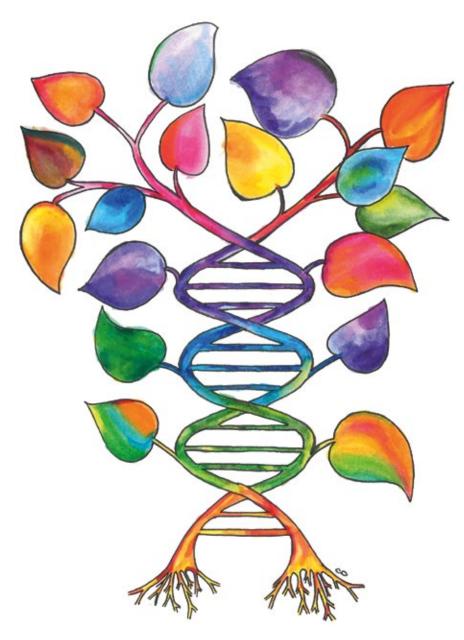
# MONTGOMERY COUNTY SCIENCE FAIR 2019

Fair: March 22<sup>nd</sup> & 23<sup>rd</sup>
FDA White Oak Campus, Building 75
10903 New Hampshire Ave., Silver Spring

Award Ceremony: March 24<sup>th</sup>
Montgomery Blair High School
51 University Blvd. E., Silver Spring









United Therapeutics Corporation is a biotechnology company focused on the development and commercialization of innovative products to address the unmet medical needs of patients with chronic and life-threatening conditions.

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Cu-Copper AoPS (\$500-\$999) BeSTEM! NexImmune

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Timothy Martin
Anne Merrell
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Schuyler Price
Aprajita Srivastava
Raj Raghavan

Susmita Shrivastava P.V. Sundareshwar

#### **Program Cover Art & Design**

The cover art is a reprint of an original painting by Carolyn Dorgan. A talented biomedical engineer, Ms. Dorgan has advanced medical devices in both industry and at the Food and Drug Administration. When she is not evaluating devices, she enjoys drawing, painting, dancing, and hanging out with her family.



# Salient CRGT is proud to be a continuing supporter of the Montgomery County Science Fair.

We celebrate the notable achievements of all participating students.



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www.ScienceMONTGOMERY.org

Food and Drug Administration, White Oak Campus, 10903 New Hampshire Ave. Silver Spring, MD 20993

#### **FRIDAY, MARCH 22, 2019**

4 PM – 9 PM Student Project Set-Up: Set-up display boards and go through Safety In-

spection at FDA White Oak Campus. Mentors, teachers, family members, and friends of Fair Participants are welcome to view the projects

#### SATURDAY, MARCH 23, 2019

**8:45 AM** – **9:45 AM** Judges Registration Period (No students present)

9:45 AM – 11:45 AM Judges Preview Period (No students present)

11:45 AM – 12:45 PM Students admitted

1:00 PM – 4:00 PM Student Interviews: All Judges, all grades; students must stay until end

of all judging.

**4:00 PM - 5:00 PM** Project Removal: All projects must be removed by 5 PM or they will

be discarded

#### **SUNDAY, MARCH 24, 2019**

**2:00 PM – 4:00 PM** Awards Ceremony at Montgomery Blair High School, 51 University

Blvd E., Silver Spring, MD 20901

**4:00 PM – 5:00 PM** Meeting with ScienceMONTGOMERY High School International

Science and Engineering Fair (ISEF) Winners and First Runner-up and

their families about trip to Phoenix, AZ for ISEF

# FOOD AND DRUG ADMINISTRATION (FDA) SCIENCE CENTER

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# Is A Proud Sponsor Of the 2019 Montgomery County Science Fair





#### MONTGOMERY AREA SCIENCE FAIR ASSOCIATION

Welcome to the Montgomery County Science Fair!

*ScienceMONTGOMERY* congratulates and applauds the students who participated in the 2019 Montgomery County Science Fair. We hope that conducting these science projects and presenting the hard work that went into them was an enjoyable and valuable experience.

The Montgomery County Science Fair brings together scientists, engineers, mathematicians, educators, parents, and young student scientists from Montgomery County. *ScienceMONTGOMERY* provides a venue for competition and research presentation among hundreds of students from public, private, and home school affiliations in grades 6 through 12. We provide cash prizes for project excellence through our numerous Category Awards. Complementing these are a large number of Community Awards generously provided by various business, scientific, professional, and educational organizations, and US Government agencies. Students are competing for more than \$40,000 worth of prizes in the form of cash, scholarships, internships, travel, banquets, bonds, books, certificates, medals, and merchandise. As an affiliate of the Intel International Science and Engineering Fair (ISEF), *ScienceMONTGOMERY* also awards fully funded travel scholarships to the students with the best four projects to compete in the International Science and Engineering Fair.

*ScienceMONTGOMERY* is a 501(c)3, nonprofit, all volunteer organization which relies on generous sponsors to fund the county-wide fair competition each year such as: AstraZeneca, GSK, the United Therapeutics Corporation, MRI Global, and Emergent BioSolutions. The Food and Drug Administration has graciously hosted our event for many years and we have received in-kind technical support from Information Innovations, Incorporated.

The all-volunteer *ScienceMONTGOMERY* Board of Directors wishes to thank each of the organizations and individuals listed in this program for making the Fair possible. Every year, we are indebted to the more than 200 volunteer judges who painstakingly evaluate projects and encourage students' further pursuit of scientific understanding. All of our sponsors, judges, and volunteers make the Fair possible, and we thank you. Additionally, we would like to acknowledge the contribution of Ms. Carolyn Dorgan for this year's program: the cover art is a reprint of one of her original paintings.

I would like to personally thank and acknowledge the *ScienceMONTGOMERY* Board members who have contributed significant talent, time, and resources late at night, after work, on weekends, and in good and bad weather to make the Fair happen. I also want to thank the parents, teachers, mentors, and sponsors who supported and encouraged Fair participants.

Finally, and most importantly, I want to thank all of the student participants for their hard work, dedication, enthusiasm, passion for science, and willingness to be part of the Montgomery County Science Fair. I sincerely hope this has been a rewarding, valuable, and unforgettable experience that you will carry with you in your careers.

Patricia A. Miller, Ph.D.

Patricia (). Miller

Fair Director March 2019



#### OFFICE OF THE COUNTY EXECUTIVE ROCK VILLE, MARYLAND 20850

Marc Elrich
County Executive

March 2019

Dr. Patricia Miller
Fair Director
ScienceMONTGOMERY
Montgomery Area Science Fair Association

Dear Dr. Miller:

Montgomery County supports and applauds *Science*MONTGOMERY, and your ongoing efforts to encourage interest in science throughout our community. Programs like yours help nurture and expand Montgomery County's longstanding national and international prominence in the life sciences and technology fields. The countywide Science Fair annually attracts hundreds of Montgomery County public and private school students, and we are very proud to support your mission to celebrate performance in science education throughout the County.

Now more than ever, Montgomery County is doing all it can to ensure a strong, vibrant economy and healthy, sustainable communities for future generations. Maintaining one of the nation's highest performing K-12 public school systems is essential to these goals, and the talented and dedicated students being recognized this year illustrate our success in this area.

