



Spring 2022

# Synopsys Virtual Championship

Celebrating 63 years of Student Science



## Welcome from Sandra Meditch, SCVSEFA Board President

Hello and Welcome to the Virtual 2022 Synopsys Championship. This has been another year of challenges for everyone and with challenges comes opportunities. The Covid-19 virus has provided interesting opportunities for discovery in many facets of our lives and our world. We have seen how it has evolved over the last year. We have also seen how we humans evolve and adapt to this changing environment. We are reaching out and connecting with others in fun and different ways. New technology is being developed to help us do this, what new technology have you learned about in the last year and how have you applied it? Science is about discovery. What have we discovered about ourselves? With each challenge, we discover and learn about ourselves and our world, that is the beauty of science.

I want to thank our major sponsor, the Synopsys Outreach Foundation, and our many donors and sponsors for their support. My thank you goes to those hard working teachers who have been asked to do so much during this challenging year and still be there for their students. To the parents and family members, providing the encouragement and support these budding scientists and engineers need. This event would not be possible without our judges, stepping up for another year of virtual interviews, we thank you. Finally, the Board of Directors and our staff, these extraordinary people have pulled together another virtual event.

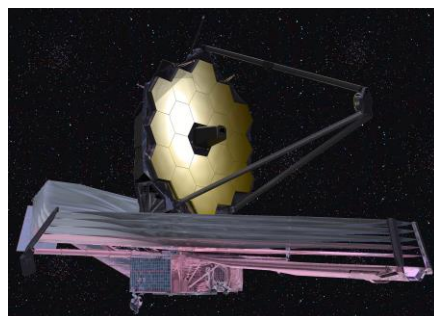
## 2021 A Year of Scientific Breakthroughs & Learning

While the year started as a continuation of the COVID-19 pandemic and climate change, scientists stepped up to the challenge and marked new advances in medicine, climate science and astronomy. New developments and the distribution of three coronavirus vaccines, the Pfizer-BioNTech, Moderna mRNA and Johnson & Johnson's Janssen vaccine, were able to help reduce transmission rates and minimize the severity of the illness. Scientists also learned about climate change and met up at the United Nations UN Climate Change Conference in Glasgow to take steps to minimize greenhouse gases and to reduce carbon emissions.

NASA's fifth Mars rover, the Perseverance, landed on the 'red planet' and will be searching for signs of microbial life in sediment along the dry, 28 mile-wide valley known as the Jezero Crater. And NASA also flew its four-pound helicopter named Ingenuity around Mars to map Mars' terrain.

To cap off the end of the year, NASA launched the James Webb Space Telescope (JWST) from French Guinea on Christmas Day. The largest and most powerful telescope ever constructed, housing a 21.3-foot-wide mirror comprised of 18 gold-plated hexagonal segments, the JWST will travel over a million miles and is able to observe a part of space and time never studied before, when galaxies formed over 13.5 billion years ago.

**Mission Name:** JWST  
the 'Transformer Telescope'  
**Main Job:** Observe the first galaxies, study the birth of stars and planets, look for exoplanets potential for life  
**Primary Mirror:** 21.3 ft-wide, hexagonal gold-plated  
**Launch:** December 25, 2021



