



THINK BEYOND

**Intel International Science and Engineering Fair
2019 Program**

May 12–17, 2019
Phoenix, Arizona

Intel International Science and Engineering Fair



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.

Intel International Science and Engineering Fair 2019

Greetings	2
Phoenix Elected Official.....	4
About Phoenix.....	6
Gordon E. Moore Award	8
Title Sponsor.....	9
Grand Awards	10
Education Outreach Day Program Sponsors.....	12
Special Award Organizations	14
Location and Hours	16
General Information	18
Schedule of Events	22
Symposia Schedule.....	32
Phoenix Local Arrangements Committee	44
Intel ISEF Committees	45
About Intel	46
Additional Acknowledgements	47
About Society for Science & the Public	48
Finalist Directory	50



Intel Foundation
Pia Wilson-Body
President, Intel Foundation

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,

A handwritten signature in black ink that reads "Pia Wilson-Body". The signature is written in a cursive, flowing style.

Pia Wilson-Body
President, Intel Foundation

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



Welcome from the Society for Science & the Public

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,

A handwritten signature in black ink that reads "Maya Ajmera". The signature is written in a cursive, flowing style.

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



State of Arizona
Doug Ducey
Governor



STATE OF ARIZONA
OFFICE OF THE GOVERNOR

EXECUTIVE OFFICE

DOUGLAS A. DUCEY
GOVERNOR

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.

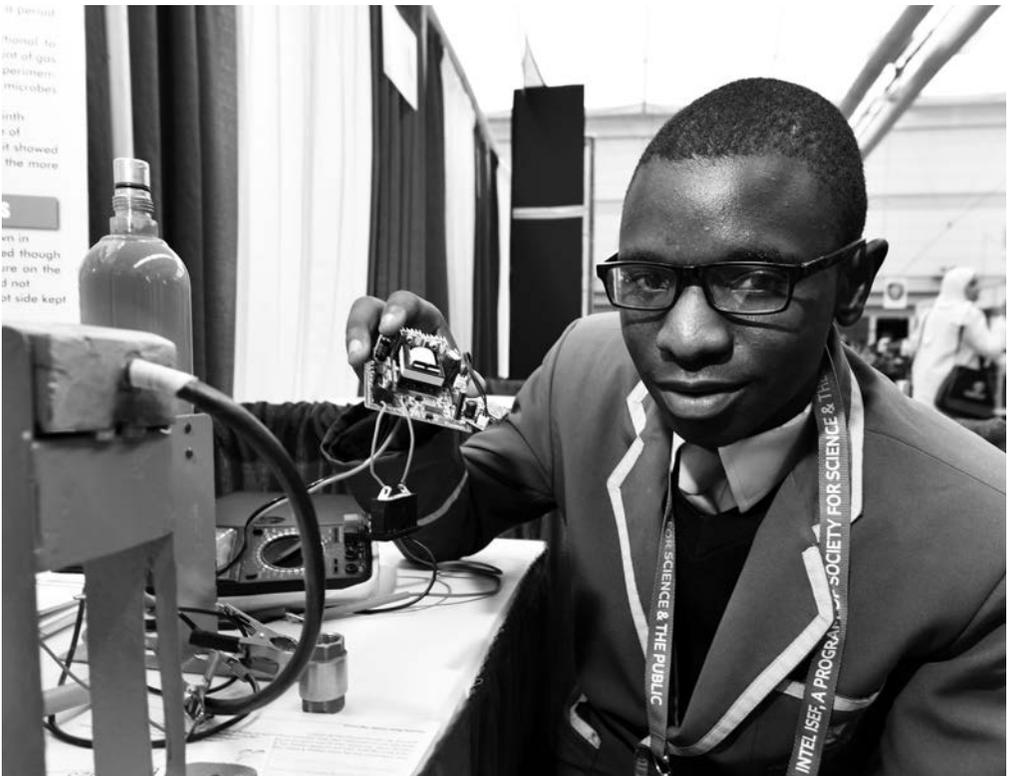
Arizona is a place for diverse opportunity and experiences with the Old West and Native American heritages blending traditional cultures by celebrating Arizona's past and present. I hope that while you are here in our beautiful state, you will take time outside of the Phoenix Convention Center to enjoy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

Douglas A. Ducey
Governor
State of Arizona

1700 WEST WASHINGTON STREET, PHOENIX, ARIZONA 85007
602-542-4331 • www.azgovernor.gov





About Phoenix

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.

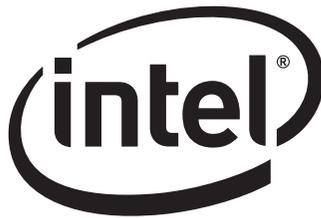
The Gordon E. Moore Award recognizes the best of the Best of Category among the outstanding students from around the world who participate in the Intel International Science and Engineering Fair. The winning project is selected on the basis of outstanding and innovative research, as well as on the work’s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

Intel ISEF 2019 Title Sponsor

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:

1st Place	\$3,000 cash award
2nd Place	\$1,500 cash award
3rd Place	\$1,000 cash award
4th Place	\$500 cash award

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.



Education Outreach Day Program Sponsors

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.



ARIZONA
COMMUNITY
FOUNDATION



PIVOTAL
FOUNDATION
Francis & Dionne Najafi

Mike & Beth Kasser



ARCONIC
FOUNDATION

Ashtavadhani Vidwan
Ambati Subbaraya
Chetty Foundation



Feng Zhang Fund
for STEM Education
and Research



Tom & Susan
Marshall



Dr. Nelson Ying



NATIONAL BANK OF ARIZONA*



FREEPORT-McMORAN
FOUNDATION

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.

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

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

	North Halls 4/5
Sunday	
<i>Finalist Project Set-up and D&S Inspections (OFP)</i>	8:00 a.m. – 8:00 p.m.
Monday	
<i>Finalist Project Set-up and D&S Inspections (OFP)</i>	8:00 a.m. – 6:00 p.m.
Tuesday	
<i>Finalists with Infractions only</i>	7:30 a.m. – 9:00 a.m.
<i>Finalists/Press/PR only</i>	9:30 a.m. – 11:00 a.m.
Wednesday	
<i>Finalists & Judges only</i>	8:00 a.m. – 11:45 a.m., 1:15 p.m. – 4:15 p.m.
Thursday	
<i>Public Visitation Day</i>	9:00 a.m. – 9:00 p.m.
Friday	
<i>Tear Down</i>	End of Awards Ceremony – 1:30 p.m.

Finalist Resource Center

	North 126 A/B/C
Sunday–Monday	8:00 a.m. – 8:00 p.m.
Tuesday	8:00 a.m. – 12:00 p.m.

Intel Quad

	West Hall 1
Sunday	1:00 p.m. – 6:00 p.m.
Monday	9:00 a.m. – 6:00 p.m.
Tuesday	9:00 a.m. – 1:30 p.m., 4:00 p.m. – 6:00 p.m.
Wednesday	11:30 a.m. – 1:00 p.m., 2:00 p.m. – 5:00 p.m.
Thursday	10:00 a.m. – 5:00 p.m.

Intel ISEF Commons 2019

	West Hall 2
Sunday	1:00 p.m. – 5:00 p.m.
Monday	9:00 a.m. – 4:00 p.m.
Tuesday (continental breakfast served)	8:00 a.m. – 9:30 a.m.

Judges' Registration

	Registration Complex
Tuesday (SAO judges)	8:00 a.m. – 7:00 p.m.
Tuesday (Grand Award judges)	12:00 p.m. – 5:00 p.m.
Wednesday (SAO judges)	7:00 a.m. – 1:00 p.m.

Official Party Registration

	Registration Complex
Saturday	3:00 p.m. – 6:00 p.m.
Sunday–Monday	8:00 a.m. – 9:00 p.m.
Tuesday	8:00 a.m. – 7:00 p.m.
Wednesday	7:00 a.m. – 7:00 p.m.
Thursday	8:00 a.m. – 7:00 p.m.
Friday	8:00 a.m. – 9:00 a.m.

Phoenix Information Booth

	Lower Level Concourse
Saturday–Thursday	8:00 a.m. – 5:00 p.m.
Friday	8:00 a.m. – 2:00 p.m.

Retail Store

	Lower Level Concourse
Saturday	3:00 p.m. – 6:00 p.m.
Sunday–Monday	8:00 a.m. – 7:00 p.m.
Tuesday–Wednesday	8:00 a.m. – 6:00 p.m.
Thursday	8:00 a.m. – 7:00 p.m.
Friday	8:00 a.m. – 2:00 p.m.

Volunteer/International Office

	North 121 A/B/C
Saturday	7:30 a.m. – 6:00 p.m.
Sunday–Monday	7:30 a.m. – 9:00 p.m.
Tuesday	7:30 a.m. – 8:00 p.m.
Wednesday–Thursday	6:00 a.m. – 7:00 p.m.
Friday	7:00 a.m. – 11:00 a.m.

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.

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

About the Phoenix Convention Center

The Convention Center is a smoke-free environment. Outside food and beverages are prohibited in the Convention Center.

THINK BEYOND



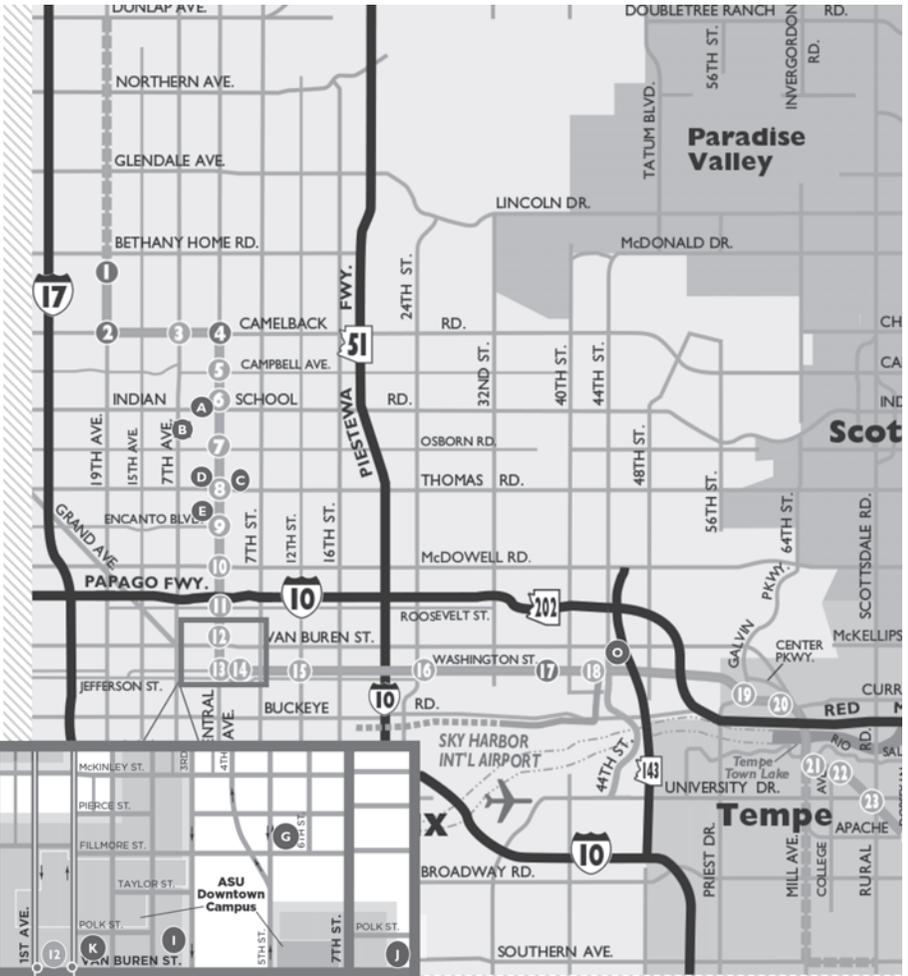
Congratulations to past winners of the Intel International Science and Engineering Fair (Intel ISEF), a program of Society for Science & the Public. Finalists have gone on to do amazing things, such as start nonprofits around the world, win awards such as the MacArthur “Genius” award, start successful 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](https://www.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

GREATER PHOENIX METRO LIGHT RAIL

Light Rail	Expansions to Light Rail	PHX Sky Train
Station Location	Park-and-Ride Station Location	



- 1 Montebello Ave. / 19th Ave.
- 2 19th Ave. & Camelback Rd.
- 3 7th Ave. & Camelback Rd.
- 4 Central Ave. & Camelback Rd.
- 5 Campbell Ave. & Central Ave.
- 6 Indian School Rd. & Central Ave.
- 7 Osborn Rd. & Central Ave.
- 8 Thomas Rd. & Central Ave.
- 9 Encanto Blvd. & Central Ave.
- 10 McDowell Rd. & Central Ave.
- 11 Roosevelt St. & Central Ave.
- 12 Van Buren St. & Central Ave.
Van Buren St. & 1st Ave.
- 13 Washington St. & Central Ave.
Jefferson St. & 1st Ave.
- 14 3rd St. & Washington St.
3rd St. & Jefferson St.
- 15 12th St. & Washington St.
12th St. & Jefferson St.
- 16 24th St. & Washington St.
24th St. & Jefferson St.
- 17 38th St. & Washington St.
- 18 44th St. & Washington St.
- 19 Priest Dr. & Washington St.
- 20 Center Parkway & Washington St.
- 21 Mill Ave. & 3rd St.
- 22 Veterans Way & College Ave.
- 23 University Dr. & Rural Rd.
- 24 Dorsey Lane & Apache Blvd.
- 25 McClintock Dr. & Apache Blvd.
- 26 Martin Lane & Apache Blvd.
- 27 Loop 101 & Apache Blvd.
- 28 Sycamore & Main St.

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

.7 miles

* Distance are approximates

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.

- | | | |
|---|---|---|
| 8:00 a.m.–5:00 p.m.
(Afterwards by appt.) | Project Drop-Off | North Halls 4/5 |
| | 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. | |
| 8:00 a.m.–7:00 p.m. | Scientific Review Committee Interviews | North 127 A–C |
| | 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 . | |
| 8:00 a.m.–8:00 p.m. | Project Set-up/Display & Safety Inspections | North Halls 4/5 |
| 1:00 p.m.–5:00 p.m. | Intel ISEF Commons | West Hall 2 |
| | Your chance to discover and learn more about top colleges and universities, research opportunities and scholarships. Plus, enter to win great prizes! | |
| 1:00 p.m.–6:00 p.m. | Intel Quad | West Hall 1 |
| | 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! | |
| 7:00 p.m.–9:00 p.m. | Student Pin Exchange | Sheraton Hotel, Phoenix Ballroom |
| | 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. | |

MONDAY, MAY 13

- | | | |
|-----------------------------|--|-----------------------------------|
| 8:00 a.m.–12:00 p.m. | Scientific Review Committee Interviews | North 127 A–C |
| | Only for finalists whose projects have not been cleared. | |
| 8:00 a.m.–6:00 p.m. | Project Set-up/Display & Safety Inspections | North Halls 4/5 |
| | All projects must be set-up and inspected no later than 6:00 p.m. Both the SRC and D&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&S by 9:00 a.m. on Tuesday, May 15. | |
| 8:45 a.m.–4:30 p.m. | Symposia | West 101 A/B/C, 106B, 106C |
| | See full schedule on pages 32–43. | |



Opening Ceremony

Monday, May 13

Phoenix Convention Center
North Halls A/B/C



Feng Zhang, Ph.D.

Core Institute Member, Broad Institute

Investigator, McGovern Institute for Brain Research, MIT

James and Patricia Poitras Professor in Neuroscience, MIT

Investigator, Howard Hughes Medical Institute

1998–1999 International Science and Engineering Fair

2000 Science Talent Search

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.

9:00 a.m.–4:00 p.m.	Intel ISEF Commons	West Hall 2
	Learn about organizations offering scholarships and research opportunities. Meet representatives from leading colleges and universities. Enter to win a GoPro camera!	
9:00 a.m.–6:00 p.m. 11:00 a.m.–3:30 p.m.	Intel Quad Movie Screening–	West Hall 1
	AMC Theaters at the Arizona Center <i>Inventing Tomorrow</i> and <i>Science Fair</i> 565 N. 3rd Street, Phoenix	
	Intel ISEF attendees will have the opportunity to attend <i>Inventing Tomorrow</i> and <i>Science Fair</i> —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.	
3:30 p.m.–6:30 p.m.	Opening Ceremony Dinner	North Ballroom 120 A–D
	All registered attendees are welcome. Intel ISEF name badges are required to enter.	
6:30 p.m.–7:00 p.m.	Opening Ceremony Pre-Show	North Halls A/B/C
	<i>Doors open at 6:15 p.m.—Casual Attire</i>	
7:00 p.m.–8:30 p.m. <i>Doors open at 6:15 p.m.</i>	Opening Ceremony	North Halls A/B/C
	Sponsored by Intel Corporation Keynote Speaker: Feng Zhang, Ph.D. The Intel ISEF Opening Ceremony Act kicks off the week of events for 2019.	
8:00 p.m.	Final Project Infractions List	
	Posted at Registration, outside of Exhibit Halls, and on student.societyforscience.org/intel-isef/attendee .	

TUESDAY, MAY 14

7:30 a.m.–9:00 a.m.	Project Infraction Clearance	North Halls 4/5
	Both the Scientific Review Committee and Display & 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&S by 9:00 a.m., Tuesday, May 14.	
8:00 a.m.–10:00 a.m.	Intel ISEF Commons	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.	
8:30 a.m.–1:00 p.m.	Symposia	West 101 A/B/C, 106B, 106C
	See full schedule on pages 32–43.	