I commend the important contributions you and *Science*MONTGOMERY make within the community, and applaud those businesses that, during these difficult economic times, pledged their support to recognize and honor the talents and achievement of our youth.

Sincerely,

Marc Elrich County Executive





#### MONTGOMERY AREA SCIENCE FAIR ASSOCIATION

"To encourage and promote interest in engineering, mathematics, science and science education in the youth of the area."

#### **OFFICERS AND EXECUTIVE BOARD**

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AstraZeneca Montgomery Blair High School

Treasurer Aprajita Srivastava Fair Director Patricia Miller, Ph.D.

Netransform LLC MCPS Teacher (Retired)

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**CAMRIS** International

Persons interested in joining the ScienceMONTGOMERY Board should contact <u>FairDirector@sciencemontgomery.org</u>

# Interested in next year's Science Fair? Are you supporting students with projects?

Check out the Intel ISEF Document Library for 2020 Rules, Guidelines, and Resources!

Documents are usually updated by the end of May for the coming year.

Email *ScienceMONTGOMERY's* Scientific Review Committee **src@sciencemontgomery.org** any time with questions or to ask for comments on a proposed research plan.

### AWARDS PROGRAM

Sunday, March 24, 2019 at 2:00 P.M. Blair High School Auditorium

**Opening of Awards Program and**Patricia Miller, Fair Director

**Welcome to ScienceMontgomery**Raghavan Venkat, President

**Presentation of Category Awards\***Patricia Miller, Fair Director

Raghavan Venkat, President

**Presentation of Community Awards\***Patricia Miller, Fair Director

Raghavan Venkat, President

**Presentation of Broadcom and ISEF Awards\*\***Raghavan Venkat, President

**Thank you and Adjournment**Patricia Miller, Fair Director

**ISEF Award Winners Meeting 4:00-5:00 PM**ISEF Committee and ISEF finalists and parents

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Proud sponsors of the Montgomery County Science Fair and a Community Awards Organization

<sup>\*</sup>When called on stage for awards, students will shake hands with board members and community awards representatives on stage and then receive awards off to the opposite side of the stage.

<sup>\*</sup>Please hold applause until all awardees for a given category or community award are presented.

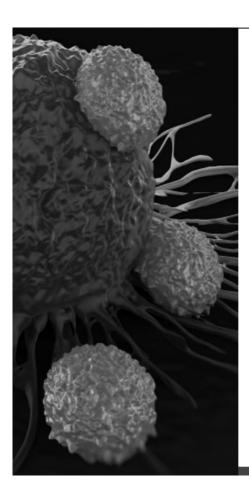
<sup>\*\*</sup>Broadcom winners will be announced and asked to come onto the stage for Broadcom packets and group photo. After Broadcom winners are dismissed from the stage, the ISEF award winners will be announced and asked to come onto the stage for a group photo.



## **Community Organizations Presenting Awards-2019**

American Industrial Hygiene Society—Potomac Section
AstraZeneca
BeSTEM! Summer Camp
Chesapeake Water Environment Association
DC ANS
GWIS NCC
IEEE Washington Section
Montgomery County Master Gardeners
MRIGlobal
QIAGEN

Rockville Science Center Sigma Xi - FDA Chapter U.S. Nuclear Regulatory Commission Washington Statistical Society



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### **2019 Update**

#### Congratulations to our 2018 ScienceMONTGOMERY Grand (ISEF) Prize Winners:

<u>Biology</u> Claire Benadon (Poolesville HS): Assessing Sheep's Mothering Abilities through Vocalization Analysis

<u>Biology</u> Daniel Schaffer (Montgomery Blair HS): What is the role of wolframin in the endoplasmic reticulum

Ca2+ signaling network?

Mathematics Mengming Luo (Montgomery Blair HS); A Characterization of N-Way Fitness Graphs

that Imply N-Way Epistasis

Physics Carissa Wu (Winston Churchill HS) and Abhishek Allamsetty (Thomas Jefferson HS): Procedural Determina-

tion of Novel Stoichiometric Topological Superconductors through Surface and Pressure Effects

Alternates: Biology Mikaela Moore and Emma Schillerstrom (Montgomery Blair HS): Analysis of Deceased Limulus Polyphemus to

Find Causes of Mortality on Wallops Island

#### Our ScienceMONTGOMERY Family's Recent Recognitions Include:

Intel ISEF 2018 NSA Research Directorate Special Award: Honorable Mention (Physical Science): Carissa Wu and Abhishek Allamsetty

American Society of Human Genetics 2017 DNA Day Essay Contest (Third Place): Alvin Ya

National Geographic Emerging Explorer (2017): Grace Young

Gates Cambridge Scholar: Neil Davey Churchill Scholar: Jared Lichtman

Greater Washington Area Regional Junior Science and Humanities Symposium: Garyk Brixi (First Place Winner, National Finalist), Mehana

Daftary (National Finalist), Angela Shi (First Place, Poster Competition)

Bethesda Magazine Extraordinary Teens: Laura Espinoza, Carissa Wu

Jack Kent Cooke College Scholar: Na Hye Kim

USA Biology Olympiad Semifinalists: Elliot Kienzle, Shwetha Kunnam, Noah Singer

Chesapeake Bay Bowl (Winning Team Members): Anish Senapati, Elliott Kienzle, Noah Singer

National Ocean Science Bowl (First Place, Team Members): Anish Senapati, Elliott Kienzle, Noah Singer

Presidential Scholars: Sreya Vangara, Michael Yin

National Science Foundation Graduate Research Fellowship: Shaun Datta

University of Toronto Biology Competition International Biology Scholar: Katherine Lei, Alan Tong, Daniel Yang Aerospace 41st Herndon Science Competition: Experiment Competition Winners: Sreya Vangara, Pratyusha Mandal;

Essay Competition Winner: Sreya Vangara

The Best Schools: (2018) World's Smartest 50 Teens: Andrew Komo

Davidson Fellow: Garyk Brixi

MIT Alumni Association Margaret L. A. MacVicar'65, ScD '67 Award: Paul Kominers

International Physics Olympiad Gold Medal: Daniel Zhu

Broadcom MASTERS Top 300: Daniel Choi, Efe Eroz, Mihir Gupta, Frank Harrigan, Jeffrey Jiang, Benjamin Nachod, Sarah Thomas

MedTechBoston 40 Under 40 Health Innovators (2018): Sherman Leung

Girls Computing League Idea-thon (Second Place, Team Member): Dhruv Pai

C-Span Classroom StudentCam 2018 Competition (Second Place, Team Member): Dhruv Pai

American Mathematical Society: Who Wants to Be a Mathematician Championship (Contestant): Steven Qu

Congressional App Challenge (Winners): Dhruv Pai & Josh Wolfson; Suveena Sreenilayam

Regeneron Science Talent Search Finalist: Daniel Schaffer; Scholars: Abhishek Allamsetty, Garyk Brixi, Laura Cui, Naveen Durvasula, Ivy Han, Steven Qu, Tesia Shi, Daniel Zhu





Each year, ScienceMONTGOMERY alumni return to volunteer at our fair.