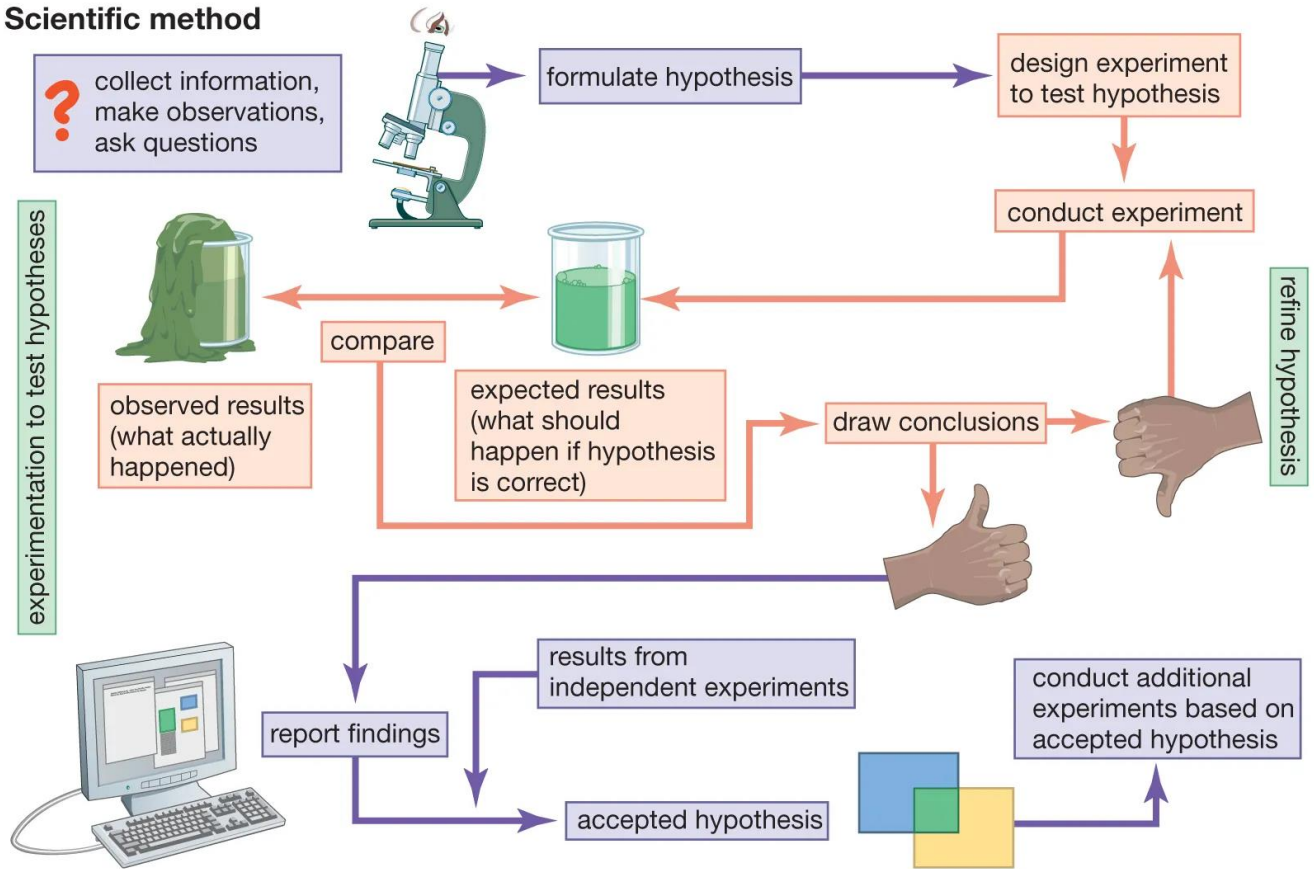
The James Webb Space Telescope is an orbiting infrared (IR) observatory that complements and extends the discoveries of the Hubble Space Telescope, with longer wavelength coverage and improved sensitivity. The longer wavelengths enable Webb to look closer to the beginning of time and to hunt for formation of the first galaxies, as well as to look inside dust clouds where stars and planetary systems are forming today.