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

<p>9:00 a.m.–1:30 p.m. 4:00 p.m.–6:00 p.m.</p>	<p>Intel Quad</p>	<p>West Hall 1</p>
<p>9:30 a.m.–11:00 a.m.</p>	<p>Press/Public Relations Time with Finalists North Halls 4/5 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.</p>	
<p>1:30 p.m.–2:35 p.m.</p>	<p>Innovation and Entrepreneurship Panel North Halls A/B/C <i>Presented by Society for Science & the Public—Casual Attire</i> 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.</p>	
<p>2:35 p.m.–2:50 p.m.</p>	<p>The Journey from Young Scientist to Successful Entrepreneur, A Conversation with Dr. George Yancopoulos North Halls A/B/C 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.</p>	
<p>2:50 p.m.–4:00 p.m.</p>	<p>Excellence in Science and Technology Panel North Halls A/B/C <i>Presented by Intel Foundation—Casual Attire</i> 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.</p>	
<p>5:00 p.m.–9:30 p.m.</p>	<p>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</p>	

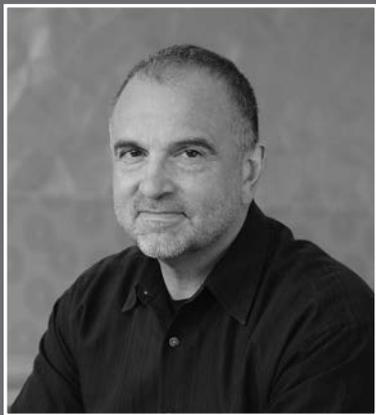
New Session

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

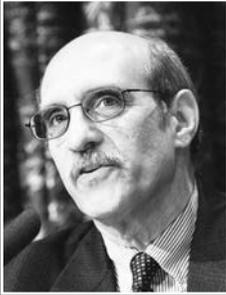
7:45 a.m.–3:30 p.m.	<p>Student Observer Program Hyatt Hotel, Regency Ballroom</p> <p>Anyone with a Student Observer badge may participate in several exciting STEM-based challenges. This event will be held at the Hyatt Regency from 7:45 a.m. to 2:30 p.m. Sessions will be presented by STEM professionals including, a Data & Analytics scientist from the Los Angeles Dodgers, a <i>Science News for Students</i> 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.</p>
8:00 a.m.–11:45 a.m.	<p>Exhibit Halls Open North Halls 4/5</p> <p>Finalists at Projects for Interviews</p> <p>Finalists and Judges only—Professional Attire</p>
9:15 a.m.–3:45 p.m.	<p>Symposia West 101 A/B/C, 106B, 106C</p> <p>See full schedule on pages 32–43.</p>
11:45 a.m.–1:00 p.m.	<p>Lunch Break</p> <p>Concession stands and additional seating will be available. No outside food may be brought into the Convention Center.</p>
1:15 p.m.–4:00 p.m.	<p>Finalists at Projects for Interviews North Halls 4/5</p> <p>Finalists and Judges only—Professional Attire</p>
2:00 p.m.–5:00 p.m.	<p>Intel Quad West Hall 1</p>
6:00 p.m.–8:00 p.m.	<p>Adult Mixer The Duce 525 South Central Avenue</p> <p>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.</p>
6:00 p.m.–10:00 p.m.	<p>Student Mixer North Halls A–E</p> <p>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,</p>

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



Elisa 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

- 9:00 a.m. – 1:00 p.m.** **All Finalists Required at Projects** **North Halls 4/5**
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.
- 9:00 a.m. – 9:00 p.m.** **Public Visitation Day** **North Halls 4/5**
Finalists' exhibits are open to the public.
- 9:00 a.m. – 4:30 p.m.** **Symposia** **West 101 A/B/C, 106B, 106C**
See full schedule on pages 32–43
- 10:00 a.m. – 5:00 p.m.** **Intel Quad** **West Hall 1**
- 7:00 p.m. – 10:00 p.m.** **Special Awards Ceremony** **North Halls A/B/C**
Doors open at 6:30 p.m. *Professional Attire*
Ceremony in which Special Award Organizations, academic institutions and government agencies give awards.

FRIDAY, MAY 17

- 7:00 a.m. – 3:00 p.m.** **Bag Storage** **North 121 A/B/C**
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.
- 9:00 a.m. – 11:00 a.m.** **Grand Awards Ceremony** **North Halls A/B/C**
(Doors open at 8:30 a.m.) *Sponsored by Intel—Professional Attire*
All students are to be seated by 8:45 a.m.
Awards Ceremony where winners from each category as well as the top overall winners for Intel ISEF 2019 are announced.
- Close of Awards Ceremony – 1:00 p.m.** **Exhibit Halls Open for Project Teardown** **North Halls 4/5**
Finalists take down and pack projects for return home. 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.

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.



**"INSPIRATIONAL
AND INVIGORATING!"**

- KENNETH TURAN, *THE LA TIMES*

**"AN
EMPOWERING CELEBRATION
OF AN OFT-MOCKED HIGH SCHOOL SUBSPECIES,
THE SCIENCE NERD..."**

- DAVID ROONEY, *THE HOLLYWOOD REPORTER*

**"THESE
EXTRAORDINARY, DRIVEN,
ECO-COMPASSIONATE CHILDREN ARE
CANCELLING THE APOCALYPSE."**

- SCOTT BEGGS, *NERDIST*

**"THE FUTURE OF OUR PLANET
IS IN GOOD HANDS."**

- MATTHEW DELMAN, *HAMMER TO NAIL*

INVENTING TOMORROW

THE FUTURE IS BRIGHTER THAN YOU THINK

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 stories 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.

ADVERTISEMENT

THE #1 AUDIENCE FAVORITE AT THE SUNDANCE AND SXSW FILM FESTIVALS!

"SO FUNNY AND SO MOVING,
IT ALMOST SEEMS **TOO
GOOD TO BE TRUE.**"
-Carly Mallenbaum, USA Today

"**INFECTIOUS AND EXUBERANT.**
EVEN IN A YEAR OF **EXTRAORDINARY**
DOCUMENTARIES, **SCIENCE FAIR IS
SOMETHING SPECIAL.**"
-Kenneth Turan, Los Angeles Times

"**UTTERLY WINNING.**
LIKE 'HOOP DREAMS' FOR
TEST TUBES AND GENOMES."
-Leah Greenblatt, Entertainment Weekly

"A FUNNY AND **INSPIRATIONAL**
OSCAR-CONTENDING DOC."
-Scott Feinberg, The Hollywood Reporter

"**MELTS YOUR HEART**
ALMOST AS SOON AS IT BEGINS."
-Monica Castillo, RogerEbert.com

"**UNFAILINGLY CHARMING.**"
-Teo Bugbee, The New York Times

"**THE FUNNIEST MOVIE**
OF THE YEAR."
-Kevin Fallon, Daily Beast

"**SUPREMELY ENTERTAINING.**"
-Peter Debruge, Variety

"LIKE A CHRISTOPHER GUEST
MOVIE - **BUT REAL.**"
-Dino Ray Ramos, Deadline

"**ENDLESSLY DELIGHTFUL.**"
-David Edelstein, New York Magazine

"**THE ULTIMATE CROWD-PLEASER.**"
-DoAnna Janes, Harper's Bazaar

"**A ROUSING SUCCESS.**"
-Alan Scherstahl, LA Weekly



FROM DUPONT AWARD-WINNING AND EMMY®-NOMINATED DIRECTORS
CRISTINA COSTANTINI & DARREN FOSTER

SCIENCE FAIR

WHAT'S THE BIG IDEA?

WRITTEN BY CRISTINA COSTANTINI, DARREN FOSTER. DIRECTED BY JEFFREY PLUNKETT, DARREN FOSTER, CRISTINA COSTANTINI
PRODUCED BY CRISTINA COSTANTINI, DARREN FOSTER, JEFFREY PLUNKETT. EXECUTIVE PRODUCERS PETER ALTON, TOM MARONEY, ALEJANDRO VALDES-BOCHIN
CASTING BY JENNIFER WOOD. COSTUME DESIGNER JEFF ANDROW. EDITOR ISAAC LEE. EXECUTIVE PRODUCERS DANIEL ERLMBERG, GEORGE LANSBURY, KEITH SUMMA

WORLD BROADCAST PREMIERE
THURSDAY MAY 9 8/7c



ScienceFairFilm.com

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

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

Today's students are creating tomorrow's success stories.

The visionaries of the future are in school right now, preparing to change the world. GoDaddy is proud to sponsor the 2019 International Science & Engineering Fair to help students make the world they want.

GoDaddy

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

Regeneration 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



www.nsa.gov

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

Learn about the Society's Research Teachers Conference, Advocate Grant Program, STEM Action and Research Grants, and Science News in High Schools.

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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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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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:

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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

1:30 p.m. to 2:30 p.m. | Room: West 106B

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

2:00 p.m. to 3:00 p.m. | Room: West 106C

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

2:45 p.m. to 3:45 p.m. | Room: West 106B

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

3:00 p.m. to 4:00 p.m. | Room: 101A/B/C

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

3:30 p.m. to 4:30 p.m. | Room: West 106C

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

4:00 p.m. to 4:30 p.m. | Room: West 106B

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

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Julie Euber

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**Society for Science & the Public and Intel thank the dedicated
committee members of Intel ISEF 2019.**

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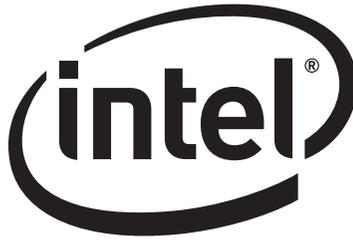
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And the hundreds of Intel employees who judge
and volunteer at Intel ISEF.

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	Ken Hallinen	James Lowery
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Thank You



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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.

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Each # next to the finalist's name indicates previous Intel ISEF participation
An * identifies non-competing projects
T: precedes the name of the Teacher-Sponsor of the Finalist
A T after the booth ID number indicates a Team Project

AMERICAN SAMOA

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

- EAEV036** **Reducing Water Turbidity Using Natural Coagulant *Mangifera indica* (Valencia Pride Mango)**
Gloria Park, 17, Senior, Pacific Horizons School, Pago Pago, American Samoa,
T: Jhoanna Dizon
- PLNT055** **An Assessment of the Impacts of Organic Mulching Materials on Pak Choi (*Brassica rapa Chinensis*) Plant Performance and Growth**
Carl Daniel Torres Balauro, 17, Senior, Fa'asao Marist High School, Pago Pago,
American Samoa, T: Cassandra Garcia
- TMED051** **Identifying and Drug Susceptibility of Gram-Negative Bacteria Found in *Bactrocera xanthodes* (Pacific Fruit Fly)**
Da In Myung, 18, Senior, South Pacific Academy, Pago Pago, American Samoa,
T: Cecilia Tuionoula

ARGENTINA

Córdoba, Argentina, ARG001, National Science Fair of Argentina

- ENMC001T** **Axial Flow Rotor to Remove Seeds' Appendages**
Estefania Nerina Tomas, 19, Senior, Francisco Manuel Panadeiro, 19, Senior,
Escuela Provincial Educacion Tecnica Numero 7, Intendente Alvear, La Pampa,
Argentina, T: Jose Rosiere

AUSTRALIA

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

- EBED015T** **aWear: An Assistive Wearable System to Assist Nurses and Residents of Aged Care Homes**
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
- ENMC040** **Phase 3: A High Performance Rowing Oar with Design Inspired by Biomimicry**
Lucy Annabelle Lake, 18, Senior, Barker College, Sydney, NSW, Australia,
T: Phil Barden
- MCRO021** **The Effects of Sugar Alcohols on *S. epidermidis* and *M. luteus***
Josiah Cheng, 18, Senior, Queensland Academy for Science, Mathematics and
Technology, Brisbane, Queensland, Australia, T: Helen White
- 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**
Tiarra Meier, 17, Senior, Anne Renee Zimmerman, 15, Sophomore, Danthonia
Home School, Elsmore, NSW, Australia, T: Christian Domer
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

THINK BEYOND

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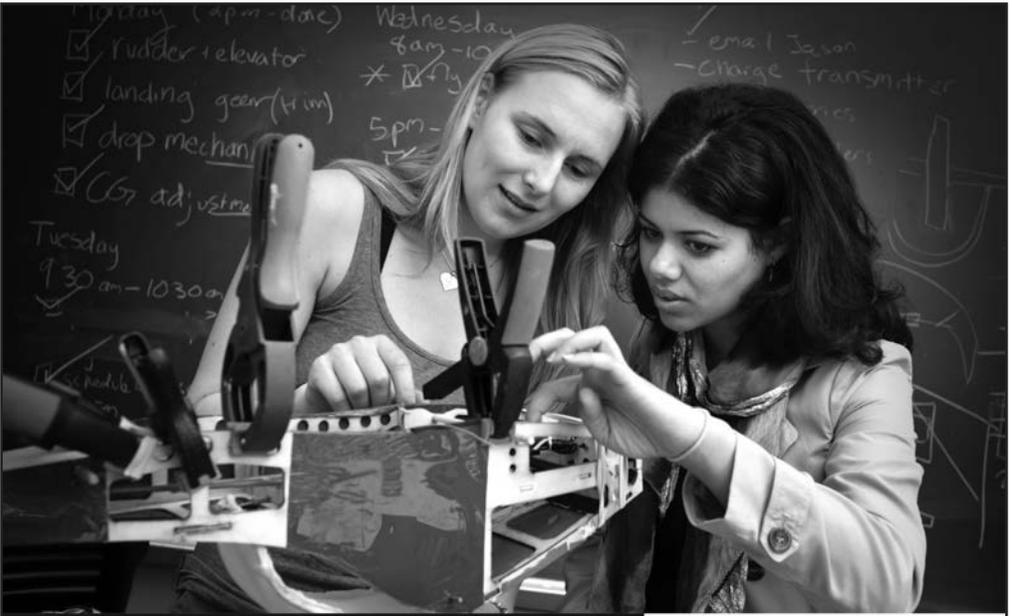
Brussels, Belgium, EUB001, European Union Contest for Young Scientists (EUCYS)

- 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 Schiling 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 Chiochetti 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 Luis 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 Schahren
- 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
Giacomin
- 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 Joaquim 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** **ENDOPISO: Reusing *Cocos 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: Francicleison Pontes
- ENEV062** ***Moringa oleifera* Seeds: A Solution to Eutrophication in Rivers and Lakes**
Patricia Honorato Moreira, 19, Senior, SENAI Vila Canaa, Goiania, Goias, Brazil, T: Flamarion Moreira
- MATS044** **The Universe in a Nutshell: Bacterial Cellulose Membrane Using Macadamia Byproduct**
- ##** Juliana Davoglio Estradioto, 18, Senior, Instituto Federal de Educacao, Ciencia e Tecnologia do Rio Grande do Sul (IFRS) - Campus Osório, Osorio, Rio Grande do Sul, Brazil, T: Flavia 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 (CNLSL)**
Ekarinny Myrela Brito de Medeiros, 18, Senior, Escola Estadual Professor Hermogenes Nogueira da Costa, Mossoro, Rio Grande do Norte, Brazil, T: Luisa 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

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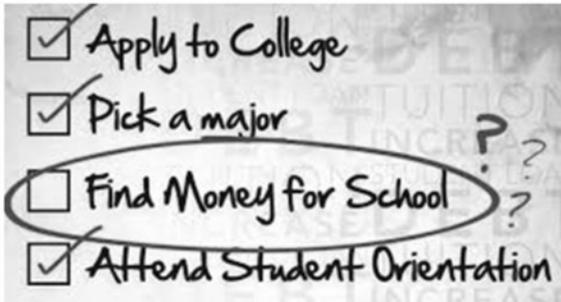


Rensselaer

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- 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 Sivashree Jayasankar, 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
- Montreal, Quebec, Canada, CAN004, Montreal Regional Science and Technology Fair*
- 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 Cu₂O-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 Heterostructure 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 CO₂ 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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- MATH005** **The Mathematical Method to Construct Time-distance Maps for Analyzing Transportation and Economy**
Peiru Xu, 18, Senior, High School Affiliated to Fudan University, Shanghai, China, T: Zongmin Wu
- MATS008** **Flexible Polymer Electrolyte for All-Solid State Lithium Batteries**
Zihao Huang, 16, Junior, Shanghai Jianping High School, Shanghai, Shanghai, China, T: Wei Wei
- MATS013T** **Atomic Engineering on Water Wetting: Life-Like Superhydrophobicity and Temperature Control**
Xuechun Wei, 17, Sophomore, Hao Fang, 15, Sophomore, Beijing Zhongguancun High School, Beijing, Beijing 101 Middle School, Beijing, Beijing, China, T: Sheng Meng
- PHYS008** **The Properties and Rate of Stars with Blazhko Effects from Gaia and OGLE Surveys**
Nan Jiang, 16, Junior, Beijing No. 2 Middle School, Beijing, China, T: Hong Chang
- PHYS011** **Faraday Heaping Unravelled: Study of Heaping Behavior of Granular Materials under Vertical Vibration**
Qingyi Wang, 17, Junior, No. 2 High School of East China Normal University, Shanghai, Shanghai, China, T: Zhentang Wang
- PHYS012** **Research and Application of Micro-Nano Structure of Mosquito Leg and Mouth**
Xinyi Ba, 17, Junior, The High School Attached to Northwest Normal University, Lan Zhou, Gan Su, China, T: Shun Li
- PHYS014** **A Networked Body Temperature Monitoring System Based on Single Chip and Reverse Carnot Cycle**
Tang Jing, 16, Sophomore, Peiyuan Middle School, Quanzhou, China, T: Chen Weina
- PLNT003** **Natural Antioxidants Reduce the Toxic Effect of Heavy Metals on the Growth of Rice (*Oryza sativa L.*)**
Hongjia Yang, 17, Junior, High School Affiliated to Shanghai Jiao Tong University, Shanghai, Shanghai, China, T: Qian Shao
- ROBO014** **Cross-Modal Text-Image Retrieval Algorithm Based on Model Transfer Learning**
Muyao Li, 17, Junior, Chengdu No. 7 High School, Chengdu, Sichuan, China, T: Yukun Zhang
- ROBO015** **Smart Keyboard/Mouse Switch Robot**
Pengrun Chen, 17, Senior, The High School Affiliated to Renmin University of China, Beijing, Beijing, China, T: Xiao Zheng
- SOFT008** **Blockchain Optimization Model Based on Consistent Hash Algorithm**
Chang Su, 17, Junior, Shimen Middle School, Nanhai, Guangdong, China, T: Xiao Ma
- SOFT009** **Automatic Mosaic and Real-time Measuring System for UAV Images**
Zeqing Yuan, 17, Junior, Xiamen No.1 High School of Fujian, Xiamen, Fujian, China, T: Jundai Wang
- SOFT014** **Enhanced Image Caption Using Scene-Graph Generation**
Feiyu Zhu, 17, Junior, The High School Affiliated to Renmin University of China, Beijing, Beijing, China, T: Dan Wan
- SOFT016** **It's Break Time: An Iris-Based Eye Fatigue Monitor**
Yufeng Sun, 17, Junior, The Experimental High School Attached to Beijing Normal University, Beijing, Beijing, China, T: Yingfei Hu
- Chengdu, China, CHN008, Sichuan Science Fair*
- 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

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- ENBM009T** **A Breakthrough Body-Powered Prosthetic Hand**
Yuet Tung Cheung, 15, Sophomore, Ka Man Ng, 16, Sophomore, Tung Laam Leung, 15, Sophomore, Skh 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** **Avinocular: 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 lo

CHINESE TAIPEI

Taipei, Chinese Taipei, TWN001, Taiwan International Science Fair

- BEHA015** **The Neural Mechanisms Underlying the Other Race Effect for Expression Perception**
Tsung-Tien Hsiung, 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**
Huai-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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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

Bogota, Colombia, Col002, Feria Nacional de Ciencia, Tecnologia e Innovacion

ENEV006T **Paper and Ink: An Alternative Strategy for Reusing Paper and Ink**

Juan Sebastian Delgado, 16, Junior, Jonathan David Rodriguez, 16, Junior, Ismael Perdomo Borrero, Gigante, Huila, Colombia, Ismael Perdomo Borrero, Gigante, Huila, Colombia, T: Yoli Delgado Murcia

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 Turrubares, Turrubares, San Jose, Costa Rica, T: Jose Herrera-Mesen

San Pedro de Montes de Oca, Costa Rica, CRI001, Feria Nacional de Ciencia y Tecnologia