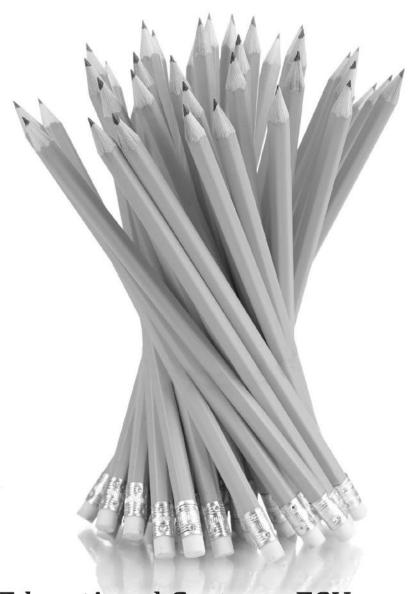
Many thanks to these ScienceMONTGOMERY alumni
for their instrumental help in making the fair happen,
over the past ten years:

Melis Anahtar · Melodi Anahtar Adam Berger · Megan Brady Katherine Brizzolara · Mindy Burton · Mandy Chen Kuo-Kai Chin · Re-I Chin · Reyna Choi Stephanie Douglas · Taylor Douglas · Chinasa Ejiofor Jeremy Fallick · Sarah Gao · Anurudh Ganesan Maddie Golding · Maggie Glaudemans · Ryan Halli · Jacob Hurwitz Phanna Iamlek · Joshua Kalampanayal · Sneha Kannan · Eric Keen Matthew Kinnard · Josh Klontz · Paul Kominers · Scott Kominers Ekesh Kumar · Kyle Le · William Lee · Emily Levine Daniel Liss · Nina Jessica Lu · Reethika Maddenini Mikala Marville · Hermela Mengesha · Tete Narh-Mensah Gyyoung Oh · Tiara Oldfield · Jason Qian · Sikandar Porter-Gill Waliullah Rifai · Kenny Rosenberg Nathan Schilling · Yashvi Shah · Lea Shand · James Sheperdson Reid Simon · Mike Sousane · Suzanne Tamrakar Haroula Tzamaras · Carmelita Ugarte Jennifer Wang · Louis Wasserman Claire Wortmann · Katherine Wu · Grace Young · David Zhang

We invite all ScienceMONTGOMERY alumni to join us as volunteers at future fairs.



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# 2019 Category and ISEF Awards Judges

	6 - 7 - 1		<b>,</b>
NAME	AFFILIATION	NAME	AFFILIATION
Dr. Sabarni Chatterjee	NCI	Ms. Bernadette Hritzo	The Henry M. Jackson Foundation
Dr. Keith Bullock	Education	Dr. Yuhong Chen	AstraZeneca
Mr. Cortez Booze	Healthcare	Dr. Tatiana Claro da Silva	
Dr. Jana Delfino	FDA	Mr. James Simonetti	USAID / Government
Dr. King Chan		Dr. Malini Ahuja	NIH
Dr. Moriah Jacobson	Uniformed Services University	Ms. Abolade Adepiti	
Dr. Mukil Natarajan	FDA	Dr. Anika Prabhu	NIH
Dr. Jonathan Hardis	NIST	Mrs. Marina Pranda	University of Maryland, College Park
Dr. Thomas Calder	NIH	Ms. Anna ganelina	NIH
Dr. Mohanraj Manangeeswaran	Food and Drug Administration	Dr. Naimish Pandya	NexImmune
Dr. Seung Kyu Lee	National Institute on Aging, NIH	Dr. Santosh Nanda	FDA
Mr. Terry Wu	National Institutes of Health	Mrs. Kshama Hegde	RKF Engineering
Dr. Erin Adkins	NIST	Dr. Corey Stambaugh	NIST
Mrs. Joy Pase	NIH	Dr. Haiyi Jiang	AstraZeneca
Dr. sri vikram palagummi	NIST	Dr. Hussien Abdelbaky	Metromont Precast
Mr. Joseph McKennan	Bioqual, Inc	Dr. Steven Brooks	National Institute of Allergy
Dr. Upasana Sahu	Food and Drug Administration		and Infectious Disease
Dr. J. Terrell Hoffeld	U.S. Public Health Service (Retired)	Dr. Lily Xia	
Dr. Arthur Samuel	IRS	Ms. Andrea Kim	FDA
Dr. Tamika Samuel		Dr. Osman Yogurtcu	
Dr. Gouri Chattopadhyay	FDA	Mr. Craig Woolcott	NOAA Office of Legislative Affairs
Dr. Suman Mukhopadhyay	NIAID/NIH	Dr. Suryatheja Ananthula	FDA
Dr. Maitreyi Chattopadhyay		Mrs. Chelsea Lehman	
Dr. Garry Didinsky	Northrop Grumman	Ms. Meghana Chalasani	U.S. Food and Drug Administration
Dr. Shirin Marfatia	FDA	Ms. Gabrielle Walsh	ORISE Fellow at FDA
Dr. Matthew Scholfield	GSK Vaccines	Dr. Kanwal Mahmood	U.S. Food and Drug Administration
Dr. Madhu Ramaswamy	AstraZeneca/Medimmune LLC	Dr. qing xu	FDA
Dr. Nisha Nagarsheth	NIH NCI	Dr. Emilia Sippert	Food and Drug Administration
Dr. Kapinga Ngalula	1111111101	Dr. Olivia Cangellaris	Ü
Mr. Timothy Petros	NIH	Dr. Guillermo Monroy	FDA
Mr. Jeff Rodman	Northrop Grumman	Dr. Somesh Chattopadhyay	FDA and George Washington University
Ms. Priscilla Gathoni	AstraZeneca Pharmaceuticals	Dr. Arup Chakraborty	,
Dr. Kyle Anderson	NIST	Ms. Aparna Ajjarapu	National Institute for Child Health
Mr. Alok Saha	11201	, , ,	and Human Development
Mr. Jon Griffin		Dr. Saroj Regmi	National Institutes of Health (NIH)
Ms. Beth Alley	AstraZeneca	Ms. Alexandra Fister	The National Institutes of Health
Dr. Daniel Elton	University of Maryland, College Park	Ms. Avery Swearer	1110 1 101101101 1110110100 01 11001111
Dr. Lindsey Sharpe	oniversity of maryland, conege rank	Ms. Katelyn Callies	
Ms. Chy Mi		Dr. Pushpanathan Muthuirulan	
Dr. Anita Verma	FDA	Dr. Anshika Jain	National Institutes of Health
Dr. Robert Silverberg	10/1	Mr. John Tegen	StayNTouch
Ms. Elizabeth Coyle		Dr. Sarala Padi	NIST
Dr. Carlos Guardia	NICHD/NIH	Dr. Sherri-Gae Scott	American Gastroenterological Association
Mrs. Padma Venkatachalam	Montgomery County Government	Ms. Jennifer Novak	American dustroenterological Association
Dr. Jennifer Symonds	ChromaDex Spherix Consulting	Dr. Shweta Sharma	
Dr. Sarah Morgan	omomatica opiicita consuming	Dr. Rakesh Upadhyay	
Mr. Jack Morgan		Dr. Manas Chattopadhyay	
Dr. Malgorzata Turalska	US Army Research Laboratory	Mrs. Kathryn Shantz	NextCure, Inc.
	OS ATTILY RESCALCII LADUIATULY	Dr. Steve Godin	Smithers Avanza
Mr. Ed Pase	LIC Fodoval Covernment /FDA	Mr. Salil Das	
Dr. Lokesh Bhattacharyya	US Federal Government/FDA	Dr. Mehdi Kazemzadeh-Narbat	Prince Georges Community College FDA
Dr. Sukhbir Kaur	NIH		
Dr. Luis Espinoza	National Institutes of Health	Dr. Karin Knudson	National Institutes of Health
Mr. Yezdi Antia	Hughes Network Systems	Mr. Nna-Emeka Ejimogu	IIC Coological Survey-
Dr. Prabha Chandrasekaran	National Institutes of Health	Mr. Larry Hothem	U.S. Geological Survey