# Congratulations to the 2021 Winners!

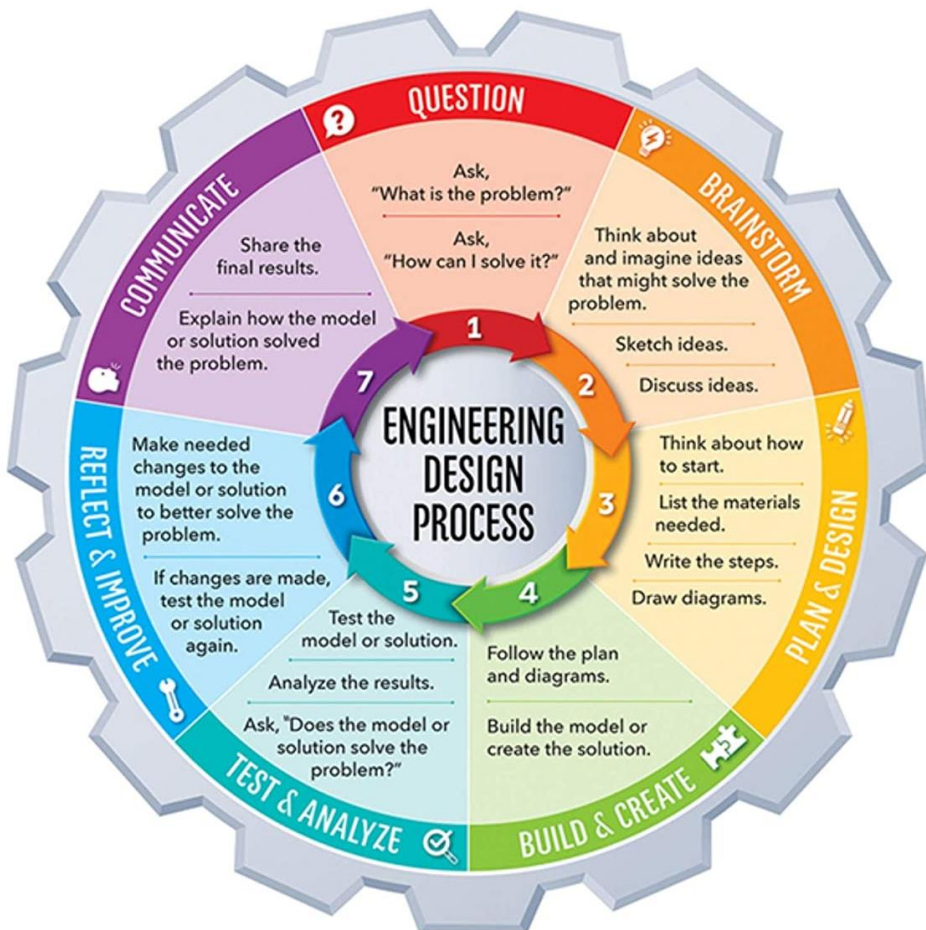
Anshika Agarwal	Nirathi Cherukuri	Angela Hu	Harshini Manian	Sasvath Ramachandran	BetsyTian
Sia Agarwal	Sahithi Cherukuri	Elliu Huang	Krish Maniar	Sumedh Ranabhor	NicoleTian
Ashwika Agrawal	Anusha Chittari	Flora Huang	Ishana Manikandan	Aditya Rao	DaniTicau
AdreemaAhsan	MyungChoi	JuliaHulgan	Atharva Manjunath	Adrit Rao	JonahTien
Krishna Ajarapu	Cindy Chou	Gavin Hung	Himani Manjunath	Vaibhav Rau	YashTipimenei
MouaazAly	Laasya Chukka	Maryam Ismail	Ishaan Mantripragada	Faris Raza	RohanTirumala
Kaushal Amancherla	Tanvi Chukka	Pranav Iyer	Clarina Manuel	Arnav Reddy	AndrewTraffas
Sahana Anamika	Sathvik Chundru	Prakrit Jain	Nidhi Mathihalli	Brenna Ren	Aadit Trivedi
Advait Anand	Andy Chung	VedantJanapaty	Ananya Mehta	Emily Ren	Harmony Tse
ArshiyaAnand	ClarissaCo	Daniel Jeznach	Anav Mehta	Anya Rocque	Justin Tseng
Rrishi Anand	RyanCo	Grace Ji	Katherine Mekechuk	Sohom Roy	Lindsey Tuckey
AnaghaAnkireddi	OliviaColace	JiaJia Jiang	NathanMing	Ashley Ruan	Kavya Ummethala
Isabel Antony	JadelynnDao	Tim Jing	Akshar Miriyala	Ananya Rupanagunta	HoshitaUndella
Tarek Aref	Ishani Das	Ishan Juluri	Arnav Mishra	Dalia MiriSaal	Daniela Urdaneta
Anandita Arun	Kingshuk Daschowdhury	Swara Kadam	Siddhartha Mishra	Yashnil Saha	Rebeca Urdaneta
MahitaArun	ParinazDastur	Shreya Kakhandiki	Ashika Mittal	Arnav Saharan	Aarush Vailaya
Sneha Arun	Harsh Deep	Veda Kamaraju	Fazal Mittu	Sidak Sandhu	Satvik Vale
Ananya Aswanikumar	Advit Deepak	ShauryanKanaujia	JohnathanMo	SidakSanghari	Sahil Varma
Akshay Attaluri	BienDelaCruz	Herin Kang	Zara Mody	SunjumSanghari	Anirudh Venkatraman
Boz Azordegan	Rucha Deo	Julia Kang	Zaara Mohamed	OjasSathaye	Divya Venkatraman
Anagha Badriprasad	DurvaDhok	Aadit Kannan	Suryabhan Mohapatra	DinahSchofield	AakashVetcha
Priyanka Balaji	Tevin Ding	Rahil Kapadia	Sahana Moogi	MuhammedShah	Annika Viswesh
Aeshon Balasubramania	Christina Dorofeev	Tara Kapoor	Atreyi Mukherjee	PraneelShah	AgathaVu
Snikitha Banda	VivanDoshi	Ishan Kar	AlexandraMull	SaloniShah	CindyWang
Ryan Bansal	CatherineDover	Shreyaa Karan	Grace Muresan	ShlokShah	Franklin Wang
ElizabethBarnett	KamronEmami	Aarav Karasi	Vineeta Muvvala	Sofia Shah	Jonathan Wang
Joy Barsoum	Aksithi Eswaran	Nikethana Karthikeyan	Anika Nagavara	SwaraShah	Kallie Wang
Shreesh Basu	Rida Faraz	Arjun Kashyap	Mridula Naikawadi	Jai Sharma	Kevin Wang
Srushti Batni	KellyFerguson	Tavleen Kaur	ShrinandanNarayanan	Shaurya Sharma	Oliver Wang
Rupali Batta	JasonFischer	Karun Kaushik	Dylan Ng	Yash Sharma	SashaWang
Mihir Baviskar	JeremyFlint	Usman Khan	CaitlinNguyen	Anthony Shen	Tevin Wang
SudhanvaBelur	Manasi Gajjalapurna	Dhananjay Khulbe	KaitlynNguyen	Stanley Shen	SophiaWatkins