EAEV026 **Forest App: Redesign the Urban Landscape so Birds Will Return to San Jose, Costa Rica**

Luis Carlos Bustamante Leon, 19, Senior, Colegio Tecnico Don Bosco, San Jose, San Jose, Costa Rica, T: Carlos Eduardo Acosta Chacon

ENMC035T **Adaptive Elevation Device for Wheelchairs (AEWheelchair)**

Hazel Bolanos/Alfaro, 16, Junior, Daniela Murillo Rodriguez, 18, Junior, Roy Fernando Rojas Santamaria, 17, Junior, Colegio Cientifico de Costa Rica Sede San Carlos, San Carlos, Alajuela, Costa Rica, T: Luis Esquivel Sancho

SOFT025T **Inclusive Translator for People with Hearing Impairment**

David Monge_Ricaurte, 17, Junior, Diego Josef Reyes_Caton, 18, Junior, Marcos David Mata_Baltodano, 17, Junior, CTP Carlos Manuel Vicente Castro, Golfito, Puntarenas, Costa Rica, T: Maria Peralta Varela

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

CHEM001 **Synthesis of HIV-1 Reverse Transcriptase Inhibitors**

Tereza Gistrova, 20, Senior, Gymnazium Zlin - Lesni Ctvrt, Zlin, Zlínský Kraj, Czech Republic, T: Jana Hrabikova

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, Czech Republic, T: Dana Kucharikova

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

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 Svobodova

SOFT058 **Colorizing Grayscale Photographs with a Neural Network**

Jaroslav Urban, 19, Senior, Stredni Prumyslova Skola Strojni 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 Markoew, 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, Junior, 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 Makhall Mankarious, 17, Junior, Assuit Science, Technology, Engineering and Mathematics High School, Assuit, Mankabad, Egypt, T: Ramadan Hussien
- North Coast & West of Egypt, Egypt, EGY002, Bibliotheca Alexandrina Science and Engineering Fair–Alexandria*
- 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



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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 Kesklinna 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, Pajjat-Hame, Finland, T: Esa Palkio

PHYS063**A Research of Cooling Characteristics of Liquid in Different Containers**

Ville Ilmari Rosendahl, 16, Freshman, Rantakylan Yhtenäiskoulu, Mikkeli, Etela-Savo, Finland, T: Merja Kankaanpaa

SOFT057T**Mobile Keyboard Optimized for Two Fingers**

Vihtori Sova, 17, Junior, Jaakko Takala, 17, Junior, Paivola School of Mathematics, Valkeakoski, Finland, T: Esa Lappi

FRANCE*Paris, France, FRA001, Olympiades de Physique***MATS002T****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***BMED061T****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

PHYS069T**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

ROBO073T**Universal Device for the Blind**

Mariam Bakhtadze, 15, Sophomore, Anna Kalandarishvili, 15, Sophomore, Milana Gagulia, 16, Sophomore, St. Alexi Shushania's School-Gymnasium, Senaki, Samegrelo Zemo-Svaneti, Georgia, T: David Songulashvili

GERMANY*Darmstadt, Germany, DEU001, Jugend Forscht***CELL002T****Chemotaxis of the Slime Mold *Physarum polycephalum* and the Interaction with Different Molds**

Anna Lia Schicktzanz, 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, Megina Gymnasium Mayen, Mayen, Germany, T: Michael Sexauer

ENEV007T**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-Knippling-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

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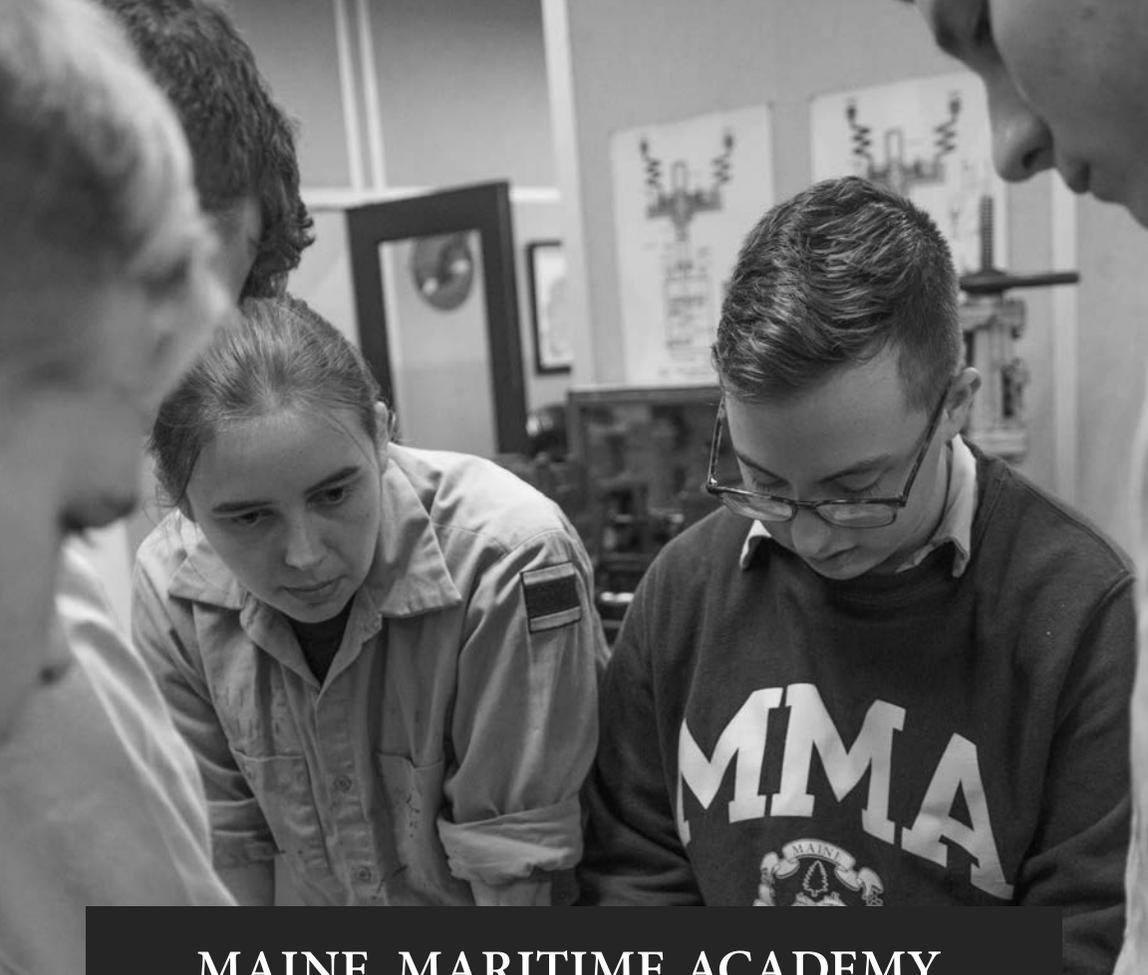
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HUNGARY*Budapest, Hungary, HUN001, Innovation Contest for Young Scientists*

- MCRO028** **Innovative Approach to the Antibacterial and Prebiotic *Lycium barbarum* Extract: Solution after the Antibiotic Era**
Blanka Novak, 19, Senior, Istvan Dobo Secondary Grammar School, Eger, Heves, Hungary, T: Zsuzsanna Prokaine Hajnal

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, Pujab, 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
- 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: Asha 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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- ROBO074** **Positively Identifying Species Using CNNs and Hypernetworks to Aid Wildlife Conservation Efforts**
Aditya Radhakrishnan, 16, Sophomore, Suguna PIP School, Coimbatore, Tamil Nadu, India, T: Radhakrishnan Purushothaman
- SOFT046** **GoO: Reimagining Data, Privacy, and the Internet with Zero-Knowledge Computing and Distributed Systems**
Mohammed Suhail China Salimpasha, 18, Senior, The Learning Centre, Mangalore, Karnataka, India, T: Vijay Moras
- SOFT059** **Recovering History: A Multifaceted System to Enhance, Classify and Reconstruct Broken Parts of Artifacts by Using a Custom Machine Learning Ensemble**
Raghav Puri, 17, Junior, Delhi Public School, Dwarka, Delhi, India, T: Meetu Sobti
- SOFT060** **Periphery Sweep Algorithm: Conquering A* Algorithm at Graph Traversal Solutions**
Richik Vivek Sen, 18, Senior, Delhi Public School - Vasant Kunj, New Delhi, Delhi, India, T: Meenakshi Mehrishi
- TMED036T** **A Novel and Innovative Chemical Strategy for Mosquito Repellent Cotton Textiles**
Suneetha Murje Prabhu, 15, Sophomore, Sanjeev Hotha, 14, Freshman, Sri Dharamasthala Manjunatheshwara English Medium School, Mangalore, Karnataka, India, Kendriya Vidyalaya Ganeshkhind, Pune, Maharashtra, India, T: Shanthala Prabhu Murje, T: Srinivas Hotha
- TMED040** **A Novel Peptide Drug as a Therapeutic in Sickle Cell Anemia**
Rutik Santosh Thorat, 18, Senior, Dayanand Anglo Vedic Public School, Navi Mumbai, Maharashtra, India, T: Manjusha Rani
- TMED047T** **Kanna: A Deep Learning Approach for Screening Amblyopia Using Facial Images**
Viswesh Krishna, 18, Senior, Vrishab Krishna, 16, Sophomore, National Public School, Indiranagar, Bangalore, Karnataka, India, T: Kaushik Murali
- INDONESIA**
Jakarta, Indonesia, IDN001, Youth Science Competition
- BEHA018T** **TEMEN (Terapi Autism Online) : An Online Autism Therapy with YouTube**
Angeline Freshbi Chesa Halim, 18, Senior, Anglila Siddha Paramarthastri, 18, Senior, Yogyakarta 8th State Senior High School, Yogyakarta, Daerah Istimewa Yogyakarta, Indonesia, T: Ezra Setiawan
- EAEV022T** **Potential Identification and Application of the *Rhizophora apiculata* and *Sonneratia alba* as a Bio Antifouling Agent for Antifoulant Paints**
Wiratathya Putramas I Made, 17, Junior, Carolline Mathilda Nggebu, 18, Senior, Denpasar 3rd State Senior High School, Denpasar, Bali, Indonesia, T: Rai Made
- EGCH013** **Exploration Study of the Potential of Microalgae *Spirulina maxima* as a Source of Renewable Electric Energy Based on Dye Sensitized Solar Cell**
Putu Diwyandaani Priyahita, 16, Junior, Denpasar 7th State Senior High School, Denpasar, Bali, Indonesia, T: I Bagus Ngurah Alit Putra Wiryawan
- ENMC027** **Reducing Wingtip Vortex by Adjusting Wingtip Angle: Experimental and Computational Analysis**
William William, 17, Senior, Santa Laurensia Senior High School, Tangerang Selatan, Banten, Indonesia, T: Gregorius Bryan
- MATS018** **Gold Nanoring Sensing Membrane Application for Hydrogen Peroxide Detection as Myocardial Marker Study**
Gardin Muhammad Andika Saputra, 17, Senior, Boyolangu 1st State Senior High School, Tulungagung, Tulungagung, East Java, Indonesia, T: Lilik Suryani
- PLNT019** **C-Rice: Computational and Experimental Design Development of Transgenic Rice to Fulfill the Nutritional Demand of Carnosine in Human**
Michaela Samanta, 18, Senior, Smak Penabur, Tangerang, Banten, Indonesia, T: Imaduddin Burhan

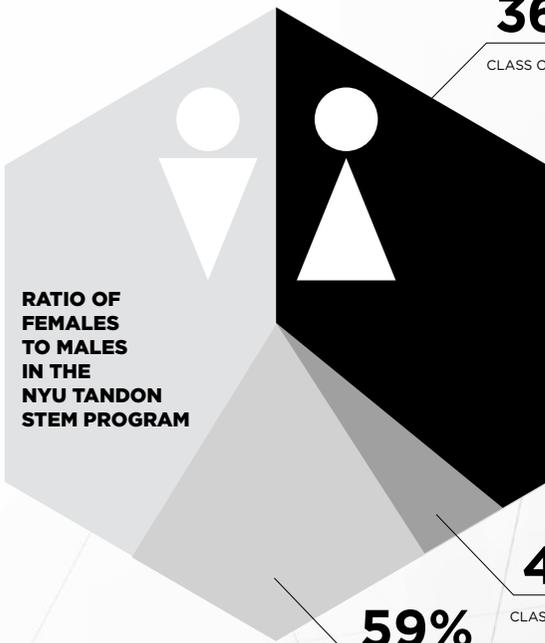


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IRAQ*Erbil, Iraq, IRQ001, INPO (Iraq National Project Olympiad)***EGCH045T The Plasma Battery****#** Mustafa Fadhil Kamal#, 17, Junior, Mohammed Nasih Hamagareeb, 15, Junior, Erbil Ishik Boys College, Erbil, Iraq, T: Shivan Majeed**ENMC077T Fire Retardant**

Ibraheem Saad Ismaiel Shakarchi, 16, Sophomore, Ayooob 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: Kyohei 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: Takuya Suzuki

ANIM016T Novel Subtle Acoustic Communication: Successful Elucidation of the Cryptic Ecology of Runner Plant Bugs (*Hallodapus spp.*) with Emphasis on Their Stridulatory Mechanisms

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

MATS014 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

- BEHA012** **DRAWIT: Predicting Children Physiological State, Behavioral Tendencies and Personality Characteristics Using Guided Drawing**
Dania Rasmi Alzubaiden, 16, Sophomore, Al Ridwan Schools, Amman, Khalda, Jordan, T: Basma Diab
- CHEM015** **Analysis of Carbon Dioxide to Oxygen Using Ultra Violet Light**
Maya Maher Almanaseer, 15, Sophomore, Umm Al-Summaq Secondary School, Amman, Khalda, Jordan, T: Bashar Lahlouh
- CHEM018T** **Removal of Nickel Ions from Electroplating Wastewater Using Nano-Kaolinite Extracted from Sweileh Sand Deposits**
Tala Raed A. Natour, 16, Junior, Rand Hashim Alqudah, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah
- EBED010** **Digitizing Marketing Collateral: An Alternative for Printing Large Quantities**
Selen Amjad Qarajeh, 15, Sophomore, Al-Omaryah Schools, Amman, Jordan, T: Amjad Qarajeh
- ENBM014** **Computer Surgery System Development**
Obaida Amer Darrs, 17, Junior, Secondary Sahab Boys, Sahab, Jordan, T: Sajedah Abu Mansour
- ENEV024T** **SUBURIFY**
Malek Akram Aldebsi, 17, Junior, Abdallah Mahmoud Abusaleemeh, 17, Junior, Al-Hasaad Al-Tarbawi School, Amman, Amman, Jordan, T: Abdallah Harb
- ENEV028** **Collecting Moisture by Static Electricity**
Abdallah Basil Omari, 16, Junior, Modern Systems School, Amman, Amman, Jordan, T: Ehab Abu Nimreh
- ENEV029T** **System of Capturing Carbon Dioxide in Factories and Transportation**
Ammar Fuad Issa Batarseh, 16, Junior, Omar Ahmad Easa Bakar, 16, Junior, Jerash Secondary School, Jerash, Jordan, T: Ahmad Al-Dalabeeh
- ENEV030** **Portable Hydrogarden**
Jana Qusai Algharaibeh, 15, Sophomore, International Academy–Amman, Amman, Jordan, T: Dema Sawalha
- MATS015T** **Carbon Nanotubes in Future's Spacesuits**
Tala Issa Gammoh, 17, Freshman, Leen Ali Salameh, 14, Freshman, Al Asriyya Schools, Amman, Jordan, T: Ali Salameh
- PLNT012** **RCHSSE: Remotely Controlled Hydroponic System by Solar Energy**
Shatha Salah Al Thyabat, 16, Sophomore, King Abdullah II School for Excellence, Ma'an, Ma'an, Jordan, T: Rehan Mubarak
- TMED014T** **ADIRIS: Alzheimer's Disease Screening through the Iris**
Raad Amer Kloob#, 17, Junior, Hala Tareq Al-Jaberi, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah
- TMED015T** **SHAMA: Strabismus Horner Anisocoria Miosis Application**
Mo'Men Bassam Gazlate, 17, Junior, Mira Nidal Al Qousi, 17, Junior, Jubilee School, Amman, Jordan, T: Sawsan Abu Jammaah

KAZAKHSTAN

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

- MATS061** **Preparation of Nanostructured Silicon with Optimal Optical Parametres**
Amelie Shakim, 16, Sophomore, Nazarbayev Intellectual School of Physics and Math, Almaty, Kazakhstan, T: Margulan Ibraimov
- ROBO072T** **GloveSpeaker**
Nurdaulet Abenovich Taumergenov, 16, Sophomore, Karen Dolmagambetov, 17, Junior, Nazarbayev Intellectual School, Aktobe, Aktobe, Kazakhstan, T: Baurzhan Shokanov

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 (U5CM) 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 Monitory 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, Alrawdha 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
- ENEV094** **Development of New Thermal Insulating Materials from Naturally Structured Materials**
Roberts Kristis Jaunarajs-Janvaris, 19, Senior, Liepaja Rainis 6 High School, Liepaja, Kurzeme, Latvia, T: Uldis Zaimis

LUXEMBOURG

Luxembourg, Luxembourg, LUX001, National Contest "Jonk 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

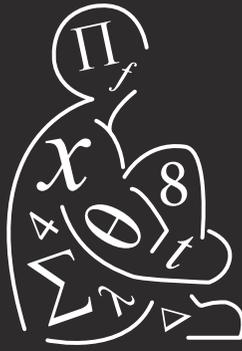
MALAYSIA

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 Mahmud
- 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 Wadhiah Rosli, 16, Senior, Puteri Irdina Sofea Jazlan Arif, 17, Junior, MRSM Tun Abdul Razak, Pekan, Pahang, Malaysia, T: Nurul Afiqah Mohamad 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 Afran Hamizi, 17, Junior, Muhammad Haiqal Syahmi Muhammad Helmi, 17, Junior, MRSM Langkawi, Kuah, Langkawi, Malaysia, T: Nurul Izzah Abd Halim
- MEXICO**
Mexico City, Mexico, MEX002, Feria Nacional de Ciencias e Ingenierias-CONACYT
- 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 Isaias 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

mens et manus



mind and hand

- 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** **PhytoDermsunscreen**
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 Ubazuonu-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 Videregaende 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, Habiba Al Handhali, 15, 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 Khurshed, 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

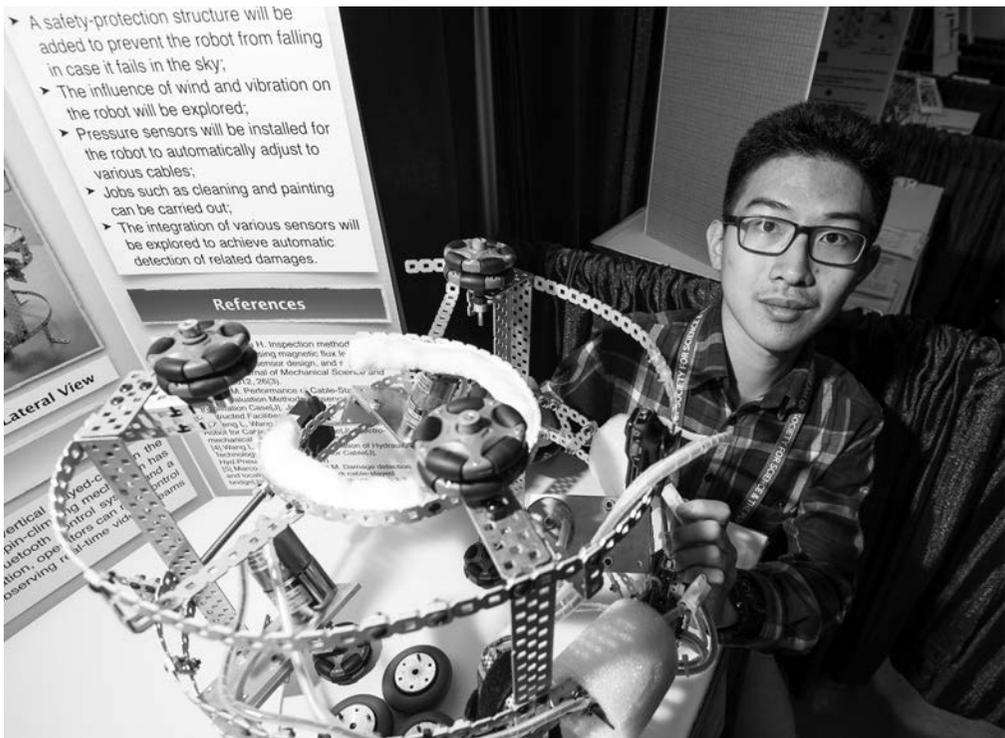
Mohammed Y. M. Owda, 15, Sophomore, Qossay A. M. Rida, 15, Sophomore, Qusra Secondary School for Boys, Nablus, South Nablus, Palestine, T: Dima Zeineddin

ENBM066T Do I Need an Antibiotic?