### 2019 Category and ISEF Awards Judges (continued)

NAME	AFFILIATION	NAME	AFFILIATION
Dr. Dawei Lin	NIH	Dr. Victor Kalasinsky	Retired-Dep of Veterans Affairs; Dep of Defense
Mr. Scott Miller	ATCC	Dr. Kathryn Kalasinsky	Retired - National Institutes of Health
Mr. Alex George	U.S. Army Research Laboratory	Dr. Amelie Vezina	NIH
Mrs. Wendy Ortiz	Northrop Grumman	Mr. Lance Minor	AstraZeneca
Dr. David Wei	NIH/NCI	Dr. Anubhavini Chaudhry	AstraZeneca
Dr. Edward Kwee	National Institute of Standards and Technology	Dr. Ishrat Sultana	FDA
Dr. Swati Choksi	NIH/NCI	Dr. Kirill Gorshkov	NIH National Institute of Health
Dr. Lena Diaw		Dr. Birong Shen	
Dr. Li Dai NCI		Dr. Christina Bergonzo	NIST
Dr. Sam Schonfeld	NASA / USRA	Mrs. Yan Guo	Pacific Biosciences
Dr. Mohammad Shahid	Children's Hospital, DC	Dr. Alicja Dabrowska Brown	AstraZeneca
Dr. Venkataraman Srinivasan	retired Research biologist, DoD	Ms. Pallavi Malla	FDA
Ms. Brenda Robles	QIAGEN	Mrs. Lynda Zorn	
Mr. Sidhartha Bakaya		Mr. Paul Arveson	Washington Academy of Sciences
Dr. Mihir Jaiswal	FDA	Ms. Theresa Marth	USDA
Dr. Norman Peterson	Medimmune	Mr. Charles Thomas	FDA
Dr. Wilson Bryan	FDA	Dr. Ferdous Khan	Grant Thornton
Mr. Richard Hayman	Retired from POS/Cash Register Industry/	Dr. Beth McNally	
	Industrial Engineering Degree	Dr. Mohd Mohsin Raza Khan	
Ms. Ilene Solomon	STEM Volunteer	Mr. Kevin McPherson	National Institutes of Health
Mr. Farshad Farhi		Dr. Liliana Brown	National Institute of Allergy and Infectious
Dr. Sarmistha Sanyal		Diseases (NIAID)	
Mr. Jack Dervin	US Air Force	Dr. Roshan Shrestha	National Cancer Institute, NIH
Mrs. Valencia Rogan	United States Air Force	Dr. Simona Puiu	FDA
Ms. Stephanie Sca		Dr. Nicholas Durham	AstraZeneca
Ms. Amberly Vaughan		Dr. Amalendu Ghosh	FDA
Ms. Rachael Campbell	Uniformed Services University	Dr. Kazue Hashimoto-torii	George Washington University
	School of Medicine	Dr. Priya Kannan	AstraZeneca
Dr. Bharat Khurana	FDA	Mr. Madhu Siddalingaiah	SEA corporation
Dr. Rok Tkavc	USUHS/HJF	Mrs. Kristen Simonetti	
Dr. Jessica Wayt	NIH	Dr. Sreya Tarafdar	FDA
Dr. Colin Heikes	NIST Center for Neutron Research	Mr. Krishna Samavedam	Hughes
Ms. Alejandra Cavazos Saldana	National Institutes of Health		

## **ScienceMONTGOMERY Participating Schools-2019**

School		Abbr	School	Abbr
Montgo	omery Blair High School	BLH	Other School	Other
Church	ill High School	СНН	Poolesville High School	POH
Clarksb	ourg High School	CHS	Roberto Clemente Middle School	RCM
Farquh	ar Middle School	FQM	Frost Middle School	RFM
George	town Day School	GDS	Richard Montgomery High School	RMH
Holy Cr	ross School	HCS	Rocky Hill Middle School	ROM
Hoover	· Middle School	HHM	St. Andrew Apostle School	SAA
Holton-	-Arms School	HOA	Seneca Valley High School	SVH
Home S	Schooled	HS	Takoma Park Middle School	TPM
St. Jane	de Chantal School	JCS	Wheaton High School	WHH
Kingsv	iew Middle School	KIM	Wootton High School	WHO
Muslim	n Community School	MCS	Walter Johnson High School	WJH
Northw	vest High School	NWH		



## ScienceMONTGOMERY needs your Element of Support for the Annual Montgomery County Science Fair!

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	<ul> <li>ISEF award in your organization's name</li> </ul>
	Name on cover of event program
	Logo on banners at Fair and Award Ceremony
	<ul> <li>Logo and link from <u>ScienceMONTGOMERY.org</u></li> </ul>
T!	\$5,000 - \$9,999 Titanium (Ti) Sponsor
Ti	<ul> <li>Full page advertisement and prime location in event program</li> </ul>
	Logo and link from <u>ScienceMONTGOMERY.org</u>
<b>A</b>	\$1,000 Silver (Ag) Sponsor
Ag	• Full page advertisement in event program
	Organization name listed on <u>ScienceMONTGOMERY.org</u>
	ATON C
Cu	\$500 Copper (Cu) Sponsor
	<ul> <li>Half Page advertisement in event program</li> <li>Organization name listed on <u>ScienceMONTGOMERY.org</u></li> </ul>
	Organization name fisted on <u>Sciencewolv'i Goweki.org</u>
Fe	\$150 Iron (Fe) Sponsor
10	Business-card sized advertisement in event program
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	Please contact me. We are interested in volunteering.
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## **EXHIBITORS**

