development Using Spectral Analysis</td>
<td>Cary Xiao, 15, Sophomore, Alabama School of Mathematics and Science, Mobile, Alabama, T: Grey Gaillard</td>
</tr>
<tr>
<td>MCRO066</td>
<td>Investigating the Bactericidal and Anti-Biofilm Effects of Naringenin on Enterobacter cloacae</td>
<td>Vanessa Siggers, 17, Junior, Murphy High School, Mobile, Alabama, T: Julie Prerost</td>
</tr>
<tr>
<td>PHYS022</td>
<td>G-Force: Angles Helping Pilots Go Faster</td>
<td>Victoria Alyce Whitehead, 14, Freshman, Holy Spirit Catholic High School, Tuscaloosa, Alabama, T: Deborah Samaniego</td>
</tr>
<tr>
<td>EAEV060</td>
<td>Achroia grisella as Effective Decomposers of Polyethylene</td>
<td>Haley Beth Donovan, 17, Senior, Wetumpka High School, Wetumpka, Alabama, T: Virginia Vilardi</td>
</tr>
<tr>
<td>MCRO074T</td>
<td>Two Part Study of Novel Ways to Alleviate Droughts Using Cloud Seeding Methods with Bacterial Ice Nucleators</td>
<td>Ji Ho Lee, 18, Senior, Suma Nagaraj Ejantkar, 18, Senior, Auburn High School, Auburn, Alabama, T: Jacque Middleton T: Jacque Middleton</td>
</tr>
<tr>
<td>PHYS066</td>
<td>Optical Characterization of Fe and Cr Doped ZnS and ZnSe Polycrystals for Mid-IR Lasing Applications</td>
<td>Eesha Banerjee, 15, Junior, Alabama School of Fine Arts, Birmingham, Alabama, T: Hungsin Chin</td>
</tr>
</tbody>
</table>

**ALASKA**
Anchorage, USAK50, Alaska Science and Engineering Fair

| EAEV077 | The Implementation of a Novel Phosphate Device for the Mitigation of Harmful Algal Blooms | Savio Le, 18, Holy Rosary Academy, Anchorage, Alaska, T: Laura Walters |
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MCRO081  Rethinking Honey; A Promising Investigation of Synthetic Honey as a Bacteriostatic Salve
#  William Joseph Deering, 17, Junior, IDEA Homeschool, Anchorage, Alaska, T: Michele Deering

ARIZONA
Sierra Vista, USAZ02, SSVEC’s Youth Engineering and Science Fair
EGPH009  What Material Is the Most Shocking?
Meghan Paige Fox, 15, Freshman, Buena High School, Sierra Vista, Arizona, T: Beverly Adams

SOF'T030  Asguardian Cyber: A Customized Cybersecurity Program to Prevent Intrusions from Hackers
Thor Gavin, 17, Junior, Academy of Excellence, Sierra Vista, Arizona, T: Louella Gavin

Tucson, USAZ03, Southern Arizona Research, Science and Engineering Fair
BEHA021  Effects of an Instructor’s Ideology on a Student’s Perspective
Rose Marie Long, 18, Senior, University High School, Tucson, Arizona, T: Pamela Tautz

EAEV025  Investigating How Water Vapor Emission Impacts the Temperature of the Troposphere
Annalisa Minke, 16, Junior, Immaculate Heart High School, Oro Valley, Arizona, T: Mary Lyons

EBED018T  Effects of a Battery Equalizer on a Solar Powered System
Jeremy Douglas Zimprich, 17, Senior, Nicholas Alexander Pratt, 17, Junior, Zachary Ryan Bennett, 17, Senior, Sonoran Science Academy Davis-Monthan, Tucson, Arizona, T: Oguz Guvenc

EGCH017  A Novel Approach to Renewable Energy: Light Stimulated Active Cation Transport Membrane via Covalent Modification with a Photoacid
## Matthew Lane Fosdick, 17, Junior, Empire High School, Tucson, Arizona, T: Sandra Crusa

MCRO027T  A Comparison of the Biofilm Forming Potential of Native Microbiota of Various Leafy Greens on Different Food Contact Surfaces

PHYS023  Chance of Non-Nucleated Light Source Superposition on Ultra-Diffuse Galaxy Centers
Max Amador Michaud, 18, Senior, University High School, Tucson, Arizona, T: Pamela Tautz

PLNT023  A Novel Application of Gold Nanoparticles to Increase the Efficiency of Plant Photosynthesis

PLNT038  Growth Promotion and Yield Enhancement of Crop Seeds with Plant Products: Effects of Extracts, Endophytic Symbionts, and Endosperm
# Damian Galasso, 16, Sophomore, Galasso Homeschool, Tucson, Arizona, T: Sandra Galasso

Phoenix, USAZ50, Arizona Science and Engineering Fair
ANIM051T  The Neural Mechanism Underlying Stimulus Evaluation of the Honeybee Brain
Angela S. Ding, 16, Junior, Nisha Kulkarni, 7, Junior, Corona del Sol High School, Tempe, Arizona, BASIS Chandler, Chandler, Arizona, T: Hong Lei

BMED082T  Identifying Key Pathways/Mechanisms for the Generation of Pancreatic Beta Cells by Trans-differentiation of Acinar Cells
Abby Liu, 17, Junior, Thalia Liu, 17, Junior, Ella Ai, 17, Junior, Hamilton High School, Chandler, Arizona, T: Mina Bhagdev

CBIO052  Retina: A Non-Invasive, Predictive Smartphone Application to Test for Cardiovascular Risk and Diabetic Retinopathy via Analysis of Cardiovascular Risk Factors and Retinal Fundus Images
Kasyap Raguram Chakravadhanula, 16, Sophomore, BASIS Scottsdale, Scottsdale, Arizona, T: Ryan Carey
CELL061  Discovery of New Genetic Mutations in Uveal Melanoma Patients by Analyzing Nitrogenous Base Pair Anomalies
   Hersh Nanda, 15, Freshman, BASIS Chandler, Chandler, Arizona,
   T: Sheetal Karnik

CHEM063  Novel Artificial Synthesis of Sugars from Non-Organic Compounds for Renewable Cellular Energy
   Sky A. Harper, 17, Junior, Navajo Preparatory School, Farmington, New Mexico, T: Yolanda Flores

EAEV083T  Biochar Filtrate: A Novel Solution to Lead Contamination through Adsorption
   Aris Sheryl Zhu, 16, Sophomore, Shreya Tripathi#, 16, Sophomore, Hamilton High School, Chandler, Arizona, T: Debbie Nipar

ENBM073  A Smartphone-Based, Point-of-Care Iron Sensor Utilizing Colorimetric Techniques
   Mindy Long, 18, Senior, Hamilton High School, Chandler, Arizona, T: Debbie Nipar

ENEV095T  Autonomous Real-Time Testing of Escherichia coli in Oak Creek Watershed
   Arianna Comes, 18, Senior, Julie Larsen, 17, Senior, Red Mountain High School, Mesa, Arizona, T: Adam Middleton

ENMC081  How to Build a GEV: A Computational and Experimental Approach to the Design of Ground Effect Vehicles in the Modern World
   Aidan Niall Powers, 18, Senior, Perry High School, Chandler, Arizona, T: Karen Hutchinson

MATH042  Applying the Black-Scholes Model to Modern-Day American-Style Stock Options: A Novel Approach
   Rithvik Musuku, 16, Junior, BASIS Chandler, Chandler, Arizona, T: Theresa Gburek

MATS071T  HemaDrop: A Novel Elemental Composition Technology for Microliter-Size Blood Droplets via Solid State Techniques
   Nikhil Suresh, 16, Sophomore, Saaketh Narayan, 18, Senior, BASIS Scottsdale, Scottsdale, Arizona, T: Ryan Carey

MCRO085  Investigating the Role of G3BP in Poliovirus Induced Stress Granule Formation
   Shaun Victor, 17, Senior, Hamilton High School, Chandler, Arizona, T: Debbie Nipar

PHYS067  Development of a Thin and Inexpensive Open-Air Proton Beam Detector for Characterizing the Beam Profile and Position
   Ethan Rosenfeld, 17, Junior, Phoenix Country Day School, Paradise Valley, Arizona, T: Michael Caplan

PLNT073T  A Novel Approach to Increasing Crop Yields: Effects of Soybean Curd Residue on Soil Productivity
   Ella Wang, 15, Freshman, Breanna Yun Tang, 14, Freshman, BASIS Chandler, Chandler, Arizona, T: Theresa Gburek

ARKANSAS

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

BCHM020  The Assembly of Collagen IV in Drosophila
   Madison Faith Yarbrough, 17, Junior, Poyen High School, Poyen, Arkansas, T: Amanda Jones

MATH031  Are MVPs Really the Most Valuable Players?
   Chase Hartsell, 17, Junior, Lakeside High School, Hot Springs, Arkansas, T: Matt Neaville

Fayetteville, USAR03, Northwest Arkansas Regional Science and Engineering Fair

BCHM018  A Simple Method for Protein Purification
   Kaushik Sampath, 17, Junior, Fayetteville High School, Fayetteville, Arkansas, T: Marc Reif

MATS038  Fabrication Optimization of Flexible 3D Micro-/Nano-structures for Potential Sensor Applications
   Alice Cai, 16, Sophomore, Fayetteville High School, Fayetteville, Arkansas, T: Marc Reif
Tune Less, Play More
Austin Brown, 14, Freshman, Providence Academy, Rogers, Arkansas, T: Laurie Johnson

Harnessing Renewable Power to Charge a Device
Chase Allen Himschoot, 18, Senior, Salem High School, Salem, Arkansas, T: Amanda Smith

Combatting Lead Contamination Crisis Using Macrophytes
Austin Daniel Murray, 16, Sophomore, Brookland High School, Brookland, Arkansas, T: Candace Campbell

Use of Biological Control Agents to Inhibit the Growth of Phytopathogenic Bacteria
Cooper Alan Bassham, 17, Junior, Salem High School, Salem, Arkansas, T: Amanda Smith

Assessment of Allium sativum and Persea americana as a Natural Corrosion Inhibitor on Carbon Steel
Sreelakshmi Sai Raghav, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas, T: April Owen

Power to the Plants
Surabhee Eswaran, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas, T: Tarsha Parker

Novel Nanostructured Metal Powder by Simple Hot Water Treatment: An Economic and Sustainable Oil-Water Separation
Anusha Bhattacharyya, 17, Senior, Little Rock Central High School, Little Rock, Arkansas, T: Patrick Foley

Transparent Superhydrophobic Coating Using Nanoparticle Embedded Teflon
Heti Shah, 16, Junior, Little Rock Central High School, Little Rock, Arkansas, T: Patrick Foley

The Flight of Arrows
Deniz Erdag, 16, Sophomore, Little Rock Central High School, Little Rock, Arkansas, T: Lee Conrad

Trends and Factors for Risky Behavior among Adolescents
Nikita Singh Rohila, 15, Sophomore, Stuttgart High School, Stuttgart, Arkansas, T: Katherine Yancey

Water Quality Analysis of the Gulpha Creek Watershed
Rachel Elizabeth Stall, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas, T: Lindsey Waddell

Construction of a Conformal Mapping: Glitter
Callen Gast, 18, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas, T: Nikki Kennedy

A Comprehensive Analysis of Agronomic and Disease Resistance Gene Mutations in Katy Rice Mutants through DNA Next-generation Sequencing
Mary Sallah Jia, 17, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas, T: Brian Monson

Effects of Insulin-Like Growth Factor-1 on Neurotransmitters of Memory
Akshay P. Padala, 14, Freshman, Little Rock Central High School, Little Rock, Arkansas, T: Patrick Foley

Induction of Apoptosis by Curcumin in Cancer Cells
Sakshi Garg, 17, Junior, Little Rock Central High School, Little Rock, Arkansas, T: Patrick Foley

Phosphorous/Nitrogen Co-Doped Carbon Derived from Soybean as High Performance Electrode Material for Supercapacitor
Amna Khan, 15, Freshman, Little Rock Central High School, Little Rock, Arkansas, T: Kellie Chiu
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EBED028T  A Wearable Sensory Tactile Aid Device for Visually Impaired Individuals
Alexandria Nicole Mooney, 18, Senior, Isabel Le Vasquez, 17, Senior, Arkansas School for Mathematics, Sciences and the Arts, Hot Springs, Arkansas, T: Walt Levisee

MCR0068  Investigation of Essential Oil Constitutes for Biofilm Prevention and Resistance Modification with Applications on Orthopedic Implants
Zane Abdeen Alsebai, 15, Freshman, Little Rock Central High School, Little Rock, Arkansas, T: Rachel Norris

ROBO058  Using Machine Learning to Diagnose Fatigue
Akshat Maunish Shah, 16, Junior, Little Rock Central High School, Little Rock, Arkansas, T: Patrick Foley

CALIFORNIA

EBED021T  Frontiers of 5G: Sparse Adaptive Battery-less Ambient Backscatter Communication Networks
Jamil Saadi Ahmad, 17, Junior, Moaaz Akbar, 16, Junior, Clovis North High School, Fresno, California, T: Matthew Carter

EGCH023  Landfills as Energy Bioreactors: Testing a Leachate Recirculation Technique for Optimization of Methane Recovery
Trevor James Amarante, 18, Senior, Fowler High School, Fowler, California, T: Stephanie Salas

ENBM047  Designing, Prototyping and Testing of a Multi-Lumen Urinary Catheter with Sustained Unidirectional Biocide Flow
Ishaan S. Brar, 16, Sophomore, Stockdale High School, Bakersfield, California, T: Eddie Hammon

Sacramento, USCA04, Sacramento Regional Science and Engineering Fair

EAEV085  Water Recycling: The Effect of Soap Nut Grey Water on the Environment (Soil Microbiome, Year 4)
Shreya Ramachandran, 15, Sophomore, American High School, Fremont, California, T: Evan Winnegar
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Tuesday, May 15  8:00 a.m.–10:00 a.m.

Continental breakfast served from 8:00 a.m.–9:30 a.m.
ENEV098  OceanBioplas: The Plasticity of Marine Exoskeleton-Inspired Materials and Their Degradability in the Environment (Soil and Seawater/Saltwater)  
Jacqueline Prawira, 14, Freshman, Mountain House High School, Mountain House, California, T: Nicole Gary

TMED050  Can the Longevity Compound Rapamycin Rescue Brain Tissue in Age-Related Diseases in Old Mice?  
Chinmayi Balusu, 16, Senior, Vista del Lago High School, Folsom, California, T: Sue Baker

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

BMED037  shRNA-Mediation of UGGT1 to Modulate Excessive Procollagen Secretion: A Novel Approach to Treatment of Cardiac Fibrosis  
Kaitlyn Margaret Wang, 17, Junior, Canyon Crest Academy, San Diego, California, T: Ariel Haas

MCRO035  Turning Over a New Phage: A Novel Approach to Phage Therapy  
Emily K. Kang, 16, Sophomore, Canyon Crest Academy, San Diego, California, T: Ariel Haas

PHYS034  An Optimized Multigrid Algorithm for Enabling Efficient Physical Simulations on Realistic Geometries  
Mason V. Holst, 15, Sophomore, Canyon Crest Academy, San Diego, California, T: Ariel Haas

ROBO052  PhonoNet: Deep Learning for Raga Identification in Indian Classical Music  
Sauhaarda Chowdhuri, 16, Junior, Westview High School, San Diego, California, T: Dom David

San Francisco, USCA06, Golden Gate STEM Fair

ENBM051  Assessing the Angular Dependence of Skull-to-Brain Impact Dynamics to Inform Future Bicycle Helmet Design  
Jeffrey James Wisoff, 16, Junior, Amador Valley High School, Pleasanton, California, T: Jonathan Brix

ENEV057  An Interdisciplinary Approach to Deforestation and Lung Disease: Using Photovoltaic Systems to Build Low-Cost Solar Cookers  
Aarthi Muthukumar, 17, Junior, Dublin High School, Dublin, California, T: Megan Sinner

ENMC050  Art or Science? String-Bow Interactions on a Novel Optoelectronic Cello  
Andrew T. Land, 16, Junior, Carlmont High School, Belmont, California, T: Robert Dubrow

MCRO050  Controlling the Chikungunya Virus Disease in Dengue Endemic Areas through the Development of a Peptide Vaccine  
#  
Sruthi Kalavacherla, 16, Junior, Amador Valley High School, Pleasanton, California, T: Renee Ogle

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

BMED058  Precision Care for Leukemia: Discovery of Novel Therapeutics for High-Risk ALL via Epigenetic and Computational Transcriptome Profiling  
#  
Ruhi Sayana, 18, Senior, The Harker School, San Jose, California, T: Chris Spener

CBIO036  Decoding Neural Networks: Novel Computational Methods to Discover Anti-Tumor B Cell Receptor Binding Motifs  
Cynthia Chen, 16, Junior, The Harker School, San Jose, California, T: Chris Spener

CBIO037  Characterization of NADPH Binding Patterns for the Rational Design of a Photoactivatable NADPH Analog  
Charles Jialiang Huang, 17, Senior, Lynbrook High School, San Jose, California, T: Lester Leung

CBIO038T  A Modular and Dynamic GPU-based Maize Simulation Using L-Systems  
Govind Mandar Pimpale, 17, Junior, Nitish Reuben, 17, Senior, Marek David Pinto, 16, Sophomore, Santa Teresa High School, San Jose, California, T: Debra Dimas

CELL040  Modeling Neurodegeneration in vitro: A Dynamic Study of Tau in a Microfluidic Chamber System via Quantum Dot Labeling  
Allison Sihan Jia, 17, Junior, The Harker School, San Jose, California, T: Chris Spener
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CELL058T Targeting Susceptibility in Mutations in the Cell Cycle: Knockout of the Ade2 Gene Using CRISPR
Ezequiel Ponce, 18, Senior, Sophia Tran, 17, Senior, Helen Nguyen, 18, Senior, Andrew P. Hill High School, San Jose, California, Andrew Putnam Hill High School, San Jose, California, Andrew P Hill High School, San Jose, California, T: Patrick Allamandola T: Patrick Allamandola

MATH034 Solving a Cryptography Problem Using the Master Pyraminx
Alexander Zhang, 14, Freshman, Lynbrook High School, San Jose, California, T: Jeremy Dybdahl

PHYS043 Effect of Epitaxial Compression on Structural and Electrical Transport Properties of 3D Topological Dirac Semimetal Cd,As
Nikita Nitin Salunke, 16, Junior, Evergreen Valley High School, San Jose, California, T: David Walz

ROBO048 Developing a Novel, Accurate, and Rapid Machine Learning-based Skin Disease Diagnosis Algorithm and Mobile Application
Raghav Ganesh, 17, Junior, Lynbrook High School, San Jose, California, T: Lester Leung

ROBO049 Novel Reinforcement Learning Methods in Collaborative Environments
Ashish Prakash Rao, 16, Junior, Bidita Sarkar, 16, Junior, Tejas Narayanan, 16, Junior, Cupertino High School, Cupertino, California, T: Eric Ferrante

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

ANIM036 Prevention of Oxidative Stress Induced Diseases through the Effects of Curcumin on Planarial Stem Cells and Regeneration
Sanjita Pamidimukkala, 15, Sophomore, Dougherty Valley High School, San Ramon, California, T: Tiffany Wu

EAEV041 Algal Bioplastics: Developing a Sustainable Cycle of Compostable and Water-Soluble Plastics by Repurposing Waste Products of Algal Biofuel Production
Melanie Elise Quan, 16, Sophomore, Las Lomas High School, Walnut Creek, California, T: Maria Laws

ROBO039 Real-Time Freespace Segmentation Using Deep Learning on Autonomous Robots for Detection of Negative Obstacles
Anish Singhani, 16, Junior, Monte Vista High School, Danville, California, T: Scott Getty

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

ENMC036T Design and Engineering of a Cam-Based Infinitely Variable Transmission for Automotive Use
Anton Bryan Lok, 17, Junior, Steven Michael Davis, 17, Junior, Palos Verdes High School, Palos Verdes Estates, California, T: Julie Munoz

TMED016 Transdermal Lactate Collection with Agarose Gels for Noninvasive and Painless Monitoring of Patients
Sina Moshfeghi, 17, Senior, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

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

BCHM012 RNA Regulation: Identifying and Preventing AMP Depurination in Early Life RNA Polymerization
Michelle Melody Nazareth, 16, Sophomore, Georgiana Bruce Kirby Prep School, Santa Cruz, California, T: David Deamer

PLNT025T Trails, Soil, and Sudden Oak Death
Natalie Taylor Owens, 18, Senior, Trevor Wesley Cambron, 17, Senior, San Lorenzo Valley High School, Felton, California, T: Stephanie Beck

Seaside, USCA12, Monterey County Science and Engineering Fair

CELL029 Epigenetic Therapy for Liver Cancer: The Effect of 5-azacytidine on the Expression of Tumor Suppresser Genes p15INK4b, p16INK4a, and SOCS-1
Shreya Kriti Kamra, 18, Senior, Stevenson School, Pebble Beach, California, T: Phil Wenzel

MATH027 Analysis of ADHD among School Students
Yuansong Wang, 18, Junior, Stevenson School, Pebble Beach, California, T: Phil Wenzel
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San Bernardino, USCA13, San Bernardino, Inyo, Mono, (SIM) Science and Engineering Fair

**CHEM071** Constructing Earth-Abundant Core Shell Plasmonic Photocatalysts for Hydrogen Production via Water Splitting
William Franche Porayouw, 15, Sophomore, Redlands High School, Redlands, California, T: Colleen Duncan

**EAEV073** Sierra Streams: The Effect of Glacial Melt on Fall Flow
Ellery McQuilkin, 14, Freshman, Lee Vining High School, Lee Vining, California, T: Geoffrey McQuilkin

**EGCH042** Z-Scheme Photocatalysis: A More Systematic Approach with ALPHAGeFexOy@Au@P-SiOx@Cu oxNanostructure
Laura Marie Noronha, 16, Junior, Redlands High School, Redlands, California, T: Colleen Duncan

Riverside, USCA15, Riverside County Science and Engineering Fair

**BCHM038** Anacardic Acid Analogs for the Inhibition of Matrix Metalloproteinase-2
Maanasi R. Kademani, 16, Junior, Martin Luther King High School, Riverside, California, T: Michele Hampton

**ENEV088** Na/Ca/K Pollution Scrub: A Domestic Approach to Chemical Carbon Capture
Dimple Amitha Garudaapuri, 15, Freshman, Eleanor Roosevelt High School, Eastvale, California, T: Jeanette Bowles

**MATS068** Facilitating Emergency Thermal Protection via an Integration of Materials Augmented by an Endothermic Process
Nicholas Perez, 17, Junior, Temescal Canyon High School, Lake Elsinore, California, T: Julie Beckius

**COLORADO**

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

**EAEV023** Tracking Microplastics through a Food Chain to Determine the Effectiveness of Plastic Biodegradation in Mealworms
Alyssa H. Rawinski, 18, Senior, Monte Vista High School, Monte Vista, Colorado, T: Loree Harvey

**EAEV030** Rock On: Limestone's Potential to Improve Water Quality in the Alamosa River Drainage
Amber Lynn Michel, 18, Senior, Monte Vista High School, Monte Vista, Colorado, T: Loree Harvey

Durango, USCO02, San Juan Basin Regional Science Fair

**MCRO022** Are We Butchering the Effectiveness of Antibiotics?
Kylie Peyton Guiles, 15, Sophomore, Mancos High School, Mancos, Colorado, T: Sensa Wolcott

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

**ENMC020** Agriculture Soil Probe Rover
Tate Schrock, 15, Freshman, Arickaree School, Anton, Colorado, T: Donald Myers

**MATH007T** The Mathematical Correlations in an Origami Coiled Structure
Drake Lee Ludgate##, 18, Senior, Nathaniel David Miner##, 17, Senior, Brush High School, Brush, Colorado, T: David Miner

Colorado Springs, USCO04, Pikes Peak Regional Science Fair

**EAEV027** A Geochemical and Petrographic Analysis of Metamorphic Lithologies Proximal to the Cripple Creek and Victor Alkaline Diatreme Complex
Jenna Marie Salvat, 18, Senior, Coronado High School, Colorado Springs, Colorado, T: Lynne Williams

**EBED011T** Engineering a Portable, Low-Cost Refreshable Braille Display for Communication with the Deaf-Blind Population
Katelynn Ryenne Salmon, 18, Senior, Josh Nakka, 17, Junior, Palmer Ridge High School, Monument, Colorado, T: Tyler Dall

**PLNT013** Fractals and Catastrophic Bifurcation: Exploring Treeline Structure Using Drones and Mathematical Models in R
Kathryn Tsi-Pak Kummel, 15, Sophomore, William J. Palmer High School, Colorado Springs, Colorado, T: Reed Carlson
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Greeley, USCO06, Longs Peak Science and Engineering Fair
ENBM006  Solar Powered Ozone and UVC-Based Decontaminator
# Alyssa Nicole Keirn, 17, Junior, Rocky Mountain High School, Fort Collins, Colorado, T: Heidi Lovaas

La Junta, USCO07, Arkansas Valley Regional Science Fair
ENEV048  Repurposing Produced Gas Well Water as an Alternative Water Source for Agriculture, Year III
Mikailah Elizabeth Feinman, 15, Freshman, Primero Junior/Senior High School, Weston, Colorado, T: Decker Gonsalves

Sterling, USCO08, Northeast Colorado Regional Science Fair
ENBM025  The Reliever: An Exercise in Port Protection
Logan Brent Klein, 19, Senior, Yuma High School, Yuma, Colorado, T: Amy Melby

Boulder, USCO09, Corden Pharma Colorado Regional Science Fair
BEHA006  Feature Weighting in Multimodal Affect Prediction and Emotional Inference
Virginia Lee Keziah, 18, Senior, Fairview High School, Boulder, Colorado, T: Paul Strode

PHYS005  Ground-based Followups of TESS Exoplanet Candidates
# Sarah Shiyi Tang, 16, Junior, Fairview High School, Boulder, Colorado, T: Paul Strode

TMED007  Determining the Cytotoxicity and Mechanism of Novel Piperlongumine Analogs
Spoorthy Reddy, 17, Senior, Fairview High School, Boulder, Colorado, T: Paul Strode

Denver, USCO10, Denver Metropolitan Regional Science and Engineering Fair
BMED003  The Role of NGAL as a Biomarker for Early Detection of Acute Kidney Injury
# Evelyn Ariana Bodoni, 17, Junior, Cherry Creek High School, Greenwood Village, Colorado, T: Keith Harrison

EAEV080  Induced Seismicity: Relationships between Earthquake Frequency and Magnitude to Saltwater Injection in Oklahoma Arbuckle Group
Skylar Gale, 18, Senior, Evergreen Senior High School, Evergreen, Colorado, T: David Moutoux

ROBO006  Fast MRI: Reconstructing MR Images Using Undersampled k-space and a GAN
Siddarth Ijju, 16, Junior, Cherry Creek High School, Greenwood Village, Colorado, T: Keith Harrison

Fort Collins, USCO50, Colorado Science and Engineering Fair
CBIO005  Discovery of Hidden Gene Regulators: A Novel Machine Learning Approach to Transcriptional Pause Site Determination
Anudeep Golla, 16, Junior, Fairview High School, Boulder, Colorado, T: Paul Strode

CHEM069T  A Novel Approach to the Synthesis of 3,5-disubstituted delta-2-isoxazoline as a Precursor to Various Diabetic Medications
Suhaas Narayanan, 17, Junior, Charles Wang, 16, Sophomore, Fort Collins High School, Fort Collins, Colorado, T: Ben Schottler

ENBM008  Utilizing Computer Vision and Machine Learning Systems to Develop a Live Time Navigational and Surgical Aid for Spinal Reconstructions
# Krithik Ramesh, 16, Junior, Cherry Creek High School, Greenwood Village, Colorado, T: Keith Harrison

PHYS068  Nanoscale Optical Probing of Two-Dimensional Heterostructures Suspended on Nano-Slits
Joy Ma, 17, Junior, Fairview High School, Boulder, Colorado, T: Paul Strode

SOFT066  Development of a High Efficiency Pattern Recognition Algorithm Using Neural Networks
Sara Dunkin Nehring, 15, Sophomore, Monte Vista High School, Monte Vista, Colorado, T: Loree Harvey
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Redding, USCT02, Connecticut STEM Fair

EAEV006 Real-Time Sinkhole Detection Using Civil Engineering Techniques, the Internet of Things (IoT), and Artificial Intelligence
Sophia Joy Wang, 16, Junior, Amity Regional High School, Woodbridge, Connecticut, T: Catherine Piscitelli