Anirudh Bharadwaj	SerenaGandhi	Dahyun Kim	Srikar Nimmagadda	Vishal Shenoy	Hongbo Wei
Vivek Bharati	Manasi Ganti	Juno Kim	Kento Nishi	Aditya Shrinivasan	Nicholas Wei
Anchal Bhardwaj	Arunima Garg	Ananth Kini	Aditya Oberai	ArhamSiddiqui	ReeseWiitala
Saanvi Bhargava	Sareena Garg	Karan Kolappa	DylanOng	GrantSims	VeronicaWong
AnishBhethanabotla	Jonathan Garnica	IshanviKommula	Vivian Ong	Sanskriti Singh	Zoe H.Wong
ManasaBhimaraju	Satvika Gautham	Riley Kong	Aareev Panda	Rishi Sinha	NolanWoo
SriramBhimaraju	Samuel Geevarghese	Krithi Koodli	Tara SPande	Tanvi Sivakumar	Vivian Wu
AvaBhowmik	Ayush Ghosh	Reshma Kosaraju	Viraj Pandey	Josephine Smith	Stephen Xia
RohanBhowmik	Shounak Ghosh	EliKozodoy	KavyaPandurangi	Eli Sobel	Anne Xu
AmanBose	JaiveerGill	Vijay Krishnamoorthy	Khushi Parikh	AyushSodani	Claire Xu
CameronBosio-Kim	Ori Gillai	Neil Krishnan	Vienna Parnell	Mridula Srinivasan	Olivia Xu
Niharika Bozza	Tanush Goel	Nicole Krockenberger	Rishab Parthasarathy	Shridhula Srinivasan	SidraXu
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GraceCalfee	Kinjal Govil	Soham Kulkarni	Letizia Pastore	Saurish Srivastava	Alison Yang
MarcellaCalfee	Ishan Goyal	Shailesh Kumar	Amrita Pasupathy	Samhita Srivatsan	Nathan Yao
Rodrigo CantuValadez	Alisa Grebin	Vaishnavi Kunapuli	Arushi Patel	Andrew Su	Raymond Yap
RichardCao	Carina Gross	Hemal Kurani	PriyankaPatel	Christopher Sun	AllenYe
MargaretCapetz	Roy Gross	Hetal Kurani	Sanika Patil	Daniel QiSun	EllaYee
EthanChacko	Elisa Grothe	Rajasi Laddha	Ritvik Patra	IleshSundar	Serena Yeh
Nikhil Chadha	Maria Grothe	Artin Lahni	Diya Pendyala	Sowmya Sundar	Melody Yin
Orchita Chakraborty	Alexander Gu	EllaLan	Rishab Perati	ZiaSvendsen	SaraYoshida
TseKai Chan	Aanya VGupta	Adalia Lee	Angelina Pham	Sonia Swamy	ReikoYoshimura
Albert Chang	Anushree Gupta	Christopher Lee	Thy Pham	VictorSwinkels-Ryan	Sonia Yu
Sonia Chang	DanikaGupta	Elaine Lee	Andy Phung	ZaainaSyeda	Alina Yuan
Tiffany Chang	Disha Gupta	ThomasLilygren	Aaditya Pillai	SuryaTallavarjula	Andrew Yuan
Yu-Ting Chang	Ridhima Gupta	Nathan Liu	Marek Pinto	AadritTalukdar	MichaelYuan
RiyaChaudhary	Rishi Gupta	Ryan Liu	Sae Pole	IsitaTalukdar	KeelaZambre
Ansh Chaurasia	Riya Gupta	Alexa Lowe	Sritej Ponna	AlbertTam	Alexander Zhang
Navya Chawla	Vaibhav Gurunathan	Heidi Lu	Aryan Ponnuru	ArnuvTandon	RobertZhang
Brian Chen	Ethan Ha	Angelina Lue	Tejas Prabhune	AdrinaTang	Amy Zheng
ClaireChen	ClaraHansen	Yuqin Ma	Rishi Prasad	PujitaTangirala	Sabrina Zhu
CodyChen	Maryam Hashmi	Wesley Maa	Shachi Prasad	ArunabhThakuria	Sophia Zhu
DanielChen	Spencer He	Kiera Maben	Tanisha Prasad	JonathanThomas	Tiffany Zhu
Dawson Chen	ConnorHoule	Aaditya Mahajan	Kashish Priyam	JosephThomas	IsaacZucker
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# Which Path Will You Take? Science Research or Engineering?