BEH	IAVIORAL AND SOCIAL SCIENCES		
M101	Music During Work? Think Again!	William Applegarth	HCS
M102	How Do Different Levels of Neural Activity Effect One's Perception of Time?	Adam Bacso	TPM
M103	Rewards and Motivation	Anuprova Bhowmik	TPM
M104	Do Dogs Have Favorite Colors?	Simon Bueno	HCS
M105	Breaking The Stroop	Brian Call	RCM
M106	The Placebo Effect	Sarah Cestone	HCS
M107	Stroopity-Doop	Devon Chen	RCM
M108	How the Brain Invests	Daniel Espinoza	TPM
		Richard Huang	TPM
M109	How group influence affects students' conformity an how authority figures and leadership pressures conformity	Grace Fogarty	HCS
M110	Does the color of food affect how we taste?	Sophia Guinea	RCM
M111	Does the perception of good stress and bad stress change with age?	Ivy Ho	HCS
M112	Effects of Music on Students' Performance/Productivity	Rushi Jain	RCM
M113	Animal vs Human	Jessica Kotchenreuther	· HCS
M114	Positive Reinforcement vs Punishment	Siena Ruzicka	HCS
M115	The Effects of Technology on Memory	Michael Ryan	HCS
M116	The effect of maze complexity on Physarum Polycephalum maze-solving skills	Niyati Sharma	RCM
		Lindsey Zhang	RCM
M117	Hocus Focus	Cata Stiehm	HCS
M118	The Correlation Between Music Taste and Personality	Jackie Wang	TPM
		Sophia Zeng	TPM
M119	How Color Affects Memory	Zoe Wilson	HCS
BIO	LOGY		
M201	Are Anti-bacterial soaps truly effective?	Suhani Agrawal	RCM
		Saragha Surendra	RCM
M202	Using Natural Preservatives to Prevent Fungal Growth	Mallige Anand	RCM
M203	The Effect of Fertilizer on Algae	Lahari Bandaru	RCM
M204	Effect of Acidity on Seed Germination	Vrinda Bhandari	RCM
		Tanya Paul	RCM
M205	Colored lights and plants	Julian Black	RCM
M206	Common Gene Alterations in Head and Neck and Eye Cancer.	Digonto Chatterjee	RFM
M207	Hand Washing 101	Daniel Chernyak	RCM
M208	Edible Plants in Desert Conditions	Aaron Chou	RCM
M209	How Plants Grow with Certain Liquids	Connor Chung	RCM
		Ryan Nguyen	RCM
M210	The Effect of Bacterial Structure on Resistance to Antibiotics After Repeated Exposure	Aditya Das	TPM
M211	Does Microwaving Bread Prevent Mold Growth?	Sarah Dicker	HOA



M212	Bacteria Growth Using Agar Plates: A Comparative Analysis	Patrick Donahue	RCM
M213	Plant Paper: Creating Paper out of Unwanted Backyard Weeds	Grace Doughty	TPM
M214	Hand Sanitizer or Hand Soap? Antibacterial or Non-Antibacterial? What to Choose?	Paris Etchu	HCS
M215	Plant Growth: Hydroponics vs. Soil	Pranav Gaddam	RCM
M216	The Effect of Adding Different Solutes to Water on Tomato Plants? Fruit Sweetness and Other Characteristics	Suvan Gangar	TPM
M217	How does light affect Red Harvester Ant activity?	Anil Ghosh	ROM
M218	Saturated and Unsaturated Fats in Plants	Kelly He	RCM
M219	Lets grow plants in winter!(using greenhouse)	Hanieh Hootkany	MCS
M220	Air Particle Concentration in Different Locations	Shriya Kalluri	RCM
M221	Enough Fat for You?	Zoha Khan	MCS
M222	How will watering plants with different liquids affect a plants growth.	Daniel Ling	RCM
M223	Does electromagnetic radiation from electronics affect plant growth?	Akshya Mahadevan	RCM
M224	The Effect of Light on the Bioluminescence of the Marine Dinoflagellate/Pyrocystis Lunula	Belky Maldonado Simran Mattikalli Harper Bender	TPM TPM TPM
M225	What organism or plant can affect weather and/or living conditions	Daniel Mathew	RCM
M226	Plants in a Drought	Dante Mayo, Jr.	RCM
M227	What Fruit Rots the fastest in Different Temperatures	Bryce Mitchell	RCM
M228	The effect of different types of music on plants	Sayuri Modi	RCM
M229	The Effects of Ethanol on Brine Shrimp	Ian Murray	HCS
M230	Determining the efficiency of aquatic filters by analyzing the survivability of Panagrellus redivivus.	Khanh Nguyen	TPM
M231	Effects of Hazardous Chemicals on Aquatic Life	Nnedimma Nwosu	HCS
M232	Effect of Neurotransmitters on Planarian Fission	Larson Ozbun	RCM
M233	When does each type of bread mold?	Arav Pal	RCM
M234	Where does a banana ripen the fastest?	Swarnarup Paria	RCM
M235	Will different amount of fertilizer help a plant grow differently?	Emmanuel Reyes	RCM
M236	What type of waste fertilizer works the best?	David Ruan	RCM
M237	Comparing Gram Positive and Gram Negative Bacteria in Houses with Pets and Houses without Pets	Katherine Saeed	RCM
M238	Growing Plantae	Lakshmi Sangireddi	RCM
M239	5-Second Rule	Neel Shah	RCM
3.55/5		Jude Lwin	RCM
	Feeding Earthworms	Amoson Shu	RCM
M241	Tomato Hornworms	Antonio Sosa	RCM
	How do different fertilizers affect algae in different ways?	Michael Stallard	RCM
	What amount of water is the best to germinate seeds.	Daniel Suh	RCM
	Are Hydroponics methods an Efficient way of Growing Crops?	Lawrence Sun	RCM
	How does the intensity of UV Radiation affect the growth of hospital-born bacteria?	Sudhish Swain	TPM
	How do pH levels affect plant growth?	James Tan	RCM
	Are Plants Picky? What type of water is the most effective at growing them?	Zory Teselko	RCM
M248	Does Liquid Soap Work Better Than Bar Soap?	Sebastian Thomas	HCS