EGCH001 Al(III)-Mediated Ionic Conduction in New Abundant Metakaolin Solid Electrolyte for Safe, Efficient Power Grid Na-Ion Batteries
Alexander Kosyakov, 17, Senior, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

ENEV009 Open-source, In-field Android and iOS Detection and Mapping of Waterborne Diseases via Time-Based Spectroscopic Sensing and RGB Luminance with a New 3D Printable Optical Interface
Nicholas Liu, 18, Senior, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

Hamden, USCT50, Connecticut Science & Engineering Fair

ANIM030 Control of Varroa destructor Infestation with a Dual-Function, Thymol-Emitting Honey Bee Hive Entranceway
Raina Jain, 16, Junior, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

BCHM014 Deuterium Oxide (D₂O) on Maintaining Viability in Coliphage Bacteriophages under Low Temperatures to Model Live Attenuated Viral Vaccine Additives
Annika Lee Morgan, 18, Senior, Joel Barlow High School, Redding, Connecticut, T: Katherine Nuzzo

BMED036 Finding a Therapy for Wolfram Syndrome: Exploring a Calcium Signaling Pathway as a Target for a Disease without a Cure
Saira Munshani, 17, Junior, Hopkins School, New Haven, Connecticut, T: Barbara Ehrlich

EGPH008 A Green Nanotechnological Approach for Energy Efficiency and Conservation: Tungsten-Doped Vanadium Dioxide Thermochromic Smart Windows
Cynthia Chen, 17, Junior, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

EGPH012T Optimization of High-Efficiency Organic-Inorganic Lead Halide Perovskite Solar Cells via a Novel Polycaprolactone Additive Pathway

ENBM030 Rapid, Smartphone-Based Diagnosis of Skin Melanoma through Differences in Tumor Cell Thermal Regulation Combined with Diffuse Spectroscopic Analysis
Melissa Woo, 16, Junior, Greenwich High School, Greenwich, Connecticut, T: Andrew Bramante

MATS037T Development of in-situ Fabrication Techniques of Martian Construction Material
Cristian Alexen Rodriguez#, 18, Senior, Srikar Reddy Godilla#, 17, Senior, CREC Academy of Aerospace and Engineering, Windsor, Connecticut, T: Michelle Bellinger

DISTRICT OF COLUMBIA
Washington, USDC01, District of Columbia STEM Fair

EGPH014 Sensory Solar Panels
Abigail Greenhalgh, 15, Sophomore, Georgetown Visitation Preparatory School, Washington, District of Columbia, T: Quillian Haralson

ENMC057T Safety Zip
Jadon Miller, 15, Sophomore, Jamar Miller, 14, Freshman, Friendship Technology Preparatory Academy, Washington, District of Columbia, T: Justin Collins
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SOFT043  Using C++ to Code the Baby-Step Giant-Step Decryption Algorithm for RSA and Elliptic Curve Cryptography  
Sofia Flynn, 18, Senior, Georgetown Visitation Preparatory School, Washington, District of Columbia, T: Quillian Haralson

FLORIDA
Avon Park, USFL01, Heartland Regional Science and Engineering Fair
EBED009  Is Your Smartphone Leaking? A Four Year Project  
Camila Rimoldi Ibanez, 16, Sophomore, Sebring High School, Sebring, Florida, T: Cynthia Letcher

PLNT069  Novel Anti-Cancer, Anti-Bacterial, and Anti-Inflammatory Properties of the Rare Plants of the Florida Ridges Implicates Urgency of Conservation  
Rohin Pankaj Patel, 16, Junior, Sebring High School, Sebring, Florida, T: Deena Wright

Bradenton, USFL02, Manatee STEM Competition
CBIO003  Statistical Evaluation of Three Computer Models to Determine the Minimum Size of a Large Population Which Remains in Hardy-Weinberg Equilibrium  
Emma Ann Johnston, 18, Senior, Manatee High School, Bradenton, Florida, T: Patricia Zalo

Fort Myers, USFL05, Thomas Alva Edison Kiwanis Science and Engineering Fair
BMED009  A Novel Approach to a Mutagenic Study of Carcinogenic Properties and Dietary Supplementation Using Reverse Mutation to Test the Toxicity of Iron Chloride and Ascorbic Acid on Salmonella typhimurium  
Myesha Alam Choudhury, 17, Senior, Canterbury School, Fort Myers, Florida, T: Kelly Percivall

CELL008  Investigation of the Effects of DNA Concentration on Polyethyleneimine Transfection Success and the Efficacy of the Serp-2 Secretion Signal  
Cynthia Sheng, 18, Senior, Fort Myers High School, Fort Myers, Florida, T: Catherine Tucker

EAEV082  Mitigation of Florida Red Tide (Karenia brevis) Blooms through Flocculation with Enhanced Local Sediments  
Mark Ethan Leone, 16, Junior, Estero High School, Estero, Florida, T: Barry Harris

EGPH003  Energy Through Wind Induced Oscillation: Investigating the Effectiveness of Various Oscillatory Amplification Methods of Polyvinylidene Fluoride Piezoelectric Strips when Applied to a Bladeless Wind Harvester as well as the Employment of Vortex Shedding Effects to Further Increase Oscillation  
Junwei Tan, 15, Freshman, Florida Southwestern Collegiate High School–Lee Campus, Fort Myers, Florida, T: Melanie Clinton

MCRO005  Green Watts: Investigating Power Production of a Single Chamber Plant Microbial Fuel Cell in a Modular System Comparing Crop Plants, Triticum aestivum, Saccharum officinarum and Zea mays - A Novel Fifth Year Study  
Luke M. Long, 18, Senior, Canterbury School, Fort Myers, Florida, T: Kelly Percivall

Dahlia Dry, 18, Senior, Fort Myers High School, Fort Myers, Florida, T: Cathy Tucker

Fort Pierce, USFL06, St. Lucie County Regional Science and Engineering Fair
MCRO006  How Does Temperature Characterize Bacteriophage Infecting Mycobacterium smegmatis?  
Nichapa Dancharnjitt, 16, Sophomore, Lincoln Park Academy, Fort Pierce, Florida, T: Lina Rao

ROBO011  Generation of Classified Image Libraries to Train Machine Learning Algorithms to Identify Different Marine Phytoplankton  
Sreya Banik, 16, Junior, Lincoln Park Academy, Fort Pierce, Florida, T: Sally Vandereedt
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Fort Walton Beach, USFL07, Panhandle Regional Science and Engineering Fair

**ENEV019**  
**Self-Sufficient Micro and Macro Plastic Water Cleaning System**  
Joseph Enguidanos, 17, Junior, Niceville High School, Niceville, Florida,  
T: Neely Calhoun

**MATH023**  
**Applications of Hyperdimensional Linear Algebra and Complex Analysis**  
James Matthew Baker, 18, Senior, Choctawhatchee High School, Fort Walton Beach, Florida, T: Joyce Gruber

Gainesville, USFL08, Alachua Region Science and Engineering Fair

**TMED005**  
**Developing Diagnostic Tools for Vascular Disease Using RNA Markers, Year Two**  
##  
Brindha Priya Rathinasabapathi, 17, Junior, Eastside High School, Gainesville, Florida, T: Adrienne Thieke

Ft Lauderdale, USFL09, Broward County Science Fair

**BMED077T**  
**Near Infrared Light Photobiomodulation and C. Iongga Mitigates the Expression of Mutant Amyloid-Beta Precursor Protein Pathway in D. melanogaster**  
*#*  
Hoang Le#, 18, Senior, Laura Sarah Allen#, 18, Senior, Western High School, Davie, Florida, T: Gina Cory

**EGCH041**  
**Utilizing a Modified Wastewater-Based Medium as a Feedstock for Engineered Saccharomyces cerevisiae to Biologically Produce Fatty Alcohols and Carboxylic Acids as Alternatives to Petrochemicals**  
Rajat Ramesh, 16, Junior, American Heritage School, Plantation, Florida, T: Leya Joykutty

Jacksonville, USFL10, Northeast Florida Regional Science and Engineering Fair

**BCHM006**  
**Targeted Drug Delivery for Drug Resistant Cancer**  
Ashton Body, 17, Junior, Episcopal School of Jacksonville, Jacksonville, Florida, T: Marion Zeiner

**BMED025**  
**Using a Crispr-Cas9 Method to Knockout AURKA in Pancreatic Cancer Cells**  
Kavitha Vudatha, 18, Senior, Stanton College Preparatory School, Jacksonville, Florida, T: John Copland

**CELL010**  
**The Effect of Interaction with Neural Stem Cells on the Migration, Proliferation, and Proteome of GBM Cells**  
Raha Riazati, 16, Junior, Stanton College Preparatory School, Jacksonville, Florida, T: John Copland

**ROBO013**  
**Using a Computer Program Applied to an Electromagnetic Walking Apparatus to Simulate Earth's Gravity in Space**  
*#*  
MaryAlice Diana Young, 17, Junior, Bishop Kenny High School, Jacksonville, Florida, T: Vicki Schmitt

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

**PLNT072**  
**The Role of Plant Hormones in the Appearance of Pseudonodules within Populus Deltoides**  
Ryan Griffin Hardin, 17, Junior, Union County High School, Lake Butler, Florida, T: Renae Allen

Bartow, USFL12, Polk Region Science and Engineering Fair

**ANIM013**  
**Reef Relief: Investigating the Allelopathic Effects of Soft Corals on the Health of Large and Small Polyp Stony Corals**  
Lauren E. Nonnenmocher, 15, Freshman, Lakeland Christian School, Lakeland, Florida, T: Matthew Croxton
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ROBO012  Electromagnetic Wall Climber, Year 2
Matthew Garrett Graham, 16, Sophomore, Polk Pre Collegiate Academy, Auburndale, Florida, T: Auburn Thompson

Melbourne, USFL 13, Brevard South Science and Engineering Fair

CELL011  The Role of Aging, Antioxidants, and Mutant Huntington Lowering in the Oxidative Stress Response of HD Neurons
Ritika Jeloka, 17, Junior, Melbourne High School, Melbourne, Florida, T: Kayla Carpenter

CHEM033 UiO-66 Metal Organic Frameworks (MOFs) Decorated with Cadmium Sulfide Quantum Dots: An Investigation of the Effectiveness of (MOFs) as a Drug Delivery System for Melanoma Treatment
Lasya Damaraju, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Paula Ladd

PLNT020  Density Dependent Signaling in the Model Eukaryote Chlamydomonas reinhardtii
Pooja Sanjay Shah, 17, Junior, West Shore Junior/Senior High School, Melbourne, Florida, T: Paula Ladd

Miami, USFL 15, South Florida Science and Engineering Fair

BMED002  Accuracy of a Novel Method to Measure In-Stent Restenosis Using Embedded Nanosensors
Ethan Zvi Levy, 16, Junior, Dr. Michael M. Krop Senior High School, Miami, Florida, T: David Buncher

EBED007  Augmented Reality for Autism
Albert Alexander Manrique, 17, Junior, MAST at FIU Biscayne Bay Campus, North Miami, Florida, T: Viviana Bermudez

EGCH004  Alternative Energy: Harnessing the Power of Mud-based Microbial Fuel Cells
Neica Iven's Joseph, 17, Senior, North Miami Beach Senior High School, North Miami Beach, Florida, T: Vania Boeva

ENEV004  Stepping Down into Cooler Water (Fountains vs. Waterfalls)
Zoe Francesca Diederich, 14, Freshman, Coral Reef Senior High School, Miami, Florida, T: Caroline Lominchar

ENEV016  A Novel Environmentally Friendly Approach to Controlling Marine Growth Using Complex Ultrasonic Waveforms
Isabela Victoria Perdomo, 16, Sophomore, MAST at FIU Biscayne Bay Campus, North Miami, Florida, T: Cristina Madrigal

PHYS010  Cell Circuits: Using Nyquist Plot to Find Equivalent Circuit Models to Human Keratinocyte Cells
Michael Bregar, 17, Senior, MAST at FIU Biscayne Bay Campus, North Miami, Florida, T: Cristina Madrigal

Ocala, USFL 16, Big Springs Regional Science Fair

BCHM001  A Novel Study on Lactose Intolerance: The Correlation between the Chirality of Isomer D-Lactose and Observed Rotation of Polarized Light
Angela Shar, 17, Senior, Vanguard High School, Ocala, Florida, T: Candace Roy

CHEM003  BuckyPaper: Investigating the Viability of Multi-Walled Carbon Nanotubes in Sensors for the Detection of Various Gases
Andy Shar, 13, Sophomore, Vanguard High School, Ocala, Florida, T: Candace Roy

PHYS003  Sustainable Energy: Can This Be Accomplished with a Permanent Magnet Generator?
Haylee Adelaide Darling, 15, Sophomore, Saint John Lutheran High School, Ocala, Florida, T: Jennifer Fontaine
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UNM ranking in world of universities granted U.S. utility patents in 2017

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Year Two: Understanding the Effects of Bifidobacterium infantis on Honeybee Gut Parasite Nosema ceranae
Varun Madan, 14, Freshman, Lake Highland Preparatory School, Orlando, Florida, T: Zasha Mickey

Effect of Conductive Inks in Silicone Based Wearable Technology on the Human Body
Setareh Klara Gooshvar, 18, Senior, Trinity Preparatory School, Winter Park, Florida, T: Michael Arney

Addressing Redshift Controversies through Non-Doppler Redshifts Induced by Light-Matter Interactions
Levon Tabirian, 16, Junior, Trinity Preparatory School, Winter Park, Florida, T: Michael Arney

Exploring a Novel Method of Foveated Rendering in Virtual Reality with an Object Based Approach
Varun Neil Aggarwal, 18, Senior, Lake Highland Preparatory School, Orlando, Florida, T: Zasha Mickey

How Do SuperDFM Strong Microbials Affect Varroa destructor in Relation to Lactobacillus within Apis mellifera?
Kaitlyn Brooke Taylor, 16, Junior, The Villages Charter High School, The Villages, Florida, T: Monica Vinas

Extracting Polysaccharides from Rhodophyta Plantae to Make Biodegradable Plastic
Kindle Sierra Hon, 18, Senior, Taylor Hubbard, 18, Senior, Chloe Lou-Anne Johnson, 18, Senior, South Sumter High School, Bushnell, Florida, T: Emily Keeler

The Effects of Curcumin and Near Infrared Light on Wound Healing and Tissue Regeneration
Vrinda Patel, 16, Sophomore, South Sumter High School, Bushnell, Florida, T: Emily Keeler

The Effect of Antifungal Plant Derivatives on the Growth of Candida albicans
Stephanie Nguyen, 15, Freshman, The Villages Charter High School, The Villages, Florida, T: Monica Vinas

The Affects of Different Glucose Ketone Index (GKI) Values on the Proliferation of VM-M3 Brain Cancer Cells
Cheyenne Rashelle Shirley, 14, Freshman, South Sumter High School, Bushnell, Florida, T: Emily Keeler

Solar Energy Driven Membrane Distillation Process to Produce Fresh Water from Undrinkable Water
Claire Jinbei Han, 14, Freshman, Pensacola High School, Pensacola, Florida, T: Cherie Stephens

Autism Diagnostics Tool Using Gesture Recognition and Machine Learning
Alan Andrew Michael, 16, Sophomore, Allen D. Nease High School, Ponte Vedra, Florida, T: Marna Fox

Key to Eliminating the Plastic Problem: Degradation of Polyethylene Plastic Using Bacillus sp. YP1 and Enterobacter asburiae YT1 from Wax Worm Gut
Grace McKayla Thompson, 18, Senior, Taeseung Um, 19, Senior, Travis Andrew Koenig, 18, Senior, Oviedo High School, Oviedo, Florida, T: William Furiosi T: William Furiosi

Zonal Differentiating Soundbar
Dylan Carrick Ryan, 18, Senior, Lyman High School, Longwood, Florida, T: Mary Acken

Nanocermic Coating of Central Venous Catheters Has Inhibitory Effect on Colonization by E. coli and Bacillus cereus
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Stuart, USFL25, Martin County Regional Science and Engineering Fair
ENMC051  Saving Our Waterways: Autonomous Dissolved Oxygen Generation Vehicle
#  Rohan Sanjeev Jakhete, 16, Junior, South Fork High School, Stuart, Florida, T: David Hill

Tallahassee, USFL26, Capital Regional Science and Engineering Fair
ENBM004  Development of a Novel Biohybrid Nanorobot for Detection and Treatment of Disease
#  Akhil Kadamala Shiju, 17, Junior, Lawton Chiles High School, Tallahassee, Florida, T: Angela Breza-Pierce
MCRO007  The Development of Zika Virus Pseudoparticles: A Novel Model for the Future
#  Dhenu Patel, 18, Senior, Maclay School, Tallahassee, Florida, T: Ariel Simonton

Tampa, USFL27, Hillsborough Regional Science Fair
CHEM009  Experimentally Designing Sustainable Clay-Based Adsorbents to Remove Arsenic from Drinking Water
#  Rajat Kaushik Doshi, 17, Senior, Henry B. Plant High School, Tampa, Florida, T: Lindsay Tait
MATH006  Analysis of the Error Convergence and Efficiency of Numerical Quadrature Algorithms for Approximating Different Integrals
#  Raphael Realina Brosula, 17, Senior, Strawberry Crest High School, Dover, Florida, T: Dianne Schroeder
SOFT011  The Encryption and Decryption of Messages with an Intelligent Chatbot through the Usage of Polygraphs
#  Srikar Parsi, 15, Sophomore, Strawberry Crest High School, Dover, Florida, T: Dianne Schroeder

Merritt Island, USFL28, Brevard Mainland Regional Science and Engineering Fair
ANIM055  What Is the Efficacy of Iminosugars in Inhibiting Glucosylceramide Synthase in Canine Macrophages?
#  Benjamin Bradley Scarpino, 17, Senior, Astronaut High School, Titusville, Florida, T: Samuel Cunningham
ENEV022  A Concrete Solution for Oyster Recruitment and Growth: Designing an Artificial Structure to Increase Oyster Shell Growth and Oyster Spat Settlement Using Calcite Media
#  Kyle Wilson Bramblett, 17, Junior, Titusville High School, Titusville, Florida, T: Jennifer Cotton

West Palm Beach, USFL29, Palm Beach Regional Science and Engineering Fair
CBIO031  Using Three-Dimensional Modeling to Analyze the Vascular System and Radiation-Induced Lung Damage
#  Karen Angela Copeland, 18, Senior, Alexander W. Dreyfoos School of the Arts, West Palm Beach, Florida, T: Stephen Anand
CHEM058  C60 Buckminsterfullerene Derivatives for DNA-Encoded Libraries, Fullerene-Supported Synthesis, and High-Throughput Screening
#  John-Mark Andrew Phillips, 18, Senior, Seminole Ridge Community High School, Loxahatchee, Florida, T: Carolyn Slygh
EAEV043  Carbon Capture Using Solid Sorbents CO2/N2 Selectivity with Amine-Tethered Polystyrene and Polyacrylic Polymers
#  Glenn Manuel Grimmett, 17, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Iris Thompson
ENEV058  Developing a Solution to Ocean Acidification Using Excess Carbon Dioxide from Power Plants with Nickel Nanoparticles
#  Alexis Marie Base, 18, Senior, Florida Atlantic University High School, Boca Raton, Florida, T: Suzette Milu
PHYS037  Characterizing the WLM Galaxy Using the Properties of RR Lyrae Variable Stars
#  Subhash Chandra Kantamneni, 17, Junior, Suncoast Community High School, Riviera Beach, Florida, T: Jeffrey Laufer
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**Mathematics and Political Science**

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**Nursing**
**Nutrition Science**
**Physics**
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**Physics for Life Sciences**
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**Psychology and Linguistics**
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**Sociology**
**Sustainability**

*Major and minor +Minor only

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

PLNT006  Using Guaiacol to Measure the Effect of a Natural Hormone (N-Acetyl-5-Methoxytryptamine) and Artificial Substitutes on the Rate of Photosynthetic Reactions and Oxygen Production, Year III
Chase A. Olivanti, 17, Junior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

ROBO017  The Effect of Atmospheric Conditions on Flash Flood Prediction Using Deep Learning
Nalin Mehra, 17, Senior, Wiregrass Ranch High School, Wesley Chapel, Florida, T: Branden Anglin

Vero Beach, USFL31, Indian River Regional Science and Engineering Fair

ENEV001  A Holistic Engineering Plan Incorporating Predictive Data Modeling into the Process of Remediating Cyanophyta Algae Blooms and Applying Photoautotrophic Prokaryotes Biomass to Improve Agricultural Outcomes
Griffin Michael Wagner, 17, Junior, Vero Beach High School, Vero Beach, Florida, T: Nicole Mosblech

PHYS002T  Optimization of Drone Flight Patterns for Use in Extraterrestrial Cave Mapping
Sydney Tran, 18, Senior, Lauren Masley Amos, 18, Senior, Vero Beach High School, Vero Beach, Florida, T: Nicole Mosblech

Sarasota, USFL32, Sarasota County STEM Summit

ENMC053  Increasing Scanning Range of Mems Mirrors for Endoscopic Optical Systems via Submersion in High Ri Fluids
Kevin Zhu, 17, Senior, Pine View School, Osprey, Florida, T: Hali Flahavan

ENMC068  Engineering a Low Cost, UV Crosslinking Hydrogel Bioprinter
Christian John Knuth, 17, Junior, Sarasota High School, Sarasota, Florida, T: Andy Harshman

Mount Dora, USFL34, Lake Regional Science & Engineering Fair

BCHM015T  Chemotaxis in Physarum
Anneke Rose Dykhouse, 15, Sophomore, Emily Judith Busto, 15, Sophomore, East Ridge High School, Clermont, Florida, T: Alec Lockhart

Green Cove Springs, USFL35, Clay Rotary Regional Science and Engineering Fair

EGPH005  It’s Getting Hot in Here!

ENEV021  A Novel Method to Alleviate the Water Crisis in Uganda
Michael Chen, 16, Junior, Ridgeview High School, Orange Park, Florida, T: Devan Skapetis

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

BEHA001  Combating Stuttering via an Empowered Multi-modal Neural Network based on Facial and Audio Recognition Data
Ronald Bohan Xu, 17, Junior, Winter Springs High School, Winter Springs, Florida, T: Paul Sacks

CELL009  Personalized Cancer Cell Weapons using CRISPR Genetic Engineering, Year Three
Nina Reddy, 18, Senior, Satellite High School, Satellite Beach, Florida, T: Joseph Scott

CHEM040  Novel Colorimetric Sensors for Detecting Chemicals in Vapor, Liquid, and Solid Phases
Helena Jiang, 16, Junior, F. W. Buchholz High School, Gainesville, Florida, T: Marc Moody

EAEV046  Novel Unmanned Environmental DNA Collection Technique
Angelina Marie Guerra, 17, Senior, Edgewood Junior Senior High School, Merritt Island, Florida, T: Ryan Cilsick

ENBM038  Smart Microfluidics-based Impedance Aggregometry Biosensor for Detection of Platelet Hyperaggregation
Eeshani Behara, 16, Junior, American Heritage School of Boca Delray, Delray Beach, Florida, T: Iris Thompson
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Graphene Solar-Photon Sail: A Novel Approach to the Application of Monolayer Graphene on Aluminumized Polyimide Film Using a Figure of Merit of a Solar-Photon Sail Membrane for Interstellar Space Exploration
Morgan Elise Barkhurst, 16, Sophomore, Florida SouthWestern Collegiate High School - Lee Campus, Fort Myers, Florida, T: Melanie Clinton

A Minimally-Invasive 3D-Printed Microneedle Array Applicator System (MU-NAAS) for Delivery of Therapeutics to Citrus Leaf Tissue
Laboni Santra, 15, Sophomore, Oviedo High School, Oviedo, Florida, T: William Furiosi

Sharks Take a Bite Out of Infection! An Antibacterial, Reusable Bandage for Post-Operative Patients
Hannah Herbst, 18, Senior, Florida Atlantic University High School, Boca Raton, Florida, T: Robin Barkes

Characterization of the Immune Response in a Pre-Clinical Model of Severe Trauma
Ayanna Danielle Prather, 18, Senior, Coretta Scott King Young Women's Leadership Academy, Atlanta, Georgia, T: Kristina Garner

Understanding Fibrinolysis in Sickle Cell Disease: Characterization of in vitro Blood Clot Resolution by Monocytes
Niara Charis Botchwey, 17, Senior, Charles R. Drew Charter School, Atlanta, Georgia, T: Courtney Bryant

A Novel Approach to Assessment and Classification of Pulmonary Function in Early Onset Scoliosis
Ananya L. Ganesh, 17, Junior, The Westminster Schools, Atlanta, Georgia, T: Florence Sumner

Immunomodulation of Human Leukemia Cell Lines by Components of Probiotic Sources
Saithetheja Adi Pucha, 16, Sophomore, Lakeside High School, Atlanta, Georgia, T: Tania Murphy

Designing High-Performing, Low-Cost Shock Absorbing Composites for Injury Protection by Impregnating Woven Fabrics with Shear Thickening Fluids
Aaditya Saha, 15, Freshman, Chamblee Charter High School, Chamblee, Georgia, T: Shaheen Begum

Freeze Protected Vaccine Cold Box for Off-Grid Locations, Year Three
Susanna Ruth Dorminy, 17, Senior, Sola Fide Home School, McDonough, Georgia, T: Ann Dorminy

Biodegradable Plastic Shoe Made from a Cornstarch and Glycerin-Based Plastic
Kailen R. Parks, 16, Sophomore, Dutchtown High School, Hampton, Georgia, T: Yamini Mital

Automated Supplementary Greenhouse Lighting Controller
Rebekah Grace Dorminy, 15, Sophomore, Sola Fide Home School, McDonough, Georgia, T: Ann Dorminy

CAM and TENS Are Effective in Opioid Tapering in High Risk Patients
Ishan Viradia, 15, Sophomore, Stratford Academy, Macon, Georgia, T: Susan Hanberry

Synthesis of Organic Pinene Pyrethrum Attractant for D. frontalis
Andrew William Schilling, 18, Senior, Cameron Arnold Trent Snyder, 18, Senior, Jasper County High School, Monticello, Georgia, T: Elizabeth Proctor
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Griffin, USGA09, Griffin RESA Regional Science Fair

**CELL004**  The Effects of Cell-Cell Crosstalk on Glucose Stimulated Insulin Secretion  
Sarah Jane Schlueuter, 17, Junior, Eastside High School, Covington, Georgia,  
T: Elizabeth Proffitt

**ENMC004**  Drones: Reducing Risks and Encouraging Participation in an Emerging Field, Utilizing a Parachute Deployment System  
William Dannelly, 15, Freshman, McIntosh High School, Peachtree City, Georgia, T: Mae Lee Terrell

**Warner Robins, USGA10, Houston Regional Science and Engineering Fair**

**BCHM002**  Purification of Glycerol-3-Phosphate Dehydrogenase and Testing Its Sensitivity to Metformin  
Isha Shah, 17, Junior, Veterans High School, Kathleen, Georgia,  
T: Bethany Silver

**BMED010**  Mortality Evaluation of Peg Gold Nanorods on Zebrafish Embryos  
Colton Lee Walker, 17, Junior, Veterans High School, Kathleen, Georgia,  
T: Bethany Silver

**Duluth, USGA11, Gwinnett Regional Fair**

**BEHA023T**  The Effects of Blue Light on the Circadian Rhythm of Madagascar Roaches  
Jonathan Arturo Gonzalez, 17, Junior, Estefania Hernandez-Medrano, 16,  
Junior, Buford High School, Buford, Georgia, Buford High School, Buford, Georgia, T: Lisa Knutson

**ENBM015**  The Intelligent Medical Stapler: Ending the Emergency Room Crisis  
Arnava Jain, 17, Junior, Gwinnett School of Mathematics, Science, and Technology, Lawrenceville, Georgia, T: Jennifer Berry

**MATS019T**  Alternative Tessellation and Inner Cone Design for Helmets  
Yunseo Ham, 19, Senior, Yunha Ham, 18, Senior, Peachtree Ridge High School, Suwanee, Georgia, T: Hyunjin Son

**Conyers, USGA12, Rockdale Regional Science & Engineering Fair**

**BCHM004**  Development of a Urinalysis Immunoassay for Cortisol Detection  
Sarah Elizabeth Burkey, 16, Junior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Scott Robinson