## Scientific method



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For a science fair competition, your project will fall into a research or engineering category. Following the Scientific Method or the Engineering Design Process enables you to learn about researching or designing a project from beginning to end. Learning these project based skills will help you in college and beyond!

Our mission is to awaken more students to the wonder and power of science, technology, engineering and mathematics (STEM).

# Special Awards and Sponsors of Special Awards

Al Foster Award  
 American Association for Laboratory  
 Animal Science, N. California  
 American Chemical Society, Silicon  
 Valley Chapter (SVACS)  
 American Institute of Aeronautics  
 and Astronautics (AIAA)  
 Intelligent Systems Award  
 American Society of Civil Engineers  
 San Jose Branch  
 American Society of Engineers of  
 Indian Origin (ASEI)  
 A Society for Materials International  
 (ASM), Santa Clara Valley  
 ASM Materials Education Foundation  
 Association for Computing  
 Machinery (ACM)  
 SF Bay Area Chapter

Association of Women Geoscientists,  
 SF Bay Area Chapter  
 Broadcom Coding with Commitment  
 Broadcom MASTERS  
 Bruce Kawanami Engineering Award  
 California Association of Professional  
 Scientists (CAPS)  
 California Botanical Society  
 Dave Parker Award  
 Excellence in Computer Science Award  
 IBM Award  
 Institute of Electrical and  
 Electronics Engineers (IEEE)  
 Northern California Institute of  
 Food Technologists  
 Office of Naval Research  
 U.S. Navy / U.S. Marine Corps  
 Regeneron Biomedical Science Award

SAMPE- Society for the Advancement  
 of Material, Process Engineering  
 Santa Clara Valley Science &  
 Engineering Fair Association - Board  
 of Directors Awards - High School  
 Santa Clara Valley Science &  
 Engineering Fair Association Board  
 of Directors Award - Middle School  
 SETI Institute  
 SPV Market Researchers  
 Valley Water  
 Wireless Communications Alliance  
 Yale Science and Engineering  
 Association  
 Zeidman Award

thank you

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### PROJECTS & STUDENTS

# Championship applicants (individuals)	819
# Individual participants	815
# from Middle schools	298
# from High schools	517
# Approved projects competing	650
# Individual projects	530
# Team projects	120

### SCHOOLS & TEACHERS

# Schools with accepted projects	84
# Middle schools	39*
# High schools	47*
# Public schools (HS/MS)	29/16*
# Private schools (HS/MS)	17/22
# Teachers participating	188
# Teachers solicited (estimate)	860

\*Some private schools counted twice, teach both grades 8 and 9.

# Remembering Robby Beyers

Friends and family of Robby Beyers have made a generous donation to the Santa Clara Valley Science and Engineering Association (SCVEFA) in his memory. A portion of the donation will be used to fund an annual **Robby Beyers Innovation Award**. The award will be given to the eight best high school projects that present a practical solution to a scientific or technological problem.