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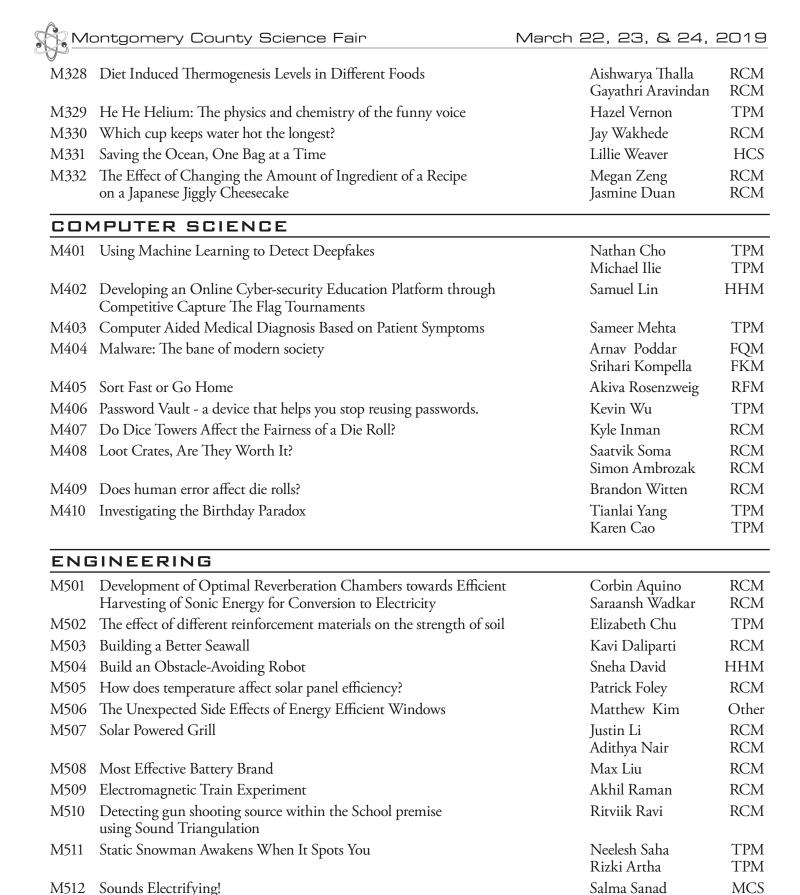
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	Tyle		
9	What will happen to the height of each plant if they are fed different types of water, each containing possible chemicals from wooden chopsticks.	Amber Tien	TPM
M250	The Effect of Capsaicin on Colonies of Bacillus Cereus	Eric Wang	RCM
	•	Uday Annavarapu	RCM
M251	Affect of Urea on Basil Plant Growth in a Hydroponics System	Jeffery Wei	RCM
		Abhiram Cheerla	RCM
M252	Can Spicy Seasoning Be Used As A Preservative?	Beza Williams	RCM
M253	Composting Efficiently	Celine Wu	TPM
		Ally Guo	TPM
1.605/	Will Die Die eine Land auf an	Elina Lee	TPM
	Which Plants Eliminate the Most Nitrate?	Angelina Xu	RCM
M255	Plant's growth rate under varying light cycles	Yun Yeung	TPM
	Effect of Manuka Honey on Gram-positive and Gram-negative bacteria	Ethan Zhang	RCM
M257	Do different soil types have different water infiltration rates?	Thomas Zhong	RCM
CHE	MISTRY		
M301	Lights on, lights off: Which fruit produces the greatest electrical charge	Isabella Amador	HCS
M302	Oil Spill Cleanup	Shrusti Amula	RCM
M303	Analyzing Paper Chromatography	Vaishnavi Banda	RCM
M304	Yeast Metabolism In Different Environments	Kaustubh Bhal	RCM
		Rehan Kabir	RCM
M305	Burning calories: How much energy is stored in food	Neel Bhattacharyya	RCM
	Does the Mpemba Effect apply to liquids other than water?	Caleb Collins	RCM
	1 117 1	Soren Brown	RCM
M307	What is the most efficient method for neutralizing Carbon Dioxide (CO2) A comparative study of natural and artificial photosynthesis.		SAA
M308	Eggstreme Decay	Alessandra DeGroat	HCS
M309	Which fruit rot the slowest and fastest?	Mostafa Elamin	RCM
M310	How To Speed Up A Chemical Reaction	Meherzan Gai	RCM
M311	Voltage of a Current and its Effects on Electroplating	Alexander Goldstein	RCM
M312	Sprouting Silver	Sayeda Hasni	MCS
M313	Toothpaste Discoloring Project	Justin Huang	RCM
M314	Pollution Catcher	Sailaja Kadali	RCM
M315	Candy Dissolver	Nikhil Kakani	RCM
M316	The Effects of Acidity on the Health of Coral Reefs	Pamela Kim	KIM
M317	Is the Water in our Homes Safe/Healthy?	Anna Linteris	RCM
M318	A New Plastic	Anne Lippard	HOA
M319	To Glow or Nor To Glow	Maegan Mathews	HCS
M320	Sweet: Which Drinks Have the Most Sugar?	Mia Mygatt	HS
M321	How does Temperature Affect a Battery?	Nnamdi Nwosu	HCS
M322	Removing Ethanol with Organic Acids	Anushka Poddar	TPM
M323	Tiny Titans Go!	Renita Santhoshkuma	
M324	How does time affect solar power water desalination?	Rohun Sarkar	RCM
M325	Which type of bottled water is the healthiest	Andrew Sha	RCM
M326	Candy Dissolver	Ella Shelley	RCM
M327	The Salinity of Sea Water in Relation to Latitude	Olivia Shi	RFM
	The building of bea water in relation to Lautude	Onvia Oni	1/1 1/1





Anjan Sesetty

Kush Sharma

Aarion King

Yashaswin Shivaprasad RFM

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A Novel Prediction System To Detect Wildfire Prone Areas

Study of best shock absorber

An improved design for a dishwasher

M513

M514

M515



M516	Applications of Railgun Technology for Short-Term Transportation	Hudson Tao River Chen	TPM TPM
M517	SpongeBox: A Prototype for Growing Plants in Space	Karthik Vedula Suhani Assija Krishay Iyer	RCM KIM PLM
M518	Generating Electricity from Kinetic Energy	Nicole Wojcik Viveka Sinha	TPM TPM
M519	Advancement of humidity control apparatus to automatically adjust to comfortable humidity levels for home living	Benjamin Wu	HHM
M520	The effect of varying number of turns per inch of coil on strength of electromagnet	Sophie Yohannan	TPM
PHY	'SICS		
M701	Hardworking Hydro-Power Stations	Liam Arthur	RCM
M702	The Mathematical Theorem of String Theory	Kayla Augustin	HCS
M703	Balloon Rocket Investigation	Jesmyn Bagasbas	RCM
M704	Effect of Different Semiconductor Materials and Dye Colors in Organic Dye-Sensitized Solar Cells	Abjini Chattopadhya	y TPM
M705	Simulation of a star-planet-moon system and the effects of a large orbital inclination on the moon's weather.	Dennis Chunikhin	RFM
M706	What light color shines the brightest in different outdoor condition? An experiment in Visual Acuity.	Matthew Dang	SAA
M707	Can Hot Water Freeze Faster than Cold Water?	Jeffrey Deng	RCM
M708	How floor material affects how a marble bounces	Zachary Evans	RCM
M709	Magnetic Shielding: The Effect of the Type of Metal on the Amount of Magnetism Blocked	Luke Griffith Luke Vincent	RCM RCM
M710	Perpetual Cycles of Energy - Hydro & Solar or Wind?	Justin Croix Harris	HCS
M711	Are More Expensive Balls Worth It?	Leavy Hu	RCM
M712	When Does it Collapse??	Vindhya Iyer Carmen Kenfack	RCM RCM
M713	Keeping Your Drinks Hot: Heat Transfer Properties of Coffee Mugs	Jacob Kline	RCM
M714	Galactic Gas	Sannidhi Reddy Korisepa	ti RCM
M715	Properties of Colored Paper	Patrick Le	RCM
M716	Energy Generated from Waste - Using Microbial Fuel Cells	Pratyusha Mandal	TPM
M717	Remember This at Your Next Picnic	Nick McGonigle	RCM
M718	Eggs-traordinary Strength	Marshall McNamee	HS
M719	Trebuchet Design	Brent Midlam Yanar Hanieh	RCM RCM
M720	What Affects a Pendulum's Period of Motion?	Ami Mundra	RCM
M721	How Does Helium Cooling Compare to Liquid Cooling a Computer?	Gabe Nather	TPM
M722	To Dissolve, or Not to Dissolve	Aaron Nealy	HS
M723	Loop the Loop	Isabelle Rivera	HCS
	Multivariable Testing Of Surface Tension	Derek Sha Eddie Fang	RCM RCM
M725	The Effect of Color on Heat through Different Types of Light Absorption	Riona Sheikh	RCM
M726	How Can We Protect Ourselves from ElectroMagnetic Field Radiation?	Veera Singh	RCM
M727	What Materials Best Cushion a Falling Egg	Milo Stammers	RCM