Majd Fawaz Ayyad, 15, Sophomore, Haya ibrahem 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



- ENEV089** **Water Is Right for Everyone**
Yafa H. S. Jaradat, 16, Junior, Seir Secondary Girls School, Seir, Hebron, Palestine, T: Linda Mtoor
- ENEV090** **Water Pollution Indicator**
Fatima M. S. Qurie, 16, Sophomore, The Orthodox School of Bethany, Bethany, Palestine, T: Sana Jaber
- MATS067** **Manufacturing Thermally and Mechanically Enhanced Concrete Bricks Using Glass Waste and Reducing Building Energy Consumption**
Saif Maher Jabari, 15, Sophomore, Al Hussein Bin Ali Secondary School, Hebron, Hebron, Palestine, T: Mohammed Walid Al Karaki
- SOFT061** **Photon Robot: Developed Algorithms that Turns Light to Data that the Blind's Brain Can Process**
Lama Alaa Abed, 17, Junior, Al- Najah Secondary School, Al-Bireh, Ramallah and Al-Bireh, Palestine, T: Manar Samara

PANAMA

Panama City, Panama, PAN001, Feria Cientifica del Ingenio Juvenil

- ANIM002T** **Diurnal Butterflies Population as Indicator Environmental Quality of the Natural Park "San Francisco," Torti, Panama**
Janai Milet Dominguez, 17, Junior, Genisis Zarahi Almanza, 17, Junior, Centro Educativo Bilingue de Torti, Panama, Panama, T: Jose Antonio Aguilar
- MCRO036T** **Pathogens and Biocontrol: Fungi Associated to *Theobroma cacao* in Guna Yala, Panama**
Lianne Marie Francis, 18, Senior, Carla Liz Chanis, 18, Senior, Smart Academy Panama, Panama, Panama, T: Ivonne Torres
- TMED003T** **Reaction of Mast Cells in the Presence of Particulate Matter from Panama City Air Samples**
Paula Patricia Palacios, 18, Senior, Natalia Carolina Cassino, 16, Senior, Colegio Real de Panama, Panama, Panama, T: Ivonne Torres

PERU

Lima, Peru, PER001, Peru Science and Engineering Fair

- ANIM018T** **Study of the *Achupalla* Worm (From the *Schistothecha* Family) in the Biodegradation of Low Density Polyethylene (LDPE)**
Johan Suclli Machacca, 14, Freshman, Willian Aguilar Paucpar, 17, Sophomore, Daniel Estrada Perez, Quispicanhis, Cusco, Peru, T: Joaquin Guzman Farfan
- ANIM019T** **Evaluation of the Biodegradable Effect of *Tenebrio molitor* "Flour Worm" in the Polystyrene "Styrofoam Residues" to Reduce the Environmental Pollution and Generate Conscience to the Population of Huanuco 2018**
Fabriscio Raul Camara Caldas, 16, Sophomore, Perla Miraval Cano, 16, Sophomore, Isaac Newton, Huanuco, Peru, T: Edith Bravo Jara
- BEHA016T** **Indigenism in Peru of the XX Century**
Fiorella Lizeth Manosalva Diaz, 16, Sophomore, Antonella Sonaly Paredes Aquino, 16, Sophomore, High Performance College of Cajamarca, Cajamarca, Peru, T: Carlos Torres Jave
- BEHA017T** **Tambomachay: Rock Art of the Archaic Man of Qanchis**
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
- EGCH012T** **Second Generation Biofuel from the Reuse of Discarded Citrus Fruits**
Claudia Jazmin Santisteban Rodriguez, 15, Sophomore, Juan Carlos Armas Santisteban, 15, Sophomore, Benjamin Franklin, Ascope, La Libertad, Peru, T: Carlos Santisteban Alvarado
- PLNT015T** **Comparison of Substrates in Sexual Propagation of the Quina Tree (*Cinchona officinalis*)**
Stefany Nicole Vasquez Meza, 13, Freshman, Marlitt Karen Barboza Hernandez, 15, Sophomore, Jose de San Martin, Bongara, Amazonas, Peru, T: Luz Quispe Sanchez

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- 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
- ENEV091** **Magnetic and Non-magnetic *Zea mays* L. Stalk Biochar Composites: Its Adsorptive Capability in the Treatment of Phosphate Contaminated Aquaculture Ponds**
Nathaniel Navela Reyes, 16, Junior, Quezon National High School, Lucena City, Quezon Province, Philippines, T: Jeric Ilao
- MATS064T** **Hibla: An Alternative Sound Absorption Material**
Shaira Castro Gozun, 18, Junior, Neil David Cortez Cayanan, 17, Junior, E'van Relle Matic Tongol, 16, Sophomore, Angeles City Science High School, Angeles City, Pampanga, Philippines, T: Lolita Bautista
- MCRO078T** **Biocontrol Potential of Endophytic Bacteria against Brown Eye Spot in Coffee**
Anna Beatriz Almonte Suavengco, 18, Senior, John Eric Paje Aggarao, 18, Senior, Kathleen Chloie Cuya Antonio, 18, Senior, Taguig Science High School, Taguig, Metro Manila, Philippines, T: Janeth Mamansag
- PLNT068T** **Automated Temperature and Humidity Monitoring System for Quality Control, Drying and Storing of Rice Varieties**
Alpha Kassandra Leonille Acain Acain, 17, Senior, Lester John Tamot Sabadao, 17, Senior, Lia Denise Tomas Tan, 17, Senior, Cagayan National High School, Tuguegarao City, Cagayan, Philippines, T: Enrique Garcia

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
- ENEV002** **The Prototype of a Vehicle which Takes Preventive Measurement of Soil Conditions Autonomously**
Piotr Lazarek, 18, Junior, Zespół Szkół Ogólnokształcących Filomata, Gliwice, Śląsk, Poland, T: Bożena Brożyna
- ENEV003** **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 Momot, 19, Senior, I Liceum Ogólnokształcące imienia Adama Mickiewicza w Stargardzie, Stargard, Województwo Zachodniopomorskie, Poland, T: Piotr Bebas
- ENMC012T** **AMSD (Autonomic Modular Scouting Drone): In Services for Society**
Jakub Jan Jurzak, 19, Senior, Szymon Stanisław Stasik, 19, Senior, Liceum Ogólnokształcące nr I im. Marii Skłodowskiej-Curie w Sucheju Beskidzkim, Sucha Beskidzka, Małopolska, 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 Benvenuti
- 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 Benvenuti

Arecibo, Puerto Rico, TEPR02, Arecibo Regional Science Fair

- ENMC041 Alternate Vehicular Traffic Direction System Utilizing Solar Energy**
Sebastian Jose Medina Maysonet, 15, Sophomore, Brigida 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 Evangelico Capitan 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**
Jeancarlos 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 Agricola 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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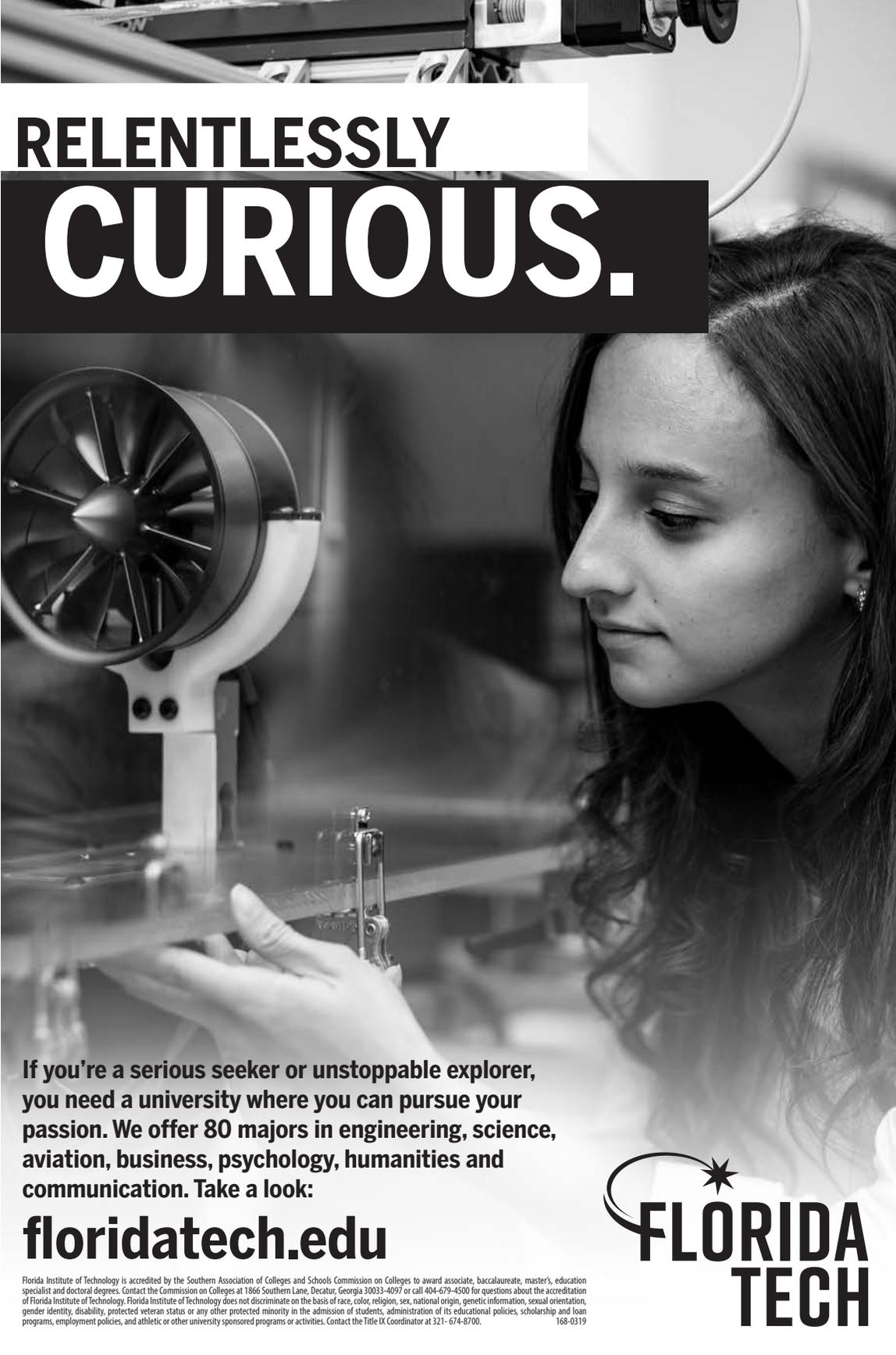
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- ENEV042** **Analysis of the Bioremediation Potential of the Microbial Communities Isolated from Termites "*Nasutitermes genus*" and Ruminants "*Capra aegagrus hircus*", in Selective Media and Bioassays of Carboxymethylcellulose (CMC) with β -D-Glucose, 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
Humacao, Puerto Rico, TEPR05, Humacao Regional Science Fair
- CHEM027** **Comparative Study on the Properties of Magnetized 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
Ponce, Puerto Rico, TEPR06, Ponce Regional Science Fair
- 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: *Arthrospira 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 (SiO_2) Loaded with Ruthenium ($\text{Ru}(\text{bpy})_3^{2+}$) 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)**

Wilmory 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, QAT001, The National Student Research Fair

BMED074T **The Effect of Silver Nanoparticles Socks on the Treatment of Diabetic Foot**

Abdulhadi Jaber Jallab, 18, Senior, Hareth Omar, 15, Sophomore, Jassim Hamad Independent Secondary School for Boys, Doha, Qatar, T: Sherif Elserwy

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

Thuraya Khalid Saleh Al-Hajri, 16, Sophomore, Noora Hamad M. F. Al-Marri, 15, Sophomore, Al Wakra Secondary School for Girls, Al Wakra, Qatar, T: Wafaa Hassan Mohamed Morsy

ENEV087 **Value Added Sensors from Environmental and Industrial Waste**

Ajlan Mohammed Al-Kaabi, 17, Senior, Omar Bin Al-Khattab Secondary School, Doha, Qatar, T: Emad Abu Yusef

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, Durlesti," Chisinau, Republic of Moldova, T: Ilker Ozer

ROMANIA

Suceava, Romania, ROM001, Romania Science and Engineering Fair

EBED001T **Material Study with Carmen Sylva Spectrometric Device – CSSD**
Ana Maria Olteanu, 16, Sophomore, Alina Luminita Negraia, 16, Sophomore, Delia Stefania Eremia, 16, Sophomore, Carmen Sylva High School, Eforie Sud, Constanta, 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, 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, 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 *Aphyllphoroid 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**
Ilia 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. Chuiikov, Moscow, Russian Federation, T: Maxim Novikov

- CHEM057T** **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
- EBED033T** **Multifunctional Orientation System**
Inna Olegovna Larina, 17, Junior, Nataliya Dmitrievna Ivlieva, 17, Junior, University Lyceum No. 1511, Moscow, Russian Federation, T: Mikhail Chmykhov
- PHYS047T** **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
Moscow, Russian Federation, RUS003, Russian Youth Program "Step Into the Future"
- MATH002** **Testing Chebyshev's Bias for Prime Numbers Up to $5 \cdot 10^{15}$**
Andrey Sergeevich Shchebetov, 18, Junior, Lomonosovskaya School, Moscow, Russian Federation, T: Natalia Lokalova
St. Petersburg, Russian Federation, RUS004, Intel Baltic Science and Engineering Fair
- 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
- MATH012T** **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
Chernogolovka, Russian Federation, RUS005, Avangard
- CHEM016T** **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
Moscow, Barnaul (Siberia Region), Russian Federation, RUS006, Scientists of the Future Fair
- 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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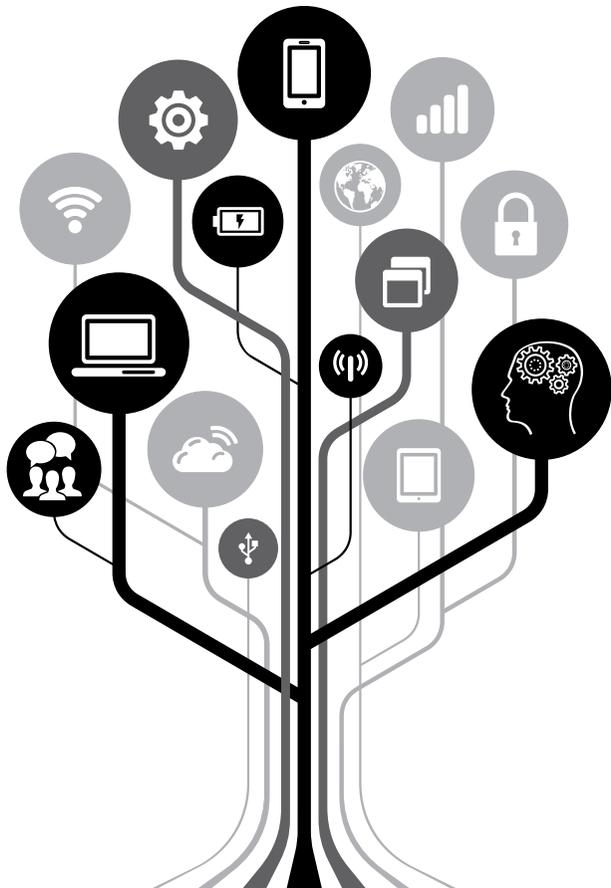
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- MATS028** **Magneto-Optical Modulation of Signals Using Colloidal Strontium Hexaferrite Nanoplatelets**
Danila Deiankov, 17, Junior, Advanced Educational Scientific Centre, A.N.Kolmogorov Boarding School, Moscow, Moscow, Russian Federation, T: Evgeny 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 Ahmed Hussain, 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 WO₃ 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 CsPbCl₃ Perovskite Nanocrystals for UV-Photodetectors**
Nora Naji Aldossary, 18, Senior, Dhahran Ahliyya School, Dammam, Eastern Province, Saudi Arabia, T: Omar Abdelsaboor
- MATS032** **Direct Color Tuning of Pure CsPbBr₃ Nanocrystals as a Potential Material for LEDs with Bright Emissions**
Faisal Suliman Aldabesh, 17, Senior, Manarat Al-Riyadh, Riyadh, Saudi Arabia, T: Omar Abdelsaboor
- MATS033** **Characterization of InGaN LEDs for Higher Efficiency Optical Devices**
Arwa Fahad Albaltan, 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 Alabdulwahab, 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 Tawfiq 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 Alsuhaibani, 17, Senior, Manarat Al-Riyadh, Riyadh, Saudi Arabia, T: David Keyes

SINGAPORE

Singapore, Singapore, SGP001, 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 Gregorcic

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 Mangwanele 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, Gyunggi-Do, South Korea, T: Alyssa Shelby

EGPH024T SHOWPAM: System of High-efficiency Ocean Wave Power with Acoustic Metamaterial