**CELL007T**  Novel QD-Conjugated DRD2/HER Antineoplastic Therapy  
Khaylie Ronae Boothe, 17, Senior, Jacqueline Gomez, 17, Senior,  
Rockdale Magnet School for Science and Technology, Conyers, Georgia,  
T: Scott Robinson

**MATS011**  Year Two—Time of the Month: Bad for the Environment?  
#  
Tykera Carmen Moore, 17, Senior, Rockdale Magnet School for Science and Technology, Conyers, Georgia, T: Scott Robinson

**Atlanta, USGA13, Fulton County Regional Science & Engineering Fair**

**BEHA003**  iSense: Artificial Intelligence Based Early Detection Tool to Identify Linguistic Bio-Markers of Mood Disorders and Recognize At-Risk Individuals  
Divya Vani Nori, 15, Sophomore, Milton High School, Milton, Georgia,  
T: Varsha Sonawane

**BEHA004**  Real-Time Analysis of Emotions for Neurological Disorder Patients  
#  
Shreya Ramesh, 16, Junior, Milton High School, Milton, Georgia,  
T: Varsha Sonawane

**CHEM007**  Sustainable Manufacturing of Gamma Butyrolactone  
Tianyu Dong, 15, Freshman, Northview High School, Johns Creek, Georgia,  
T: Rebecca Bingham

**Marietta, USGA14, Cobb/Paulding Regional Science Fair**

**CELL001**  Phase IV: The Effects of Epigallocatechin-3-Gallate on Breast and Cervical Carcinomas  
Stephen Robert Litt, 14, Freshman, Kennesaw Mountain High School Academy of Mathematics, Science and Technology, Kennesaw, Georgia,  
T: Kristen Younker

**MCRO003**  Cloning of Serratia marcescens chiA Gene as a Biocontrol Alternative for Plants Targeted by Pathogenic Fungi  
Nicole Frey, 18, Senior, Paulding County High School, Dallas, Georgia,  
T: Marc Pedersen
**BMED076**  
**Arc, GAD67, and the Orbitofrontal Cortex: Reconsidering the Molecular and Systemic Basis of Major Depressive Disorder**  
Joseph Sexton, 18, Senior, West Forsyth High School, Cumming, Georgia,  
T: Rebecca Britten

**CELL049**  
**Developing a Novel Retroviral Vector Capable of Inducible Knockdown in CD8 T Cells**  
Priyanka S. Parikh, 18, Senior, Columbus High School, Columbus, Georgia,  
T: Laura Solomons

**CHEM055**  
Sara Khadija Makboul, 17, Junior, Kennesaw Mountain High School, Kennesaw, Georgia,  
T: Chelsea Sexton

**TMED043**  
**Investigating the Role of the Cat-2 Gene in Substance Dependence**  
Zakwan Khan, 18, Junior, Woodstock High School, Woodstock, Georgia,  
T: Anna Grantham

**HAWAII**

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

**ANIM005**  
**Cancer-inhibiting Diet-Derived Alkaloids in Secretions from Hawaii Poison Dart Frog *Dendrobates auratus***  
Aslan Cook, 18, Senior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii,  
T: Gail Ishimoto

**TMED008**  
**The Protective Effects of Insulin in Cardiomyocytes against Iron-mediated Cell Death**  
Carina Nanea Tanaka, 18, Senior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii,  
T: Gail Ishimoto

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

**ENBM022**  
**Engineering a Mechanical Finger Prosthetic**  
Bryson Spencer Valdez Manuel, 18, Senior, Waipahu High School, Waipahu, Hawaii,  
T: Tessie Ford

**PLNT027T**  
**Acclimating Algae for Mariculture and Other Commercial Uses**  
John Luke Kuakapilihaomikalani Czerwinski, 18, Senior, Marlin Tornquist Tucker, 18, Senior, Jonah Keanuenue Shiroma, 18, Senior, Waipahu High School, Waipahu, Hawaii,  
T: Sherry Tenn  
T: Sherry Tenn

**SOFT017**  
**Helping the Environment through the Use of Web Development and Machine Learning**  
Timoteo Sumalinog III, 17, Senior, Waipahu High School, Waipahu, Hawaii,  
T: Lucille Imamura

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

**EAEV002**  
**The Effect of Salt Spray, Ungulate Fencing, and Soil Type on Coastal Plant Distribution and Abundance on the Kalaupapa Peninsula, Molokai**  
Cameryn Rae Hoeamaikalani Kahalewai, 17, Senior, Molokai High School, Hoʻolehua, Hawaii,  
T: Emilio Macalad

**ENBM057**  
**Investigating the Interactions between LINGO1, EGFR, and the Trefoil Factor Family and Their Relation to Colorectal Cancer**  
Joshua ‘Alohikamahina Loui Worth, 16, Sophomore, Kamehameha Schools Maui, Makawao, Hawaii,  
T: Malia Panglao

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

**PLNT004**  
**Investigating the Effect of the Removal of Red Mangrove Trees on the Ecosystem of Kauai**  
Isabella Grace Parsons, 15, Freshman, Kauai High School, Lihue, Hawaii,  
T: Daniel Matthews

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

**PLNT011**  
**Susceptibilities of Various Growth Stages of *Metrosideros polymorpha* to *Ceratocystis lukuohia* Infection**  
Shwe Yee Win, 15, Sophomore, Hilo High School, Hilo, Hawaii,  
T: Nyra Dee

**TMED012**  
**Development of a Recombinase Polymerase Amplification, Lateral Flow Assay to Detect *Angiostrongylus cantonensis* in Slug Tissue**  
Elizabeth Susan Atkinson, 18, Senior, Hilo High School, Hilo, Hawaii,  
T: Nyra Dee
Kaneohe, USHI06, Windward District Science and Engineering Fair
EBED008 Development of an Autonomous Aerial Vehicle Using Computer Vision and Artificial Intelligence to Assist First Responders In Dangerous Situations
## Samuel M. Cadotte, 17, Senior, Kalaheo High School, Kailua, Hawaii, T: Crystal Stafford

Honolulu, USHI07, Central Oahu District Science and Engineering Fair
MATH008 Predicting Short Term Equity Price Change Using Internet Search Trends Valence Data
### Benjamin Weiss, 18, Senior, Kalaheo High School, Kailua, Hawaii, T: Crystal Stafford

Honolulu, USHI08, Honolulu District Science & Engineering Fair
EAEV007 Analyzing the Mitigating Effects of Ipomoea aquatica on the Kapakahi Stream at the Pouhala Marsh of Oahu
Brea Avery Swartwood, 16, Junior, Mililani High School, Mililani, Hawaii, T: Nel Venzon

Honolulu, USHI09, West Hawaii District Fair
EAEV101T Finding the Optimal Way to Detect Rapid Ohia Death Utilizing Aerial Photography
Alexander Keona Bell, 16, Sophomore, Nicholas Kawika White, 15, Sophomore, Evan Makai Curry, 16, Sophomore, Kealakehe High School, Kailua-Kona, Hawaii, T: Justin Brown

Honolulu, USHI50, Hawaii State Science and Engineering Fair
BMED089 Ptychosperma macarthurii (MacArthur Palm) Seeds Inhibit Growth of ex vivo Cancer Cells
Nalani Leah Miller, 18, Senior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Gail Ishimoto

Coeur d’Alene, USID01, Northern Idaho Science & Engineering Fair
EAEV020 The Effect of Smoke on Farm Crops
Paige Susan Lindsley, 18, Senior, Grangeville High School, Grangeville, Idaho, T: Shaun Bass
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Equus caballus Hair as a Suture Material: Hair Color as Related to Tensile Strength
Cecily R. Puckett, 16, Sophomore, Kamiah High School, Kamiah, Idaho, T: Elizabeth Privette

Boise, USID02, Western Idaho Science & Engineering Fair

Detecting Chicken α-globulin in Vegan Products Utilizing Immunoassay, ELISA, Techniques
Lukas Wyatt Keller, 18, Senior, Emmett High School, Emmett, Idaho, T: Robin Wilson

Discovering a Bacteriophage
Melina Mohammad, 14, Freshman, Treasure Valley Math and Science Center, Boise, Idaho, T: Shanda Palsulich

Pocatello, USID03, Eastern Idaho Science & Engineering Fair

Suspension Knee Brace
Madi Lynn Facer, 18, Senior, Hayli Jean Austin, 18, Senior, Pocatello High School, Pocatello, Idaho, Pocatello High School, Pocatello, Idaho, T: Anne Koski

ILLINOIS

Chicago, USIL01, Chicago Public Schools Student Science Fair

Hydrogel Modification to Encapsulate and Release Exosomes for Targeted Delivery
Anagha Aneesh, 17, Junior, Walter Payton College Preparatory High School, Chicago, Illinois, T: Walter Kinderman

Saving Skin: A Model of Optimal Sunscreen Reapplication Time, Integrated into a Pre-Existing Mobile Application
Mercy Oladipo, 17, Senior, Whitney M. Young Magnet High School, Chicago, Illinois, T: Lynne Muhammad

K-edge X-ray Absorption Near Edge Structure (XANES) Analysis Methodology: A Case Study on Thiophenic Sulfur Compounds
Kayla Lanting Huang, 16, Junior, Whitney M. Young Magnet High School, Chicago, Illinois, T: Lynne Muhammad

Vision Based Robot System
Dhruv Bala, 15, Sophomore, Lane Technical College Prep High School, Chicago, Illinois, T: Lucy Young

Peoria, USIL03, Heart of Illinois Science and Engineering Fair

The T/Ha Yield Potential of Simulated Herbicide Drift on Glycine max
Prescott Oz Jeckel, 17, Junior, Delavan High School, Delavan, Illinois, T: Hannah Jamruk

The Effect of Fungicide on Fungal Communities Associated with Glycine max Roots
Kylie Erin Orris, 18, Senior, Southeastern Junior/Senior High School, Augusta, Illinois, T: Stephen Foster

Effect of Pleosporales Fungi on Commercial Crop Growth and Germination
Jayleigh Michelle Peuster, 18, Senior, Southeastern Junior/Senior High School, Augusta, Illinois, T: Stephen Foster

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

FRUGGIE: Building Healthy Food Pyramids with Technology
Annika Huprikar, 17, Junior, Deerfield High School, Deerfield, Illinois, T: Judi Luepke

Fighting Zika: Computational Discovery of New Drugs to Inhibit the NS2B-NS3 Protease of the Zika Virus
Sayalee Neellesh Patankar, 16, Sophomore, Adlai E. Stevenson High School, Lincolnshire, Illinois, T: Christina Palffy
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<td>PHYS028</td>
<td>Touchdown Events during Drop Impact of Newtonian Fluid</td>
<td>Michael Frim, 18, Senior, Evanston Township High School, Evanston, Illinois, T: Mark Vondracek</td>
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<td>PLNT030</td>
<td>The Influence of Soil Microbes on the Restoration Success in the Critically Endangered <em>Widdringtonia whytei</em></td>
<td>Gurleen Kaur, 18, Senior, Wheeling High School, Wheeling, Illinois, T: Carol Bouvier</td>
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<td>ROBO055</td>
<td>A Novel Approach to the Diagnosis of Heart Disease Using Machine Learning and Deep Neural Networks</td>
<td>Sahithi Anikreddy, 15, Sophomore, James B. Conant High School, Hoffman Estates, Illinois, T: Adi Kadimetla</td>
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<td>INDIANA</td>
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<td>Evansville, USIN20, Hoosier Science and Engineering Fair Region 1</td>
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<td>PLNT049</td>
<td>A Field Study: Sustaining Crop Growth in a Flooded Area with the Application of Oscillatoria</td>
<td>Jacob Liam Martin, 16, Sophomore, Northwestern High School, Kokomo, Indiana, T: Linda Wilson</td>
<td>Fort Wayne/Angloa, USIN21, Hoosier Science and Engineering Fair Region 2</td>
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<td>MATS049</td>
<td>Development of Optimal Microstructure Morphology in Organic Solar Cell Active Layer through Genetic Algorithm</td>
<td>Caine Aryee Ardayfio, 15, Sophomore, University High School of Indiana, Carmel, Indiana, T: Brandon Hogan</td>
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<td>West Lafayette, USIN26, Hoosier Science and Engineering Fair Region 7</td>
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<td>ENBM069</td>
<td>Naturally 3D Printing Away Fatal Catheter–Associated Urinary Tract Infections, Year Two</td>
<td>Mitchell James Sampson, 16, Sophomore, Northview High School, Brazil, Indiana, T: Rachel Sparks</td>
<td>Muncie, USIN23, Hoosier Science and Engineering Fair Region 4</td>
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<td>MCR0062</td>
<td>Isolation and Characterization of an Environmentally Sourced Bacteriophage for <em>Serratia marcescens</em></td>
<td>Demetri Massow, 18, Senior, Crown Point High School, Crown Point, Indiana, T: Ashley Cosme</td>
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<td>CELL042</td>
<td>Using Zika Virus Proteins NS4A and NS4B to Investigate Oncolytic Virus Therapy against Glioblastoma Cancer</td>
<td>Sowmya Chundi, 15, Freshman, Carmel High School, Carmel, Indiana, T: Clark Gedney</td>
<td>Greencastle, USIN25, Hoosier Science and Engineering Fair Region 6</td>
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<td>Cell050</td>
<td>Improved Treatment for Alzheimer's by Enhancing Tyrosine Phosphorylation of the DAB1 Protein through Lauric Acid</td>
<td>Siya Goel, 14, Freshman, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Croy</td>
<td>Greencastle, USIN25, Hoosier Science and Engineering Fair Region 6</td>
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<tr>
<td>BMED060T</td>
<td>Development of a Microscope for Fully Automated Real-Time Cancer Cell Tracking</td>
<td>Nicole Lakshmi Segaran#, 17, Junior, Yannink Singh, 17, Junior, Carmel High School, Carmel, Indiana, T: Jennifer Drudge</td>
<td>West Lafayette, USIN26, Hoosier Science and Engineering Fair Region 7</td>
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<td>CHEM050</td>
<td>Synthesis and Use of Robust Cobalt (II) Catalysts for the Reduction of CO₂ to CO</td>
<td>Ankush Kundan Dhawan, 17, Junior, Signature School, Evansville, Indiana, T: Jeffery Seyler</td>
<td>West Lafayette, USIN26, Hoosier Science and Engineering Fair Region 7</td>
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<td>ENMC054</td>
<td>Welcome to &quot;Sistance&quot;: A New Form of Base Communication for Deaf-Blind Children</td>
<td>Mackenzie Lee Hunt, 17, Junior, New Tech Institute, Evansville, Indiana, T: Patrick Carter</td>
<td>West Lafayette, USIN26, Hoosier Science and Engineering Fair Region 7</td>
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Valparaiso, USIN27, Hoosier Science and Engineering Fair Region 8

**Valparaiso, USIN27, Hoosier Science and Engineering Fair Region 8**

**PLNT047 Eliciting Plant Defensive Mechanisms via Mycorrhizal Stimulation**

Amanda Grace Wilson, 18, Senior, Northwestern High School, Kokomo, Indiana, T: Linda Wilson

**Indianapolis, USIN50, Hoosier Science and Engineering Fair**

**ENBM064T SAVIUTS: Sensory Aid for the Visually Impaired Utilizing Time-of-flight Sensors**

Joseph Henning, 18, Senior, Ben Swihart, 18, Senior, Wyatt Hooper, 18, Senior, New Prairie High School, New Carlisle, Indiana, New Prairie High School, New Carlisle, Indiana, T: Kimberly Holifield T: Kim Holifield

**PHYS056 Flock Fragmentation: The Dispersal of Saturated Flocks in a System of Self-Propelled Particles**

Parker Jou, 17, Senior, Carmel High School, Carmel, Indiana, T: Jennifer Drudge

IOWA

*Cedar Rapids, USIA01, Eastern Iowa Science and Engineering Fair*

**ANIM043 What Is Honey? A Comparison of Honey from Iowa Beekeepers vs. National Store Brand Honey Using Pollen and Chemical Analyses**

Amara Jean Orth, 15, Freshman, Lewis Central High School, Council Bluffs, Iowa, T: Michelle Kavars

**PLNT042 Accelerating Plant Growth to Improve Crop Production and Soil Fertility: Analyzing the Effects of Macronutrients and Mycorrhizal Fungi for Zea mays, Phase III**

Kayla Janae Livesay, 16, Sophomore, Van Buren Community Schools, Keosauqua, Iowa, T: Amanda Schiller

*Fort Dodge, USIA02, Western Iowa Science and Engineering Fair*

**MATS024 Biodegradable Backlash**

Hailey Jo Kintz, 16, Junior, Guthrie Center High School, Guthrie Center, Iowa, T: Alexa Groff

**PLNT022 Farming on Mars: Potential Strategies for Sustainable Agriculture**

Pooja Kasiviswanathan, 16, Junior, Ames High School, Ames, Iowa, T: Vijayapalani Paramasivan

*Ames, USIA50, State Science and Technology Fair of Iowa*

**ANIM050T Increasing the Population of Danaus plexippus by Manipulating Food Choice Behavior**

Abigail Grace Wittkamp#, 17, Senior, Sara Katherine Dodge#, 17, Senior, Burlington Community High School, Burlington, Iowa, T: Elizabeth Sanning

**BMED069 Involvement of the AhR in Reproductive Function with Exposure to PCB 126**

Radha Madhavi Velamuri, 18, Senior, Valley High School, West Des Moines, Iowa, T: Karen Summers

**MCRO069 DNA Sequencing of Soil Microbiota from Mulching: A Novel Rotational Fragment Farming for Efficient Agriculture**

Pranav Chhaliyil, 18, Senior, Maharishi School of the Age of Enlightenment, Fairfield, Iowa, T: Barbara Hays

**MCRO070 Use of Glutamate, Arginine, Glucose to Enhance the Survival of Probiotic Bacteria in an Artificial Gastric Environment**

Meena Ramadugu, 15, Freshman, John F. Kennedy High School, Cedar Rapids, Iowa, T: Bradley Horton

**PLNT062 Increased Yield Production of Chasmogamous and Cleistogamous Glycine max Using Apis mellifera, Organic Kaolinite Pesticide on Aphis glycines, and More Natural Potassium Fertilizer (Phase III)**

Brooklyn Leann Pardall, 18, Senior, Central Lee High School, Donnellson, Iowa, T: Alicia Schiller-Haynes

KANSAS

*Wichita, USKS50, Kansas State Science and Engineering Fair*

**CELL055 Can Tumor Cells Stimulate Macrophages through Cell to Cell Communication without Contact?**

Lauren Danielle Cassou, 17, Senior, Manhattan High School, Manhattan, Kansas, T: Janet Stark
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EGCH039T  Harnessing Energy Using Soil-Based Microbial Fuel Cells (MFC)
Ashvini Sachinda Wickramasundara, 15, Freshman, Eshi Wickramasundara, 16, Junior, Manhattan High School, Manhattan, Kansas, T: Ganga Hettiarachchi

KENTUCKY
Louisville, USKY02, Louisville Regional Science and Engineering Fair

BCHM011  Synthesis and Characterization of Platinum Anticancer Compound Oxalato (1,4-dimethylpiperazine) Platinum(II)
Sasha Sairajeev, 18, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Kevin Williams

CBIO011T  Finding the Most Influential Factors which Control the Healing of Chronic Wounds
Rithik Ghan ta Reddy, 17, Senior, Abdullah Ossama Ateyeh, 17, Senior, The Carol Martin Gatton Academy of Mathematics and Science in Kentucky, Bowling Green, Kentucky, T: Richard Schugart

EGPH015  Solar Updraft Tower-Wind Turbine Hybrid: Maximizing Power Output through Vortex Shedding, Water Droplet Atomization and Arduino Servo Control Feedback Loop
#  Rachel Spaulding, 18, Senior, Eastern High School, Louisville, Kentucky, T: David Steineker

TMED018  Tender Coconut Water Inhibits the Growth of HepG2 Cancer Cell by Reversing 'Epithelial to Mesenchymal Transition' Process
#  Vaitheesh L. Jaganathan, 17, Junior, Ballard High School, Louisville, Kentucky, T: Glenda Jones

Louisville, USKY03, Dupont Manual High School Regional Fair

CBIO009  Classifying Cancer Using Machine Learning in Order for CRISPR/Cas9 Technology to Be More Effective
Shreeya Arora, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Erin Moss

CELL016  Physiologic Oxygen Tension Enhances Proliferation, Resistance to Hypoxic Stress, and Telomerase Activity of Mouse Cardiac Mesenchymal Stem Cells
Robi Abella Bolli, 15, Freshman, duPont Manual High School, Louisville, Kentucky, T: Jennifer Proffitt

EBED012  Engineering an Automated Chloramine Testing Device
Anna Elizabeth Morgan, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

MCRO019  The Effects of Sugar Substitutes and Prebiotics on the Virulence of Gastrointestinal Bacteria
#  Elaina Rose Render, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

ROBO022T  The Development of a Holistic System for Broad-Spectrum Crop Disease Diagnosis and Treatment
#  Shreshth Srivastava#, 17, Junior, Pranav Senthilvel#, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak

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

ENBM032  What Is a Step and Why Does It Matter? A Comparison of Devices to Track Activity
Samuel Latz, 17, Senior, Covington Latin School, Covington, Kentucky, T: Ruth Hemmer

Lexington, USKY05, Central Kentucky Regional Science and Engineering Fair

ENMC025  Bioinspired Submersible Dual Propulsion System: A Novel Approach to Ultra-Efficient Submarine Propulsion Utilizing Starting and Stopping Vortex Rings Mirroring Jellyfish Motion
##  Rachel M. Seevers, 17, Senior, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young

MATH024  Classifying Quaternion Identities
#  Theodore Arthur Ehrenborg, 17, Senior, Henry Clay High School, Lexington, Kentucky, T: Renee Goin
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<td>Kentucky, T: Karen Young</td>
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<td>BCHM027T</td>
<td>An Innovative Method of Room Temperature Biospecimen Preservation</td>
<td>Jack Boylan, 17, Junior, Kavya Sai Koneru, 16, Junior, duPont Manual High</td>
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<td>T: Glenn Zwanzig; T: Kathy Fries</td>
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<td>via Tetramethyl Orthosilane (Sol-Gel) Encapsulation and Polyethylene</td>
<td>School, Louisville, Kentucky, T: Glenn Zwanzig</td>
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<td>CBIO049</td>
<td>Classification of Full EEGs (Electroencephalograms) for Biometrics and</td>
<td>Sarvesh Babu, 15, Sophomore, duPont Manual High School, Louisville, Kentucky,</td>
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<td>T: Glenn Zwanzig; T: Kathy Fries</td>
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<td>Medical Applications through Machine Learning and AI</td>
<td>Kentucky, T: Glenn Zwanzig</td>
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<td>ENEV080</td>
<td>Pressure Assisted Cryogenic Carbon Dioxide Extraction: A Novel Method</td>
<td>Zachary Schneider, 18, Senior, Saint Xavier High School, Louisville,</td>
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<td>of Carbon Sequestration</td>
<td>Kentucky, T: Glenn Zwanzig</td>
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<td>ENEV097</td>
<td>Developing a 3D Modeling Application Based on a Bezier Surface</td>
<td>Raymond Micheal Suo, 17, Junior, Naomi Kenyatta, 17, Junior, Allen Wu, 16,</td>
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<td>T: Glenn Zwanzig; T: Glenn Zwanzig</td>
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<td>Reconstruction Algorithm for the Rebuilding of Natural Disaster and</td>
<td>Senior, duPont Manual High School, Louisville, Kentucky, Horace Mann</td>
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<td>War Damaged Areas</td>
<td>School, Bronx, New York, T: Glenn Zwanzig</td>
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<td>LOUISIANA</td>
<td>Validate the Impact of Evidence Based Instruction in Increasing the</td>
<td>Mary Grace Salmon, 17, Junior, St. Joseph's Academy, Baton Rouge, Louisiana,</td>
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<td>Phonological Awareness Skills for Individuals with Dyslexia</td>
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<td>The Effects of Aging on Nucleolar and Ribosomal Function in Drosophila</td>
<td>Maci Taylor Mannina, 16, Junior, St. Joseph's Academy, Baton Rouge,</td>
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<td>T: Jacqueline Savoia</td>
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<td>Louisiana, T: Jacqueline Savoia</td>
<td>CELL003</td>
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<td>CHEM006</td>
<td>Influence of Vegetated Coverage on Surface Runoff Losses of the</td>
<td>Hailey Danielle Lewy, 16, Junior, Saint Joseph's Academy, Baton Rouge,</td>
<td>Finalist Directory</td>
<td>T: Jacqueline Savoia</td>
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<td>Insecticide, Bifenthrin</td>
<td>Louisiana, T: Jacqueline Savoia</td>
<td>CHEM006</td>
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<tr>
<td>LOUISIANA</td>
<td>Inhibition of UCP2 Suppresses Cell Proliferation and Migration of</td>
<td>Lawrence Alex Shi, 17, Senior, Caddo Parish Magnet High School, Shreveport,</td>
<td>Finalist Directory</td>
<td>T: Kris Clements</td>
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<tr>
<td>TMED021</td>
<td>Cholangiocarcinoma through the Regulation of Epithelial-Mesenchymal</td>
<td>Louisiana, T: Kris Clements</td>
<td>TMED021</td>
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Intel International Science and Engineering Fair 2019
Houma, USLA03, Terrebonne Parish Science Fair

MCRO004  Reinhardtii Remediation
Liz Diaz, 15, Sophomore, H.L. Bourgeois High School, Gray, Louisiana, T: Leah Rauhaus

MCRO011  Dirt-tricity
Kyle Joseph Keneker, 18, Senior, South Terrebonne High School, Bourg, Louisiana, T: Chris Brown

Lafayette, USLA04, Louisiana Region VI Science and Engineering Fair

BEHA014  Good Night Sleep Tight: A Study of the Impact of Co-Sleeping on the Child, the Mother, and the Parental Relationship
# Hallee Elizabeth Mire, 17, Junior, Catholic High School, New Iberia, Louisiana, T: Michele Stelly

Lake Charles, USLA05, Louisiana Region V Science and Engineering Fair

BMED011  Behind the "Scenes" and Our Sleep
Maggie Mae Reeves, 15, Sophomore, Alfred M. Barbe High School, Lake Charles, Louisiana, T: Judith Reeves

ENMC011  Using a Hybrid Rocket Engine to Create Controllable Lift
## Donald Edward Martin, 18, Senior, Academics Etc., Lake Charles, Louisiana, T: Katherine Martin

St. James Parish, USLA06, St. James Parish Science Fair

CHEM066T  How Dangerous Are E-Cigarettes? An Analysis of Metals and Chemicals Affecting Users
# Kaylee K. Bourgeois#, 18, Senior, Caihren Wood, 17, Senior, Lutcher High School, Lutcher, Louisiana, St. James High School, St James, Louisiana, T: Mallory Cortez

New Orleans, USLA08, Greater New Orleans Science and Engineering Fair

BEHA010  The Attachment Theory and Emotional Development: A Twin Study
Paean Luby, 15, Sophomore, Benjamin Franklin High School, New Orleans, Louisiana, T: Cliff Robinson

# Alexander Bryce Walker, 18, Senior, Patrick F. Taylor Science & Technology Academy, Westwego, Louisiana, T: Amanda Godshaw

ENMC015  Simple Problem, Simple Solution: Backpack with Built-In Desk
Grayson Barron, 15, Freshman, John Curtis Christian School, River Ridge, Louisiana, T: Cathy Boucvalt

Baton Rouge, USLA50, Louisiana Science and Engineering Fair

ANIM024  Caffeine as a Natural Larvicidal in Reducing the Malaria Transmission of Anopheles quadrinaculatus Mosquitoes
Pooja Veerareddy, 16, Sophomore, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements

EAEV033  The Introduction of Different Nitrogen and Phosphorus Levels to Regulate Phytoplankton Growth in Aquatic Habitats
Amelia Claire Cave, 16, Junior, Edward Douglas White Catholic High School, Thibodaux, Louisiana, T: Linda Messina

EGPH011  Exploring the Effect of Vortex Generators on Boundary Layer Separation and Laminar Flow in a Venturi and Determining the Potential Improvement on Efficiency of a Vertical Axis Wind Turbines (VAWTs)
Rachel Michelle Pizzolato, 15, Freshman, John Curtis Christian School, River Ridge, Louisiana, T: Cathy Boucvalt