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Anjali Justin

Srirashmika Kanipakala WHO





Examining the effects of bacteriophage genes on Chlamydia Trachomatis

H219

H220

Natural Water Purification



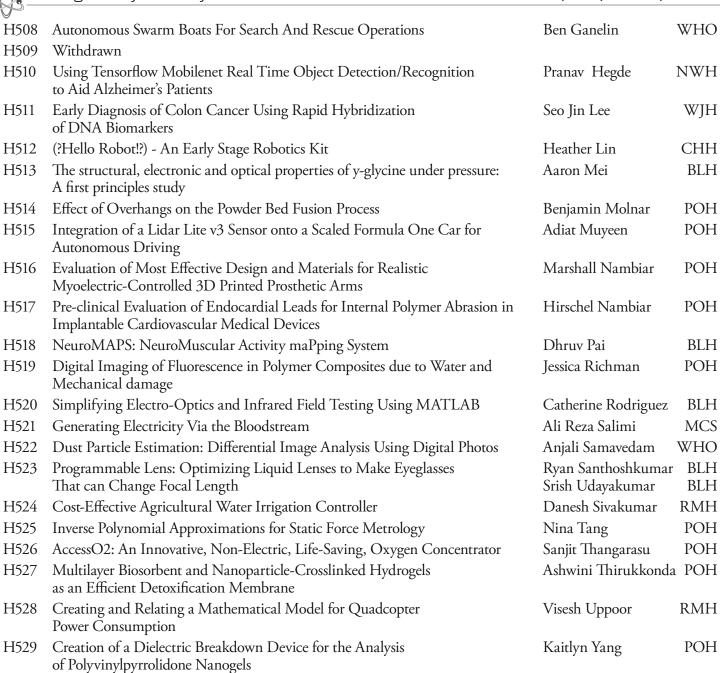
H221	Countering Free Radicals: Comparing the Antioxidant Effects of Curcumin and Ascorbic Acid	Abeni Kazi	MCS
H222	The Effect of Egg Membrane on Planarian Growth Rate	Joanne Liu	WHO
H223	Detecting Prostate Cancer with combined [18F]DCFPyLPET and multi-parametric MRI	Justin Ma	РОН
H224	Manufacturing A Seaweed Based Bio-stimulant to Promote Growth and Strengthen Plant Tissue	Benjamin Nachod	РОН
H225	Halal vs. Non-Halal Meat	Fatemeh Naghavi	MCS
H226	The Role of Serotonergic Signaling on Neuroplasticity	Clarissa Ng	POH
H227	Which part of the Neem tree extract best serves as anti-bacterial, anti-fungal and natural pesticide?	Nikhil Niranjan	CHS
H228	Regional Disparity in Microglial Responses to Aging in the Basal Ganglia	Chloe Noh	RMH
H229	Rock Paper Scissors Equilibrium in the Tetrahymena Ciliate Species	Keerthi Padmanabha Vaishnavi Iyer	nWHO QOH
H230	Exploration of Rio Kinase Inhibitors	Vaibhav Patil	POH
H231	Selective and Distributed Attention in Pigeon Category Learning	Rathna Ramesh	WHO
H232	A Forebrain-Hypothalamic Circuit Mediates Hepatic Steatosis in Male but not Female Mice	Priyanka Ravi	BLH
H233	How the Shape of Structures 3D-printed in Polylactic Acid Plastic Influences Cancer Cell Growth within Petri Dishes	Anika Seth Shruti Chauhan	BLH BLH
H234	A novel method to identify common pathways and genes through meta-analysis of microarray expression data of bipolar disorder, schizophrenia, and major depressive disorder	Tesia Shi	RMH
H235	The Viability of the Foldscope as a Citizen Science Instrument Using Variability in Count of Rotifer Mastax Contractions and Daphnia Heart Rate	Nataraj Shivaprasad	WHO
H236	Analysis of Nanoparticle Dispersal in the Cystic Fibrosis Mouse Lung	Valentina Simon	BLH
H237	Developing and improving an existing reverse genetics system for respiratory syncytial virus (RSV)	Shriya Singh	POH
H238	Effect of Dilutions of T4 Phage and Streptomycin on E.coli	Devasena Sitaram Yuri Kim	BLH BLH
H239	Using artificial intelligence for in silico discovery and characterization of tissue agnostic cancer drugs	Sonia Stan	POH
H240	The Effect of Different Methods of Tillage on the Mortality Rate of Harlequin Bug Eggs in Broccoli Fields	Brandon Summers	РОН
H241	Discovery of Arboviruses in Field-Captured Mosquitoes from the Republic of Korea	Sivani Sundaram	РОН
H242	Green Energy extraction from Photosynthesis in Cyanobacteria	Sujay Swain	BLH
H243	Bayesian Analysis of Amygdala Lesions in Stimulus-Based versus Action-Based reinforcement learning	Michelle Tang	BLH
H244	Analyzing Antibiotic Class Resistance of the Cystic Fibrosis Lung Microbiome over the Treatment Period	Alice Varughese	BLH
H245	Determination of Speciation within Plethodon punctatus and Plethodon wehrlei	Sourabh Vellala	POH
H246	Examining Effects of Sea Level Rise on Marsh Elevation through Changes in Decomposition Rates of Marsh Soils	Rebecca Wessel	BLH
H247	Farming Mars	Bowen Xiang	WHO
H248	Predictors of Hard Outcomes in the Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial Using Machine Learning	Victoria Xin	BLH

H249 H250	Creation of Bi-specific Antibodies for Improved Ebola Virus Binding Avidity	Melody Zeng Shawn Zhao	WJH BLH
П2)0	Prediction of the Structure of the CD81-HCV E2 Complex through Computational Modeling	Shawh Zhao	DLFI
CHE	MISTRY		
H301	Particle Size Fractionation of Calcium Sulfate	Sadhana Dasari	RMH
H302	Development of small molecule inhibitors of the NLRP3 inflammasome	Yash Duddukunta Rohan Daftary	BLH CHH
H303	Characterizing Cement Hydration With Sucrose and Aluminum Sulfate Admixtures	Ricky Hong	РОН
H304	Identification of Chemical Features Associated with Selective Activity of BK Potassium Channel Modulators	Frank Horrigan	РОН
H305	The Effect of Alum and Carbon on Water Purification	Sri Kanipakala	WHO
H306	Chemistry In Cooking	Amber Liang	WJH
H307	Discovery of First-in-Class Trpml1 Agonist for the Treatment of Muscular Dystrophy	Amanda Liu	BLH
H308	Measuring Pollutants in Water Using Light Refraction	Namya Nanda	RMH
H309	The Future of Potable Water and Renewable Energy Production: Analyzing the efficacy of Air Cathode Microbial Desalination Cells with varying mesh sizes	Shreya Shete	РОН
H310	Force Field Optimization and SILCS Simulation of Ribonuclease T1 Complex with 2'GMP for Stronger Binding	Sahil Sinha	POH
H311	The Effect of Calcium Concentration on the Voltage Produced by a Plant	Vipulan Sritharan	WHO
	APUTER SCIENCE		
H401	Towards the Use of the Digital Library of Mathematical Functions (DLMF) with Virtual Reality	Kevin Chen	РОН
H402	A Novel Implementation of Reinforcement Learning for taking Efficient Crystallographic Measurements	Ryan Cho Telon Yan	BLH BLH
H403	Identification of Mitotic Cells for Automated Detection of Cancer Tissue via Artificial Intelligence	Lauren Choi	WJH
H404	The Medical Butterfly	Bhuvan Devarsu Surya Perla Danny Liu	WHO WHO WHO
H405	Effects of Mined Sentiment Data on the Ability to Predict Price Changes in Bitcoin		BLH
H406	An AI-powered Machine Learning Model with Sentiment Analysis and NLP to predict Gun Violence through Social Media Data	Aditi Gubba Om Desai	POH POH
H407	Pollinfo: A personalized alternative to pollen.com	Iris Gupta Vivian Li Joy Xu	BLH BLH BLH
H408	An Orbital Survey of Meteors Using SAAMER	Devin Hoover	POH
H409	Real Time, AI Based Solution Against School Shootings	Sreedatta Kaligotla	POH
H410	An Analysis of the Effects of Swarm Intelligence Algorithm Hybridization	Ozan Kayaalp	BLH
H411	Using Computer Vision to Determine When to Treat Honeybee Colonies for Varroa Mites	Brian Kee	РОН
H412	Solution for Public Health Issue: Using a Mobile Phone App to prevent Chronic Illness Related to Sedentary Life Style	Kyle Kim	POH
H413	Implementation of Uncertainty Quantification with Python (UQpy) within ABAQUS	Grace Kim	POH