Joonyoung 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



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- ENEV084T Porous Xylem Plastic (P.X.P)**
Chaerin Kim, 17, Senior, Yedam Lee, 17, Senior, Gahyeon Cho, 17, Senior, Boyoung Girls' High School, Dongducheon-si, Gyeonggi-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 Beatrise 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 Denuwan 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 Udupola, 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, Utställningen 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, Borås, Västergötland, 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 Mahrning, 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 Winstal, 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: Panthita Suwannavong
- EGCH036T** **Novel Alternative Energy: Seawater Electric Generator Improved by the Catalyst from Waste Lard**
Chawit Kaewnuratchadasorn, 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 Phoosawat, 17, Junior, Chutinan Sriphetpool, 17, Junior, Suratpitaya School, Muang Suratthani, Suratthani, Thailand, T: Chalernporn Pongtheerawan
- ENEV075T** **The Greenovation of Low Cost Super-Adsorbent Polymer for Co-Treatment of Industrial Wastewater**
Supaporn Klabbklaydee, 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, Chutipphan Charoensuk, 18, Senior, Princess Chulabhorn Science High School Phetchaburi, Cha-Am, Phetchaburi, Thailand, T: Pitsinee Kongsukon
- 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 Chanlueng
- 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 Jaikeaw



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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**
Nampung Panya, 18, Senior, Jetsada Sittikhankaew, 18, Senior, Phirachat Kochanil, 18, Senior, Damrongratsongkroh School, Muangchiangrai, Chiangrai, Thailand, T: Kiattisak 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
Bangkok, Thailand, THA002, Young Scientists Competition
- 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 Santilinnon, 17, Junior, Natpraweew Pattayawij, 17, Junior, Mahidol Wittayanusorn School, Nakhon Pathom, Thailand, T: Kiattipoom Rodpun
- EGCH038T** **Green and High-Performance Supercapacitor Prepared by NiO Embedded Carbon and Nanocellulose from Corn Wastes**
Chayutapon Punyaratyuenyong, 16, Sophomore, Methasit Tantiplubtong, 16, Sophomore, Mancharat Tangtrongkijcharoen, 16, Sophomore, Kamnoetvidya Science Academy, Rayong, Thailand, T: Panuphong Pootawang
- MATH037T** **Private-Key Cryptosystem Using $p \times p \times p$ 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 Hayemasae
- 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 Akyol, 16, Junior, Nilufer Kemer, 17, Junior, Izmir Ozel Ege Lisesi, Izmir, Bornova, Turkey, T: Onur Akpınar

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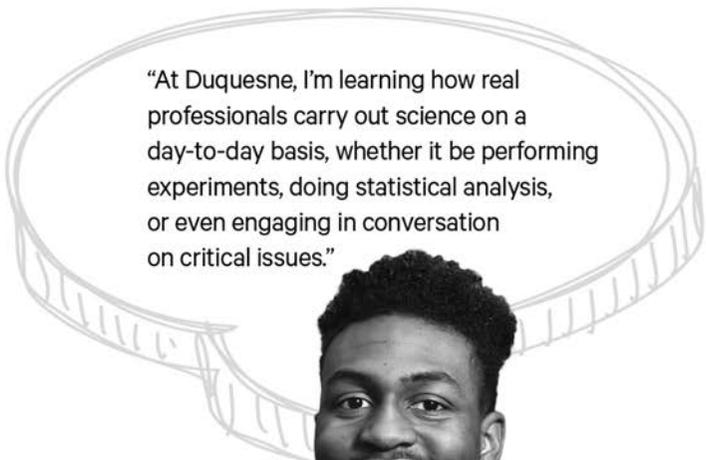
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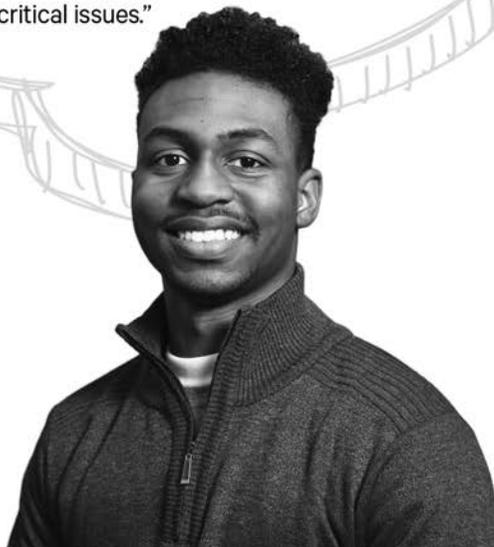
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- EAEV017T** **Mobile Weather Station and Databank**
Asli Dogu, 16, Sophomore, Berk Alaattin Bektemur, 15, Sophomore, Private Anabilim Anatolian High School, Istanbul, Istanbul, Turkey, T: Yasin Kaplan
- EGCH040** **Alternative of Renewable Energy Resources Microbial Fuel Cells**
Umut Atacan Pamuk, 18, Senior, Ankara Ozel Zafer Fen Lisesi, Ankara, Baglica, Turkey, T: Onur Aydogmus
- ENBM041** **Kabartgac: An Electronic Ring that Helps Visually Impaired to Sense 2D Pictures via Vibrations**
Bahadir Alp Alp Selay, 16, Junior, Izmir Ataturk High School, Izmir, Turkey, T: Zerrin Hepsogutlu
- MATH033** **A New Rule on Divisibility by $(c - 1) \cdot c^k$ and Its Application in Cryptology**
Ibrahim Muhammed Cevik, 18, Senior, Tofas Fen Lisesi, Nilufer, Bursa, Turkey, T: Hakan Ozkaynak
- ROBO019** **PIC-TALK: Creating a Digital Ecosystem that Consists of Open Source Hardware and Software Products for Visually Impaired People**
Musa Sadik Unal, 19, Senior, Kartal Anadolu Imam Hatip High School, Istanbul, Turkey, T: Ersin Erturk
- SOFT022T** **Sign Language Translator**
Arda Mavi, 18, Senior, Zeynep Dikle, 17, Senior, Ayranci Anadolu Lisesi, Ankara, Nazmi Arikan 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 Solomianiuk, 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, Kyiv'ska 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***
Nataliia Maliuk, 16, Junior, Ukrainian Medical Lyceum National Medical University the Name of O. O. Bogomolets, Kyiv, Ukraine, T: Serafima Tarasevich
- CHEM064** **The New "Smart" Corrosion Protective Pigment based on Tripolyphosphate-intercalated Zn-Al Layered Double Hydroxide: Synthesis and Characterisation**
Sofia 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 Kharasakhal, 17, Junior, Mariupol Technical Lyceum, Mariupol, Ukraine, T: Viacheslav Ponomarchuk

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- 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 E Jabban 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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- EAEV031 Utilizing Native Hyper-Accumulators to Determine Efficient Methods for Heavy Metal Phytoremediation**
Sid Singh, 18, Senior, Alabama School of Fine Arts, Birmingham, Alabama, T: Jameson Ware
- ENBM017 Automatic Traumatic Injury and Concussion Alert System (ATICAS)**
Reagan Elizabeth Shoop, 18, Senior, Hewitt Trussville High School, Trussville, Alabama, T: Jason Dooley
Huntsville, USA L03, North Alabama Regional Science and Engineering Fair
- BCHM013T Optimizing Bone Marrow Cryopreservation for Primitive Hematopoietic Stem Cell Compartment Studies Using Flow Cytometry Analysis**
Dongwon Lee, 18, Senior, Yewon Lee, 15, Freshman, James Clemens High School, Madison, Alabama, T: Leah McRae
- BCHM016 Development of a Method Towards the Metabolic Monitoring of TCA Cycle Compounds Observed in Rat Urine Using NMR Spectroscopy**
Sai Sumedha Bobba, 16, Junior, James Clemens High School, Madison, Alabama, T: Leah McRae
- PHYS025 Capital X: Designing and Testing a Procedure for Building an Inexpensive X-ray Generator**
Catherine Elise Blevins, 17, Junior, Covenant Christian Academy, Huntsville, Alabama, T: Rhonda Lisauckis
Mobile, USA L04, Mobile Regional Science Fair
- BMED029 The Effect of Different Dilutions of Pomegranate Juice, Pineapple Juice, Orange Juice, and Coconut Milk on the Growth of HT29 and OVCAR8 Cell Lines**
Raj Vipul Mehta, 17, Senior, W.P. Davidson High School, Mobile, Alabama, T: Emily Hosford
- EBED020 MADSA: Musical Accuracy Development Using Spectral Analysis**
Cary Xiao, 15, Sophomore, Alabama School of Mathematics and Science, Mobile, Alabama, T: Grey Gaillard
- MCRO066 Investigating the Bactericidal and Anti-Biofilm Effects of Naringenin on *Enterobacter cloacae***
Vanessa Siggers, 17, Junior, Murphy High School, Mobile, Alabama, T: Julie Prerost
Livingston, USA L05, West Alabama Regional Science Fair
- PHYS022 G-Force: Angles Helping Pilots Go Faster**
Victoria Alyce Whitehead, 14, Freshman, Holy Spirit Catholic High School, Tuscaloosa, Alabama, T: Deborah Samaniego
Huntsville, USA L50, Alabama Science and Engineering Fair
- BCHM041 Pharmacokinetic Modeling of *in vitro* Diffusion Rates for Antiviral Drug Acyclovir**
Nikitha Sridhar, 16, Junior, Auburn High School, Auburn, Alabama, T: Jacque Middleton
- EAEV060 *Achroia grisella* as Effective Decomposers of Polyethylene**
Haley Beth Donovan, 17, Senior, Wetumpka High School, Wetumpka, Alabama, T: Virginia Vilaridi
- MCRO074T Two Part Study of Novel Ways to Alleviate Droughts Using Cloud Seeding Methods with Bacterial Ice Nucleators**
Ji Ho Lee, 18, Senior, Suma Nagaraj Ejanthkar, 18, Senior, Auburn High School, Auburn, Alabama, T: Jacque Middleton T: Jacque Middleton
- PHYS066 Optical Characterization of Fe and Cr Doped ZnS and ZnSe Polycrystals for Mid-IR Lasing Applications**
Eesha Banerjee, 15, Junior, Alabama School of Fine Arts, Birmingham, Alabama, T: Hungsin Chin

ALASKA

Anchorage, USA K50, 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
- SOFT030** **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**
Meena Niveda Ravishankar##, 17, Junior, Vishakk Rajendran##, 16, Junior, Jeremy Chen-Hao Wang#, 17, Junior, University High School, Tucson, Arizona, BASIS Tucson North, Tucson, Arizona, Catalina Foothills High School, Tucson, Arizona, T: Sadhana Ravishankar T: Rajendran Subramaniam
- 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**
Alexander Clinton Nelson, 15, Freshman, Nelson Home School, Tucson, Arizona, T: Sandra Nelson
- 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

- PHYS027** **Tune Less, Play More**
Austin Brown, 14, Freshman, Providence Academy, Rogers, Arkansas,
T: Laurie Johnson
Jonesboro, USAR04, Northeast Arkansas Regional Science Fair
- EGPH027** **Harnessing Renewable Power to Charge a Device**
Chase Allen Himschoot, 18, Senior, Salem High School, Salem, Arkansas,
T: Amanda Smith
- ENEV038** **Combatting Lead Contamination Crisis Using Macrophytes**
Austin Daniel Murray, 16, Sophomore, Brookland High School, Brookland,
Arkansas, T: Candace Campbell
- PLNT031** **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
Little Rock, USAR05, Central Arkansas Regional Science and Engineering Fair
- CHEM011** **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
- ENEV026** **Power to the Plants**
Surabhee Eswaran, 16, Sophomore, Little Rock Central High School, Little
Rock, Arkansas, T: Tarsha Parker
- MATS009** **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
- MATS010** **Transparent Superhydrophobic Coating Using Nanoparticle Embedded Teflon**

Hetvi Shah, 16, Junior, Little Rock Central High School, Little Rock, Arkansas,
T: Patrick Foley
- PHYS015** **The Flight of Arrows**
Deniz Erdag, 16, Sophomore, Little Rock Central High School, Little Rock,
Arkansas, T: Lee Conrad
Monticello, USAR06, Southeast Arkansas Regional Science Fair
- BEHA020** **Trends and Factors for Risky Behavior among Adolescents**
Nikita Singh Rohila, 15, Sophomore, Stuttgart High School, Stuttgart,
Arkansas, T: Katherine Yancey
Hot Springs, USAR07, West Central Regional Science Fair
- EAEV015** **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
- MATH015** **Construction of a Conformal Mapping: Glitter**
Callen Gast, 18, Senior, Arkansas School for Mathematics, Sciences and the
Arts, Hot Springs, Arkansas, T: Nikki Kennedy
- PLNT009** **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
Conway, USAR50, Arkansas State Science Fair
- BCHM026** **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
- BMED066** **Induction of Apoptosis by Curcumin in Cancer Cells**

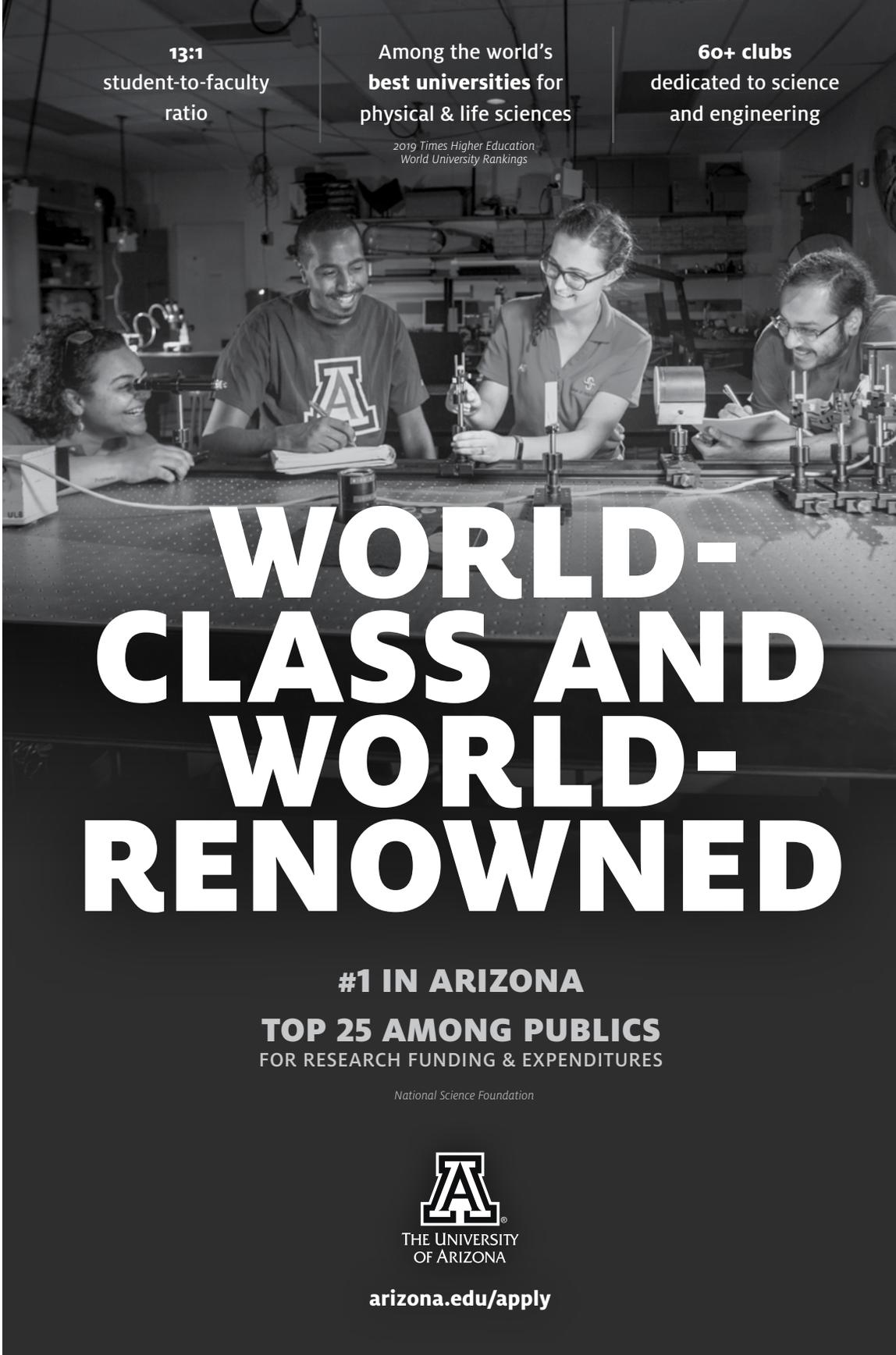
Sakshi Garg, 17, Junior, Little Rock Central High School, Little Rock, Arkansas,
T: Patrick Foley
- CHEM045** **Phosphorous/Nitrogen Co-Doped Carbon Derived from Soybean as High Performance Electrode Material for Supercapacitor**
Amna Khan, 15, Freshman, Little Rock Central High School, Little Rock,
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 Levisse
- MCRO068** **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

Costa Mesa, USCA01, Orange County Science and Engineering Fair

- ANIM039** **Use of Pulsed Photobiomodulation in Nerve Regeneration after Injury-Induced Peripheral Neuropathy in *Danio rerio*: Effect of Mitochondrial Protein Genetic Variant, mpv17, in A Delta and C Nerve Fiber Growth**
Nadia Ansari, 15, Freshman, Sage Hill School, Newport Beach, California, T: Dan Thomassen
- MATH032** **Dynamics of the Tangent Map**
Andrei Mandelshtam, 15, Sophomore, University High School, Irvine, California, T: Valerie Thompson
- MCRO056** **Identifying Antibiotic Molecules in *Ceanothus leucodermis* and Quantifying Their Antibacterial Activity with a Novel, Simulation-Aided Method**
Daniel Feng, 15, Sophomore, University High School, Irvine, California, T: Lynette Burnside
- PHYS040** **Synthesis and Analysis of Strontium Titanate (STO): Can It Replace Silicon for Power Electronic Applications?**
Alexander Sunghoon Kwon, 16, Junior, Sage Hill School, Newport Beach, California, T: Anie Robinson

Los Angeles, USCA02, Los Angeles County Science and Engineering Fair

- MATS062** **A Novel 3D-Printing Methodology of Inverse Opals from Free-Standing Crystalline Structures for Next-Generation Optical Sensing**
Benjamin Cheung Liu, 17, Senior, Arcadia High School, Arcadia, California, T: Craig Monden

- TMED054** **Transforming *in vitro* Studies of Hypertonic Dextrose Injections for Osteoarthritis: A Wide Range Investigation of Effective Dose with a Physiologically Relevant Model**
Elisha Daniel Johnston, 15, Sophomore, Palos Verdes Peninsula High School, Rolling Hills Estates, California, T: Melissa Klose

Fresno, USCA03, Fresno County Science Fair

- ANIM029** **Assessing the Effect of Light Pollution on Courtship Behavior of *Drosophila melanogaster***
Haidyn Noel Washburn, 17, Junior, Sanger High School, Sanger, California, T: Davin Aalto