Robby was a long-time supporter of SCVEFA donating both time and money to the fair each year. His generosity to SCVEFA was just one example of his great, sharing personality.

Robby was born in Ann Arbor, Michigan, in 1958, grew up in the suburbs of Washington, DC and earned his BS, MS, and PhD ('80, '82, '89) from Stanford University in Materials Science. His early career was as a material scientist at the IBM Almaden Research Center, where he had several major achievements, including co-inventing single-walled carbon nanotubes and developing techniques used throughout the semi-conductor industry. He then changed careers, earning both a JD and MBA ('00, '01) from Santa Clara University and becoming a distinguished patent attorney. He authored hundreds of patents, including the Apple iPhone's user interface.

All the while he was pursuing his studies and career, he also was the unofficial photographer for the Stanford Marching Band, an active mentor for Santa Clara Law students interested in pursuing careers in patent law, and wrote a self-help book. When he was diagnosed with Amyotrophic Lateral Sclerosis (ALS), he allowed doctors at UCSF to operate on his brain as part of a project trying to translate brainwaves into direct communication. For those of us fortunate enough to know him, he was one of the nicest people.

According to a family member, Robby had three goals in life "1. Make good use of your time, 2. Be loyal to the principles and people that matter to you and 3. Leave it better than you found it."

His presence and guidance will be missed.

My name is Eesha Khare and the Synopsys Science Fair was a critical part of my trajectory into science and engineering research over the past 10 years. I participated at the Synopsys Science Fair from my freshman to senior year in 2009 - 2013, while I was a student at Lynbrook High School in San Jose. My very first science fair project was about studying the effect of various toxins on the microstructure of plant leaves. My science partner and I exposed plants to various chemicals, cross sectioned them with a razor in our backyard, and then brought them to school to look at the structures under an optical microscope after staining. This freshman year project and first exposure to Synopsys cemented my desire to develop and carry out challenging STEM projects, present and answer questions about my work, and most importantly, keep participating in this enriching and supportive community. From this initial freshman year leaf project to my senior year research work on supercapacitors for energy storage, I was propelled into a world of science, research, biology, and materials that ultimately inspired my current work. I continued to participate in science fairs through the remaining years of high school, had the opportunity to attend the CA State Fairs and Intel ISEF, and was even lucky enough to be named the CA State Project of the Year winner, the top Young Scientist Award at Intel ISEF, and Forbes 30 under 30 in Energy.

After high school, I attended Harvard University where I studied Bioengineering and Chemistry and was able to engage in the excitement of the many opportunities the University had to offer. From pursuing research at the University's research labs in bioengineering and materials science, to interning at QuantumScape energy storage company, to building a snow-melting hydrogel for one of my engineering design classes, I had the opportunity to learn from experts to develop new and interesting independent questions at the forefront of research. I was also lucky to complement this scientific background with experiences in fields that are just as critical to the development and translation of STEM ideas. I worked at the Harvard Kennedy School's Institute of Politics and California Energy Commission to better understand the role policies play in promoting STEM tech. I also engaged in dance and arts at the college, teaching dance for all four years for the annual Ghungroo showcase. These experiences outside of sciences encouraged me to pursue an MPhil at the University of Cambridge Trinity College in History and Philosophy of Sciences, to learn more about why we do science the way we do it now and how historical factors affect this research work.

I'm now a PhD Candidate in Materials Science and Engineering at MIT where I research bioinspired self-healing materials. I have a lot of fun modeling and experimenting with a special type of bonds, called metal-coordination bonds, to design new proteins and polymers with controlled mechanical properties at research labs in MIT, Tufts, and the Max Planck Institute in Postdam, Germany. During my time at MIT, I've also been involved in diversity, equity, and inclusion initiatives, entrepreneurial activities, and have even taken up a new form of dance flamenco! I look forward to continuing exploring science and engineering topics in materials science and energy, and finding new and creative ways to develop, translate, and apply those topics. Happy to welcome more Synopsys Science Fair students into this research community. Happy researching!

We gratefully acknowledge those who support the **Synopsys Championship** and thank those who support STEM education by allowing their employees time to volunteer at the event. Thanks to the students, parents, teachers, mentors, schools and for making the Synopsys Silicon Valley Science & Technology Championship a premier event.

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\*\* Matching gifts \* Gifts in kind



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**SCVSEFA, Treasurer, PO Box 307, Los Altos, CA 94023-0307.**

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