ENBM028T  3D Printed Carpal Tunnel Splint
William Rives Alexander, 18, Senior, Adam Michael Barousse, 18, Senior, William Edward Delatte, 18, Senior, St. Thomas More Catholic High School, Lafayette, Louisiana, T: Shawnessy Bloom
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MCRO033  Analysis of the Antimicrobial Efficacy of the Lichen Extract Usnic Acid, Year Two
#  Joshua Michael Devier, 18, Senior, Saint Paul's School, Covington, Louisiana, T: John Carambat

PLNT033  Lead Phytoremediation in Contaminated Soils Using Ornamental Landscape Plants
Danna Claire Thompson, 16, Sophomore, St. Joseph's Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia

MAINE
Brunswick, USME50, Maine State Science Fair
EBED025  Developing Three-Dimensional Spatial Cognition for the Visually Impaired Using Computational Depth Mapping and Vibro-Tactile Display
#  Tyler James Delargy, 17, Senior, Bangor High School, Bangor, Maine, T: Cary James

ENMC059T  eTouch Project: An Affordable Braille e-Reader with the Cloud-Based Digital Library for the Blind
Artem Laptiev, 19, Junior, Antonina Zakorchemna, 18, Senior, Fryeburg Academy, Fryeburg, Maine, Ukraine, Fryeburg Academy, Fryeburg, Maine, T: James Wauer

PLNT059  Testing the Effectiveness of Mycorrhizae in the Phytoremediation of Heavy Metals from Stormwater
Amara Precious Ifeji, 17, Junior, Bangor High School, Bangor, Maine, T: Cary James

MARYLAND
Glen Burnie, USMD01, Anne Arundel County Regional Science and Engineering Fair
ENBM033  Body Anomaly Detection through 3D Body Scanning, Image Processing, and Machine Learning
#  Andrew Adel Karam, 18, Senior, Arundel High School, Gambrills, Maryland, T: Adam Swetz

ENEV069  Fly Ash Sustainability: Transforming Dredged Soils into Construction Material
Aaban Ali Syed, 15, Freshman, North County High School, Glen Burnie, Maryland, T: Angela Tatum

SOFT035  Should I Trust What's in My Computer? Using Current Draw Analysis to Identify Malicious Firmware in Solid State Drives
Ryan McDowell, 17, Junior, Rockbridge Academy, Millersville, Maryland, T: Bob Podgurski

Frederick, USMD02, Frederick County Science and Engineering Fair
BCHM032  Synthetic Virus-Like Particles: The Future of Targeted Drug Delivery
Joshua Hoyoung Yu, 17, Senior, Urbana High School, Ijamsville, Maryland, T: Suzanne Dashiel

CELL051  HIF1-α Promotes ID2 Expression through Novel HRE Sites in the ID2 Promoter
Abigail Elizabeth Haffey, 17, Senior, Homeschool, Walkersville, Maryland, T: Kimberly Romanchuk

Silver Spring, USMD03, ScienceMontgomery
ENMC071  AccessO₂: An Innovative, Non-Electric, Life-Saving, Oxygen Concentrator
Sanjit Thangargasu, 16, Sophomore, Poolesville High School, Poolesville, Maryland, T: Kevin Lee

PHYS042  Heisenberg-Scaling Measurement Protocol for Analytic Functions with Quantum Sensor Networks
Kevin Qian, 18, Senior, Montgomery Blair High School, Silver Spring, Maryland, T: Angelique Bosse

TMED035  A Fast, Sensitive, and Non-Invasive Approach to Detecting Breast Cancer Using a Fully Convolutional Neural Network
Ishana Shastri, 17, Senior, Poolesville High School, Poolesville, Maryland, T: Kevin Lee
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TMED039  Tuning Vaccine Physical Properties to Improve Anti-tumor Response Using Polyplexes
   Allie Amerman, 17, Senior, Wheaton High School, Silver Spring, Maryland, T: Daniel Bates
   Largo, USMD05, Prince George's Area Science Fair

EBED023  Oh No, Watch Out for the . . .
   Kobi Terell Robinson, 18, Senior, From the Heart Christian School, Suitland, District of Columbia, T: Christal Long

MATH030  The Bilman-Trogdon Inverse Scattering Transform for the Toda Lattice
   Mitchell Stephen Smith, 18, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland, T: Yau-Jong Twu

ROBO041  Autonomous Visual Tracking of Unmanned Aerial Vehicles
   Carla Rose, 18, Senior, Eleanor Roosevelt High School, Greenbelt, Maryland, T: Yau-Jong Twu
   Towson, USMD06, Baltimore Science Fair

CELL038  Development of a CD4+ Neoantigen Vaccine in the Panc02 Tumor Model
   Jocelyn Susan Mathew, 17, Senior, Centennial High School, Ellicott City, Maryland, T: Toni Ireland

EAEV044  Machine Learning Classifiers to Predict Red Tide in Florida
   Marvin Fangzhou Li, 16, Sophomore, James M. Bennett High School, Salisbury, Maryland, T: Philip Bock
   Baltimore, USMD07, Morgan State University Science-Mathematics-Engineering Fair

MATS052  Optical Damage to Irradiated Scintillators and Induced Optical Recovery Techniques
   Jeffrey Bowen Li, 17, Junior, Gilman School, Baltimore, Maryland, T: Alvaro Salcedo

MASSACHUSETTS

Somerville, USMA02, Massachusetts Region IV Science Fair
ENMC063  Modeling Mass Flow Distribution in a Multistage Rocket Concept Design
   Albert Rachid Farah, 16, Junior, Medford High School, Medford, Massachusetts, T: Michael Wadness
   Fall River, USMA03, Massachusetts Region III Science Fair

BMED059  Effects of Alcohol and Aspartame on the Heart Rate of Daphnia magna
   Deandria Lida Nafrere, 17, Junior, Foxborough Regional Charter School, Foxborough, Massachusetts, T: Roy Pavao
   North Adams, USMA04, Massachusetts Region I Science Fair

CHEM038  Concentration of Red Dye in Sports Drinks
   Abigail Goyette, 18, Senior, Westfield High School, Westfield, Massachusetts, T: Jon Tyler
   Worcester, USMA05, Massachusetts Region II State Science Fair

ENBM059  Under Pressure: Customized Insoles for Plantar Pressure Ulcers
   Hannah Alexandra Puhov, 16, Junior, Massachusetts Academy of Math and Science at WPI, Worcester, Massachusetts, T: Siobhan Curran

ENBM068  Bio-ink: Evaluation of Protein as Biomaterials for 3D Bioprinting
   Jiwon Choi, 18, Senior, Saint Mark's School, Southborough, Massachusetts, T: Lindsey Lohwater
   Boston, USMA06, Massachusetts Region VI Science Fair

BCHM029  Does Exposing Lactaid Pills to Acid Impact Enzyme Activity
   Gianfranco Lazzaro Yee, 18, Junior, Urban Science Academy, Boston, Massachusetts, T: Ernest Coakley

BCHM035T  The Effect of Nitrate in Polluted Water on Daphnia
   Stefania Lazzaro Yee, 16, Sophomore, Tashaina Huez-Santiago, 17, Sophomore, Urban Science Academy, West Roxbury, Massachusetts, T: Ernest Coakley T: Ernest Coakley

ENMC055T  The Effect of Sweep Angle on a Wing's Lift Force
   Thomas Louis DeMasi, 15, Freshman, Stanley Chen, 15, Freshman, Michael Josiah Dubuisson, 15, Freshman, Boston Latin Academy, Boston, Massachusetts, T: Kelly Gordon
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Cambridge, USMA50, Massachusetts State Science & Engineering Fair

BCHM042  **IFNγ Susceptibility in Chordoma**  
Ananthan Sadagopan, 15, Sophomore, Westborough High School, Westborough, Massachusetts, T: Lauren Bakale

BEHA049  **Predicting Opioid Use Disorder (OUD) Using Machine Learning**  
Adway Suhrid Wadekar, 16, Sophomore, Saint John's High School, Shrewsbury, Massachusetts, T: William James

BEHA050  **A Novel Noninvasive and Inexpensive Biomarker for Diagnosing Major Depressive Disorder (MDD): Using Machine Learning Model* in silico* and Drosophila melanogaster Model* in vivo**  
Anvitha Narasimha Addanki, 16, Junior, Canton High School, Canton, Massachusetts, T: Erica Fitzgerald

CHEM065  **Analysis of Manufacturing Process of D-Glucose-Based Thermoformed-Polymers**  
Suvin Sundararajan, 15, Sophomore, Westfield High School, Westfield, Massachusetts, T: Jon Tyler

ENBM074  **An RNA-based Early Detection Method for Prostate Cancer Using Nanotechnology**  
Daisy Wang, 16, Junior, Boston Latin School, Boston, Massachusetts, T: Tingying Zeng

MCRO053  **Development of a qPCR Assay for Quantification of Saccharibacteria**  
John Lin, 16, Sophomore, Boston Latin School, Boston, Massachusetts, T: Kathleen Bateman

MCRO054  **The Acidifying Ocean's Effect on Protease Activity in Alteromonas**  
Noah Eliot Glasgow, 16, Sophomore, Falmouth Academy, Falmouth, Massachusetts, T: Alison Ament

TMED030  **Going Green to Prevent Breast Cancer: The Effect of Epigallocatechin Gallate (EGCG) on Tumor Growth in Planaria**  
Ellia Jacqueline Sweeney, 16, Sophomore, Bishop Feehan High School, Attleboro, Massachusetts, T: Audrey Lavertu

TMED052  **Ultrasensitive Detection of Early-Stage Cancer Using ctDNA Sequencing with UMIs**  
Elizabeth Ding, 16, Junior, Lexington High School, Lexington, Massachusetts, T: Parul Kumar

Michigan

Detroit, USMI02, Science and Engineering Fair of Metropolitan Detroit

BEHA033  **A Data-Driven Optimization of Economic Resource Allocation**  
Vihaar Bhanukiran Nandigala, 16, Sophomore, Walled Lake Western, Walled Lake, Michigan, T: Usha Nandigala

BMED046  **A Novel, Noninvasive Approach to Melanoma Diagnosis Using Optical Coherence Tomography and Bioconjugated Gold Nanoparticles**  
Shriya Gampala Reddy, 15, Sophomore, Northville High School, Northville, Michigan, T: Karin Nelson

CBIO020  **Deep Learning to Evaluate the Combinatorial Impact of Genetic Variants on Gene Expression**  
Collin Liyuan Wang, 17, Senior, Detroit Country Day School, Beverly Hills, Michigan, T: Gillian Von Seeger

EAEV037T  **Utilizing Google Earth Engine to Retrieve the Devon Ice Cap’s Equilibrium Line Altitude**  
Kevin Zhiyang Zhou, 17, Junior, Peizhi Liu, 17, Senior, Troy High School, Troy, Michigan, T: Rebecca Brewer

ENEV047  **Graphene Sand Synthesis and Applications in Water Filtration and Desalination**  
Neha Narayan, 17, Junior, Salem High School, Canton, Michigan, T: Marcia Lizzio

ENEV052  **The Use of Micellar Water to Aid Filtration of Oil-Based Contaminants in Pools**  
Bhuvna Murthy, 17, Senior, Huron High School, Ann Arbor, Michigan, T: Andrew Collins
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Top 3 Public Universities in the West: U.S. News & World Report, 2019

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ROBO037  Hardware Integrated LiDAR Simulation for the Development of Collision Avoidance Algorithms  
Matthew Tan, 18, Senior, Cranbrook Kingswood School, Bloomfield Hills, Michigan, T: Stephanie Kokoszka

Flint, USMIO3, Flint Regional Science Fair
ENEV044  Using Raw Bamboo Waste to Sustainably Purify Water  
Akash Rathod, 18, Senior, Okemos High School, Okemos, Michigan, T: Dave Chapman

ENMC044  Water Injection on the Gasoline Heat Engine  
Joseph Paul Kopka, 17, Senior, Saginaw Arts and Sciences Academy, Saginaw, Michigan, T: David Allan

MCRO039  Identifying Novel Mechanisms of Quorum Sensing Receptor Protein RpfR: Relevance to the BDSF Quorum Sensing Signaling Pathway  
Neehal Reddy Tumma, 17, Senior, Port Huron Northern High School, Port Huron, Michigan, T: Nico Fernandez

Kalamazoo, USMI07, Southwest Michigan Science & Engineering Fair
PHYS051  Novel Approach to Efficient Growth of Iron Selenide (FeSe) High-Temperature Superconductors  
Saaketh Mukunda Medepalli, 17, Senior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Clement Burns

SOFT048T  SmartCane Mobile Application for the Wearable White Cane  
Julia Lillian Strauss, 17, Junior, Anna Clare Puca, 17, Junior, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan, T: Jennifer Richardson T: Pnina Ari-Gur

Berrien Springs, USMIO8, Berrien County Regional Science Fair
CELL048  Isolating Exosomes in Urine and Saliva to Detect Dust and Dander Allergens in IgE Sensitized Individuals Using a Capillary Tube Precipitation Test: A New Non-Intrusive Antigen/Antibody Reaction Allergy Test  
Audrey Jules Bakerson, 17, Junior, Berrien County Mathematics and Science Center, Berrien Springs, Michigan, T: Denise Smith

Detroit, USMIO50, Michigan Science and Engineering Fair
BMED047  Enabling Influenza Virus-like Particles (VLPs) as a Universal Vaccine  
Madeleine Yang, 17, Senior, Detroit Country Day School, Beverly Hills, Michigan, T: Ross Arseneau

ENBM035  A Novel Approach to Environmental Biosensors Using a Two-Step Genetic Circuit  
Jakar Dhillon, 16, Sophomore, Bloomfield Hills High School, Bloomfield Hills, Michigan, T: Dennis Kwasny

MINNESOTA
Duluth, USMN02, Northeast Minnesota Regional Science Fair
EAEV003T  What Effect Do Local Factors (Lake Breeze, Industry, Topography, Harbor, and Weather) versus Regional Factors (Statewide Transport) Have on Ozone Levels in Duluth, Minnesota?  
Payten Amber Schneberger, 18, Senior, MacKenzie Leigh Brummer, 18, Senior, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh

ENMC005  The Effect of Varying Micro-Perforated Acoustical Tape on the Sound Intensity of a HVAC System Using a Scale Model and Two and Three Dimensional Modeling Software  
Abigail Rose Smith, 16, Junior, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh

MCRO001  The Use of Lemna minor as a Human Model to Study the Effect of Acetylsalicylic Acid (Aspirin) on Staphylococcus epidermidis Biofilm Development  
Emma Marie Wells, 17, Senior, Cloquet Senior High School, Cloquet, Minnesota, T: Cynthia Welsh
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Mankato, USMN03, Southern Minnesota Regional Science and Engineering Fair

ANIM006T Identifying the Effect of Limiting Micronutrients on the Ecological Footprint of *Bellamya chinensis*

EAEV005T An Analysis of Natural Soil Amendments Applied to Ryegrass and Switchgrass to Reduce the Effects of Road Salt
Anna Jo Prchal#, 18, Senior, Julianne Pankow#, 18, Senior, New Prague High School, New Prague, Minnesota, T: Jodi Prchal

St. Paul, USMN04, Twin Cities Regional Science Fair

ENMC026 The Stability of an Aircraft Wing with Varied Winglets
Osman Abass Warfa, 16, Sophomore, Burnsville High School, Burnsville, Minnesota, T: Mike Huemoeller

MCRO029 Thyme and Thyme Again! Investigation of Synergistic Antimicrobial Activity of *Thymus vulgaris* Essential Oil in Combination with 'Superfood' Essential Oils
Manasheeth Seth Padiyath, 17, Junior, Woodbury High School, Woodbury, Minnesota, T: Kaarin Schumacher

PLNT037 Combating Undernutrition in Developing Countries with a Compact Aeroponics System Utilizing Contaminated Water
Haley Colleen Jostes, 18, Senior, Stillwater Area High School, Stillwater, Minnesota, T: Andrew Weaver

Crookston, USMN05, Western Minnesota Regional Science Fair

BEHA005 The Impact of High School Scheduling on Test Scores
Olivia Sunshine McNair, 17, Junior, Perham High School, Perham, Minnesota, T: Shawn Stafki

Winona, USMN06, Southeast Minnesota Regional Science Fair

CELL005 The Presence of *Borrelia burgdorferi* in *Ixodes scapularis*
Carlyn Frie, 17, Senior, Cochrane-Fountain City High School, Fountain City, Wisconsin, T: Solomon Simon

Rochester, USMN07, Rochester Regional Science & Engineering Fair

BMED013 Meloxicam: A Potential Treatment for Idiopathic Pulmonary Fibrosis
Meredith Kottom, 17, Junior, Schaeffer Academy, Rochester, Minnesota, T: Philip Arant

TMED010 Deployment of a Scalable Single Shot Detector (SSD) Mobile Architecture for the Localization and Classification of Pneumonia Chest Radiographs
Daniel Patrick Fleury, 17, Junior, John Marshall High School, Rochester, Minnesota, T: Teresa Felmlee

Saint Cloud, USMN08, David F. Grether Central Minnesota Regional Science Fair and Research Paper Program

MCRO012 Demonstrating Transfer of Antibiotic Resistant Genes in the Rhizosphere and Experimenting with Auxins on the Rate of Transference
Rebecca L. Kottke, 14, Freshman, Blaine High School, Blaine, Minnesota, T: Eric Johnson

St. Paul, USMN09, St. Paul Science Fair

BMED020 Determination of Mutant JUP Localization in an iPSC Model of ARVC: Implications for Diagnosis and Pathogenesis
Ethan Ekin Dincer, 17, Senior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker

ENBM016 Applying Thermopile Array Sensors and Machine Learning to Detect Falls of Older Adults
Melissa Nie, 17, Junior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker

St. Paul, USMN10, Western Suburbs Science Fair

BMED038T Healing a Broken Heart: Examining the Role of Polycomb Group Protein Asxl2 in Cardiomyocyte Proliferation
Rachel Elizabeth Gunderson, 17, Junior, Boatemaa Adoawaa Agyeman-Mensah, 17, Junior, Breck School, Golden Valley, Minnesota, T: Kati Kragtorg
EGPH007  Harvesting the Blue Wave Energy by Circular Electromagnetic Generator  
Kerui Yang, 17, Junior, Edina High School, Edina, Minnesota, T: Caroline Ylitalo

ROBO025  Robust Autonomous Micro Aerial Vehicle (MAV) Navigation with Onboard, Environment-Agnostic, Multi-Sensor SLAM  
#  Parthiv Nandakumar Krishna, 17, Senior, Minnetonka High School, Minnetonka, Minnesota, T: Kimberly Hoehne

St. Paul, USMNS0, Minnesota Academy of Science State Science & Engineering Fair

BMED084  Sulforaphane Improves Oxidative Stress Response in Caenorhabditis elegans via SKN-1  
Nitya Bhagwati Thakkar, 17, Senior, Saint Paul Academy and Summit School, Saint Paul, Minnesota, T: Karissa Baker

BMED085  Multicatheter Radioactive Implant Navigation with Machine Learning for Rapid, Efficient High Dose Rate (HDR) Brachytherapy Treatment Planning  
Benjamin Bin Yan, 16, Junior, Century High School, Rochester, Minnesota, T: Janelle Milliken

EBED044T  Field Yield Revealed: Creating a Radar-Based System for Pre-Harvest Potato Yield Mapping  
James Clinton, 17, Junior, Nathan Rockafellow, 17, Junior, Breck School, Golden Valley, Minnesota, T: Kati Kragtorp

ENMC079  Engineering Weighted 3D Printed Vests for Sea Turtles with Bubble Butt Syndrome  
Gabriela Queiroz Miranda, 18, Senior, Minnetonka High School, Minnetonka, Minnesota, T: Kimberly Hoehne

MISSISSIPPI

Biloxi, USMOS01, Mississippi Region VI Science and Engineering Fair

EAEV050T  A Comprehensive Spatiotemporal Model for Interpolation of Tropospheric Fine Particulate Matter Concentration  
Vayd Ramkumar, 16, Junior, Esmond Tsang, 16, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

Booneville, USMOS02, Mississippi Region IV Science Fair

MCRO075  Design and Application of an Affordable Air Sampler for the Detection of Bacterial Aerosols in Poultry Farms  
Aaron Wan, 15, Sophomore, Starkville High School, Starkville, Mississippi, T: Mary Brandon

MCRO087T  A Gut Feeling: The Effects of Melatonin on the Proliferation of Enterobacter aerogenes, a Key Member of the Human Gut Microbiome  
Maria Victoria Kaltchenko, 17, Senior, Bertha Alicia Mireles, 17, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

Cleveland, USMOS03, Mississippi Region III Science and Engineering Fair

ENEV017T  Solar Water Disinfection and the Advanced Oxidation Process: Design of a Sustainable Water Treatment Process  
##  Helen Peng##, 18, Senior, Reggie Hong Zheng, 16, Junior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson

Hattiesburg, USMOS04, University of Southern Mississippi Region I Science and Engineering Fair

BCHM043  Development of Integrase Inhibitors  
Kimberly Tran Mai, 17, Junior, Laurel High School, Laurel, Mississippi, T: Rebecca Hooper

MCRO086  The Binding Mechanisms of Probiotics Isolated from Commercial Yogurts  
Lucie Iles LeBlanc, 17, Junior, Brookhaven Academy, Brookhaven, Mississippi, T: Leslie Hood

Jackson, USMOS05, Mississippi Region II Science and Engineering Fair

MCRO047  The Effects of Temperature on Ampicillin Resistant E. coli: A Case Study on the Degradation of Biodiversity  
George Wakeland Monroe, 17, Junior, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Krissy Rehm
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<td><strong>Oxford, USMS07, Mississippi Region VII Science and Engineering Fair</strong></td>
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<td><strong>CHEM041</strong></td>
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<td><strong>Fawaz Ahmad, 16, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson</strong></td>
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<td><strong>Bach Xuan Nguyen, 18, Junior, Oxford High School, Oxford, Mississippi, T: Sarah Robinson</strong></td>
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<td><strong>University, USMS50, Mississippi Science and Engineering State Fair</strong></td>
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<td><strong>EAEV068</strong></td>
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<td><strong>MISSOURI</strong></td>
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<td><strong>Cape Girardeau, USMO01, Southeast Missouri Regional Science Fair</strong></td>
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<td><strong>ANIM025</strong></td>
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<td><strong>Grant Roseman, 15, Freshman, Roseman High School, Jackson, Missouri, T: Andrea Roseman</strong></td>
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<td><strong>CELL026T</strong></td>
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<td><strong>Hunter Lee Rees, 16, Sophomore, Eli Lee Jones, 16, Sophomore, Jackson High School, Jackson, Missouri, T: Leanne Thele</strong></td>
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<tr>
<td><strong>Jefferson City, USMO02, Lincoln University Regional Science Fair</strong></td>
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<td><strong>PHYS041</strong></td>
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<tr>
<td><strong>Joshua L. Harmon, 18, Senior, Camdenton High School, Camdenton, Missouri, T: Chris Reeves</strong></td>
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<tr>
<td><strong>SOFT037</strong></td>
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<tr>
<td><strong>Lucas Tyler Mosher, 18, Senior, Camdenton High School, Camdenton, Missouri, T: Chris Reeves</strong></td>
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<tr>
<td><strong>Joplin, USMO03, Missouri Southern Regional Science Fair</strong></td>
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<td><strong>BMED043</strong></td>
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<tr>
<td><strong>Krusha Dharmesh Bhakta, 18, Senior, Joplin High School, Joplin, Missouri, T: Karisa Boyer</strong></td>
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</table>
At VCU Engineering, undergrads — including first-year students — dive into long-term research projects alongside grad student mentors and faculty. From developing mobile apps to inventing new medical devices, our students move research from the lab to the larger community.

#EngineersMakeItReal
Look for us at Booth 313
egr.vcu.edu
Kansas City, USMO04, Greater Kansas City Science & Engineering Fair

BCHM040  Loss of O-GlcNAc Transferase Alters Mitochondrial Function
Amy Qiang, 18, Senior, Shawnee Mission West High School, Overland Park, Kansas, T: Brenda Bott

BMED080  The Effect of Cucurbitacin B and I on Colon Cancer Cell Proliferation
Peyton Marie Panovich, 18, Senior, Shawnee Mission West High School, Overland Park, Kansas, T: Brenda Bott

CELL060  Differential Expression of Retrotransposons in Stem Cell Lineages of the Preimplantation Embryo
Eddie Dai, 16, Junior, Olathe North High School, Olathe, Kansas, T: Amy Clement

Saint Charles, USMO05, Missouri Tri-County Regional Science and Engineering Fair

ANIM004  Effect of E-Cigarette Aerosol Exposure on Cardiac Development and Cytosine Methylation in Embryonic Danio rerio
Charles Phillip Stone, 18, Senior, Wentzville Holt High School, Wentzville, Missouri, T: Jennifer Hess

Saint Joseph, USMO06, Mid-America Regional Science and Engineering Fair

MCRO055  Effects of i-Motifs and G-quadruplexes on Bacterial Gene Transcription
Isabella Avery Wiebelt-Smith, 16, Sophomore, Central High School, Saint Joseph, Missouri, T: Jay Meyers

St. Louis, USMO07, Academy of Science - Greater St. Louis Science Fair

BMED014  Reversing Tumor-Induced T Cell Suppression through Activation of TLR8 Pathway
Cindy Wang, 17, Junior, Ladue Horton Watkins High School, St. Louis, Missouri, T: Monica Bowman

CBIO008  A Novel PCA-Based Wishart Filtering Method for Reduction of Unstructured Noise in fMRI and Connectomes to Improve Diagnosis of Neurodegenerative Diseases
Nikhil Vamsi Boddu, 16, Junior, Marquette High School, Chesterfield, Missouri, T: Cathy Farrar

Springfield, USMO08, Ozarks Science and Engineering Fair

BCHM025  Creating Potential Guidelines Based on the Effects of Silver Nanoparticles and Cadmium Quantum Dots on Saccharomyces cerevisiae
Daniel Sungwhi Kim, 15, Sophomore, Kickapoo High School, Springfield, Missouri, T: Kyoungtae Kim

EAEV047  Evaluating Nano-Ferrofluid as a Technique for Microplastic Removal in Water
Katie Lu, 18, Senior, Central High School, Springfield, Missouri, T: Rhyian Friesen

Hillsboro, USMO09, Mastodon Art/Science Regional Fair

ANIM044  A Solution to Varroa Mite Infestations Using RNA-interference
Elizabeth Paige Wamsley, 17, Junior, Timber Ridge Scholars, Pacific, Missouri, T: Pamela Wamsley

BEHA037  Improve Mental Health by Virtual Reality
Mia Hines, 17, Junior, Timber Ridge Scholars, Pacific, Missouri, T: Pamela Wamsley

Fayette, USMO10, Central Methodist Eagles Science and Engineering Fair

CHEM024  The Construction of a Nephelometer and Its Use for the Determination of Chloride in Water Samples
Clayton Alexander Garnett, 18, Senior, Moberly High School, Moberly, Missouri, T: Edwin Lewis

MONTANA

Billings, USMT01, MSU Billings Science Expo

PLNT053  Determining the Presence of β-carotene in the Pericarp of the Kernel in a Heritage Breed of Zea mays
Caleb Mark, 15, Freshman, Greenwood Home School, Hardin, Montana, T: Kristen Mark
Butte, USMT02, Montana Tech Regional Science and Engineering Fair

CELL019  Developing Molecular Genetic Assays for the Detection of Mountain Lion (*Puma concolor*) DNA from Snow-Tracks
Mia Flower Foster, 17, Junior, Hellgate High School, Missoula, Montana, T: Rob Jensen

MCRO044  Effect of Iron Treatments on the Bacteria *Mycobacterium smegmatis* and *Escherichia coli* and the Role of *Escherichia coli* FhuA Iron Uptake Receptor on Phage Infections
Rachel Anne Rost, 16, Junior, Baker High School, Baker, Montana, T: Linda Rost

Havre, USMT03, Hi-Line Regional Science and Engineering Fair – MSU-Northern

EGCH015  Comparing the Glucose Concentration of Lignocellulosic Biomass Generated by Cellulase Across Six pH Buffers
Hope Gasvoda, 17, Junior, Big Sandy High School, Big Sandy, Montana, T: Melanie Schwarzbach

Great Falls, USMT04, Montana Region II Science and Engineering Fair

ENEV037T  The Implementation of Silver Nanoparticle Water Filtration Incorporating Ultraviolet Sterilization
Madison Clowiegand##, 17, Senior, Mackenzie Camille Wiegand##, 17, Senior, Simms High School, Simms, Montana, T: Jordan Holleman