- EBED021T** **Frontiers of 5G: Sparse Adaptive Battery-less Ambient Backscatter Communication Networks**
Jamil Saadi Ahmad, 17, Junior, Moaz 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 Slinger
- 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 Spenner
- 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 Spenner
- 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 Spenner



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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 Cd₃As₂**
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
- ROBO049T Novel Reinforcement Learning Methods in Collaborative Environments**
Ashish Prakash Rao, 16, Junior, Bidipata 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 Suppressor 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 ALPHA-Fe₂O₃@Au@P-SiO₂@Cu₂O Nanostructure**
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 Garuadapuri, 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

CBIO053 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, Fossil Ridge 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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CONNECTICUT*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 Nanotechnology 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

Sirina Verma Prasad, 17, Senior, Anisa Verma Prasad, 17, Senior, Staples High School, Westport, Connecticut, T: Karen Thompson

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
- PHYS007** **Plotting New Horizons: A Statistical Analysis of Potential Factors Influencing the Probability of Planetary System Formation**
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

BNEV019 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. longa 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 Joykuttu

**ENMC065 Design and Numerical Analysis of a Novel Co-Flow Jet System to Improve
the Lift, Range, and Fuel Efficiency of a Commercial Airline Wing**

Hans C Ehrnrooth, 18, Senior, Pine Crest School, Fort Lauderdale, Florida,
T: Jennifer Gordinier

**MATS074 Developing a Bacterial Cellulose and Kombucha Tea Waste Product Based
Scaffold with an Integrated Oxygen Generating Construct for Islet Cell
Transplantation**

Angelin T. Mathew, 16, Sophomore, American Heritage School, Plantation,
Florida, T: Leya Joykuttu

**ROBO068T Development of Software for Mental Illness Diagnostics: Facial Expression
Classification through Machine Learning**

Geela Margo Mandigma Ramos, 17, Senior, Fabio Ibanez, 15, Sophomore,
Miramar High School, Miramar, Florida, T: Tamekia Thompson

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, USFL13, 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
Merritt Island, USFL14, Brevard Intracoastal Regional Science and Engineering Fair
- MCRO051** **Resisting the Nucleotide in Oligonucleotide-Directed Mutagenesis**
 Maximus Lee Schieman, 17, Junior, Satellite High School, Satellite Beach, Florida, T: Joseph Scott
- ROBO020** **Drones for Invasive Species Monitoring**
 Zachary Axel Hohl, 18, Senior, Edgewood Junior Senior High School, Merritt Island, Florida, T: Ryan Cilsick
Miami, USFL15, 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, USFL16, 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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Orlando, USFL17, Dr. Nelson Ying-Orange County Science Exposition

- ANIM027** **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
- ENBM010** **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
- PHYS020** **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
- SOFT028** **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

Bushnell, USFL18, Sumter County Regional Science Fair

- ANIM001** **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
- CHEM004T** **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
- ENBM002** **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
- MCRO009** **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
- TMED001** **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

Pensacola, USFL20, West Panhandle Regional Science and Engineering Fair

- ENEV012** **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

Saint Augustine, USFL21, St. Johns County Science Fair

- ROBO021** **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

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

- ENEV063T** **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
- ENMC018** **Zonal Differentiating Soundbar**
Dylan Carrick Ryan, 18, Senior, Lyman High School, Longwood, Florida, T: Mary Acken
- MCRO015** **Nanoceramic Coating of Central Venous Catheters Has Inhibitory Effect on Colonization by *E. coli* and *Bacillus cereus***
Varsha Naga, 15, Freshman, Winter Springs High School, Winter Springs, Florida, T: Paul Sacks



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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 CO_2/N_2 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

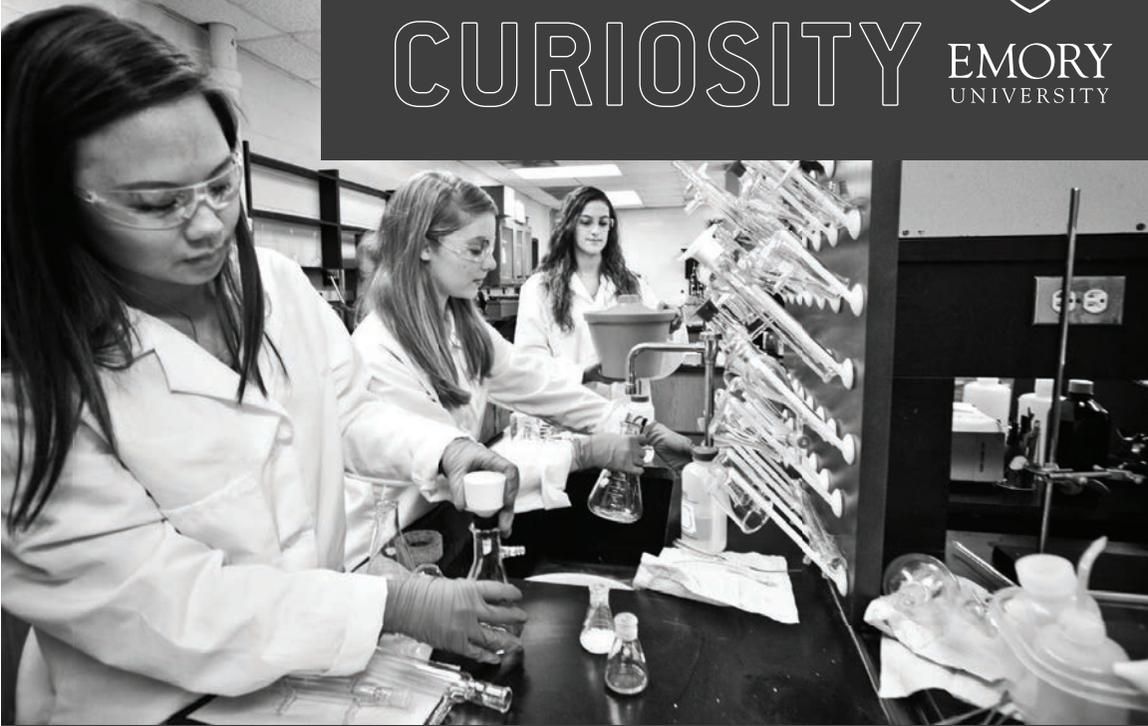
PHYS037 Characterizing the WLM Galaxy Using the Properties of RR Lyrae Variable Stars

Subhash Chandra Kantamneni, 17, Junior, Suncoast Community High School, Riviera Beach, Florida, T: Jeffrey Laufer

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Sustainability Sciences+

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Land O' Lakes, USFL30, Pasco Regional Science and Engineering Fair

PLNT006 **Using Guaiaacol 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 Mem 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!**

Gavin Alexander Baker, 16, Sophomore, Fleming Island High School, Fleming Island, Florida, T: Mary Turner

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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- PHYS062** **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
- PLNT048** **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
- TMED027** **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

GEORGIA*Albany, USGA01, Darton College/Merck Regional Science Fair*

- BMED017** **Mini-hugs: Electrically Inflatable Cuffs to Reduce Stress and BP**
Joyabhishek Samuel Charles, 16, Junior, Americus Sumter High School, Americus, Georgia, T: Pushpa Rajan

Atlanta, USGA03, Atlanta City Science & Engineering Fair

- BMED007** **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

- BMED015** **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

- TMED020** **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

Stone Mountain, USGA04, Dekalb Science & Engineering Fair

- CELL025** **Immunomodulation of Human Leukemia Cell Lines by Components of Probiotic Sources**

Saitheja Adi Pucha, 16, Sophomore, Lakeside High School, Atlanta, Georgia, T: Tania Murphy

- MATS050** **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

McDonough, USGA06, Henry County Science and Engineering Fair

- EBED005** **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

- ENEV010** **Biodegradable Plastic Shoe Made from a Cornstarch and Glycerin-Based Plastic**

Kailen R. Parks, 16, Sophomore, Dutchtown High School, Hampton, Georgia, T: Yamini Mital

- ENMC006** **Automated Supplementary Greenhouse Lighting Controller**

Rebekah Grace Dorminy, 15, Sophomore, Sola Fide Home School, McDonough, Georgia, T: Ann Dorminy

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

- BMED005** **CAM and TENS Are Effective in Opioid Tapering in High Risk Patients**

Ishan Viradia, 15, Sophomore, Stratford Academy, Macon, Georgia, T: Susan Hanberry

- EAEV004T** **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 Schlueter, 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**
Arnav 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

Athens, USGA50, Georgia State Science and Engineering Fair

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 Miacro: A Reverse-Engineering Framework for Non Invasive Carcinogenic Acrylamide Removal Using Predictive Neural Networks to Rectify Industry Procedures for Sustainable, Next Generation Consumer Health

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 Hoemaikalani Kahalewai, 17, Senior, Molokai High School,
Ho'olehua, 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
Development of a Recombinase Polymerase Amplification, Lateral Flow

TMED012 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

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, USHI07, Central Oahu District Science and 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

ENEV011 Designing an Algae-Immobilized Membrane Bioreactor for Wastewater Bioremediation and High-Density Algae Production
 ## Min Hua Tsou, 18, Senior, Mililani High School, Mililani, Hawaii, T: Nel Venzon

Honolulu, USHI08, Honolulu District Science & Engineering Fair

BMED008 Tracking the HIV Epidemic in the Philippines Using Phylogenetic Analysis
 # Brandon Alex Nguyen, 15, Junior, Henry J. Kaiser High School, Honolulu, Hawaii, T: Garrett Hatakenaka

TMED009 Neural Networks and Cancer Detection
 Iwalani Yuanman Campbell, 15, Sophomore, President William McKinley High School, Honolulu, Hawaii, T: Cam Tu Trinh

Kailua-Kona, USHI09, West Hawaii District Fair

ENEV101T 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

CELL062 Sea Cucumber Extracts (*Holothuria cinerascens* and *Holothuria impatiens'* Cuvierian Tubules) Decrease Cancer Cell Viability
 Kaeo Thomas Lee Xuan Kekumano, 16, Junior, Kamehameha Schools Kapalama Campus, Honolulu, Hawaii, T: Gail Ishimoto

EAEV075 Mapping Arsenic Movement due to Tsunami Events: Developing a Comprehensive Hot Spot Map of Arsenic Contamination in Wailoa State Park in Hilo, Hawaii
 # Jared Juichi Keoni Goodwin, 18, Senior, Hilo High School, Hilo, Hawaii, T: Pascale Pinner

ENEV093 Mirror Reflecting Machine to Increase Solar Power
 Camry Gach, 15, Freshman, Seabury Hall Upper School, Makawao, Hawaii, T: C. Moka Brown

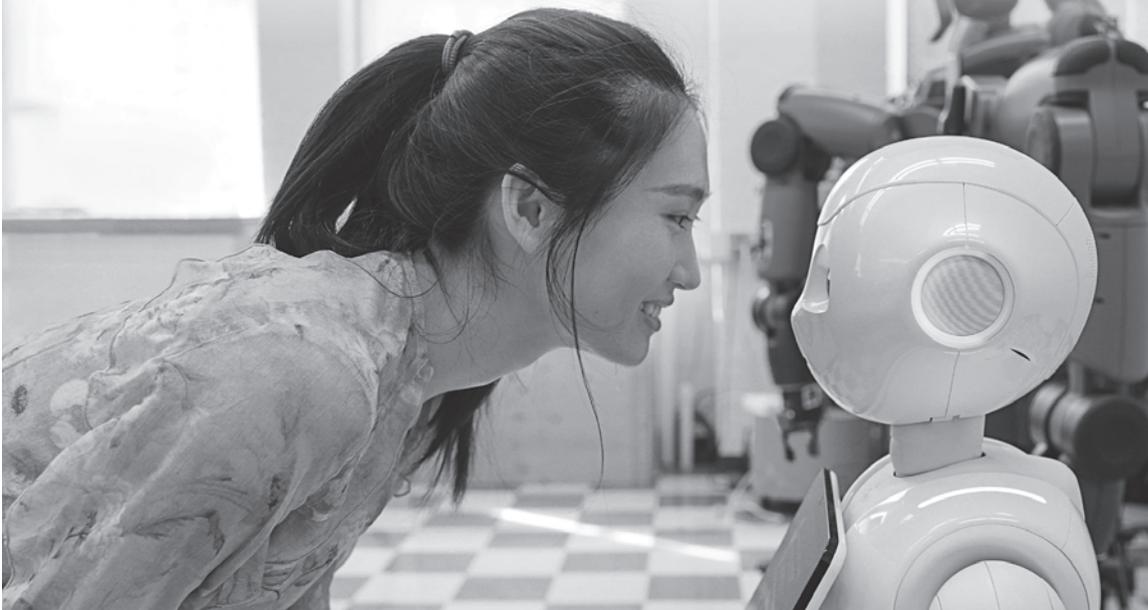
PHYS060 Probing Stellar Remnant for Planet Candidate; Analysis of K2 Target 251248385
 Stephanie Naphat Yoshida, 16, Sophomore, Punahou School, Honolulu, Hawaii, T: Johannes Adams

IDAHO

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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- MATS016** **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
- BCHM017** **Detecting Chicken γ -globulin in Vegan Products Utilizing Immunoassay, ELISA, Techniques**
Lukas Wyatt Keller, 18, Senior, Emmett High School, Emmett, Idaho,
T: Robin Wilson
- MCRO031** **Discovering a Bacteriophage**
Melina Mohammadi, 14, Freshman, Treasure Valley Math and Science Center,
Boise, Idaho, T: Shanda Palsulich
Pocatello, USID03, Eastern Idaho Science & Engineering Fair
- ENBM019T** **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
- ENBM043** **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
- ENBM044** **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
- PHYS049** **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
- ROBO051** **Vision Based Robot System**
Dhruv Bala, 15, Sophomore, Lane Technical College Prep High School,
Chicago, Illinois, T: Lucy Young
Edwardsville, USIL02, STEM Science and Engineering Research Challenge
- SOFT056** **Hash Chaining: A Theoretical Model Using Salted Hashes to Generate Ethereal Keys**
Samuel Raymond Berkley, 16, Junior, The Governor French Academy,
Belleville, Illinois, T: Christine Stewart
Peoria, USIL03, Heart of Illinois Science and Engineering Fair
- PLNT065** **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
Springfield, USIL04, Illinois Junior Academy of Science Region X Science Fair
- CELL022** **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
- PLNT035** **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
- BEHA026** **FRUGGIE: Building Healthy Food Pyramids with Technology**
Annika Huprikar, 17, Junior, Deerfield High School, Deerfield, Illinois,
T: Judi Luepke
- CBIO014** **Fighting Zika: Computational Discovery of New Drugs to Inhibit the NS2B-NS3 Protease of the Zika Virus**
Sayalee Neelesh Patankar, 16, Sophomore, Adlai E. Stevenson High School,
Lincolnshire, Illinois, T: Christina Palffy

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- PHYS028** **Touchdown Events during Drop Impact of Newtonian Fluid**
Michael Frim, 18, Senior, Evanston Township High School, Evanston, Illinois,
T: Mark Vondracek
- PLNT030** **The Influence of Soil Microbes on the Restoration Success in the Critically Endangered *Widdringtonia whytei***
Gurleen Kaur, 18, Senior, Wheeling High School, Wheeling, Illinois,
T: Carol Bouvier
- ROBO055** **A Novel Approach to the Diagnosis of Heart Disease Using Machine Learning and Deep Neural Networks**
Sahithi Ankireddy, 15, Sophomore, James B. Conant High School, Hoffman Estates, Illinois, T: Adi Kadimetla
- INDIANA**
Evansville, USIN20, Hoosier Science and Engineering Fair Region 1
- PLNT049** **A Field Study: Sustaining Crop Growth in a Flooded Area with the Application of *Oscillatoria***
Jacob Liam Martin, 16, Sophomore, Northwestern High School, Kokomo, Indiana, T: Linda Wilson
- Fort Wayne/Angloa, USIN21, Hoosier Science and Engineering Fair Region 2*
- MATS049** **Development of Optimal Microstructure Morphology in Organic Solar Cell Active Layer through Genetic Algorithm**
Caine Aryee Ardayio, 15, Sophomore, University High School of Indiana, Carmel, Indiana, T: Brandon Hogan
- Indianapolis, USIN22, Hoosier Science and Engineering Fair Region 3*
- ENBM069** **Naturally 3D Printing Away Fatal Catheter-Associated Urinary Tract Infections, Year Two**
Mitchell James Sampson, 16, Sophomore, Northview High School, Brazil, Indiana, T: Rachel Sparks
- Muncie, USIN23, Hoosier Science and Engineering Fair Region 4*
- MCRO062** **Isolation and Characterization of an Environmentally Sourced Bacteriophage for *Serratia marcescens***
Demetri Massow, 18, Senior, Crown Point High School, Crown Point, Indiana, T: Ashley Cosme
- Indianapolis, USIN24, Hoosier Science and Engineering Fair Region 5*
- CELL042** **Using Zika Virus Proteins NS4A and NS4B to Investigate Oncolytic Virus Therapy against Glioblastoma Cancer**
Sowmya Chundi, 15, Freshman, Carmel High School, Carmel, Indiana, T: Clark Gedney
- Greencastle, USIN25, Hoosier Science and Engineering Fair Region 6*
- CELL050** **Improved Treatment for Alzheimer's by Enhancing Tyrosine Phosphorylation of the DAB1 Protein through Lauric Acid**
Siya Goel, 14, Freshman, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Croy
- ENEV079** **A Systems Dynamics Model Exploring the Continuous Biodegradation of Plastic**
Kreesha Saha, 14, Freshman, West Lafayette Junior/Senior High School, West Lafayette, Indiana, T: Brittany Croy
- West Lafayette, USIN26, Hoosier Science and Engineering Fair Region 7*
- BMED060T** **Development of a Microscope for Fully Automated Real-Time Cancer Cell Tracking**
Nicole Lakshmi Segaran#, 17, Junior, Yannik Singh, 17, Junior, Carmel High School, Carmel, Indiana, T: Jennifer Drudge
- CHEM050** **Synthesis and Use of Robust Cobalt (II) Catalysts for the Reduction of CO₂ to CO**
Ankush Kundan Dhawan, 17, Junior, Signature School, Evansville, Indiana, T: Jeffery Seyler
- ENMC054** **Welcome to "Sistance": A New Form of Base Communication for Deaf-Blind Children**
Mackenzie Lee Hunt, 17, Junior, New Tech Institute, Evansville, Indiana, T: Patrick Carter



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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-dimethylpiperzine) 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 Ghanta 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