			$\Theta$
H414	Mitigating Bias in Machine Learning Algorithms using the MNIST Database	Jason Lee Jason Lee	POH POH
		Charles Wang	Other
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H416	Security Vulnerabilities in Microservices Architecture	Daniel Li	POH
H417	WiFi Motion Detection: A Study into Efficacy and Classification	Sadhana Lolla Amy Zhao	POH Other
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H422	Comparing Efficiencies of Factoring Algorithms and the Implications	Ipsa Mittra	BLH
	on RSA Cryptosystem	Rafael Pedersen	BLH
		Joshua Liu	Other
H423	The Viability of Bluetooth Technology as a Means of Distance Sensing	Eshaan Moorjani	WHO
		Aashni Moorjani	BLH
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	Using Audio Fingerprinting	Gabriel Wu Kevin Higgs	BLH BLH
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H427	Investigating the Ability of a Convolutional Neural Network to Learn Physics	Rachel Rosenzweig	POH
H428	Using Machine Learning to Predict Prescription Drug Effectiveness	Ronoy Sarkar	POH
	for a Specific Patient	•	
H429	Predictive Analysis Using Machine Learning and Adaptive Algorithms to Predict Relapse and Suggest Preventive Measures for Prescription Opioid Abuse	Kush Savsani	RMH
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H431	Region-based Fully Convolutional Network (R-FCN) for Localization of Tumors in Mammograms	Ishana Shastri	POH
H432	Analysis of Cell Line Sensitivity to Cancer Drugs by using Amazon Deep Learning Algorithm	Sabrina Su	РОН
H433	Finding Intracardiac Ablation Lesions with Hyperspectral/Multispectral Imaging and Unsupervised Learning	Grace Tang	POH
H434	Diagnosing Breast Cancer Through Explainable Machine Learning	Ayush Varshney	BLH
H501	Automated Person Tagging and Tracking	Kristen Yee	POH
END	GINEERING		
H502	Harnessing the Signaling Power of Cancer Cells for Tissue Engineering	Roshini Balan	HOA
H503	Structure-Property Relationships in Multi-functional Hierarchical	Edward Bian	РОН
	Fiber Nanocomposites		
H504	Robotic Intervention for Motivating Child in Play Sessions	John Carbonell	POH
H505	Structure and thermoelectric properties of an n-type Sr1-xHoxMnO3 perovskite series	Peiqi Chen	РОН
H506	Can a rover travel an obstacle course?	Aidan Douglas	SVH
H507	Alternative Computer Input Devices for the Disabled	Aakash Dutt	WHO
		Konstantin Tomashevsk	•
		Shrikar Vasisht	WHO
			/







for the Assessment of PFL Enabled Robots

Analyzing the Effects of Angled Impacts on Testing Devices Used

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Scientific Review Committee
would like to thank the
students, teachers, volunteers and
all of the local IRBs and SRCs
for their efforts

Timothy Yih

POH

H530

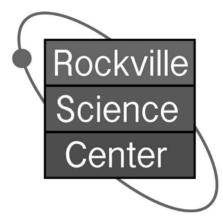


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H601	Projection-based Methodologies for Discriminating between Benign and Malignant Breast Tumors	Avani Ahuja	GDS
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H603	On the Communication Complexity of Stable Matching Under Metric Space Market Embeddings	Naveen Durvasula	BLH
H604	Analyzing the Impact of a PKA-cAMP-Calcium Feedback Loop on Electrochemical and Metabolic Oscillations in the Pancreatic ?-Cell	Shwetha Kunnam	BLH
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H609	On the Okounkov-Olshanski formula for the number of tableaux of skew shapes	Daniel Zhu	BLH
PHY	'SICS		
H701	Analysis of Quasars with Different Redshifts	Yash Anand	BLH
H702	Utilizing Neodymium Magnets in conjunction with the magnetic induction premises of Faraday's Law and Lenz's Law in developing an electromagnetic field generator	Arman Bolouri	RMH
H703	Ship Motion Predictions Using Computer Simulations	Claire Brizzolara	WJH
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H706	Exploring Segmentation Techniques for Material Identification in Howardite and Chondrite Meteorites	Isabella DeClue	BLH
H707	Modeling Ion Times through a miniature EBIT	Bryan Foo	POH
H708	Utility of Commercial Satellite Shortwave Infrared Multispectral Imagery for Precise Geo-location of Active Wildfires Through Heavy Smoke Clouds over the California Camp Fire	Katie Kolodner	RMH
H709	Analyzing Hypervelocity Impacts into Metal to Reveal the Impact History of Asteroid 16 Psyche	Siobhan Light	RMH
H710	The Thermals Beneath My Wings	Lara Ojha	BLH
H711	Binary Black Hole Hunting	Rohan Ojha	BLH
H712	Heisenberg-Scaling Measurement Protocol for Analytic Functions with Quantum Sensor Networks	Kevin Qian	BLH
H713	Power of a Step	Abrar Sheikh	POH
H714	Characterization of Lattice Thermal Transport in Two-Dimensional BAs, BP, and BSb: A First-Principles Study	Charles Shi	BLH
H715	Screening of Metallic Single-Replacements for Lead-free Perovskites with Intrinsic Photovoltaic Functionalities	Clark Zhang	BLH
H716	Raman Spectroscopic Study of the CH4-CO2-H2O System at Room Temperature and High Pressures	Justin Zhang Matthew Shu Eric Hao	BLH BLH BLH
H717	Designing Graphene Based Color Pigment for Painting	Shang Zhang	Other





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- •Encourage students to explore science through experimentation and to present their results.
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