MCRO026  Assessing the Effectiveness of Iron Oxide Nanoparticles against Bacterial Growth
Jeena Marie Alborano, 16, Sophomore, North Toole County High School, Sunburst, Montana, T: Amanda Nix

Missoula, USMT50, Montana Science Fair

EGPH018  3D Printed Dimpled Wind Turbine Blade Designs
Hunter James Mashak, 18, Senior, Baker High School, Baker, Montana, T: Linda Rost

SOFT051  FASTCAT: A Predictive Neural Network Based Fire Size Classifier
Dylan Wichman, 17, Junior, Billings Central Catholic High School, Billings, Montana, T: Debora Wines

NEBRASKA

Curtis, USNE01, Central Nebraska Science and Engineering Fair

EAEV012T  The Effect of *Margaritifera margaritifera* on Nitrates in Hastings, NE
Tyler Jordan Slechta, 16, Sophomore, Tristan Weston, 16, Sophomore, Adams Central Jr.-Sr. High School, Hastings, Nebraska, T: Jay Cecrle T: Jay Cecrle

Nebraska City, USNE02, Greater Nebraska Science and Engineering Fair

EBED022  Predicting and Monitoring Collision in Helmets Using Microcontroller and Sensor Array
Daniel Patrick Stara, 18, Senior, Aquinas Catholic Middle High School, David City, Nebraska, T: Roy Emory

MCRO049  The Development of *Bacillus subtilis* as an Environmental Competitor for Bacterial Leaf Streak
Katie J. Bathke, 18, Senior, Allen Consolidated Schools, Allen, Nebraska, T: Marc Bathke

NEVADA

Elko, USNV01, Elko County STEM Fair

MAT051  The Use of Chicken Feathers as Fibers in Fiber Reinforced Concrete
Loulou Neff, 16, Sophomore, Elko High School, Elko, Nevada, T: Kristin Birdzell

ROBO036  Autonomous Maze Solving
John Watson, 17, Senior, Elko High School, Elko, Nevada, T: Kristin Birdzell

Las Vegas, USNV02, Southern Nevada Regional Science and Engineering Fair

CELL027  Effect of CYP3A Inhibitor Bergamottin on Androgen Receptor Signaling in Prostate Cancer Cells
Olapina Vetrichelvan, 17, Junior, Ed W. Clark High School, Las Vegas, Nevada, T: Sarah Cooper

ENVEV068  Is Larvae the Solution to Decreasing Plastic Waste?
Kirstin Taylor Springer, 14, Freshman, Coral Academy of Science Las Vegas, Henderson, Nevada, T: Khurmet Ayapanov
NEW HAMPSHIRE
Concord, USNH50, New Hampshire Science & Engineering Expo

CBIO033  Identification of Dysregulated Pathways Unifying Neurodegenerative Disease
Ayush Noori, 16, Junior, Phillips Exeter Academy, Exeter, New Hampshire, T: Shabnam Noori

ENEV059  Photocatalytic Oxidation Utilizing Doped Titanium Dioxide for Air Purification
Adyant Shankar, 17, Junior, Nashua High School South, Nashua, New Hampshire, T: Cynthia Pitkin

NEW JERSEY
New Brunswick, USNJ01, Nokia Bell Labs North Jersey Regional Science Fair

BMED028  Efficacy of Anti-Annexin 2 Antibodies on Retinal Neoangiogenesis in a Model of Oxygen-Induced Retinopathy
Angela Youn, 18, Senior, Tenafly High School, Tenafly, New Jersey, T: Anat Firnberg

ENBM026T  TremorWear: A Smart-Sensing, Device-Independent Tremor-Suppression Library for Wearable Tremor Orthoses
Alex Luotian Zhang, 17, Junior, Charles Ma, 16, Junior, Montgomery High School, Skillman, New Jersey, Montgomery High School, Skillman, New Jersey, T: Jason Sullivan

ENBM027  Design and Construction of a Cost-Effective Full Arm Prosthetic with Computer Vision
Noam Yakar, 15, Sophomore, Tenafly High School, Tenafly, New Jersey, T: Helen Coyle

ENMC042  Analysis of Laser Signal Disruption for Sensitive Compartmented Information Facilities via Oscillation of Reflecting Media
Sharmi Shah, 17, Senior, Colonia High School, Colonia, New Jersey, T: James Danch

MATH025T  On the Largest Axes-Parallel Rectangle among Points in a Square
Taeyang Park, 16, Sophomore, Seo Yeong Kwag, 16, Junior, Peddie School, Hightstown, New Jersey, Blair Academy, Blairstown, New Jersey, T: Dan Ismailescu T: Caren Standfast

ROBO056  Design and Analysis of Fast Algorithms for Interactive Machine Learning
Jagdeep Bhatia, 16, Junior, Watchung Hills Regional High School, Warren, New Jersey, T: Daniel Hsu

New Jersey City, USNJ02, Jersey City Medical Center/Barnabas Health STEM Showcase

CHEM042  Silk Fibrin as an Aqueous Coating Material for the Sustained Delivery of Hydrophilic Drugs
Amy Wahba, 17, Junior, Bayonne High School, Bayonne, New Jersey, T: Sandra Stamos

EAEV049  Large-Scale Field Testing of Stropharia Mycelium Buffer Strips for Harmful Algae Bloom Prevention, Year 5
Harshal Rajesh Agrawal, 17, Senior, Dr. Ronald E. McNair Academic High School, Jersey City, New Jersey, T: Jeremy Stanton

Lawrenceville, USNJ03, Mercer Science and Engineering Fair

CELL023  Optical Induction of Membraneless Organelles
Michelle Tong, 18, Senior, West Windsor Plainsboro High School North, Plainsboro, New Jersey, T: Holly Crochetiere

EAEV057  A Novel Method of Monitoring the Health of Our Global Fresh Water Supply Using DNA Barcoding of Chironomidae (Diptera)
Sonja MS Michaluk, 16, Junior, Hopewell Valley Central High School, Pennington, New Jersey, T: Karen Lucci

Hackensack, USNJ04, BCA Research Expo

BMED022  Cancer's Other Half: Limiting Metastasis by Restricting Blood Vessel Formation
Maiya Mao, 18, Senior, Bergen County Academies, Hackensack, New Jersey, T: Donna Leonardi
BMED023  Pif1 Gene Integration to Inhibit Telomerase Activation in Cancer
Maximilian Zhang, 16, Junior, Bergen County Academies, Hackensack, New Jersey, T: Donna Leonardi

Jason Ping, 17, Junior, Bergen County Academies, Hackensack, New Jersey, T: Donna Leonardi

NEW MEXICO
Albuquerque, USAI50, National American Indian Science and Engineering Fair
ENBM071  An Improved Inexpensive Closed-Loop Insulin Pump for Automatic Management of Types 1 and 2 Diabetes
###
Anna Quinlan, 17, Senior, Menlo-Atherton High School, Atherton, California, T: Rachel Richards

TMED053  Chaga Mushroom Extract as an Inhibitor of HNSCC Cell Migration
Victoria Kathryn Dushane, 18, Senior, Sherman Indian High School, Riverside, California, T: Helen Bonner

Albuquerque, USNM01, Central New Mexico Regional Science and Engineering Challenge
CELL039  Increasing Metabolic Substrates Improves Spreading Depolarization Recovery in a Brain Slice Model of Stroke: An Innovative Therapy for Reducing Brain Injury after Stroke
###
Rusty Ludwigsen, 18, Senior, Early College Academy, Albuquerque, New Mexico, T: Mark Walker

EGCH035  Comparing Heat Production between Corn Oil, Beef Lard and Plastic Based Diesel
Paulina Maria Naydenkov, 16, Sophomore, Albuquerque Institute for Math and Science, Albuquerque, New Mexico, T: Phillip Watje

MATH026  Classifying Magic Squares and Their Associated Symmetries Using a Chord Diagram Approach
##
AnaMaria Perez, 17, Junior, Albuquerque Academy, Albuquerque, New Mexico, T: Kevin Fowler

MCRO058  A Method for Water Purification Using Bacteriophage
#
George Walter Santarpia, 17, Junior, Albuquerque Institute for Math and Science, Albuquerque, New Mexico, T: Reginald Tyler

Farmington, USNM02, San Juan New Mexico Regional Science and Engineering Fair
BMED042  Cellular Perception: Analyzing and Translating the Impact of Cell Phone Radiation
Sydney Elise Gilbert, 17, Senior, Piedra Vista High School, Farmington, New Mexico, T: Gail Silva

EAEV035  Metals and Metalloids in Corn Detected with the Inductively Coupled Plasma-Mass Spectrometer
McKayla Taylor Gilbert, 16, Sophomore, Farmington High School, Farmington, New Mexico, T: Robert Watson

Grants, USNM03, Four Corners Regional Science and Engineering Fair
ANIM023  Nematode Caenorhabditis elegans: Population Growth Response to Various Sugar Solutions
Marisa Alianna Armijo, 16, Junior, West Las Vegas High School, Ribera, New Mexico, T: Erika Guaba-Roldan

ROBO028  Project Simon: Development of an Advanced Telerobotic System
##
Marc Miguel Mirabal, 18, Senior, Grants High School, Grants, New Mexico, T: Shelby Alexander

Las Cruces, USNM04, Southwestern New Mexico Regional Science and Engineering Fair
BEHA032  Emotional Interactive Storytelling Robots: An Interactive Design of an Upper Limb Motor Re-learning Method for Neurological Diseases
##
Mustafa Muhyi, 17, Las Cruces High School, Las Cruces, New Mexico, T: Rajaa Shindi

Las Vegas, USNM05, Northeastern New Mexico Regional Science and Engineering Fair
ANIM052  Varying Deer and Elk Population Over the Period of Two Years
Marisa Alianna Armijo, 16, Junior, West Las Vegas High School, Ribera, New Mexico, T: Erika Guaba-Roldan
ENEV082T  A Novel Computational Tool to Inform Cost-Effective Nutrition Interventions in Sub-Saharan Africa

## Lillian Kay Petersen##, 16, Junior, Garyk Jandl Brixi#, 18, Senior, Los Alamos High School, Los Alamos, New Mexico, Winston Churchill High School, Potomac, Maryland, T: Katie Tauxe T: Virginia Brown

Portales, USNM06, Southeastern New Mexico Regional Student Research Challenge

ENEV025  Using Calcium Chloride to Source Drinking Water in Arid Climates: H2O Absorption and CaCl2 Regeneration Rates in Relation to Desiccant Surface Area

Ryan . Helmer, 15, Sophomore, Jefferson Montessori Academy, Carlsbad, New Mexico, T: Kerrie Thatcher

Socorro, USNM50, New Mexico Science and Engineering Fair

ANIM054  Modeling the Effects of Invasive Species on Crocodilian Populations

# Karin Ruth Ebey, 15, Sophomore, Los Alamos High School, Los Alamos, New Mexico, T: Katie Tauxe

CBIO047  Protein Function Inference via Artificial Intelligence: Predicting Cancer-Related Gene Functions

# Charles S. Strauss, 16, Junior, Los Alamos High School, Los Alamos, New Mexico, T: Vladimir Gligorijevic

EAEV079  Tsunami Forecasting and Risk Analysis

Robert Russell Strauss, 14, Freshman, Los Alamos High School, Los Alamos, New Mexico, T: Mark Petersen

MATH043  Contradictions in the Banach–Tarski Paradox within Euclidean Space

## Xander Jones, 17, Navajo Preparatory School, Farmington, New Mexico, T: Yolanda Flores

ROBO040  A Game of Jamming: A Multi-Agent Game Theoretic Learning Based Cognitive Anti-Jamming Communication System to Combat an AI Jammer

Milidu Jayaweera, 14, Freshman, La Cueva High School, Albuquerque, New Mexico, T: Lena Eddings

NEW YORK

ANIM035  Habitat Preference Drives Brain Shape in Crocodylomorphs

Anthony Joseph D'Amore, 17, Senior, Smithtown High School East, St. James, New York, T: Maria Zeitlin

ANIM037  The Cardiovascular Effects of Electronic Cigarette Components on Daphnia magna: An Investigation into Decreased Heart Elasticity

Ian Carlson Bailey, 16, Sophomore, Garden City High School, Garden City, New York, T: Steven Gordon

BEHA034  The Novel Volumetric Quantification of the Chemobrain Phenomenon within a Pediatric Population

Jessica Michelle Goldstein, 17, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Raymond Tesar

BEHA035  Brain Inflammatory Responses Compromise NG2-Glial Homeostasis during Depression

# Matthew Mullahy, 18, Senior, Smithtown High School East, St. James, New York, T: Maria Zeitlin

BMED055  Negative Pressure Wound Therapy: Cancer Metastasis Stimulated by HIF-1ALPHA Regulated MALAT1 and SOX Cooperation

# Shruthi Shekar, 18, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

CBIO028  Meta-Analysis of Cancer-Related Gene Sets: Linking Craniosynostosis and Endometrial Cancer

Suchir Misra, 16, Junior, Jericho High School, Jericho, New York, T: Serena McCalla

CBIO035  Discretizing a Hybrid Cardiac Reconstruction: A Novel Simulation of Sustained Fibrillation

Arianna Pahlavan, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla
CELL031  Palbociclib Treated MDA-MB-231 Breast Cancer Cells Exhibit Increased Invasive Behavior in Zebrafish Xenograft Model
Matthew Ira Weltmann, 17, Senior, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

CELL032  EMT* Is Indispensable to Endothelial Cell Physiology during Pathological Angiogenesis
Madhav Subramanian, 18, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

EAEV038  Multidecadal Trends in Tropical Cyclone Behavior within Tropical North Atlantic Sub-basins
Kelsey Yan Ge, 17, Senior, Ward Melville High School, East Setauket, New York, T: Marnie Kula

EAEV042  Pretreatment of Brassica rapa with Pyrabactin Increases Tolerance to Drought Conditions
Yuktha Chiguripati, 17, Junior, W. Tresper Clarke High School, Westbury, New York, T: Erika Rotolo

EGCH029T Application of Electrospun Poly(acrylic acid)-Platinum/Carbon Catalyst Ink to Optimize Polymer Electrolyte Membrane Fuel Cell Performance
Danielle Kelly, 18, Senior, Audrey Shine, 18, Senior, Friends Academy, Locust Valley, New York, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Mark Alber T: Mary Lou O’Donnell

ENBM040  The Development of a Novel Prediction Model for Bipolar-I Disorder Utilizing Radiomic Analysis
Julia Catherine Brandenstein, 17, Senior, Plainview-Old Bethpage John F. Kennedy High School, Plainview, New York, T: Mary Lou O’Donnell

ENEV055T Optimizing the Removal of Methylene Blue from Aqueous Solution Using Cucurbita pepo and an Analysis of Desorption Efficiency and Material Reusability
Serena Zhao, 16, Junior, Samantha Chen, 15, Sophomore, Manhasset High School, Manhasset, New York, T: Alison Huenger

ENMC048  Designing a Universal Liquid 3-Dimensional Printer Utilizing a Novel Liquid Transport System
Jeffrey Yu, 17, Senior, Roslyn High School, Roslyn Heights, New York, T: Allyson Wesely

MATH029  An Analysis of Growth Rates in One-Dimensional Cellular Automata
Jared Steven Bank, 17, Senior, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

MCRO052T Investigating the Role of the Novel ESCRT-III Recruiter CCDC11 in HIV Viral Budding: Identifying a Potential Target for Antiviral Therapy

PHYS038  Disentangling Spatial Correlations from Inhomogeneous Materials with Shift-Invariant Artificial Neural Networks: A Novel Approach to Study Superconductivity
Kaylie Hausknecht, 17, Senior, Lynbrook Senior High School, Lynbrook, New York, T: David Shanker

ROBO038  Artificial Neural Network Based Target Localization Method for Multi-Static Passive Radar Systems
Sean Pak, 18, Senior, Commack High School, Commack, New York, T: Lorraine Solomon

TMED029  Hexokinase Domain Containing 1 (Hkdc1): A Metabolic Regulator of Nonalcoholic Fatty Liver Disease (NAFLD)
Caroline Yu, 17, Senior, Jericho High School, Jericho, New York, T: Serena McCalla

New York City, USNY03, New York City Science and Engineering Fair

BEHA039  A Neuromodulator Exerts Antagonistic Effects on the Network State of Aplysia californica
Lucian Aaron Dobroszycycki, 18, Senior, The Bronx High School of Science, Bronx, New York, T: JoAnn Gensert
BMED065 Prostate Carcinomas in African Americans Have Distinct miRNA Expression and Biological Markers for Poor Prognosis
Malhaar Agrawal, 17, Junior, Horace Mann School, Bronx, New York, T: George Epstein

CBIO040 Novel Analysis of the Growth of the Fetus: A Much Needed Method in the Precise Diagnosis of Microcephaly and Other Growth Diseases
Tahmid Uddin Ahamed, 18, Senior, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

CELL041 Identification of GREB1 as a Potential Mutant Estrogen Receptor Coactivator in Breast Cancer
Esther Shishin Chai, 16, Junior, Townsend Harris High School, Flushing, New York, T: Katherine Cooper

CHEM047 The Effects of a Silica Coating on the Aggregation of Gold Nanoparticles
Paige Lorna Sherman, 15, Sophomore, Hunter College High School, New York, New York, T: Gilana Reiss

EAEV052 Ash Me Again! Looking for U in All the Unusual Places at Golema Pest, Macedonia
Jialin Zhuo, 18, Senior, Bronx High School of Science, Bronx, New York, T: Bonnie Blackwell

EAEV064 Evaluating Severe Weather Prediction Methods from Thermodynamic Profiles
Maria Geogdzhayeva, 17, Junior, Hunter College High School, New York, New York, T: Philip Frankel

ENBM054 A Novel & Robust Computer Vision-Based Algorithm for Heart Rate Estimation Using Cameras
Mohammadou Ravane Gningue, 17, Senior, Bronx High School of Science, Bronx, New York, T: Vladimir Shapovalov

MATS047 Evidence of Gain in Cleaved Facet II-VI Quantum Well Structures through Photoluminescence Spectroscopy
Ange Marie Louis, 18, Senior, Brooklyn Technical High School, Brooklyn, New York, T: MaCrae Maxfield

MCRO064 Investigating the Role of Fusobacterium nucleatum in Esophageal Adenocarcinoma
Richard Peilin Han, 16, Junior, Horace Mann School, Bronx, New York, T: George Epstein

PHYS044 Tatooine Found! Discovery, Confirmation, and Characterization of the First-Ever Circumbinary Planet Detected Using Doppler Spectroscopy
# Brian Yikang Wu, 17, Junior, Horace Mann School, Bronx, New York, T: Jian Ge

ROBO053 WormBot: Mimicking Earthworm Locomotion
# Ari Joseph Firester, 16, Junior, Hunter College High School, New York, New York, T: Philip Frankel

SOFT052 Detecting Privacy Violations in Children's Apps Using HPCs
# Suha Sabi Hussain, 17, Senior, Queens High School for the Sciences at York College, Jamaica, New York, T: Jose Mondestin

Westchester, Putnam, Sullivan Counties, USNY05, Regeneron-Westchester Science and Engineering Fair

BEHA027 Sensory Integration in Adolescents with a History of Multiple Concussions
Giovanni Carmelo Santucci, 18, Senior, Ossining High School, Ossining, New York, T: Angelo Piccirillo

Kellen Cooks, 17, Senior, Ossining High School, Ossining, New York, T: Angelo Piccirillo

BEHA036 Evaluating the Relationship between Concussion Knowledge and Reporting Tendencies in High School Athletes
Joseph David Atherall, 17, Senior, Yorktown High School, Yorktown Heights, New York, T: Rachel Koenigstein
BMED040  Examining the Role of Transcription Factors, Nr4a1, Foxp1, and Olig2, in the Development of Medium Spiny Neurons from the Q175 Mouse Model of Huntington's Disease
Samantha Abbuzzese, 18, Senior, Byram Hills High School, Armonk, New York, T: Caroline Matthew

CBIO027T  Molecular Dynamics Approach to Pharmacophore Modelling of Mu Opioid Receptor Ligands and DAMGO
Janani Rajadurai, 18, Senior, Pooja Rajadurai, 18, Senior, Yorktown High School, Yorktown Heights, New York, T: Rachel Koenigstein

CELL020  Engineered Atstrin Protein Stabilizes Dysregulated Macrophage Polarization, Subsequent Osseous and Cartilaginous Tissue Remodeling in Ankylosing Spondylitis
Magdalene Ruth Ford, 18, Senior, Ossining High School, Ossining, New York, T: Valerie Holmes

CELL028  Enhancing Microtubule Dynamics with Fidgetin-Like 2 Depletion
Jed Katzenstein, 18, Senior, Dobbs Ferry High School, Dobbs Ferry, New York, T: Erica Curran

CELL036  Investigation of Aspects of Neuron Function in Schizophrenia Using hiPSC Cells
Ryan Michael Onatzevitch, 17, Senior, Yorktown High School, Yorktown Heights, New York, T: Michael Blueglass

CELL044  Proteasome Inhibitor A as an Alternative Medicine to Fumagilin in the Treatment of Nosema ceranae in Honey Bee Colonies
Sun Graham, 16, Junior, Somers High School, LincolnIndale, New York, T: William Maelia

ENEV064  Optimizing Thermal Hydrolysis for Increased Biogas Generation in Wastewater Treatment
Rachel Joseph, 18, Senior, Somers High School, LincolnIndale, New York, T: William Maelia

MATS043T  Characterization of a Novel Method for the in situ Deposition of Silver Nanoparticles on 3D-Printed Polylactic Acid to Synthesize an Anti-Bacterial Implant Material
Anastasia Popova, 18, Senior, Isha Brahmbhatt, 16, Junior, Hackley School, Tarrytown, New York, Ardsley High School, Ardsley, New York, T: Andrew Ying T: Diana Evangelista

MCRO032  Human Photosynthesis: Functional Chloroplast Sequestration in Human Mesenchymal Stem Cells
Brent Perlman, 17, Senior, Byram Hills High School, Armonk, New York, T: Stephanie Greenwald

MCRO057  The Antiviral Function of XAF1 during Immune Response
Cheryl Lynn Luo, 18, Senior, Yorktown High School, Yorktown Heights, New York, T: Rachel Koenigstein

SOFT042T  The Impact of an Interactive Mobile Application on the Quality of Cardiopulmonary Resuscitation
Adeel Arif, 17, Junior, Amber Arif, 17, Junior, Ardsley High School, Ardsley, New York, T: Diana Evangelista

TMED024  Priming the Tumor Microenvironment with Cyclophosphamide to Enhance Nanoparticle Delivery: An Imaging Study
Renner Kwittken, 18, Senior, Byram Hills High School, Armonk, New York, T: Stephanie Greenwald

Syracuse, USNY06, Central New York Science and Engineering Fair
ENEV085  Creating a Sustainable Engineering System for Urban Green Roof Drainage Irrigation via a Two-Way Heavy Metal Removal Mechanism Involving Photocatalytic Reduction and Phytoremediation
Jason Cho, 18, Senior, Fayetteville-Manlius High School, Manlius, New York, T: Gyu Leem

ROBO062  Enhancing Wind Power Predictions by Using Weather Data and Improving LSTMs
Maximilian Du, 16, Junior, Fayetteville-Manlius High School, Manlius, New York, T: Joshua Comden
TMED038  Investigating the Potentially Lethal Effects of Kratom When Combined with Over the Counter Medications and Readily Available Household Products on *Daphnia* Heart Rate to Mimic the Dangers of Teen Drug Fabrication and Abuse  
Jay D. Hunter, 17, Senior, Cato-Meridian, Cato, New York, T: Krista Kolodziejczyk

Troy, USNY07, Greater Capital Region Science and Engineering Fair, Inc.

BMED064  The Effect of 460 Nm Light on Seizure-Like Activity (SLA) in Bang-Sensitive *Drosophila* as Measured by Seizure Velocity, Distance Traveled and Seizure Duration  
Margaret Farr, 18, Senior, Saratoga Springs High School, Saratoga Springs, New York, T: Fran Lohnes

ENBM053  The Music Box: Control of Music through the Use of a SSVEP-Based Brain Computer Interface System  
Olivia Zhou, 17, Senior, Shaker High School, Latham, New York, T: Nathaniel Covert

ENBM060  Tomographic Thermometry with Color CT and Deep Learning to Guide HIFU Surgery  
Nathan Wang, 16, Junior, Shaker High School, Latham, New York, T: Nathaniel Covert

Utica, USNY08, Utica College Regional Science Fair

CHEM039  From Juice to Water: Using Organic Chemistry Techniques to Extract the Water from Watermelon Juice  
Ruqiyah Saleha Shaik, 18, Senior, Rome Free Academy, Rome, New York, T: Fumin Pan

Rochester, USNY09, Terra Rochester Finger Lakes Science & Engineering Fair

BCHM028  Detection of Lung Cancer Biomarkers: A Catalytic Assay Strategy Based on Gold Alloy Nanoparticles  
Jerry Hou, 16, Junior, Corning-Painted Post High School, Corning, New York, T: Jane Li

Buffalo, USNY11, Western New York Regional Science and Engineering Fair

BMED062  Study of the Juul E-Cigarette through Investigation of Factors which Contribute to Popularity  
#  
Liam-Gavin Dell, 16, Sophomore, City Honors School, Buffalo, New York, T: Todd Richards

St. Bonaventure, USNY12, Twin Tiers Regional Science Fair

MATS056  Aluminum SiO$_2$ Coated Optical Mirror Deterioration with Epoxy Resin  
Shayla Elizabeth Wilhelm, 17, Junior, Portville Central School, Portville, New York, T: Robert Stives

Potsdam, USNY13, Terra North East Regional Science and Engineering Fair

ENEV066  Novel Bioremediation of Plastic Straws and Cigarette Filters by Wax Worms (*Galleria mellonella*)  
Roger Lyman Dezotell, 16, Junior, Ausable Valley Middle High School, Keeseville, New York, T: Danielle Garneau

Queens, USNY50, New York State Science and Engineering Fair

BCHM033  Characterizing the Role of Nuclear Flap Endonuclease 1 as a Mitochondrial Long Patch DNA Base Excision Repair Enzyme *in vitro*  
#  
Tong Ye, 17, Junior, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

BCHM036  Amino Acid Residue-Specific Interaction between gC1qR and Cytotoxic Peptides of Various Pathogenic Microorganisms with Homology to HIV-1 gp41 35  
Chidera Adaolisa Odelia Ejikeme, 17, Senior, Half Hollow Hills High School West, Dix Hills, New York, T: Berhane Ghebrehiwet

BMED070  Segmentation of Lung Lobe Structures using a Novel Artificial Intelligence Framework for Precise Lung Cancer Radiation Therapy  
Shriila Tushar Shah, 18, Senior, Yorktown High School, Yorktown Heights, New York, T: Michael Blueglass

BMED071  The Identification and Characterization of PRDM1 Co-factors in HEK Cells  
Melissa Ann Pittard, 17, Senior, Paul D. Schreiber High School, Port Washington, New York, T: Marla Ezratty
CELL053T  CCDC11 Regulates Efficient Midbody Recruitment of Ist1 Suggesting Impaired Organization of ESCRT Machinery
# Jillian Emma Parker, 17, Senior, Jiachen Elizabeth Lee, 18, Senior, Arooba Ahmed, 17, Senior, Half Hollow Hills High School West, Dix Hills, New York, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

CELL054  The Executioner Protein: Targeting BAX to Induce Apoptosis in Anaplastic Thyroid Cancer Cells
Francesca Rosemary Di Cristofano, 18, Senior, Pelham Memorial High School, Pelham, New York, T: Efstatios Beltecas

EAEV065  U-Pb Geochronology of Fluid Flow Events in the Barstow Formation, California
Ethan Jacob Sontarp, 17, Junior, Commack High School, Commack, New York, T: Jeanette Collette

EBED036  Development of a Flexible Durometer Sensor for Improving Hardness Tactile Modality Using Piezoelectric Polymers
Carrie Hsu, 16, Junior, Herricks High School, New Hyde Park, New York, T: Renee Barcia

EGPH023  Analytical Interpretations of Geophysical Fluid Mechanics in Coaxial Borehole Heat Exchangers and Respective Applications
Richard Thompson Lee, 17, Senior, Manhasset High School, Manhasset, New York, T: Alison Huenger

MATH038  A Trust Model in Bootstrap Percolation
Rinni Bhansali, 18, Senior, Half Hollow Hills High School East, Dix Hills, New York, T: Michael Lake