- SOFT029** **General Distributed Backtracking Framework for Solving Combinatorial Constraint Satisfaction Problems**
David Aryeh Vulakh, 17, Junior, Paul Laurence Dunbar High School, Lexington, Kentucky, T: Karen Young
Richmond, USKY50, Kentucky Science and Engineering Fair
- BCHM027T** **An Innovative Method of Room Temperature Biospecimen Preservation via Tetramethyl Orthosilane (Sol-Gel) Encapsulation and Polyethylene Glycol Extraction**
Jack Boylan, 17, Junior, Kavya Sai Koneru, 16, Junior, duPont Manual High School, Louisville, Kentucky, T: Glenn Zwanzig T: Kathy Fries
- CBIO049** **Classification of Full EEGs (Electroencephelograms) for Biometrics and Medical Applications through Machine Learning and AI**
Sarvesh Babu, 15, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak
- ENBM052** **Virtual Colonoscopy: Engineering a Deep Learning Algorithm for Bio-Imaging Colon Segmentation to Diagnose Colorectal Cancer**
Ramy Mohamed Khodeir, 17, Junior, duPont Manual High School, Louisville, Kentucky, T: Glenn Zwanzig
- ENEV080** **Pressure Assisted Cryogenic Carbon Dioxide Extraction: A Novel Method of Carbon Sequestration**
Zachary Schneider, 18, Senior, Saint Xavier High School, Louisville, Kentucky, T: Greg Cambron
- MCRO077** **Effects of Grape Components on Periodontitis**
Anne Liang, 16, Sophomore, duPont Manual High School, Louisville, Kentucky, T: Keri Polevchak
- SOFT045T** **Developing a 3D Modeling Application Based on a Bezier Surface Reconstruction Algorithm for the Rebuilding of Natural Disaster and War Damaged Areas**
Raymond Micheal Suo, 17, Junior, Naomi Kenyatta, 17, Junior, Allen Wu, 16, Junior, duPont Manual High School, Louisville, Kentucky, Horace Mann School, Bronx, New York, T: Glenn Zwanzig
- LOUISIANA**
Baton Rouge, USLA01, Louisiana Region VII-Science and Engineering Fair
- BEHA002** **Validate the Impact of Evidence Based Instruction in Increasing the Phonological Awareness Skills for Individuals with Dyslexia**
Mary Grace Salmon, 17, Junior, St. Joseph's Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia
- CELL003** **The Effects of Aging on Nucleolar and Ribosomal Function in *Drosophila melanogaster***
Maci Taylor Mannina, 16, Junior, St. Joseph's Academy, Baton Rouge, Louisiana, T: Jacqueline Savoia
- CHEM006** **Influence of Vegetated Coverage on Surface Runoff Losses of the Insecticide, Bifenthrin**
Hailey Danielle Lewy, 16, Junior, Saint Joseph's Academy, Baton Rouge, Louisiana, T: Jaqueline Savoia
Bossier City, USLA02, Bossier Parish Community College Louisiana Region I Science and Engineering Fair
- BCHM019** **Effects of Acute and Chronic Alcohol Consumption on the Blood-Brain Barrier**
Grace Karen Sun, 17, Junior, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements
- PHYS029** **A Search for Exoplanets in High Metallicity Open Clusters Using a Large Scale Photometric Algorithm**
Ashini Ashish Modi, 15, Freshman, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements
- TMED021** **Inhibition of UCP2 Suppresses Cell Proliferation and Migration of Cholangiocarcinoma through the Regulation of Epithelial-Mesenchymal Transition**
Lawrence Alex Shi, 17, Senior, Caddo Parish Magnet High School, Shreveport, Louisiana, T: Kris Clements

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 "Screens" 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

Paeen Luby, 15, Sophomore, Benjamin Franklin High School, New Orleans,
Louisiana, T: Cliff Robinson

EGCH009 Nutrient Manipulation in *C. moewusii* to Activate [Fe-Fe] Hydrogenase Reserves: A Continued Study in Increasing the Cost-Efficiency of Green Hydrogen Fuel Production

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

SOFT026T Implementation of Basic Machine Learning and Iterative Algorithms into a Self-Tuning PID System

Joaquin Alejo Gomez#, 16, Junior, Paul Martin Kraig Oramous, 17, Junior,
Benjamin Franklin High School, New Orleans, Louisiana, T: Teresa Burchette

Baton Rouge, USLA50, Louisiana Science and Engineering Fair

ANIM024 Caffeine as a Natural Larvicidal in Reducing the Malaria Transmission of *Anopheles quadrimaculatus* 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

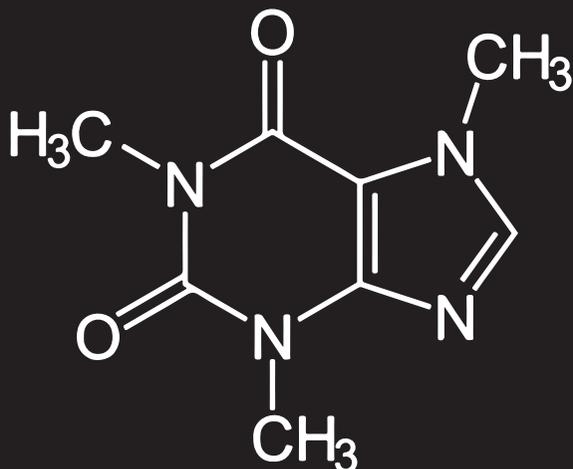
Amelia Claire Cave, 16, Junior, Edward Douglas White Catholic High School,
Thibodaux, Louisiana, T: Linda Messina

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 Dashiell
- 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

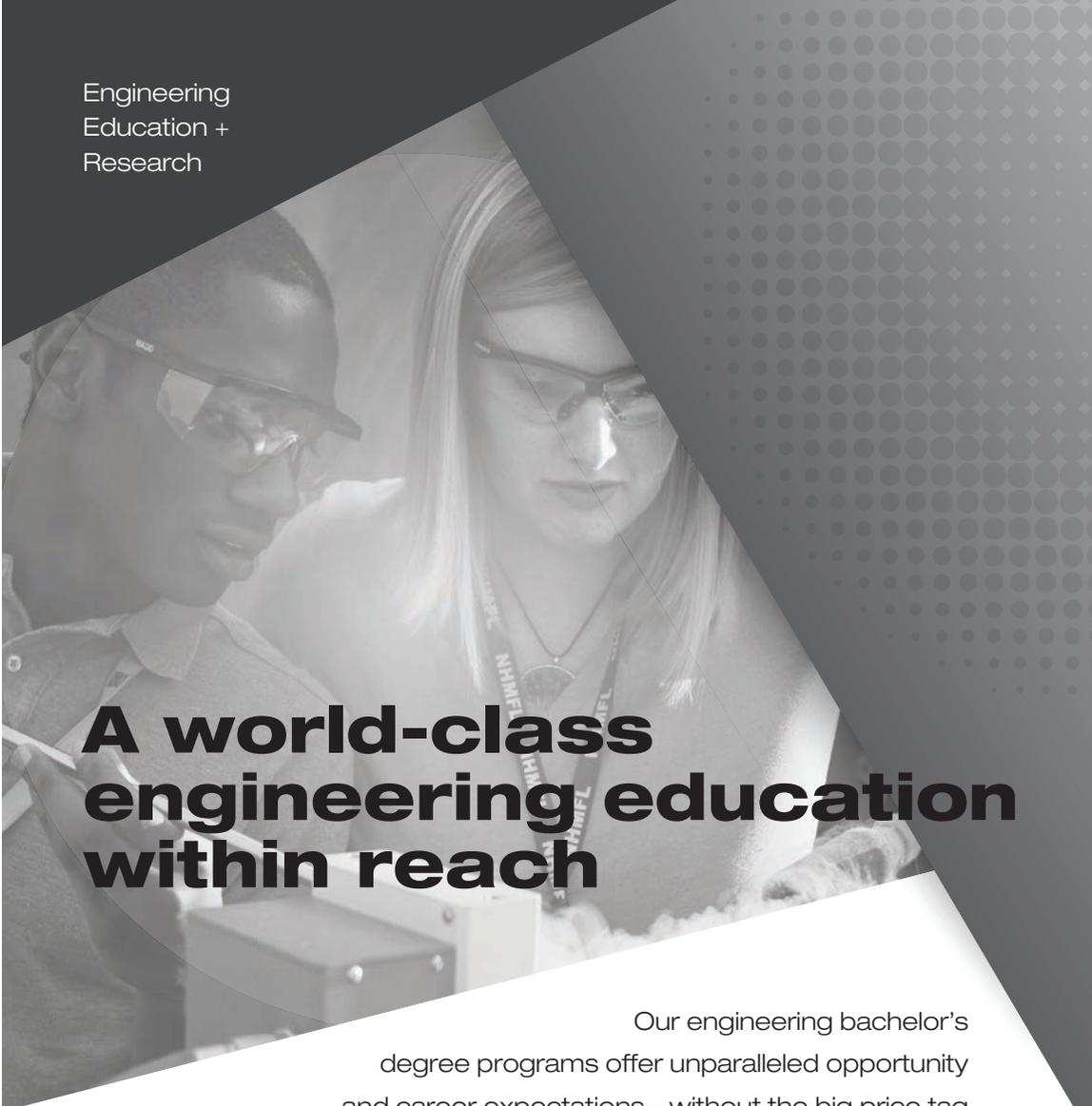
- ENMC071** **AccessO₂: An Innovative, Non-Electric, Life-Saving, Oxygen Concentrator**
 Sanjit Thangarasu, 16, Sophomore, Poolesville High School, Poolesville, Maryland, T: Kevin Lee
- PHYS042** **Heisenberg-Scaling Measurement Protocol for Analytic Functions with Quantum Sensor Networks**
 Kevin Qian, 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

- 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***
Deeandria 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 Huezo-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 IFNg 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**
Vihhaar 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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- 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, USMI03, 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**

Neelal 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, USMI08, 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, USMI50, 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 *Bellamyia chinensis*

Malachy Ryan Bloom, 17, Junior, Luke Alexander Drummer, 17, Junior, Mankato East High School, Mankato, Minnesota, Mankato East High School, Mankato, Minnesota, T: Phillip Sexton

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

Manashree 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 burgdoeferi* 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 Kragtorp

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- 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, USMN50, 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, USMS01, 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, USMS02, 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, USMS03, 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, USMS04, University of Southern Mississippi Region I Science and Engineering Fair

- BCHM043** **Development of Integrase Inhibitors**
Kimberlynn 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, USMS05, 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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- PLNT043** **The Differential Responses via Growth & Photosynthetic Rates of Non-Calcifying *I. galbana* & Calcifying *T. chuii* to Calcium & Foreign Algae Exposure**
Daniel Ulion Joshua, 18, Senior, Madison Central High School, Madison, Mississippi, T: Amy Bennett
- ROBO042** **Predicting Earthquake Aftershocks with Machine Learning**
Forrest Rogers Hutchison, 15, Sophomore, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Krissy Rehm
Mississippi State, USMS06, Mississippi Region V Science and Engineering Fair
- CBIO012** **A Novel Spatiotemporal Model for Epidemics in Dynamic Populations**
Hamilton Ji Wan, 17, Senior, Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson
- CBIO017** **Development of an Antimicrobial Peptide Activity Detector using Machine Learning for the Discovery of New Drugs**
Michael Lu, 16, Sophomore, Starkville High School, Starkville, Mississippi, T: Mary Brandon
Oxford, USMS07, Mississippi Region VII Science and Engineering Fair
- CHEM041** **Green Tea (*Camellia sinensis*): Comparison of Antioxidant Activity between Authentic and Supplement Samples via the Briggs-Rauscher Reaction along with their UHPLC Fingerprinting in order to Address the Issue of Adulteration**
Fawaz Ahmad, 16, Sophomore, Oxford High School, Oxford, Mississippi, T: Sarah Robinson
- SOFT036** **Multifactorial Optimization, Personalized Navigation**
Bach Xuan Nguyen, 18, Junior, Oxford High School, Oxford, Mississippi, T: Sarah Robinson
University, USMS50, Mississippi Science and Engineering State Fair
- EAEV068** **Sargassum's Impact on Ocean Acidification**
Vivian Heleana Pryor, 18, Senior, St. Andrew's Episcopal School, Ridgeland, Mississippi, T: Marks McWhorter
- ROBO065** **Real-Time Monitoring of Physical Activity Using Accelerometer Data**
Dennis Lee, 16, Junior, The Mississippi School for Mathematics and Science, Columbus, Mississippi, T: Tina Gibson
- MISSOURI**
Cape Girardeau, USMO01, Southeast Missouri Regional Science Fair
- ANIM025** **How Will Different Ticks Respond to Carbon Dioxide?**
Grant Roseman, 15, Freshman, Roseman High School, Jackson, Missouri, T: Andrea Roseman
- CELL026T** **Bioremediation of Elevated Arsenite Concentrations in Groundwater via the Arsenite Oxidase Gene Cluster in Transgenic Bacteria**
Hunter Lee Rees, 16, Sophomore, Eli Lee Jones, 16, Sophomore, Jackson Senior High School, Jackson, Missouri, T: Leanne Thele
Jefferson City, USMO02, Lincoln University Regional Science Fair
- PHYS041** **Examining the Potential of Selective Bacterial Lysis through Pulsed Magnetic Fields at the Resonant Frequency of the *Escherichia coli* Cell Membrane**
Joshua L. Harmon, 18, Senior, Camdenton High School, Camdenton, Missouri, T: Chris Reeves
- SOFT037** **Exploring the Potential Use of a Novel Integrated ID-Mounted RFID Tag Software System Coupled with Ultrasonic Sensors for Asset Tracking and School Security**
Lucas Tyler Mosher, 18, Senior, Camdenton High School, Camdenton, Missouri, T: Chris Reeves
Joplin, USMO03, Missouri Southern Regional Science Fair
- BMED043** **Effect of Erythromycin on Infantile Hypertrophic Pyloric Stenosis**
Krusha Dharmesh Bhakta, 18, Senior, Joplin High School, Joplin, Missouri, T: Karisa Boyer



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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-Ferofluid as a Technique for Microplastic Removal in Water**

#

Katie Lu, 18, Senior, Central High School, Springfield, Missouri, T: Rhyan 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 Clio Wiegand##, 17, Senior, Mackenzie Camille Wiegand##, 17, Senior, Simms High School, Simms, Montana, T: Jordan Hollern

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 Ceclre T: Jay Ceclre

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

MATS051 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

Opalina Vetrichevan, 17, Junior, Ed W. Clark High School, Las Vegas, Nevada,
T: Sarah Cooper

ENEV068 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 Neovascularization 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

*Jersey City, USNJ02, Jersey City Medical Center/Barnabas Health STEM Showcase***CHEM042 Silk Fibroin 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
- CBIO016** **Enabling Personalized Medicine: A Novel Deep Learning Tool for Classifying Genetic Mutations Using Text from Clinical Evidence**
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**
Louie Remijio Martinez, 17, Junior, Grants High School, Grants, New Mexico, T: Shelby Alexander
- 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 Brixii#, 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**
Long Island, USNY02, Long Island Science and Engineering Fair
- 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** **ETM* 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 Chigurupati, 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 Weseley
- 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**
Poojan Pandya, 16, Junior, Leo Takemaru, 16, Junior, Half Hollow Hills High School West, Dix Hills, New York, Ward Melville High School, East Setauket, New York, T: Michael Lake
- 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 Dobroszycki, 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
- BEHA028** **Unveiling the Nature of Graffiti Disapproval in NYC: A Novel Mapping Method for Defining the Trends of Graffiti Complaints**
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 Abbruzzese, 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 Atsttrin 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, Lincolndale, New York, T: William Maelia
- ENEV064** **Optimizing Thermal Hydrolysis for Increased Biogas Generation in Wastewater Treatment**
Rachel Joseph, 18, Senior, Somers High School, Lincolndale, 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 Brahmhatt, 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, Junior, 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 SiO₂ 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 3S**
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**
Shrila 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: Efstathios 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
Raleigh, USNC50, North Carolina State Science Fair
- 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 Voley, 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**
Josie Abigail Gonzalez, 15, Freshman, Kallie Angelina Elam, 15, Freshman, Eastern Alamance Highschool, Mebane, North Carolina, Eastern Alamance High School, Mebane, North Carolina, T: Shelley Casey
- 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

- BEHA043** **The Public Perception of Meat Labeling**
Abbigale Elaine Steeke, 18, Senior, Scranton Public School, Scranton, North Dakota, T: Andrew Burch
Fargo, USND03, Southeast North Dakota Regional Science and Engineering Fair
- EAEV053** **An Analysis of Microbial Reductions Methods for Lake Water**
Emerson Anna Falk, 16, Sophomore, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha
- TMED049** **A New Method to Study the Human Microbiome**
Isabelle Louise Chambers, 16, Junior, Woodhaven Academy, Fargo, North Dakota, T: Victoria Chambers
Jamestown, USND04, Southeast Central North Dakota Science and Engineering Fair
- PHYS052** **Electromagnetic Braking: Efficiency Relative to Position**
Bryce William Goettle, 18, Senior, Ashley Public School, Ashley, North Dakota, T: Lucas Moldenhauer
- ROBO071** **KEVAN: Kevan the Efficient Videogame-Playing Artificially Intelligent Neural Network**
Megan Dean Beyer, 17, Junior, Litchville-Marion High School, Marion, North Dakota, T: Peter Sykora
Grand Forks, USND05, Northeast North Dakota Regional Science and Engineering Fair
- EAEV066** **Saving Our Seas: A Solid Solution to Reducing Carbon Dioxide and Ocean Acidification**
Alyssa Mae Kemp, 17, Senior, Cavalier Public High School, Cavalier, North Dakota, T: LuAnn Kemp
Williston, USND06, Northwest North Dakota Regional Science Fair
- EAEV070** **(H₂O)^h My!**
Mikayla Grace Wolfe, 18, Senior, Tioga High School, Tioga, North Dakota, T: Debra Moe
- EAEV072** **The Environmental Impact of Sodium in Nature**
Bryan Martinez, 17, Junior, Trenton High School, Trenton, North Dakota, T: Bob Turcotte
- ENMC069** **A Safer Pipeline Design**
Brody Richard LaRoque, 17, Junior, Trenton High School, Trenton, North Dakota, T: Bob Turcotte
Grand Forks, USND50, North Dakota State Science and Engineering Fair
- BMED086** **Epigenetic Targets in Longevity Control in *Drosophila melanogaster* (Common Fruit Fly)**
Shrimayi Nikhil Patel, 15, Sophomore, Red River High School, Grand Forks, North Dakota, T: Lorraine O' Shea
- ENEV065** **An Application of Titanium Dioxide Coatings to Reduce Nitrogen Oxides**
Abigail Renae Post, 15, Sophomore, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha
- PLNT050** **Using Soil Enhancements to Increase *Zea mays* Profitability in Limited Production Agricultural Areas**
Emma Pearl Kratcha, 15, Freshman, Hankinson Public School, Hankinson, North Dakota, T: Patty Kratcha
- OHIO**
Athens, USOH01, Southeastern Ohio Regional Science and Engineering Fair
- BMED051** **Computational Screening of Small Molecules for Antibacterial Agents that Target T-Box Riboswitches**
Shifra Rajani Narasimhan, 16, Senior, Athens High School, The Plains, Ohio, T: Andrea Anderson
Cleveland, USOH02, Northeastern Ohio Science and Engineering Fair
- EGCH033** **Investigation of Thin-Film Silver as Top Electrode Material for Transparent Organic Solar Cells**
Jing-Jing Shen, 17, Senior, Beachwood High School, Beachwood, Ohio, T: Genevieve Sauve
- MATS054** **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**
Garrett Blum, 17, Junior, University School, Chagrin Falls, Ohio, T: Sara Laux