MATH039  Modifying the Tau-Value to Better Approximate Player Value in Cooperative Games
Joseph Melkonian, 18, Senior, Paul D. Schreiber High School, Port Washington, New York, T: Marla Ezratty

MATS076  The Effect of Bentonite Clays and Nanoclays on the Fresh and Hardened Properties of Cement and Concrete for Applications in 3D Cement Printing (3DCP)
Iyinoluwa Martin Tugbobo, 17, Senior, Elmont Memorial Junior-Senior High School, Elmont, New York, T: Michelle Flannory

MCRO071  Metal and Hyperglycemia-induced Neurotoxicity using a Caenorhabditis elegans RAGE Model
Michael Justin Alexander Lawes, 18, Senior, Elmont Memorial Junior-Senior High School, Elmont, New York, T: Michelle Flannory

PLNT061  Identifying Differential Expression and Conserved Alternative Splicing (AS) Events in Zea mays (Maize)
Pragati Muthukumar, 18, Commack High School, Commack, New York, T: Jeanette Collette

NORTH CAROLINA
Charlotte, USNC01, Charlotte-Mecklenburg Regional Science Fair

EAEV011  Bioremediation of Wastewater—Effect of Algae in Bioremediation of Nitrate and Phosphate Content in Wastewater
Hrishika Roychoudhury, 14, Freshman, Ardrey Kell High School, Charlotte, North Carolina, T: Matthew Welch

ENMC013  Sweatshirt: Fabric Biofuel Cells for Energy Harvesting from Perspiration
Rohit Nemani, 17, Senior, Cox Mill High School, Concord, North Carolina, T: Marsha Robeson

Durham, USNC02, North Carolina Central Region III Science Fair

MATS012  Get a Grip: Creating Soft Robotic Grippers via Self-folding by Infrared Activation
Ana Ratanaphruks, 17, Junior, Wake STEM Early College High School, Raleigh, North Carolina, T: William Burgess

Durham, USNC03, North Carolina Science Fair Region 3B

EGCH002  Titanium Dioxide Nanoparticle Coatings May Be Used to Coat Solar Panels to Make Them Safer for Birds
Michael Li, 17, Senior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Michael Bruno
TMED006 Battling Blindness in Premature Babies: An Image Processing and Machine Learning Based Application for Early Detection and Prevention of Retinopathy of Prematurity
Ishaan Maitra, 17, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Kimberly Monahan

ANIM045T The Sixth Sense: Evaluation of Magnetoreception in Culex quinquefasciatus for Potential Mosquito Control
Hunter Chase Bishop#, 18, Senior, Fritz Alexander Ruppert#, 16, Junior, Brevard Senior High School, Brevard, North Carolina, T: Jennifer Williams

BEHA041 Analyzing and Evaluating Pupillary Diameter In Migraine Patients and Nonheadache Patients Under the Effect of Light Stimuli
Akshra Premnarasu Paimagam, 16, Sophomore, Myers Park High School, Charlotte, North Carolina, T: Premnarasu Paimagam

CHEM046 Synthesis of Silver Compounds with Potential Anti-Cancer Activity: Silver(I) Complexes with Xylyl-Substituted Heterocyclic Thiones and Selones
Aakriti Lakshmanan, 15, Sophomore, Ardrey Kell High School, Charlotte, North Carolina, T: Matthew Welch

EAEV059T The Bioaccumulation, Toxicity, and Electrical Discharge Plasma-Treatment of the Emerging Perfluorinated Contaminant, GenX
Uma Loh Volety, 14, Freshman, Elizabeth Grace Kinsey, 18, Senior, John T. Hoggard High School, Wilmington, North Carolina, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Ai Ning Loh

EGCH034T The Effectiveness of Local Photosynthetic Aquatic Microorganisms in Biophotovoltaic Solar Cells
Ada Noel Weaver, 15, Sophomore, Marli Brooke Cohen, 16, Sophomore, Brevard Senior High School, Brevard, North Carolina, T: Jennifer Williams

ENBM055 A Novel Multimodal Wearable Sensor System for Continuous Monitoring of Chronic Diseases
Jason Li, 17, Junior, North Carolina School of Science and Mathematics, Durham, North Carolina, T: Kimberly Monahan

ENMC060T Fungi Strength

MCRO065T Antifungal Activity of Bacteria Isolated from the Endangered Green Salamander, Aneides aeneus
Nicole Marisha Rideout#, 18, Senior, John Van Nguyen#, 18, Senior, Brevard Senior High School, Brevard, North Carolina, T: Jennifer Williams

PHYS050 Glue Busters II: The Effects of Accelerated Cure Time on the Ultimate Shear Strength and Efficiency of CA and PVA Glue
Kaitlyn Lee Zuravel, 15, Freshman, Terry Sanford High School, Fayetteville, North Carolina, T: Deborah Vajner

PLNT054 A Method of Utilizing Nutrients from Martian Resources for Use in a Hydroponic Plant System
Isaiah James Lefler, 16, Sophomore, Brevard Senior High School, Brevard, North Carolina, T: Jennifer Williams

ROBO064T Optimizing Cell Quantification in Biological Assays Using a Convolutional Neural Network
Varun Rajesh Pai, 17, Senior, Vineel Parashar Vanam, 17, Senior, Vatsal Varma, 18, Senior, Ardrey Kell High School, Charlotte, North Carolina, T: Stephanie Sayward

SOFT053 Computational Models and Algorithms for Dynamic Resource Distribution
Dev Mayur Chheda, 15, Sophomore, Ardrey Kell High School, Charlotte, North Carolina, T: Mayur Chheda

NORTH DAKOTA
Mandan, USND01, Southwest Central North Dakota Regional Science and Engineering Fair

BCHM034 Fats: How Much Fats Are in Your Food?
Halle Rivinius, 15, Freshman, Grant County High School, Elgin, North Dakota, T: Megan Maier
<table>
<thead>
<tr>
<th>BEHA043</th>
<th>The Public Perception of Meat Labeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbigale Elaine Steeke, 18, Senior, Scranton Public School, Scranton, North Dakota, T: Andrew Burch</td>
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</tr>
</tbody>
</table>

*Fargo, USND03, Southeast North Dakota Regional Science and Engineering Fair*

<table>
<thead>
<tr>
<th>EAEV053</th>
<th>An Analysis of Microbial Reductions Methods for Lake Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerson Anna Falk, 16, Sophomore, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha</td>
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<table>
<thead>
<tr>
<th>TMED049</th>
<th>A New Method to Study the Human Microbiome</th>
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</thead>
<tbody>
<tr>
<td>Isabelle Louise Chambers, 16, Junior, Woodhaven Academy, Fargo, North Dakota, T: Victoria Chambers</td>
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</tbody>
</table>

*Jamestown, USND04, Southeast Central North Dakota Science and Engineering Fair*

<table>
<thead>
<tr>
<th>PHYS052</th>
<th>Electromagnetic Braking: Efficiency Relative to Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bryce William Goettle, 18, Senior, Ashley Public School, Ashley, North Dakota, T: Lucas Moldenhauer</td>
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<tr>
<th>ROBO071</th>
<th>KEVAN: Kevan the Efficient Videogame-Playing Artificially Intelligent Neural Network</th>
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<tbody>
<tr>
<td>Megan Dean Beyer, 17, Junior, Litchville-Marion High School, Marion, North Dakota, T: Peter Sykora</td>
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*Grand Forks, USND05, Northeast North Dakota Regional Science and Engineering Fair*

<table>
<thead>
<tr>
<th>EAEV066</th>
<th>Saving Our Seas: A Solid Solution to Reducing Carbon Dioxide and Ocean Acidification</th>
</tr>
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<tbody>
<tr>
<td>Alyssa Mae Kemp, 17, Senior, Cavalier Public High School, Cavalier, North Dakota, T: LuAnn Kemp</td>
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*Williston, USND06, Northwest North Dakota Regional Science Fair*

<table>
<thead>
<tr>
<th>EAEV070</th>
<th>(H₂O) Oh My!</th>
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<tbody>
<tr>
<td>Mikayla Grace Wolfe, 18, Senior, Tioga High School, Tioga, North Dakota, T: Debra Moe</td>
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<table>
<thead>
<tr>
<th>EAEV072</th>
<th>The Environmental Impact of Sodium in Nature</th>
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<tbody>
<tr>
<td>Bryan Martinez, 17, Junior, Trenton High School, Trenton, North Dakota, T: Bob Turcotte</td>
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<tr>
<th>ENMC069</th>
<th>A Safer Pipeline Design</th>
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<tbody>
<tr>
<td>Brody Richard LaRoque, 17, Junior, Trenton High School, Trenton, North Dakota, T: Bob Turcotte</td>
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*Grand Forks, USND50, North Dakota State Science and Engineering Fair*

<table>
<thead>
<tr>
<th>BMED086</th>
<th>Epigenetic Targets in Longevity Control in Drosophila melanogaster (Common Fruit Fly)</th>
</tr>
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<tbody>
<tr>
<td>Shrimayi Nikhil Patel, 15, Sophomore, Red River High School, Grand Forks, North Dakota, T: Lorraine O’Shea</td>
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<thead>
<tr>
<th>ENEV065</th>
<th>An Application of Titanium Dioxide Coatings to Reduce Nitrogen Oxides</th>
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<tbody>
<tr>
<td>Abigail Renae Post, 15, Sophomore, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha</td>
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<tr>
<th>PLNT050</th>
<th>Using Soil Enhancements to Increase Zea mays Profitability in Limited Production Agricultural Areas</th>
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<tbody>
<tr>
<td>Emma Pearl Kratcha, 15, Freshman, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha</td>
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**OHIO**

*Athens, USOH01, Southeastern Ohio Regional Science and Engineering Fair*

<table>
<thead>
<tr>
<th>BMED051</th>
<th>Computational Screening of Small Molecules for Antibacterial Agents that Target T-Box Riboswitches</th>
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<tbody>
<tr>
<td>Shifra Rajani Narasimhan, 16, Senior, Athens High School, The Plains, Ohio, T: Andrea Anderson</td>
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*Cleveland, USOH02, Northeastern Ohio Science and Engineering Fair*

<table>
<thead>
<tr>
<th>EGCH033</th>
<th>Investigation of Thin-Film Silver as Top Electrode Material for Transparent Organic Solar Cells</th>
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<tbody>
<tr>
<td>Jing-Jing Shen, 17, Senior, Beachwood High School, Beachwood, Ohio, T: Genevieve Sauve</td>
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<tr>
<th>MATS054</th>
<th>Honeycomb Structures as a Helmet Liner Material: Use of Artificial Neural Network Modeling to Predict Helmet Liner Safety for Known and Experimental Helmet Liner Materials</th>
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<tbody>
<tr>
<td>Garrett Blum, 17, Junior, University School, Chagrin Falls, Ohio, T: Sara Laux</td>
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<tr>
<td>Code</td>
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<tr>
<td>PLNT026</td>
<td>Impact of Different Chemicals on Plant Types</td>
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<tr>
<td>SOFT033</td>
<td>Mobile Application to Facilitate the Transmission and Interpretation of Biometric Data to Enable the Early Detection of Cardiovascular Disease</td>
</tr>
<tr>
<td>BEHA022</td>
<td>Effect of Bilingualism on Stroop Interference</td>
</tr>
<tr>
<td>ENMC039</td>
<td>EXFA on the Fly: Testing the In-Air Performance of the EXtended Flaps and Airbrakes (EXFA) System</td>
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<tr>
<td>MCRO030</td>
<td>Improved Efficacy of Sulfadimethoxine with Herbal Supplements to Inhibit the Growth of Paramecium aurelia</td>
</tr>
<tr>
<td>CHEM029</td>
<td>Improving Affinity-Based Drug Delivery with Convenient Computational Models</td>
</tr>
<tr>
<td>MATS035</td>
<td>Thrombus-Directed Drug Delivery Systems for Targeted Fibrinolysis</td>
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<tr>
<td>TMED032</td>
<td>Site-Specific Delivery of Immune Agonists for Antitumoral Response of the Tumor Microenvironment</td>
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<tr>
<td>ANIM031</td>
<td>The Prevalence of Cryptosporidium in Various Ages of Calves</td>
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<tr>
<td>EAEV032</td>
<td>A Survey of Lichen Diversity in Fulton County OH Cemeteries and Spectrophotometric Analysis for Use as Air Quality Indicators, Year Two</td>
</tr>
<tr>
<td>CBIO046T</td>
<td>Segmenting CT Slices: Optimizing Lesion Detection through Mask Region-based Convolutional Neural Networks</td>
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<tr>
<td>ENEV070</td>
<td>Mechanism Leveraging eWaste to Enhance Water Condensation through Effective Use of Solid State Magneto-Caloric Thermal Cooling</td>
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<tr>
<td>CBIO041</td>
<td>An in silico Approach to Study Bacteria Protein Determinants of Antibiotic Resistance</td>
</tr>
<tr>
<td>CBIO042</td>
<td>A Novel Design for Investigating Cell Deconvolution Methods for Tumor Microenvironment</td>
</tr>
<tr>
<td>CELL046</td>
<td>tRNA Dynamics between the Nucleus and Cytoplasm</td>
</tr>
</tbody>
</table>
EAEV067 Thermodynamics: Analysis of Wildfire Ash, and the Melting Effect on Alaska's Mount Hunter
Leena Vyas, 17, Senior, Tippecanoe High School, Tipp City, Ohio, T: Annette Malott

EGPH017 The Effect of Cadmium Telluride Thickness on the Current and Voltage Output of Thin-Film Solar Cells
Prashamsa Koirala, 14, Freshman, Ottawa Hills Junior/Senior High School, Ottawa Hills, Ohio, T: Jeremy Nixon

ENEV072T Optimizing Hydrogels in Cosmetics: Creating Effective Self-Assembled Nanostructures Coupled with an Antioxidant-Rich and High SPF Pollution-fighting Soybean Oil Cream
Arvind Prasad, 15, Sophomore, Govind S. Nadathur, 16, Sophomore, Sycamore High School, Cincinnati, Ohio, T: Beth Quinones T: Julie Haverkos

OKLAHOMA

Alva, USOK01, Northwestern Oklahoma State University Regional Science Fair

CHEM044 Comparison Methods of Food Storage
Kirstin Paige Parkhurst, 18, Senior, Northwest Technology Center, Fairview, Oklahoma, T: Shawn Cusack

PLNT051 Death by Black Walnuts
Kynsie Renae Wallace, 18, Senior, Northwest Technology Center, Fairview, Oklahoma, T: Shawn Cusack

Bartlesville, USOK02, Bartlesville District Science Fair

CHEM014 Distillation as a Method of Wastewater Treatment
Kathryn Ann McIntyre, 15, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman

EAEV018 Big Problem, Tiny Solution: Is Nanotechnology the New Oil Spill Clean Up Solution?
Maha Mohsen Achour, 16, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman

ENMC019T Cracking Under Pressure
Bryce Adley Goodin, 15, Sophomore, Colton Micheal McCullough, 16, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman

Miami, USOK04, Northeastern Oklahoma A&M Science and Engineering Fair

TMED011 Characterizing Matcha Green Tea as an Anti-Cancer Agent
Michael Ken-iong Hwang, 17, Junior, Jenks High School, Jenks, Oklahoma, T: Erica Conness

Muskogee, USOK05, Muskogee Regional Science and Engineering Fair

ENMC032 An Innovative Hybrid Diffusion Burner Design for NOx Reduction in High Temperature Applications, Year Three of an Ongoing Study
Brendan Joseph Crotty, 17, Junior, Hickory Hill Academy Homeschool, Muskogee, Oklahoma, T: Jennifer Crotty

Ada, USOK07, East Central Oklahoma Regional Science and Engineering Fair

EGCH016 Optimizing Bioethanol Production from Eastern Red Cedar Sawdust
Landon K. Estes, 17, Junior, Latta High School, Ada, Oklahoma, T: Julie Bruner

Wilburton, USOK09, Eastern Oklahoma Regional Science & Engineering Fair presented by The Community State Bank

ENEV027 SymBead Aquatic Technologies: The Development of a Low-Impact, Cost-Effective, Multi-Pollutant Bioremediation System
Braden Nicholas Milford, 17, Senior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Sally Fenska

Stillwater, USOK50, Oklahoma State Science and Engineering Fair

CHEM049T The Development of an Innovative Systemic Catalytic Mechanism for the Removal of Free Radicals Associated with Colorectal Cancer
Jaxon Riley Henderson, 17, Junior, Jackson Elliott Pool, 17, Junior, Zachary John Uhren, 17, Junior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Sally Fenska

MCRO072 The Effects of a Simulated Mars Environment on the Primary Productivity of Select Cyanobacteria
Olivia Nalley, 17, Junior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Sally Fenska
MCRO088T  The Effect of Vitamin D3 and Vitamin D3+ on the Resistance of Various Antibiotics to Gram-Negative and Gram-Positive Bacteria
Caitlin Thao Nguyen, 16, Junior, Sophie Rae Pazzo, 17, Junior, Cascia Hall Preparatory School, Tulsa, Oklahoma, T: Sally Fenska

ROBO063  The Next Artificial Intelligence Revolution: AI Making Decisions without Human Models or Knowledge of Rules to Create Completely Independent Solutions
Michael Norman Brockman, 16, Sophomore, Bartlesville High School, Bartlesville, Oklahoma, T: Gary Layman

OREGON
Gresham, USOR01, Gresham-Barlow Science Expo
ENBM018  A Novel Nanomaterial as a Multifunctional Contrast Agent for Targeted X-ray and Fluorescent Biomedical Imaging
Arjun Jain, 16, Junior, Catlin Gabel School, Portland, Oregon, T: Joey Grissom

ENMC031T  Cubitum Viribus: How Does the Angle of Rotation of the Mechanical Arm Affect Torque and Load Capacity?
Ethan Matthew Vang, 17, Junior, Logan Michael Hall, 17, Junior, Deepshay Prithivi Ray, 17, Junior, Gresham High School, Gresham, Oregon, T: Stephen Scannell

MATS021  Development of MicroCT Techniques for Quantifying Thrombus Formation in Cardiovascular Biomaterials
Avi Gupta, 17, Senior, Catlin Gabel School, Portland, Oregon, T: Joey Grissom

Portland, USOR02, Portland Public Schools Science Expo
CELL043  Characterization of the Role of Catalases in Hydroxyurea Toxicity and Their Potential as Novel Chemotherapeutic Targets
Natalie Eajia Wang, 16, Junior, Lincoln High School, Portland, Oregon, T: Nathan Watson

ENMC033  Determining the Drag Coefficient of the Falcon 9 Block 5 Rocket
Tyler Huntington Mapes, 17, Junior, Franklin High School, Portland, Oregon, T: Merritt Sansom

Hillsboro, USOR04, Beaverton-Hillsboro Science Expo
CBI0005  Tracing Cell Lineages from Single-Cell Data Using Markov Affinity Estimation
Lauren Hsing-Tze Li, 18, Senior, Westview High School, Portland, Oregon, T: Debbie Cooper

ENBM007  A Novel Optical Diagnostic Method for Non-Invasive Detection of Blood Glucose Using Reverse Iontophoresis Modulation and Personalized Neural Networks
Rohan Ahluwalia, 17, Junior, Westview High School, Portland, Oregon, T: Debbie Cooper

MATH013  Applied Mathematical Modeling of Continuous Dynamic Systems of Fluids in Pipe Flows
Anne Mae DeForge, 17, Senior, Liberty High School, Hillsboro, Oregon, T: Steffan Ledgerwood

PORTLAND, USOR05, Aardvark Science Exposition
ANIM017  Gait Analysis of Periplaneta americana Cockroaches Exposed to Limonene
Sophie Chen, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Peter Langley

BEHA013  A Study of the Speech-to-Song Illusion
Eric Lian, 17, Sophomore, Oregon Episcopal School, Portland, Oregon, T: Bevin Daglen

EAEV010  The Role of Fluorescent Pigments in Protecting Zooxanthellae
Emma Wetsel, 16, Junior, Oregon Episcopal School, Portland, Oregon, T: Peter Langley
ENMC014  Development of a Fully Reusable and Autonomously Landing Suborbital Launch Vehicle  
##  Ryan Steven Westcott, 17, Junior, Oregon Episcopal School, Portland, Oregon, T: Peter Langley

TMED025  Diagnosis of Various Diseases Using Neural Network Classification Based on Retinal Fundus Images  
#  Aneesh Gupta, 17, Senior, Oregon Episcopal School, Portland, Oregon, T: Owen Gross

Wilsonville, USOR06, CREST–Jane Goodall Science Symposium

EBED016T  SkyHound: a Low-Cost 3D Printed Autonomous WiFi Tracking Search Drone to Locate Missing Victims of Natural Disasters  
Pooja Jain, 18, Senior, Neel Jain, 15, Sophomore, West Linn High School, West Linn, Oregon, T: Michael George

ENBM020T  A 5th Generation CAR T-Cell: MicroRNA Guided Radiogenetics for T-Cell Engineering  
Marlee Feltham#, 18, Senior, Rishima Mukherjee#, 17, Senior, West Linn High School, West Linn, Oregon, T: Nancy Monson

Wilsonville, USOR06, CREST–Jane Goodall Science Symposium

MATSO22  Acrylate Polymerization: Formation of UV Curable Antimicrobial Copolymers  
##  Nathan Tidball, 17, Senior, Wilsonville High School, Wilsonville, Oregon, T: Jim O’Connell

SOFT023  A Deep Learning-Based Drowning Detection Method for Dynamic Swimming Pool Environments Using Spatiotemporal Neighborhood Analysis  
#  Jessica Mengxin Yu, 17, Senior, West Linn High School, West Linn, Oregon, T: Danielle Grenier

Salem, USOR07, Central Western Oregon Science Expo

BEHA025  Vaccine Hesitancy and the Web: An Analysis of Online Resources Cited by Vaccine Hesitancy Blogs  
#  Sophia Alexandra Hawley, 17, Senior, West Salem High School, Salem, Oregon, T: Jonathan Williams

MRCRO014  Implications for Biogas Energy Use via Methanogenesis in Mars Conditions  
Alexandria Soren Montgomery, 18, Senior, West Salem High School, Salem, Oregon, T: Jonathan Williams

Bend, USOR08, Central Oregon Community College Regional Science Expo

EGCH043  Aluminum, Batteries, and Carbon  
Jacob Jiaxu Zhao, 16, Sophomore, Bend Science Station, Bend, Oregon, T: David Bermudez

Portland, USOR50, Intel Northwest Science Expo

BMED087T  Reverse Testing Chemotherapies on Drosophila Models to Determine Protein–Kinase Pathways Affected by Hypertrophic Cardiomyopathy  
#  Aditya Sood, 15, Freshman, Himani Sood#, 18, Senior, Westview High School, Portland, Oregon, T: Debbie Cooper

CELL059  Direct Evolution of Antibody Fragments Targeting CD32a for Application in Immunotherapy to Eradicate HIV Latency  
Long Thang Ngo, 18, Senior, Oregon Episcopal School, Portland, Oregon, T: Ryan Holland

ENEV086  Designing an in situ Soil Conductivity Monitoring System for Precision Agriculture and Water Management  
#  Rohan Mahesh Wagh, 17, Junior, Sunset High School, Portland, Oregon, T: Korin Riske

PHYS061  Implementing Quantum Dot Qubits in Optimized Linear Quantum Computing Architectures through Evolutionary Computational Modeling  
Lucas Braun, 16, Sophomore, School of Science & Technology, Beaverton, Oregon, T: Melissa Shell

PLNT075  Historic Spatial Arrangement and Potential Fire and Disease Risk Reduction in Coastal Forests  
Samuel Hooley, 18, Senior, Tillamook High School, Tillamook, Oregon, T: Claire Thomas
SOFT062  Non-Periodic Pseudo-Random Number Generator Using Sinai Billiards
Advay Koranne, 17, Junior, Catlin Gabel School, Portland, Oregon, T: Joseph Grissom

PENNSYLVANIA
Harrisburg, USPA01, Capital Area Science and Engineering Fair
EAEV024  Beetles Beware: Effects of Various Biopesticides on Callosobruchus maculatus Behavior
Adele Rose Shirmer, 18, Senior, Susquenita High School, Duncannon, Pennsylvania, T: Kathleen Becker
ENBM031  A Step Towards Solving Foot Pain: A Revolutionary Shoe with Magnetic Levitation to Reduce Ground Reaction Force
Dev Lochan, 16, Sophomore, Cumberland Valley High School, Mechanicsburg, Pennsylvania, T: Michael Floreck
ENMC038  Aerodynamic Bicycle
Christian James Gasdaska, 17, Junior, Susquenita High School, Duncannon, Pennsylvania, T: Kathleen Becker
ROBO030T  Developing and Simulating Self-Driving Car A.I. for a Crash Free Autonomous Intersection
Liam Greyson Douglas, 17, Junior, Alec Timothy Warren#, 18, Senior, Harrisburg Academy, Lemoine, Pennsylvania, T: Lakshmi Shrikantia

Lancaster, USPA02, North Museum Science and Engineering Fair
CBIO032  Investigation of Protein Tertiary Structure and Intermolecular Forces of Ligand Associations through Computer Modeling
Logan Tyler Vogelsong, 18, Senior, Elizabethtown Area High School, Elizabethtown, Pennsylvania, T: Theresa Swenson
ENBM039  Bioelectric Potential Telemetry: Detection, Measurement and Application
Gaurav Mittal, 16, Junior, Manheim Township High School, Lancaster, Pennsylvania, T: Anjan Mittal

Philadelphia, USPA03, Delaware Valley Science Fairs
ANIM053  The Effect of Chronic Exposure to Artificial Light at Night on the Development & Fecundity of Manduca sexta
Carolyn M. Almonte, 15, Sophomore, Burlington Township High School, Burlington, New Jersey, T: Sherita Singleton
BCHM037  Exploring the Biomechanics of Red Blood Cells: Paving the Way to Efficient and Physiological Modeling of Erythrocytes in Shear Flow
Prathysha Oliveira Kothare, 16, Sophomore, Parkland High School, Allentown, Pennsylvania, T: Michael Post
BEHA051  Testing of the Future: Should Standardized Tests Be Taken on Paper or Online?
Zoe Jasmine Frantz, 17, Junior, Avon Grove High School, West Grove, Pennsylvania, T: Gretchen Young
CBIO048  Drugs to Defeat Diabetes: Comparing Diabetes Drug Treatment Efficacy after Metformin Using Big Data
Flavien Paul Moise, 15, Freshman, Council Rock High School North, Newtown, Pennsylvania, T: Therese Grateful
EAEV084  Evaluating Pollution Concentrations with a Drone
Matthew Sparling, 15, Freshman, Penncrest High School, Media, Pennsylvania, T: Jay Sparling
EBED041  midiKEY: A Novel Low Cost Resistive Soft Crochet Stretch Sensor as Applied to a Wearable Bluetooth Keyboard Text Input Device
Amanda Shayna Ahteck, 17, Senior, Holmdel High School, Holmdel, New Jersey, T: Josephine Blaha
ENEV100  Nature’s Water Filters: The Impact of Temperature on the Filtration Efficiency of Mussels
Maria Josefinar Karakousis, 14, Freshman, Julia Reynolds Masterman Laboratory and Demonstration School, Philadelphia, Pennsylvania, T: Kathleen Tait
ENMC073  Multi-Terrain Robot
MATS075  Heat Loss through a Wall Made with Optimum Insulating Bricks  
Isha Mohapatra, 18, Senior, Moravian Academy, Bethlehem, Pennsylvania, 
T: Gaby Dee

MCRO080  The Effect of Endocytosis Altering Substances on Vacuole Formation in Tetrahymena  
Caden Traversari, 15, Junior, Springside Chestnut Hill Academy, Philadelphia, Pennsylvania, 
T: Scott Stein

MCRO084T The Antimicrobial and Antibiotic Activity of the Local Flora from Camden County against Aerobic Activity  

PLNT070  Algal Fertilizer: Enhancing American Beachgrass Growth on Dunes  
Claudia C. Schreier, 18, Senior, Marine Academy of Technology and Environmental Science, Manahawkin, New Jersey, T: John Wnek

MCRO059  Identification and Characterization of Freshwater Vibrio Phages from Pittsburgh, Pennsylvania  
Rachel Feihan Bina, 16, Sophomore, North Allegheny Senior High School, Wexford, Pennsylvania, T: Bruce Allen