- PLNT026** **Impact of Different Chemicals on Plant Types**
Abigail Irene May, 16, Sophomore, St. Vincent - St. Mary High School, Akron, Ohio, T: Joanna Price
- SOFT033** **Mobile Application to Facilitate the Transmission and Interpretation of Biometric Data to Enable the Early Detection of Cardiovascular Disease**
Andrew Lebowitz, 17, Junior, Solon High School, Solon, Ohio,
T: Anthony Sanson
Dayton, USOH04, Montgomery County Science and Engineering Fair
- BEHA022** **Effect of Bilingualism on Stroop Interference**
Cameron Ryan Neidhard, 16, Sophomore, Carroll High School, Dayton, Ohio,
T: Christina O'Malley
- ENMC039** **EXFA on the Fly: Testing the In-Air Performance of the EXTended Flaps and Airbrakes (EXFA) System**
Lucas Kai-Luen Hung, 17, Junior, Home School, Miamisburg, Ohio,
T: Danielle Hung
- MCRO030** **Improved Efficacy of Sulfadimethoxine with Herbal Supplements to Inhibit the Growth of *Paramecium aurelia***
Ryan Ballou, 16, Sophomore, Carroll High School, Dayton, Ohio,
T: Christina O'Malley
Shaker Heights, USOH05, Hathaway Brown Upper School Fair
- CHEM029** **Improving Affinity-Based Drug Delivery with Convenient Computational Models**
Alison Wenqing Xin, 18, Senior, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller
- MATS035** **Thrombus-Directed Drug Delivery Systems for Targeted Fibrinolysis**
Tejal Pendekanti, 16, Junior, Hathaway Brown School, Shaker Heights, Ohio,
T: Crystal Miller
- TMED032** **Site-Specific Delivery of Immune Agonists for Antitumoral Response of the Tumor Microenvironment**
Shruthi Ravichandran, 15, Sophomore, Hathaway Brown School, Shaker Heights, Ohio, T: Crystal Miller
Archbold, USOH06, Northwest Ohio Science and Engineering Fair
- ANIM031** **The Prevalence of *Cryptosporidium* in Various Ages of Calves**
Jessica N. McWatters, 17, Junior, Pettisville High School, Pettisville, Ohio,
T: Donna Meller
- EAEV032** **A Survey of Lichen Diversity in Fulton County OH Cemeteries and Spectrophotometric Analysis for Use as Air Quality Indicators, Year Two**
Carsyn Kaylene Hagans, 15, Freshman, Archbold High School, Archbold, Ohio,
T: Laura Bickel
Marion, USOH07, Marion Area Science and Engineering Fair
- CBIO046T** **Segmenting CT Slices: Optimizing Lesion Detection through Mask Region-based Convolutional Neural Networks**
Nitish Dashora, 17, Junior, Liam Chen, 17, Junior, Olentangy Liberty High School, Powell, Ohio, T: Kevin Streib
- ENEV070** **Mechanism Leveraging eWaste to Enhance Water Condensation through Effective Use of Solid State Magneto-Caloric Thermal Cooling**
Soham Joshi, 14, Freshman, Columbus Academy, Gahanna, Ohio,
T: Chris Bolognese
Columbus, USOH50, Buckeye Science and Engineering Fair
- CBIO041** **An *in silico* Approach to Study Bacteria Protein Determinants of Antibiotic Resistance**
Mohini Parvate, 16, Sophomore, Dublin Jerome High School, Dublin, Ohio,
T: Joshua Manner
- CBIO042** **A Novel Design for Investigating Cell Deconvolution Methods for Tumor Microenvironment**
Virginia Ma, 17, Senior, Columbus Academy, Gahanna, Ohio, T: Moira Landes
- CELL046** **tRNA Dynamics between the Nucleus and Cytoplasm**
Leon L. Wu, 17, Junior, Upper Arlington High School, Upper Arlington, Ohio,
T: Kathryn Ward

- 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** **Cubitus 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*
- CBIO005** **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
- SOFT013** **A Secure Implementation of Mendelian Randomization via Multi-Party Computation**
Divya Amirtharaj, 17, Senior, Westview High School, Portland, Oregon, T: Debbie Cooper
- 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 Dahlen
- 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
- MATS022** **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
- MCRO014** **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, Lemoyne, 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 Josefina Karakousis, 14, Freshman, Julia Reynolds Masterman Laboratory and Demonstration School, Philadelphia, Pennsylvania, T: Kathleen Tait

ENMC073 Multi-Terrain Robot

Carter Daniel Gassler, 16, Sophomore, Avon Grove Charter School, West Grove, Pennsylvania, T: Kelly Sweeney

- 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**
Vijay Ramu, 15, Sophomore, Saarath Chaturvedi, 15, Sophomore, Riya Deepak Chaturvedi, 15, Sophomore, Cherokee High School, Marlton, New Jersey,
Eastern Regional High School, Voorhees, New Jersey, T: Yajamana Ramu
- 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
- SOFT067** **An Adaptive, Low-Cost Device for Automated & Offline Medical Analysis Utilizing Neural Networks with Reinforcement Learning Optimization**
Neil Deshmukh, 16, Junior, Moravian Academy, Bethlehem, Pennsylvania,
T: Gaby Dee
- Pittsburgh, USPA04, Covestro Pittsburgh Regional Science & Engineering Fair*
- 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
- 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
- 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
- York, USPA06, York County Science and Engineering Fair*
- MCRO025** **The Role of Cholesterol in Hantavirus Entry and Infection of Host Cells**
Astha Ray, 15, Sophomore, Dallastown Area High School, Dallastown,
Pennsylvania, T: Steve Stauffer
- SOFT024T** **Developing a Twitter 'Bot' Identification Application for Public Use**
Adam Joseph Rilatt#, 16, Junior, Daniella Maria Feistritzer#, 16, Junior, Central
York High School, York, Pennsylvania, T: Dianna Guise
- 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

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 Alys 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

Tatiyana 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

Brookings, USSD02, Eastern South Dakota Science and Engineering Fair

EAEV056T Spotting 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 Tampr-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 Ionic?: Developing a Ferrofluid

Serenity Engel, 18, Senior, Hot Springs High School, Hot Springs, South Dakota, T: John Entwisle

Mitchell, USSD04, South Central South Dakota Science and Engineering Fair

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

Nashville, USTN06, Middle Tennessee Science and Engineering Fair

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 Kaili-May Liu, 17, Senior, Ravenwood High School, Brentwood, Tennessee, T: Peter Lowen

TEXAS

Dallas, USTX01, Beal Bank Dallas Regional Science and Engineering Fair

EAEV009T **Bioremediation of Tetracycline Polluted Soils: How Antibiotic Resistance Can Reduce Antibiotic Pollution in the Environment and a Solution to Groundwater Antibiotic Pollution**

Sriya Teerdhala, 15, Freshman, Sanjana Hiremath, 15, Freshman, Plano East Senior High School, Plano, Texas, T: Julie Baker 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

- CBIO006** **Predicting the Development of Secondary Central Nervous System Cancer through Ensemble Learning Methods**
Julia Christina Ayalde Camacho, 16, Junior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls
- ENBM021** **Stereoscopic Three-Dimensional X-Ray Reconstruction Processing: A Low-Radiation Cost-Effective Versatile Medical Imaging Procedure for Safe and Rapid Scanning**
David Yue, 18, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls
- ENEV031** **H2Go: A Construction and Analysis of a Novel Purification Device**
Haneul Hyun, 16, Junior, Colleyville Heritage High School, Colleyville, Texas, T: Sonya Loughran
- MCRO013** **First Isolation and Characterization of Bacteriophages "Liamboii" and "Ostambo" Infecting *Streptomyces antibioticus***
Sangita Vasikaran, 17, Senior, Texas Academy of Mathematics and Science, Denton, Texas, T: Samuel Earls
- TMED019** **Reconstituted High-Density Lipoproteins for the Treatment of Pediatric Cancer**
Ruhani Kaur Ahluwalia, 15, Sophomore, Harmony School of Innovation – Fort Worth, Fort Worth, Texas, T: Bilal Yildirim
Brownsville, USTX04, Rio Grande Valley Regional Science and Engineering Fair
- CHEM035** **Green Synthesis of Medicinally Privileged Thio-Heterocycles**
Valeria Esmeralda Stevens, 18, Senior, McAllen High School, McAllen, Texas, T: Eva Sanchez
- MATS046** **Development of Piezoelectric Nonwoven Polymer Composites Fibers**
Samya Ahsan, 17, Junior, UTRGV Mathematics and Science Academy, Edinburg, Texas, T: Tim Sears
- TMED028** **Development of Smart Bandages to Control the Healing Process of Chronic Wounds**
Pablo Vidal, 17, Junior, UTRGV Mathematics and Science Academy, Edinburg, Texas, T: Karen Lozano
Houston, USTX05, Science Engineering Fair of Houston
- ANIM010** **Modeling Prenatal Nicotine Exposure with *Hydra littoralis***
Christopher Scott Calizzi, 18, Senior, College Park High School, The Woodlands, Texas, T: Sara Fox
- BEHA009** **Procrastination versus Perceived Consequences**
Alyssa Knowles, 17, Junior, Friendswood High School, Friendswood, Texas, T: Dawne Welch
- BMED018** **Mitochondrial Effects of High Energy High Charge (HZE) Irradiation on the Liver**
Alexandra Tan, 19, Senior, Ball High School, Galveston, Texas, T: Michelle Puig
- CELL006** **Analyzing the Effects of CRISPR**
Melannie Paulette Nimocks, 17, Junior, College Park High School, The Woodlands, Texas, T: Sara Fox
- ENBM011** **Engineering a Novel Wearable Biosensing Mechanism through the Implementation of Microelectromechanical Systems and Machine Learning to Realize Anomalies Hinting towards Future Cardiac Episodes**
Prerit Choudhary, 16, Junior, College Park High School, The Woodlands, Texas, T: Susan Caffery
- ENEV023T** **Application of Engineered Natural Materials for Phosphorus Removal to Control Algae Blooms in Eutrophic Water with Insight into Chemical Mechanisms and Large-Scale Feasibility Analysis**
Steven Wu, 18, Senior, Richard Zhang, 18, Senior, Clear Lake High School, Houston, Texas, T: Brenda Pinchbeck
- ENMC017** **Portable Graphene Oxide Desalination**
Marcus Justin Schlauch, 18, Senior, Clear Brook High School, Friendswood, Texas, T: Alaina Garza
- ENMC023T** **Improving Motorcyclist Safety: A New Helmet Integrity Monitoring Technology**
Ronin Foster Burke, 16, Junior, Jeremiah Gabriel Elizabe, 16, Junior, College Park High School, The Woodlands, Texas, T: Susan Caffery T: Karen Humes

- 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: Janice Trees 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 Gravitometer**
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 Methyl-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**
Bridget 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

College Station, USTX50, Texas Science and Engineering Fair

- 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, Junior, 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

- BEHA040 #** **A Tool to Predict Sex Discrimination**
Troilus Robert White, 17, Junior, Cedar City High School, Cedar City, Utah, T: Anna Lewin
- PHYS058T** **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
- PLNT060** **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*
- ANIM034T** **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
- BEHA030** **Conformity Among Ages**
Kaylee Dayle Stewart, 17, Junior, Weber High School, Pleasant View, Utah, T: Lareen Radle
- PHYS031** **The Unpredictability of Photons**
Adam Kent Thomas, 15, Freshman, Bonneville High School, Washington Terrace, Utah, T: Sara Yearsley
- PHYS032** **Effects of Clothing on the Aerodynamics of a Mountain Biker**
Isaac Day Staten, 15, Freshman, Bonneville High School, Washington Terrace, Utah, T: Benjamin Sherman
- PLNT036T ##** **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
- Provo, USUT04, Central Utah STEM Fair*
- ANIM041** **The Variance of Nitrogen and Phosphorus Levels in Chicken Manure Induced by Flock Age**
Jesse Shepherd, 15, Freshman, Spanish Fork Junior High School, Spanish Fork, Utah, T: Chaleesa Warren
- EBED031 #** **Doppler Radar Flash Flood Detector**
Ammon Wallace, 15, Sophomore, Salem Hills High School, Salem, Utah, T: Kent Stone
- ENMC058T #** **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
- MATS053** **Effect of Stationary Magnetic Fields on Zinc Oxide Nanowires**
Liesel Robinson, 14, Freshman, Early Light Academy, South Jordan, Utah, T: Darci Cordero
- Salt Lake City, USUT05, University of Utah Science and Engineering Fair*
- BMED053** **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
- CBIO021T** **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 Thirlwell
- CBIO023** **A Novel Mathematical Model for the Early Detection of Dengue Fever Using SIR Infectious Disease Epidemiological Compartments, Ordinary Differential Equations, and Statistical Computing**
Tarun Kumar Martheswaran, 15, Sophomore, The Waterford School, Sandy, Utah, T: James Harris
- CBIO030T** **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
- MCRO048** **Fishing for New Crop-Benefiting Soil Bacteria through Plant-Microbe Interactions**
Gary Zhan, 14, Freshman, Logan High School, Logan, Utah, T: Christina Howell

VERMONT

- Northfield, USVT50, Vermont Science, Technology, Engineering and Mathematics Fair*
- CELL045** **Evaluation of a Rare PMS1 Germline Variant as a Putative Hereditary Breast Cancer Risk Allele**
Kelly Xu, 16, Junior, South Burlington High School, South Burlington, Vermont, T: Nathaniel Moore
- ENEV071** **Designing a Solar Powered Ultrasonic Cyanobacteria Growth Inhibitor**
Virginia Elisabeth Snyder, 17, Junior, Windsor High School, Windsor, Vermont, T: Catharine Engwall
- MCRO061** **Evolution of *Aspergillus fumigatus* in Cystic Fibrosis Lungs to Higher Virulence in a Hyperosmotic Environment**
Emily Ann Dean, 15, Sophomore, Woodstock Union High School Middle School, Woodstock, Vermont, T: Vanessa Cramer

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

CBIO034 **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 ALPHA5 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 Filtration of EMG and EEG Signals through Supervised Machine Learning**

Divjot Singh Bedi, 17, Junior, Rishabh Misra, 17, Junior, Thomas Jefferson High School for Science and Technology, Alexandria, Virginia, T: Jennifer James

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 Physiology 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**

Sarah Sajila Syed#, 16, Junior, Saijai Supanklang#, 16, Junior, Miamar Gloria Burgos-Rosario#, 17, Junior, Hayfield Secondary School, Alexandria, Virginia, T: Luke Tonia

PHYS039 **Simulation of Timescale Matching between Organic and Metallic Phase-change Materials for Transient Thermal Reduction**

Justin Wang, 18, Senior, Chantilly High School, Chantilly, Virginia, T: Rebecca Wills

PHYS048 **Modelling Energy Extraction via the Penrose Process in Analog Black Holes**

Luke Antonio Mrini, 17, Senior, Lake Braddock Secondary School, Burke, Virginia, T: Robert Irelan

ROBO050 **Textual Origin Classification and Implicit Bias Detection with Deep Recurrent Neural Networks**

Jerry Wei, 15, Sophomore, Oakton High School, Vienna, Virginia, T: Grace Wang

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**
Luke Gardner, 17, Junior, Luke Alexander Suess, 17, Junior, Patrick Henry High 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: β -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 *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
- EENEV045** **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**
Adivi 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 Sobinovskiy, 16, Sophomore, Lisa Sobinovskiy, 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 Quryshi, 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**
Ashlyn 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 Sreejayan 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, Tacuarembó, 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**

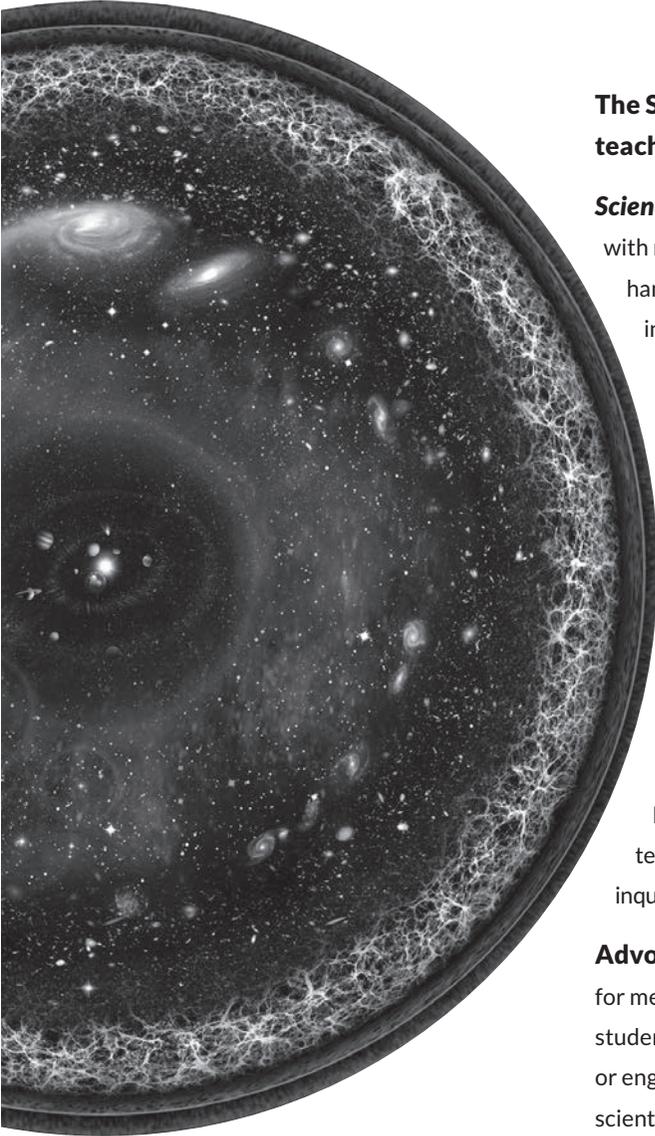
Bao Chau Phan Nam, 17, Senior, Le Quy Don High School For The Gifted, Quy Nhon, Binh Dinh, Vietnam, T: Nam Hung Phan

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**
Tuan Kiet Vo, 16, Junior, Thien Hieu Tran, 17, Junior, Le Quy Don Secondary School for the Gifted, Quy Nhon, Binh Dinh, Vietnam, Le Quy Don Secondary School for The Gifted, Quy Nhon, Binh Dinh, Vietnam, T: Hoang Cao
- CHEM062** **3-Hydroxy-1-Azoalkenes 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
- MCRO083T** **Genomic Analysis of Pseudomonas aeruginosa Resistance to Carbapenem Isolates in Three Major Hospitals in Hanoi (2011-2015)**
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 Ngoro
- 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**
ChenChen 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

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UNIVERSAL MAP 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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1719 N Street, NW

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