MCRO060  Serum Marker of Glyphosate Exposure Associated with Changes in Oral and Gut Microbiome Composition  
Aria Rosalee Eppinger, 17, Junior, Winchester Thurston School, Pittsburgh, Pennsylvania, T: Graig Marx

MCRO063  Antimicrobial Properties of Skin Secretions from Salamanders  
Jakobi Tosani Deslouches, 18, Senior, Pittsburgh Allderdice High School, Pittsburgh, Pennsylvania, T: Janet Waldeck

ROBO057  Horus: Using Sensor Fusion to Combine Infrastructure and On-Board Sensing to Improve Autonomous Vehicle Safety  
Sanjay Seshan, 16, Sophomore, Fox Chapel Area High School, Pittsburgh, Pennsylvania, T: Annette Sparrow

TMED037  Serotonin and Cortisol Response in Relation to Ashwagandha Root Treatment in C. elegans: A Model Organism for Antidepressant Studies  
Ellie Marie Chibirka, 18, Senior, Conrad Weiser High School, Robesonia, Pennsylvania, T: Adelle Schade

RHODE ISLAND  
Warwick, USRI50, Rhode Island Science and Engineering Fair

BMED032  Ending the EpiPen Epidemic: Creating an Intestinal Organoid to Understand the Immune Mechanisms Involved in a Peanut Allergy  
Isabella Heffernan, 15, Sophomore, Saint Mary Academy Bayview, Riverside, Rhode Island, T: Janell Johnson

Reading, USPA05, Reading and Berks Science and Engineering Fair

EAEV058  Using a Collaborative Robot to Simulate How Topography Impacts Tornado Intensity  
Joseph Walker, 16, Junior, Berks Catholic High School, Reading, Pennsylvania, T: Mary Ann Buchanan
CBIO026T Using Bioinformatics Techniques to Identify Gene Expression and Potential Genetic Pathways in Preeclampsia
Claire Lynn Martel, 18, Senior, Christina Curran, 17, Senior, Barrington High School, Barrington, Rhode Island, T: Diana Siliezar T: Diana Siliezar

SOUTH CAROLINA
Aiken, USSC01, Central Savannah River Area Science and Engineering Fair
MCRO082 Inhibition of Staphylococcus epidermidis: Correlation between Mode of Action and Gram Stain
Madison Marie Ackroyd, 15, Freshman, Aiken Scholar's Academy, Aiken, South Carolina, T: Jasmine Scott
Bluffton, USSC02, Sea Island Regional Science Fair
CHEM034 Bisphenols: An Investigation of Baby Food Containers
Rachel Allys Stratton, 16, Junior, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: Janet Sullivan
ENMC046 Prototype for Real-Time Hydration Monitoring Using BIA
Coral R Lemasters, 16, Sophomore, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: Janet Sullivan
MCRO038 Fight the Bite: Identifying Aerobic and Anaerobic Bacteria Commonly Found in the Oral Cavities of Shark Populations Located in Beaufort County, South Carolina, in Order to Better Prescribe Antibiotics to Shark Bite Patients
Lucas Alexander Tomita, 18, Senior, Hilton Head Preparatory School, Hilton Head Island, South Carolina, T: Gilbert Ramseur
Charleston, USSC03, Low Country Science Fair
BMED090 Maternal Marijuana Use: Effects on Neonatal Abstinence Syndrome Withdrawal and Treatment
Tatiana Adkins, 17, Senior, Palmetto Scholars Academy, North Charleston, South Carolina, T: Vondina Moseley
EAEV078 A Novel Arsenic Filtration System for Low-Income Families in Rural Bangladesh
Ishraq Aziz Haque, 16, Sophomore, Academic Magnet High School, North Charleston, South Carolina, T: Katharine Metzner-Roop
Columbia, USSC04, USC Central South Carolina Region II Science and Engineering Fair
BMED052 Exploring the Role of Circulating miR-134 in Breast Cancer Recurrence
Lauren Yuqing Chen, 15, Junior, Dutch Fork High School, Irmo, South Carolina, T: Peisheng Xu
EAEV045 An New Estimate of Marine Ice under Amery Ice Shelf
Madeleine Marie Maylath, 18, Senior, Chapin High School, Chapin, South Carolina, T: Lisa Maylath
Spartanburg, USSC07, Piedmont South Carolina Region III Science Fair
BCHM023 How Does Exposure to Ultraviolet Light Denature Protein Structure?
Isabella Geneva Revels, 14, Freshman, South Pointe High School, Rock Hill, South Carolina, T: David Consalvi

SOUTH DAKOTA
Aberdeen, USSD01, Northern South Dakota Science and Math Fair
BMED056 Cardiovascular Catastrophe
Taren Tschetter, 18, Senior, Doland High School, Doland, South Dakota, T: Melissa Knox
CELL035T The Effects of UVB Radiation on Planaria's Cell Regeneration through Cultural and DNA Analysis
Haiden Grace Grandpre, 15, Freshman, Teryn Marie Sparling, 14, Freshman, Northwestern High School, Mellette, South Dakota, T: Denise Clemens
ROBO054 Development of a Machine Learning Algorithm for Generating Random Numbers
Abraham Wieland, 17, Junior, Aberdeen Central High School, Aberdeen, South Dakota, T: Amy Dix

192 Intel International Science and Engineering Fair 2019
Brookings, USSD02, Eastern South Dakota Science and Engineering Fair

**EAEV056T** Spacing Space Weather: Finding a Correlation between Kp Index and Error Magnitude
Elisabeth Austia Peirce, 16, Junior, Deirdre Katherine Cross, 17, Junior, Elk Point Jefferson High School, Elk Point, South Dakota, T: Melanie Norris

**MATS055** Carbonized Biofilms as a Green, Affordable Material for Water Purification and Pollutant Removal
William Vincent Hummel, 15, Freshman, Brookings High School, Brookings, South Dakota, T: Laura Hummel

**MCRO079** Red Light Green Light: Microarray Gene Expression Data to Analyze Differences in Healthy and Cancerous Prostate Tissues
Jocelyn Joy Zonnefeld, 17, Junior, Unity Christian High School, Orange City, Iowa, T: Tim Kamp

**TMED041** Tamp-X: A Novel Technology to Combat Prescription Opioid Abuse
Aditya Tummala, 14, Freshman, Brookings High School, Brookings, South Dakota, T: Marcie Welsh

Rapid City, USSD03, High Plains Regional Science and Engineering Fair

**CHEM070** How Ironic?: Developing a Ferrofluid
Serenity Engel, 18, Senior, Hot Springs High School, Hot Springs, South Dakota, T: John Entwisle

**ENBM034** Navigational Support Cane
Peyton Marie Brink, 15, Freshman, Plankinton High School, Plankinton, South Dakota, T: Bob Sprang

**ENEV043T** How Does Fertilizer Affect the Effluent of Agricultural Drain Tile in Fields?
Callie Jayne Berndt, 17, Senior, Lauren Elizabeth Sees, 17, Senior, Avon High School, Avon, South Dakota, T: Paul Kuhlman

**PLNT032** Analyzing the Effect of Tomato Variety and Maturity Date on Yield
Evan James Blaha, 17, Senior, Avon High School, Avon, South Dakota, T: Paul Kuhlman

**TENNESSEE**

Chattanooga, USTN01, Chattanooga Regional Science and Engineering Fair

**EAEV051T** Excess Carbon Dioxide Compromises Shell Integrity, Reproduction, and Behavior in the Freshwater Gastropod *Melanoides tuberculata*
Keith Kim, 18, Senior, Eric Suh, 18, Senior, The McCallie School, Chattanooga, Tennessee, T: Karah Nazor

**EGPH016T** Roadside Wind Converter
Lauren Elizabeth Singleton, 15, Freshman, Austin Dillion Kline, 15, Freshman, McMinn County High School, Athens, Tennessee, T: Cynthia Moses T: Cynthia Moses

Cookeville, USTN02, Cumberland Plateau Regional Science and Engineering Fair

**ENMC074** Saving One Child’s Life at a Time
Elizabeth Aline Newberry, 17, Junior, Jackson County High School, Gainesboro, Tennessee, T: Sally Rodgers

Knoxville, USTN04, Southern Appalachian Science and Engineering Fair

**BMED081** Mathematical Model to Predict Mortality from Early Onset Pneumonia in Acute Myocardial Infarction
Samaya Baljepally, 17, Junior, Bearden High School, Knoxville, Tennessee, T: Reggie Casaus

**CBIO050** Development of an Efficient Radiobiokinetic Calculation Method Using Matrices and Vectors
David Joy, 18, Senior, Oak Ridge High School, Oak Ridge, Tennessee, T: Karla Mullins

Memphis, USTN05, Memphis-Shelby County Science and Engineering Fair

**MATS073** Biofabrication of 3-Dimensional Polymeric Hydrogels for Tissue Regeneration Scaffolds and Delivery Devices
Naisha Anaum Chowdhury, 15, Freshman, Pleasant View School, Memphis, Tennessee, T: Farhana Chowdhury
CHEM061 Using Molecular Dynamics Simulations to Study the Self-Assembly of Patchy Alkane-Tethered Nanoparticles
Caroline J. Spindel, 18, Senior, Harpeth Hall, Nashville, Tennessee, T: Valerie Guenst

SOFT041 Weight Friction: a Simple Method to Overcome Catastrophic Forgetting and Enable Continual Learning in Neural Networks
Gabrielle Kaill-May Liu, 17, Senior, Ravenwood High School, Brentwood, Tennessee, T: Peter Lowen

TAMAS
Dallas, USTX01, Beal Bank Dallas Regional Science and Engineering Fair
Sriya Teerdhala, 15, Freshman, Sanjana Hiremath, 15, Freshman, Plano East Senior High School, Plano, Texas, T: Julie Baker

EGCH003T Optimizing and Fine-Tuning Electrode Pore Sizes Utilizing Varying Ratios of the Immiscible Polymer Blend PAN-PS for High Energy Density and Wide Temperature Range Supercapacitors
Ashna Shah#, 18, Senior, Ashay Shah#, 18, Senior, Plano East Senior High School, Plano, Texas, T: Julie Baker

ENBM005 TheraArm: Orthosis Therapy for Arm Rehabilitation and Movement Assistance
Andrei Spiride, 17, Junior, Plano East Senior High School, Plano, Texas, T: Julie Baker

ENEV015 Agrobotics: An Autonomous Arduino Uno/Due Computer Vision Based Raspberry Pi High Throughput Plant Phenotyping Precision Agriculture Robot Using Dual Linear Mechanisms
Risha Dianne Valera, 17, Junior, Plano West Senior High School, Plano, Texas, T: Nicole Lyssy

MCRO010 An Optimal, Low-Cost Microbial Consortium for Oxidation of Biodegradable Waste in a Waste Based Microbial Fuel Cell
Gargi Porwal, 17, Junior, Plano West Senior High School, Plano, Texas, T: Nicole Lyssy

PLNT005 Pectin Feeds the Seeds: The Effect of Extracted Pectin on Various Seed Growth Mediums in Relation to Soil Moisture Retention and Plant Growth
Rachel Anna Mammen, 15, Freshman, Jasper High School, Plano, Texas, T: Vashka Desai

ROBO010 Thermocloud: A Smart Collaborative Thermostat
Harshal V. Bharatia, 14, Freshman, Vines High School, Plano, Texas, T: Emily Sharma

SOFT010T Preventing Left Turn Road Accidents Using Photosensory Technologies and Computer Vision
Humza Rayaan Salim, 16, Sophomore, Yousuf Muneeb Ahmad, 16, Sophomore, T.C. Jasper High School, Plano, Texas, T: Vashka Desai

El Paso, USTX02, Sun Country Science Fair
CELL014 Essential Oils Inhibit E. coli
Jelena Starr Wright, 17, Junior, Mission Early College High School, El Paso, Texas, T: Sandra Blough

CHEM020T Synthesis of Silver Nanoparticles and Their Effects on Cancer Cells
Min Dong Zhang, 17, Junior, Jose Merino-Gardez, 17, Junior, Transmountain Early College High School, El Paso, Texas, T: Edgar Bridges

ENBM012 Employing Computer Vision to Provide Artificial Eyes for the Visually Impaired and Blind
Vincent Yang, 14, Freshman, Radford School, El Paso, Texas, T: Gloria Herrera

Fort Worth, USTX03, Fort Worth Regional Science and Engineering Fair
BEHA031 Diagnosing Autism with Machine Learning: Binary Classification for Eye Movement in Virtual Reality Environment
Rhythm Garg, 17, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls
<table>
<thead>
<tr>
<th>Project Code</th>
<th>Project Title</th>
<th>Team Members</th>
<th>Team Mentors</th>
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<tbody>
<tr>
<td>CBIO006</td>
<td>Predicting the Development of Secondary Central Nervous System Cancer</td>
<td>Julia Christina Ayalde Camacho, 16, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls</td>
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<td>through Ensemble Learning Methods</td>
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<td>ENBM021</td>
<td>Stereoscopic Three-Dimensional X-Ray Reconstruction Processing:</td>
<td>David Yue, 18, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls</td>
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<td>A Low-Radiation Cost-Effective Versatile Medical Imaging Procedure for Safe</td>
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<td>and Rapid Scanning</td>
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<td>ENEV031</td>
<td>H2Go: A Construction and Analysis of a Novel Purification Device</td>
<td>Sangita Vasikaran, 17, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls</td>
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<td>MCRO013</td>
<td>First Isolation and Characterization of Bacteriophages &quot;Liamboii&quot; and &quot;Ostambo&quot; Infecting <em>Streptomyces antibioticus</em></td>
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<td>TMED019</td>
<td>Reconstituted High-Density Lipoproteins for the Treatment of Pediatric Cancer</td>
<td>Ruhani 15, Sophomore, Harmony School of Innovation–Fort Worth, Fort Worth, Texas, T: Bilal Yildirim</td>
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<td>CHEM035</td>
<td>Green Synthesis of Medicinally Privileged Thio-Heterocycles</td>
<td>Valeria Esmeralda Stevens, 18, Senior, McAllen High School, McAllen, Texas, T: Eva Sanchez</td>
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<td>MATS046</td>
<td>Development of Piezoelectric Nonwoven Polymer Composites Fibers</td>
<td>Samya Ahsan, 17, Junior, UTRGV Mathematics and Science Academy, Edinburg, Texas, T: Tim Sears</td>
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<td>TMED028</td>
<td>Development of Smart Bandages to Control the Healing Process of Chronic</td>
<td>Pablo Vidal, 17, Junior, UTRGV Mathematics and Science Academy, Edinburg, Texas, T: Karen Lozano</td>
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<td>ANIM010</td>
<td>Modeling Prenatal Nicotine Exposure with <em>Hydra littoralis</em></td>
<td>Christopher Scott Calizzi, 18, Senior, College Park High School, The Woodlands, Texas, T: Sara Fox</td>
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<td>BEHA009</td>
<td>Procrastination versus Perceived Consequences</td>
<td>Alyssa Knowles, 17, Junior, Friendswood High School, Friendswood, Texas, T: Dawne Welch</td>
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<td>BMED018</td>
<td>Mitochondrial Effects of High Energy High Charge (HZE) Irradiation on the</td>
<td>Alexandra Tan, 19, Senior, Ball High School, Galveston, Texas, T: Michelle Puig</td>
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<td>CELL006</td>
<td>Analyzing the Effects of CRISPR</td>
<td>Melannie Paulette Nimocks, 17, Junior, College Park High School, The Woodlands, Texas, T: Sara Fox</td>
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<td>ENBM011</td>
<td>Engineering a Novel Wearable Biosensing Mechanism through the Implementation</td>
<td>Preprit Choudhary, 16, Junior, College Park High School, The Woodlands, Texas, T: Susan Caffery</td>
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<td>of Microelectromechanical Systems and Machine Learning to Realize Anomalies</td>
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<td>Hinting towards Future Cardiac Episodes</td>
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<td>ENEV023T</td>
<td>Application of Engineered Natural Materials for Phosphorus Removal to Control</td>
<td>Steven Wu, 18, Senior, Richard Zhang, 18, Senior, Clear Lake High School, Houston, Texas, T: Brenda Pinchbeck</td>
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<td>Algae Blooms in Eutrophic Water with Insight into Chemical Mechanisms and</td>
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<td>Large-Scale Feasibility Analysis</td>
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<td>ENMC017</td>
<td>Portable Graphene Oxide Desalination</td>
<td>Marcus Justin Schlauch, 18, Senior, Clear Brook High School, Friendswood, Texas, T: Alaina Garza</td>
<td></td>
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</tbody>
</table>
MATH009 Implementing EconoPhysics to Predict Mixed Migration
Brendan E. R. Alam, 17, Junior, College Park High School, The Woodlands, Texas, T: Jennifer Streger

PHYS016 Faraday's Return
Sebastian Saenz, 16, Sophomore, College Park High School, The Woodlands, Texas, T: Lionel Ronduen

PLNT024 Organic Stimulation of Plant Growth: Inoculation of Bacterial Endophytes from Leersia oryzoides
Adham Mohab Kassem, 18, Senior, College Park High School, The Woodlands, Texas, T: Susan Caffery

SOFT015T PanOculus: A Novel, Multifaceted Diagnostic Tool for Skin Cancer, Diabetic Retinopathy, and Otitis Media Powered by Deep Learning
Abhinav Sinha, 16, Sophomore, Naail Lakhani, 16, Sophomore, Jayanth Sairam Pratap, 16, Sophomore, John Foster Dulles High School, Sugar Land, Texas, John Foster Dulles High School, Sugar Land, Texas, T: Kristin Philip

Kilgore, USTX06, East Texas Regional Science Fair

CHEM032 Effect of Photodegradation on Dihydroxynaphthalene for Decomposition of Polyaromatic Hydrocarbons
Josh Roy, 18, Senior, Nacogdoches High School, Nacogdoches, Texas, T: Jason Ray

Laredo, USTX07, United Independent School District Regional Science Fair

ENEV005 Biodegradability of 3D Engineered Polylactic Acid/Thermoplastic Polyurethane Ammunition
Joseph Alexander Orduno, 17, Junior, United High School, Laredo, Texas, T: Susana Halfhill

Lubbock, USTX08, South Plains Regional Science and Engineering Fair

PLNT007 Evaluation of Surface Characteristics of Natural and Synthetic Athletic Fields
Michael Andrew Chaloupka, 14, Freshman, Christ the King Cathedral School, Lubbock, Texas, T: Alicea Chaloupka

PLNT008 Reducing Water Requirements in the Greenhouse Production of Solanum lycopersicum with Soil Amendments
Benjamin Luke Wanjura, 18, Senior, Christ the King Cathedral School, Lubbock, Texas, T: Alicea Chaloupka

Odessa, USTX09, Permian Basin Regional Science Fair

ENEV049T 1.21 Gigawatts: Optimizing Electrical Efficiency to Improve Water Quality through Electrocoagulation, a Green Technology
Matthew Jeffrey Trees##, 16, Junior, Garrett Guerrero##, 17, Junior, Trees Family Home School, San Angelo, Texas, Guerrero Home School, San Angelo, Texas, T: Annette Guerrero

San Antonio, USTX11, Alamo Regional Science and Engineering Fair

ANIM020 Impact of Horizontal vs. Vertical Positioning of Gallus gallus Eggs during Incubation
Alicia Ann Montemayor, 18, Senior, Agriscience Magnet Program, San Antonio, Texas, T: Joshua Anderson

BCHM010 The Effect of Senolytic Drugs on the Brain Shape or Functional Ability of Alzheimer Tau Drosophila
Ashara Naomi Somawardana, 17, Senior, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Maia Bland

MATH017 On the Application of Heat Diffusion across a Manifold for Dimensionality Reduction
John Tadeusz Piwinski, 16, Sophomore, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Sarah Chavez

PHYS021 Search for Variations in the Strength and Frequency of Earth's Gravitational Field Using a Homemade Fiber Optic Gravimeter
Catherine Annastina Taboada, 15, Sophomore, BASIS San Antonio Shavano Campus, San Antonio, Texas, T: Maia Bland
PLNT017T Forced Cellular Dilation: A Novel Approach to Increasing Auxin Levels in Native Stem Cuttings for Habitat Rehabilitation and Greenhouse Production through the Use of a Vacuum Chamber
Shannon Leigh Anderson#, 17, Junior, William Wayne Anderson, 15, Sophomore, Anderson Christian Academy, Seguin, Texas, T: Lisa Anderson T: Lisa Anderson

PLNT018 Stop and Smell the Flowers: A Continuation of the Assessment of the Effects of Aeration in Regards to the Lifespan and Bacteria Presence of the Chrysanthemum grandiflorum
# Hannah Noelle Taylor, 18, Senior, Agriscience Magnet Program, San Antonio, Texas, T: Joshua Anderson

TMED017 G-CSF as a Preventative Treatment for Traumatic Brain Injury in Drosophila melanogaster
# Beril Lara Saygin, 17, Junior, Keystone School, San Antonio, Texas, T: Jason Nydegger

Waco, USTX12, Central Texas Science and Engineering Fair

ENMC021T Hybrid Rocket Engine
Caleb Wilson Chakmakjian#, 16, Sophomore, Wyatt Todd Tyson, 16, Sophomore, Live Oak Classical School, Waco, Texas, T: Katherine Pitts

MCRO017 An Algorithmic Platform to Optimize the Prescription of Antibiotics to Minimize Antibiotic Resistance Developing in Patients or Communities
Sophie Kathleen Kearney, 17, Junior, Midway High School, Waco, Texas, T: Krystle Moos

Austin, USTX13, Austin Energy Regional Science Festival

ANIM009 Silybum marianum and Rauwolfia serpentina as Novel Agents for Alzheimer's Disease Treatment and Lifespan Extension in a Caenorhabditis elegans Model
# Sindhuja Uppuluri, 17, Junior, Westwood High School, Austin, Texas, T: Christin Angirasa

BCHM005 Functional Studies of Methy-CpG-binding Domain Protein 4 (MBD4)
Michelle Lee, 17, Junior, Westwood High School, Austin, Texas, T: Christin Angirasa

EAEV071 The Effect of Carboxymethyl Cellulose on the Filtration Capabilities of Zebra Mussels
Jack Delli-Santi, 18, Senior, Lake Travis High School, Austin, Texas, T: Kallie Nichols

EGCH010T Using Carbon Nanotubes to Create Flexible Fuel Cells
Nora Boumaraf, 15, Sophomore, Ayla Saeed, 15, Sophomore, Austin Peace Academy, Austin, Texas, T: Nadeyah Baddour T: Nadeyah Baddour

PHYS013 Testing the Accuracy of the Tangent Point Method for Determining the Milky Way's Rotation Curve
Camille Chiu, 16, Sophomore, College Station High School, College Station, Texas, T: Casey Akin

TMED013 Using Dendrimers and PLGA Nanoparticles for Targeted Drug Delivery to Treat Neuroinflammation
Bridge Jessica Li, 16, Junior, Vandegrift High School, Austin, Texas, T: Anne Goshorn

Laredo, USTX14, Laredo Independent School District Science Fair

BEHA007 Ultrasonic Behaviors
Esther Morales, 17, Senior, Dr Leo Cigarroa High School, Laredo, Texas, T: Paloma Guel

Corpus Christi, USTX15, Coastal Bend Regional Science Fair

ENBM050 Praesidium 1
Adrian Trevino Alamillo II, 17, Senior, Richard King High School, Corpus Christi, Texas, T: Tammy Ladner

ROBO032 Nintendo Da Vinci: Implementing a Novel Control System to Improve Performance in Robotic Surgery
# Ibrahim Samhar Al-Akash, 16, Sophomore, Veterans Memorial High School, Corpus Christi, Texas, T: Porfirio Zamora
ANIM042  The Effects of cisd Gene Family Disruption in *Caenorhabditis elegans* Fertility
Zihan Zhao, 16, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls

CELL057  Regulation of SREBP-1 by Polyunsaturated Fatty Acids
Zhuoran Wang, 18, Senior, Colleyville Heritage High School, Colleyville, Texas, T: Sonya Loughran

EGPH019  Microlens-enhanced Flexible Gallium Arsenide Microcell Array for Low-cost, Roof-top Photovoltaics for Automobiles
#  Kumaran Selva, 17, Junior, Clear Lake High School, Houston, Texas, T: Brenda Pinchbeck

ENMC064  The Mini-Workstation for Astronauts Redefined
Darryl Emmanuel Previlor, 18, Senior, College Park High School, The Woodlands, Texas, T: Karen Humes

PLNT063  Space Botanist: Effects of Fertilizer on Tomatoes Grown Upside Down in 75% Regolith
Emily Crawley, 15, Freshman, Brenham High School, Brenham, Texas, T: Allison Bentke

ROBO059  Looking through Walls with Artificial Intelligence: An Innovative Solution for Real-Time Retrieval of the Human Figure behind Visual Obstruction
#  Kevin Meng, 16, Junior, Plano West Senior High School, Plano, Texas, T: Neil Milburn

TMED042  EyeSpy Diagnosis: Developing a Smartphone-Based Non-Invasive Intelligent Device and Application for the Accurate and Affordable Diagnosis of Eye Fundus Anomalies via Machine Learning
#  Kabir Jolly, 17, Junior, College Park High School, The Woodlands, Texas, T: Susan Caffery

TMED045T  TMZ+X: siRNA-based Synthetic Lethal Screening and Synergism with TMZ as a Novel Approach to Inhibition of Proliferation in GBM
Arnav Garyali, 17, Senior, Adarsha Pokkulandra, 18, Senior, Dulles High School, Sugar Land, Texas, Dulles High School, Sugar Land, Texas, T: Kristin Phillip

UTAH

Layton, USUT01, North Davis Area Science and Engineering Fair

CELL021  Novel CRISPR Knockout of Hif-1a in U251 Glioblastoma Cells
Eric Jared Gillespie, 15, Freshman, Millcreek Junior High School, Bountiful, Utah, T: Kristin Bates

ENMC043  A Robotics Assistive Device Application in Minimizing Manibus Tremors and Persons Afflicted with Bradykinesia
Shaylee Ray Stanger, 15, Freshman, Clearfield High School, Clearfield, Utah, T: Chelsey King

ENMC049T  Development of Predictive Software for the Engineering & Optimization of Reliable Rocket Components
#  Ryan Spencer Pearson#, 16, Junior, Chad Harrison Brown#, 17, Junior, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin

PLNT034  A New Spin on Botany: The Effect of Gravitational Resistance during Germination on Plant Growth
Jacob Eric Bennett, 16, Sophomore, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin

ROBO035  Bowed Stringed Instrument Raw Audio Synthesis with Generative Neural Networks
##  Benjamin Garrett DeVries, 17, Junior, Woods Cross High School, Woods Cross, Utah, T: Janette Duffin

Cedar City, USUT02, Southern Utah Science and Engineering Fair

ANIM038  The Effect Wood, Paper, Litter, and Hay Beddings Have on the Release of Ammonia from Rabbit Waste
Taleah Heaton, 17, Junior, Success Academy DSU, St. George, Utah, T: Charmain Brammer
A Tool to Predict Sex Discrimination
Troilus Robert White, 17, Junior, Cedar City High School, Cedar City, Utah, T: Anna Lewin

Young Stellar Objects in L1688: Searching for Evidence of Star Formation Using Infrared Data
Jacie Erickson, 18, Senior, Joseph Karl Erickson, 18, Senior, Bracken Jolley, 18, Senior, South Sevier High School, Monroe, Utah, T: Deborah Morgan

Propagating Welsh's Milkweed
Jacob Robinson, 17, Junior, South Sevier High School, Monroe, Utah, T: Deborah Morgan

Ogden, USUT03, Weber Area Science and Engineering Fair

The Effect of Dewormers on Ram's Fertility
Jaycee Anne Bennett, 17, Junior, Kaleb Kearl, 15, Sophomore, Fremont High School, Plain City, Utah, T: Laruel Selman T: Laurel Selman

Conformity Among Ages
Kaylee Dayle Stewart, 17, Junior, Weber High School, Pleasant View, Utah, T: Lareen Radle

The Unpredictability of Photons
Adam Kent Thomas, 15, Freshman, Bonneville High School, Washington Terrace, Utah, T: Sara Yearsley

Effects of Clothing on the Aerodynamics of a Mountain Biker
Isaac Day Staten, 15, Freshman, Bonneville High School, Washington Terrace, Utah, T: Benjamin Sherman

The Effect of Fermentation on Corn Silage Nutritional Composition
Cheyenne Marcheta Breeding#, 18, Senior, Jace Michael Marriott##, 16, Junior, Fremont High School, Plain City, Utah, T: Robert Riley

The Variance of Nitrogen and Phosphorus Levels in Chicken Manure Induced by Flock Age
Jesse Shepherd, 15, Freshman, Spanish Fork High School, Spanish Fork, Utah, T: Chaleesa Warren

Doppler Radar Flash Flood Detector
Ammon Wallace, 15, Sophomore, Salem Hills High School, Salem, Utah, T: Kent Stone

A Continued Study of a More Realistic Solution to Refugee Housing Using the Isoperimetric Honeycomb Conjecture
Samantha B. Davis#, 18, Senior, Alicia Kuhlmann#, 18, Senior, Bingham High School, South Jordan, Utah, T: Christopher Fish T: Chris Fish

Effect of Stationary Magnetic Fields on Zinc Oxide Nanowires
Liesel Robinson, 14, Freshman, Early Light Academy, South Jordan, Utah, T: Darci Cordero

p53-Bad: A Novel Mitochondrially Targeted Gene Therapy for Ovarian Cancer
Madeline Jean Joklik-McLeod, 18, Senior, Juan Diego Catholic High School, Draper, Utah, T: Christine Celestino

An Epidemiological Study Quantifying Differences in Thyroid Cancer Risk across Birth Cohorts and I-131 Exposure Levels
Anisa Habib, 16, Junior, Tejita Agarwal, 17, Junior, West High School, Salt Lake City, Utah, T: Hilary Thrilwell

Tarun Kumar Martheswaran, 15, Sophomore, The Waterford School, Sandy, Utah, T: James Harris

Using Machine Learning Techniques to Detect Mutant p53 Transcriptional Activity
Sanjana Vasudevan Kargi, 15, Junior, Dua Azhar, 16, Junior, Beehive Science and Technology Academy, Sandy, Utah, T: Kerrie Upenieks
CELL030  Utilizing Ligand Structuring Metaservers to Model Pathogenic p16 Mutation Effects on Binding Sites of Cell Signaling Pathways
Christopher Li, 16, Sophomore, West High School, Salt Lake City, Utah, T: Crystal King

MCRO043  Viruses to the Rescue?: Using Microtiter Assays and an In-Lab Developed Simulated Anatomic Lung Model to Determine the Effectiveness of Bacteriophage Therapy as a Preventative Measure against Poly-Microbial Biofilms in Cystic Fibrosis Patients
#  Divyam Goel, 17, Senior, West High School, Salt Lake City, Utah, T: Hilary Thirlwell

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

BMED049  Antioxidants and Their Effects on Reducing the Adverse Impacts of Diesel Exhaust on Lung Cancer Cells
Ankit Garg, 15, Freshman, Logan High School, Logan, Utah, T: Christina Howell

BMED050  How Do Gastrointestinal Microorganisms React with 5-fu?
Quincy Lynn Koons, 15, Freshman, DaVinci Academy of the Science and the Arts, Ogden, Utah, T: Deb Neal

CBIO029  Investigating the Principle of Adaptive Plasticity in Variably Epistatic Systems
##  Wyatt Graham Brannon, 16, Junior, InTech Collegiate High School, North Logan, Utah, T: Tracy Davidson

**VERMONT**

MCRO048  Fishing for New Crop-Benefiting Soil Bacteria through Plant-Microbe Interactions
Gary Zhan, 14, Freshman, Logan High School, Logan, Utah, T: Christina Howell

**VIRGINIA**

**Arlington, USVA01, Northern Virginia Science and Engineering Fair**

CBIO044  Investigating Cancer Mutations: Improving the Analysis of Cancer Data with Software
Caroline Cunningham, 17, Junior, Washington-Lee High School, Arlington, Virginia, T: Mary Fretts

EAEV029  Optimizing Metformin HCl Removal: Utilizing Molecular Sieves and Absorbents within Sand Filtration Units
#  James Licato, 16, Sophomore, Washington-Lee High School, Arlington, Virginia, T: Mary Fretts

**Charlottesville, USVA02, Virginia Piedmont Regional Science Fair**

BMED035  The Effect of a Low-Carbohydrate Diet on Cardiovascular Disease Risk Factors
Elizabeth "Libby" Grace Terrell, 16, Junior, Western Albemarle High School, Crozet, Virginia, T: Carol Stutzman

CELL033  3D Spatiotemporal Profiling of Adrenergic and Cholinergic Transmission
Paula K. Zhu, 17, Junior, Albemarle High School, Charlottesville, Virginia, T: Kirsten Fuoti
Fairfax, USVA03, Fairfax County Regional Science and Engineering Fair

CBI0034  CeRNetwork: A Platform for in silico Discovery and Classification of Competing Endogenous RNA Molecules for Multi-Omic Network Diffusion and Novel miRNA-Sequestering Drug Design
#  David Toomer, 17, Senior, Hayfield Secondary School, Alexandria, Virginia, T: Julie Riley

CELL047  The Role of ALPHAS Single Nucleotide Polymorphism on Nicotine Dependence
Sid D Thakker, 15, Sophomore, James Madison High School, Vienna, Virginia, T: Jyothsna Vallampati

EBED027T  BMCI-Net: A Novel Approach to Non-Invasive, Fully Mobile Prosthetic Control Using Robust Pattern Detection and Filtering of EMG and EEG Signals through Supervised Machine Learning

EGCH027  Discovery of FAZnF3, a Hybrid Organic-inorganic Perovskite for Photocatalytic Water Splitting
Kaien Yang, 16, Sophomore, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Hadan Kauffman

ENBM042  Non-Invasive Electronic Wireless Knee Biomechanical and Physiological Monitoring for Post-Operative Rehabilitation
Rachel Naidich, 18, Senior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Paul Kosek

MCRO067T  Cyanocide: A Novel Strategy for Harmful Algal Bloom Mitigation via Initiation of Programmed Cell Death

Harrisonburg, USVA04, Shenandoah Valley Regional Science Fair

ENEV099T  Activated Carbon Foam Surfaced Carbon Dioxide Scrubber with an Environmentally Sustainable Gas Purification System Using Bicarbonate Ions
Madison Nichols, 17, Senior, John Sykes Richardson, 18, Senior, Massanutten Regional Governor's School, Mt. Jackson, Virginia, T: Kara Bates

Lynchburg, USVA05, Central Virginia Regional Science Fair

ENEV033  The Effect of Bamboo Fiber on the Tensile Strength of Tapioca-Based Bioplastic
Natalie Torres, 16, Junior, Central Virginia Governor's School for Science and Technology, Lynchburg, Virginia, T: Michelle Douglass

MCRO020  The Effects of Different Amplitudes of a Particular Song on the Antibiotic Susceptibility of Escherichia coli against Ampicillin
Shardul Shekhar Naphade, 17, Junior, Central Virginia Governor's School for Science and Technology, Lynchburg, Virginia, T: Michelle Douglass

Manassas, USVA06, Prince William-Manassas Regional Science Fair

PHYS045T  Recycling against Radiation: A Comparison between Recycled and Non-Recycled HDPE for Radiation Shielding
George Matthew French, 17, Junior, Zane Vandivere, 16, Junior, Governor's School at Innovation Park, Manassas, Virginia, T: Ales Psaker
ROBO061T  An Alternate Approach to Predict Elections beyond the Poll
Zachary Nowak, 18, Senior, Ethan M Saari, 18, Senior, Governor’s School at
Innovation Park, Manassas, Virginia, T: Ales Psaker
Ashburn, USVA07, Loudoun County Science and Engineering Fair

CBIO013  Identifying miR-331-3p as a Unique Blood-Based Biomarker for Lung
Adenocarcinoma through Random Forest Classification
Madden W. Moore, 18, Senior, Academies of Loudoun, Leesburg, Virginia,
T: Duke Writer

ENMC037  Creation of an FDM 3D Printer Constructed Entirely by Parts Created with
Additive Manufacturing Techniques
Brian Anthony Minnick, 15, Sophomore, Academies of Loudoun, Leesburg,
Virginia, T: Suzanne Lohr

MATS025T  Developing Honey-based Antibacterial Wound-healing Agents by
Integrating Glucose Oxidase Enhancement with Pectin Hydrogels
Zhiyuan Li, 18, Senior, Rohan Parikh, 17, Senior, Academies of Loudoun,
Leesburg, Virginia, T: Zachary Minchow-Proffitt

ROBO031T  DeepLetters: A Convolutional Long Short-Term Memory (CNN-LSTM)
Approach to Fingerspelling Translation
Saarthak Maheshwari, 17, Senior, Riley Donald White, 18, Senior, Stone Bridge
High School, Ashburn, Virginia, T: Janet Cascio

Roanoke, USVA08, Western Virginia Regional Science Fair

BMED063  Big Data Analytics: Identification of Novel Cancer Progression Gene
Signatures for Precision/Personalized Medicine
Kevin Sheng, 16, Junior, Roanoke Valley Governor’s School for Science and
Technology, Roanoke, Virginia, T: Steve Smith

CBIO045T  Examining the Effectiveness of Convolutional Neural Networks for
Determining Visual Fixation Using fMRI
Harrison Lev Huang, 17, Senior, Erik Scarlatescu, 17, Junior, Roanoke
Valley Governor’s School for Science and Technology, Roanoke, Virginia,
T: Doug Divers

EBED035T  LIDAR-Based Navigational Aid for the Artificial Reconstruction of Facial
Vision for the Visually Impaired
School, Roanoke, Virginia, Roanoke Valley Governor’s School for Science and
Technology, Roanoke, Virginia, T: Brent Holt

Norfolk, USVA09, Tidewater Science and Engineering Fair

CELL024  Alpha-synuclein Enhances Toxicity of Tau Oligomers in vitro
Katelynne Berland, 18, Senior, New Horizons Governor’s School for Science and
Technology, Hampton, Virginia, T: Margaret Mulvey

ENEV046  Application of Microbial Fuel Cell Biosensors in Detecting Water Pollution
Anna Vargas, 16, Junior, Tabb High School, Yorktown, Virginia, T: Teresa Hux

Radford, USVA10, Blue Ridge Highlands Regional Science Fair

EAEV040  Effects of Gasoline on RGB Values of Montipora capricornis and Pavona
frondifera Corals
Ainsley LaPlante, 18, Senior, Southwest Virginia Governor’s School, Pulaski,
Virginia, T: Jared Brown

SOFT032  An AI-based System for Discovering Potential Adverse Drug Events Using
Open Data
Brandon Xu Fan, 16, Junior, Blacksburg High School, Blacksburg, Virginia,
T: Katharine Davis

Richmond, USVA11, Metro Richmond STEM Fair

BMED033  An In-Depth Patch-Clamp Study of HCN2 Channel (Year II): Identification
of Novel Biomarkers and Therapy for Ih Current Suppression in Autism
Spectrum Disorders
Perisa Satish Ashar, 16, Sophomore, Maggie L. Walker Governor’s School,
Richmond, Virginia, T: Jeremy Clark

CBIO019  MetaLyzer: A Novel Analyzer for the Metagenomic Bacteria Using Deep
Learning
Cameron Sharma, 15, Freshman, Mills E. Godwin High School, Henrico,
Virginia, T: Kelly Ostrom
MCRO034  The Inhibition of Methane-Producing Bacteria Using Novel Compound: \(\beta\)-carboline
David Jefferson Kang, 16, Sophomore, John Randolph Tucker High School, Richmond, Virginia, T: Matthew Togna

TMED022  CRISPR/Cas9-Mediated Knockout of AEG-1 Promotes Sensitivity to Sorafenib in Human Hepatocellular Carcinoma (HCC)
#  Anusha Puri, 16, Junior, Science, Math, and Technology Center at Mills E. Godwin High School, Henrico, Virginia, T: Samantha Cope
Warrenton, USVA12, Fauquier County Regional Science & Engineering Fair

ROBO026  The Effect of a Genetic Algorithm on Traffic Efficiency
Laura Taylor Thompson, 17, Junior, Mountain Vista Governor's School, Warrenton, Virginia, T: Vineeta Ribeiro
Roanoke, USVA50, Virginia State Science and Engineering Fair

CHEM059  Analyzing the Difference in the Sorption Concentrations of Copper and Iron in Polylactic Acid and High Density Polyethylene Plastic Bags
Rose Tomiak, 17, Junior, Southwest Virginia Governor's School, Pulaski, Virginia, T: Jared Brown

EAEV069  Evaluating the Impact of Coal Ash Pollution through a \textit{C. elegans} Developmental Model
Mary Grace Giles, 17, Junior, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia, T: Cindy Bohland

ENMC070  The Effect of Architectural Design on Supertall Building Flutter Acceleration
Allison Stocks, 16, Junior, Yorktown High School, Arlington, Virginia, T: Michael Lovrencic

MATS042  Using Self Assembled Monolayers for the Fabrication of Implantable Strain Gauge Sensors
Justin Hu, 16, Junior, James Madison High School, Vienna, Virginia, T: Jyothsna Vallampati

MCRO073  Dynamic Roles of Epstein-Barr Virus Reactivation: Identifying Novel Mechanisms of EBV-Positive Lymphoma Progression and Treatment
#  Logan Dunkenberger, 18, Senior, Roanoke Valley Governor's School for Science and Technology, Roanoke, Virginia, T: Cindy Bohland

WASHINGTON
Kennewick, USWA01, Mid-Columbia Regional Science and Engineering Fair
ENEV045  The Solution to Pollution Is...Plastic? Accelerating Oil Spill Remediation by Using Polymer Exposure to Destabilize Emulsions
Zoe Anne Gotthold, 16, Sophomore, Richland High School, Richland, Washington, T: Dale Ingram

ROBO033  Frugal Flight: Indoor Stabilization of a Computationally Independent Drone without GPS
#  Nikhil Devanathan, 17, Junior, Kennewick High School, Kennewick, Washington, T: Joshua Eerkes
Tacoma, USWA02, South Sound Regional Science and Engineering Fair

BEHA047T  Anxiety Disorder Detection and EMDR Treatment Using Optical PCCR Eye Tracking
##  Nicole Marie Gunderson, 18, Senior, Rachel Freeman, 18, Senior, Abhinav Gundrala##, 17, Senior, Olympia High School, Olympia, Washington, T: Alex Steinkamp

EGCH030  Perovskite Solar Cell: A Simple Hot Casting Method to Formulate High-quality, Lead-free, Sn-based Perovskite Films with Reduced Pinholes
Smriti Manickam Somasundaram, 14, Freshman, Olympia High School, Olympia, Washington, T: Erin Harbour

TMED034  A Lung Cancer Prediction and Detection System Using Nodule Based Methods and Machine Learning Algorithms
#  Sathvik Nallamalli, 15, Sophomore, Olympia High School, Olympia, Washington, T: Alex Steinkamp
Bellevue, USWA03, Central Sound Regional Science & Engineering Fair

BMED041 Identifying the Role of TEAD Proteins and the Pharmacological Disruption of YAP1 to Inhibit the Function of Oncogenic YAP1 Fusions
Aditi Subramanyam, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

EGCH025 Improvement of Perovskite Solar Cell Efficiency through PLA Additive Induced Boundary Passivation with Application of Machine Learning in Crystal Image Analysis
Aum Divyang Upadhyay, 18, Senior, Interlake High School, Bellevue, Washington, T: Jenn Pang

PHYS030 Applications of Helium-4 Doubly Forbidden Singlet-Triplet Transition Lines in Astronomical Spectroscopy
Christine Ye, 14, Freshman, Eastlake High School, Sammamish, Washington, T: Ann Zhou

Vancouver, USWA04, Southwest Washington Science and Engineering Fair

BMED030 Copy Number Implementation and Analysis of Ovarian Germ Cell Tumors
Rahul Ram, 17, Senior, Camas High School, Camas, Washington, T: Brianna Abraham

ROBO067T Implementing LiDAR in Simultaneous Localization and Mapping Systems
Gareth I Starratt, 15, Sophomore, Julian David McOmie, 15, Sophomore, Camas High School, Camas, Washington, T: Brianna Abraham

Spokane, USWA05, Eastern Washington Regional Science and Engineering Fair

BEHA038 Chest Wall Muscle EMG Activity and Arm Force during Functional Tasks: Implications After Open Heart Surgery
Ansel LaPier, 15, Freshman, Central Valley High School, Spokane Valley, Washington, T: Kimberly Cleary

BMED024 Analysis of KLF11 Sequence in Type One Diabetic and Wild Type Mice
Jacob Satake, 17, Junior, North Central High School, Spokane, Washington, T: Dan Shay

BMED034T The Use of C. elegans as an Indicator for Toxins in Feminine Hygiene Products
Sarah Mahan, 18, Senior, Erin Marie Hucke, 17, Senior, Joel E. Ferris High School, Spokane, Washington, T: Darci Hastings T: Darci Hucke

EAEV034 Brake Pad Dust Particulates on the Fertility and Vitality Rates of Drosophila melanogaster
Josie Jan Westmoreland, 17, Junior, Odessa High School, Odessa, Washington, T: Jeff Wehr

Bremerton, USWA50, Washington State Science and Engineering Fair

ANIM049 A Survey of Lake Crescent for Endemic Salmonid Spawning Sites Using eDNA
Vita Anne Olson, 16, Junior, Sequim High School, Sequim, Washington, T: Debra Beckett

BMED075 An in silico Analysis of Glioblastoma Patients for the Identification of a miRNA Signature as a Diagnostic Biomarker
Anirudh Kannan Iyer, 16, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender

EGCH032 A Novel Process to Fabricate Stable Bipolar Membranes for the Next Generation of Hydrogen Fuel Cells
Nikhita Amrutha Bontha, 14, Freshman, Hanford High School, Richland, Washington, T: Brian Palmer

ENBM046 Stimulating Gamma Brain Waves via the Visual System Using Flashing LED Lights: Optimizing a Potential Treatment for Alzheimer’s
Meredith Weigelt Hillier, 14, Freshman, Newport Senior High School, Bellevue, Washington, T: Jennifer Wikrent

PLNT067 Determining the Most Effective Salt Concentration of Irrigation Water for Trichoderma harzianum to Confer Salt Tolerance through Symbiosis to Oryza sativa Plants
Manasvini Calmidi, 17, Junior, Nikola Tesla STEM High School, Redmond, Washington, T: Kate Allender
ROBO066  myRadioloGIST: Early Detection of Lung Cancer from Hidden Gist Signals in CT Scans with Deep Neural Networks and Transfer Learning

Eshika Saxena, 17, Senior, Interlake High School, Bellevue, Washington, T: Daniel Peterson

WEST VIRGINIA

Keyser, USWV01, West Virginia Eastern Panhandle Regional High School Science Fair

BEHA029  Now You See It, Now You Don't! Test Your Peripheral Vision
Averi Janae Smith, 14, Freshman, Keyser High School, Keyser, West Virginia, T: Brianna Teets

SOFT034  Visual Analysis of Arbitrary Binary Data
Matthew Spiker, 17, Junior, Jefferson High School, Shenandoah Junction, West Virginia, T: Shane Price

Fairmont, USWV50, West Virginia State Science and Engineering Fair

CELL052T  X-Inactivation: (It's the Cat's Meow!) Random or Predetermined?
Gina Sobinovsky, 16, Sophomore, Lisa Sobinovsky, 16, Sophomore, Hedgesville High School, Hedgesville, West Virginia, T: Andrew Ferber

ROBO044  Protection of Deep Neural Networks against Adversarial Attacks with Application to Facial Recognition
Alice Guo, 15, Freshman, Morgantown High School, Morgantown, West Virginia, T: Bill Gibson

WISCONSIN

Glendale, USWI02, Nicolet Science and Engineering Fair

ANIM022  Metformin as a Novel Method for Polychlorinated Biphenyl Induced Non-alcoholic Fatty Liver Disease Remediation in Danio rerio as a Model for Human Livers
Anna Spektor, 18, Senior, Nicolet High School, Glendale, Wisconsin, T: Stephanie Rasmussen

Milwaukee, USWI03, University School of Milwaukee—Science Fair

BCHM007  Coupling Multiple Stresses to the Activation of Akt-Kinase Signaling Pathway
Amogh Bhatnagar, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

CELL013  GATA6 and GATA4 CRISPR Cas-9 and shRNA Technology to Investigate Human Gastric Development and Disease Using Human Organoid Model Systems
Afiya Fatima Qurysi, 17, Junior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

MATH016  Generating Set for Nonzero Determinant Links under Skein Relation
Aayush Karan, 17, Senior, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

Madison, USWI04, Capital Science and Engineering Fair

ENEV018T  Filtration of Carbonic Acid Out of Water
Jack Maher, 17, Senior, Jasmine Radica Narine, 18, Senior, Muskego High School, Muskego, Wisconsin, T: Karen Lindholm-Rynkiewicz

PHYS009  Plasma Characterization Applied to an Understanding of Ion Acoustic Waves
Yiyang Shi, 18, Senior, West High School, Madison, Wisconsin, T: Oliver Schmitz

Milwaukee, USWI50, Badger State Science and Engineering Fair

BMED039  The Potential Pathophysiological Role of STING in the Development of Hypertensive Nephropathy
Rohan Anne, 15, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

CBIO015  An Iterative Transfer Learning Approach to Multiobjective de novo Drug Design with Recurrent Neural Networks and Nondominated Sorting
Jacob Yasonik, 17, Junior, Homestead High School, Mequon, Wisconsin, T: Kathy Connelly
MATS026 Using Grain Refinement to Improve the Corrosion Resistance and Mechanical Properties of A205-T7 Aluminum Alloy
Neil Sai Dogra, 16, Sophomore, University School of Milwaukee, Milwaukee, Wisconsin, T: Robert Juranitch

WYOMING
Greybull, USWY01, Northern Wyoming District Science Fair

PHYS036 Utilization of 3D Printed Honeycomb Variations as Potential Housing Structures for Future Planetary Colonization
Ashlynn Ewen, 17, Senior, Greybull High School, Greybull, Wyoming, T: Joel Kuper

Laramie, USWY50, Wyoming State Science Fair

CELL034 EnLIGHTened Therapeutics: Engineering Light-Activated Proteins for Optogenetic Applications
# Arundathi Srijejan Nair, 16, Junior, Laramie High School, Laramie, Wyoming, T: Jacob Greenlee

MCRO037T What’s in Your Air? A Microbial DNA Analysis of a Filter System
Carly Afton Keller, 16, Sophomore, Danielle Elizabeth Clapper, 16, Sophomore, Southeast Goshen County High School, Yoder, Wyoming, T: Robin Schainost

TMED002 Investigating the Effects of Chaga Mushroom Extracts on the Development of a Specific Tumor Cell Line
Bailee Marie Foster, 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

BEHA046 Reward Schedule and Pacing in Video Games and Their Effects on Popularity
Cooper Robert Crowther, 16, Sophomore, Good Hope Country Day School, Kingshill, United States Virgin Islands, T: Jane Coles

ENMC075 Riding Revolution: Electric Skateboard Modifications
# Kieran Hensleigh Walter-Sundaram, 17, Junior, Good Hope Country Day School, Kingshill, United States Virgin Islands, T: Jane Coles

URUGUAY
Piripolis, Uruguay, URY001, Feria Nacional de Clubes de Ciencia

CHEM026 Thermal Pyrolysis as an Alternative to the Problem of Plastic Waste in the Landfill of Villa Tambores
Carina Soledad Texeira, 16, Freshman, Sofia Etchecopar, 16, Freshman, Liceo Dr. J. M. Dalto, Tambores, Tacuarembo, Uruguay, Liceo Dr. J. M. Dalto, Tambores, Uruguay, T: Richard Bottino

VIETNAM
Ha Noi City, Vietnam, VNM001, Ha Noi Science Fair

BEHA044T Promoting the Values of the Relics of Temple of Literature and the Imperial Academy to Bring into Play the Traditional Fondness for Learning
Xuan Dat Tran, 16, Junior, Truong Chinh Le, 16, Junior, Nguyen Hue High School for Gifted Students, Ha Noi, Vietnam, T: Nhung Nguyen Thi

BMED072 Studying the NT-proBNP as a Biochemical for Diagnosing and Predicting Early Heart Failure in Primary Hypertension Patients Classified by the ACC/AHA Categories of Hypertension in 2017
Bao Chau Phan Nam, 17, Senior, Le Quy Don High School For The Gifted, Quy Nhon, Binh Dinh, Vietnam, T: Nam Hung Phan

CELL056 Study on Produce Transgenic Up-Eucalyptus Plant (E. urophylla x E. pellita) for Increasing Fiber Length
Thi Thuy Trang Dao, 17, Junior, Hung Vuong Gifted High School, Pleiku, Gia Lai, Vietnam, T: Thi Kim Hue Phung
CHEM054T  Research, Design of the MnO₂/Cellulose Acetate Nano-Filter Membrane Equipment System Applied to Treat Wastewater Containing Pb²⁺, Cd²⁺, TSS, COD, E. coli and Coliform into Domestic Water  

CHEM062  3-Hydroxy-1-Azoolkenes and Their Ester Derivatives: New Cytotoxic Agents for Cancer Treatment  
Hung Son Pham, 16, Junior, Tran Phu Gifted High School, Hai Phong, Vietnam, T: Hai Ly Nguyen Thi

EBED029  Virtual Laboratory: The Solution to Improving the Efficiency of Learning in High School  
Hoang Khoi Do, 17, Junior, Kim Lien High School, Ha Noi, Ha Noi, Vietnam, T: Hanh Duong

Hai Anh Tran, 17, Junior, Minh Thao Nguyen, 17, Junior, High School for Gifted Students, Hanoi University of Science, Hanoi, Vietnam, T: Quoc Hung Dinh

ROBO060  Feeding Robot Using Image Processing Technology for Parkinson Patients  
Long Hoang Vu, 17, Senior, Lao Cai High School No. 1, Lao Cai, Vietnam, T: Trong Vuong

ROBO077T  Diagnosing Plant Diseases Using Convolutional Neural Network  
Huy Minh Do, 16, Junior, Nguyen Nam Khoa Pham, 7, Junior, Le Quy Don High School for the Gifted, Da Nang, Vietnam, T: Nho Do

TMED055T  Study on Chemical Composition, Preventive and Treatment Effects of Blumea lacera Extract on Experimental Chronic Renal Failure  
Linh Khanh Trinh, 15, Sophomore, Van Cuong Tran, 17, Junior, HUS High School for Gifted Student, Hanoi, Vietnam, T: Thu Nguyen

ZIMBABWE  
Harare, Zimbabwe, ZWE001, Zimbabwe National Science Fair

CHEM019  Water Purification by Capillary Action in Paper Towels  
Vongayi Anesu Marazanye, 18, Senior, High Achievers Coach Educational Centre, Harare, Zimbabwe, T: Tariro Ndoro

EGCH011  Biochar Technology: A Carbon-Negative Energy System  
Vivian Clarissah Chinoda, 17, Junior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Memory Mutema

ENBM077  Advancing Biotechnology in Africa  
Darlsy Chikomborero Chingono, 17, Senior, Queen Elizabeth Girls' High School, Harare, Zimbabwe, T: Memory Mutema

ENMC076  Aeronautics Science behind Airplanes  
Tanatswa Cletos Musariri, 14, Senior, St. Johns Emerald Hill, Harare, Zimbabwe, T: Wendy Gwete

MCRO016  From Water Purification to Carbon Capture and Nutrient Supplementation: A Potential Zimbabwean Solution  
Chen Chen Zha, 18, Senior, Hellenic Academy, Harare, Zimbabwe, T: Robin Powles

SOFT064T  Alcohol Sensor  
Rufaro Nicole Mutogo, 17, Senior, Tinotenda Zimhunga, 18, Senior, Chisipite Senior School, Harare, Zimbabwe, T: Paul Grotto T: Paolo Grotto
This diagram, made up of stitched together NASA imagery, is essentially a map of the observable universe. The solar system is at center. The scale changes as you move outward so that the distances depicted toward the edge of the circle are enormous.

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The foundation of tomorrow’s innovation is education. That's why making quality education available to more students around the world — with the help of technology — has inspired Intel's commitment to education for 50 years. We do more than make contributions. Intel gets directly involved in developing and helping to change policy, training teachers, offering free curricula, providing kids with a place to explore technology, and encouraging young innovators. Intel believes that students at all levels everywhere deserve to have the skills they need to become part of the next generation of innovators.

In the last decade, Intel has invested more than $1 billion, and Intel employees have donated more than four million hours, toward improving education in more than 80 countries, regions and territories. We are actively involved in education programs, advocacy, and technology access to help tomorrow's innovators.

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