

# Spring 2024 Synopsys Championship

**Celebrating 65 years of Student Science** 



#### Welcome from Srinivas T. Rao, Ph.D., SCVSEFA Board President



On behalf of the Santa Clara Valley Science and Engineering Fair Association (SCVSEFA), I welcome you to the 2024 Synopsys Championship! It is an honor to be part of the SCVSEFA which has been fostering scientific curiosity for over six decades. This year is special as it is also the 25th anniversary of the Synopsys Outreach Foundation's generous support for the Championship.

The Santa Clara Valley is at the heart of the ever-expanding Silicon Valley. It stands as a symbol of technological advancement and innovation as a ground for numerous successful technology startups. The evolution of the valley reflects its

adaptability to the changing economic landscape, and an environment perfect for the pursuit of cutting-edge ideas.

SCVSEFA is dedicated to shaping young minds, by encouraging curiosity, fostering critical thinking, and guiding participants to define problem statements, identify key factors, and build working models for test and validation. SCVSEFA thus plays a crucial role in developing the problem-solving skills of the next generation. The exhibits presented by these young tech enthusiasts not only showcase their creativity and ingenuity but also tell compelling stories of exploration and discovery.

I would like to express my sincere gratitude to the board members, teachers, judges, community volunteers, parents, and our diligent staff who have contributed to the planning of this event. Their support demonstrates a commitment to nurturing talent and promoting STEM education, which is essential for the continued progress of our society.

I conclude with a heartfelt thanks to the Synopsys Outreach Foundation, and other sponsors, corporate partners, and donors for their continued support to SCVSEFA. With your generosity, we can work together to inspire and empower future generations of scientists and engineers to make meaningful contributions to the world.

#### From Humble Beginnings to National Recognition: The Santa Clara Valley Science Fair's Transformation

#### Written by Heidi Black, Paul Streit, Larke Reeber, SCVSEFA Board Members

In 1999, the Santa Clara Valley Science and Engineering Fair was a small event with limited participation and minimal impact. However, with the visionary support of the Synopsys Outreach Foundation, the fair has undergone a remarkable transformation over the past 25 years.

**A Turning Point:** In 2001, Intel's International Science and Engineering Fair (ISEF) was coming to San Jose, but the local science fair scene was underdeveloped. Recognizing the need to ignite student passion for STEM through hands-on experiences, Aart de Geus, CEO of Synopsys, Inc., worked to establish funding to become the named sponsor of the Synopsys Science and Technology Championship in 2000.

A Catalyst for Change - The Synopsys Championship, with its increased funding and resources, led to significant improvements:

- **Doubled participation:** More students were able to showcase their projects at a larger venue, the McEnery Convention Center.
- Enhanced board: By attracting talent from the tech community, the fair's board gained valuable expertise to drive further progress.
- Increased regional impact: The financial stability and success of the Synopsys Championship inspired and helped establish the Alameda County Science and Engineering Fair and other area science fairs.
- Measurable success: The impact of the Synopsys Outreach Foundation's support is evident in several key metrics, including:
  - Exponentially increased representation at the California Science and Engineering Fair and ISEF.
    Santa Clara County's ISEF participation jumped from 2 projects to 12, including students from underserved communities. State fair participation increased from less than 20 students to over 100.
  - Soaring award recognition. In the decades since the foundation's involvement, students rate of winning awards at both the CSEF and ISEF has soared. Students win many more awards than other large participating fairs at CSEF and win awards at ISEF at double the national average.
  - *National reputation.* The Synopsys Championship gained recognition as a premier science fair, attracting enquiries from other fairs seeking to emulate its success.

**Beyond Numbers -** The impact of the Synopsys Outreach Foundation's contribution extends beyond quantifiable metrics. Their support has allowed the Santa Clara Valley Science and Engineering Fair Association to:

- Maintain a robust online presence.
- · Hire staff to manage administrative tasks efficiently.
- Offer a professional environment for judges, volunteers, and participants.
- Fund travel for all students participating in ISEF.

A Shared Vision - The success story of the Santa Clara Valley Science and Engineering Fair is a testament to the combined efforts of the Santa Clara Valley Science and Engineering Fair Association, and the volunteers, teachers, and students who participate. However, we could not have achieved our success without the critical role of Synopsys Outreach Foundation's unwavering commitment to transforming a local event into a nationally recognized platform for fostering scientific curiosity and innovation.

## **International Science & Engineering Fair 2023**

Written by Heidi Black, SCVSEFA Board, Head Chaperone for ISEF

This was my 25th International Science & Engineering Fair (ISEF), I attended one as a guest of the previous sponsor, Intel, for the educator academy, but I have chaperoned all but 2 since, and I helped to run those two. Once upon a time, I had a pretty good idea of who might come home



with awards, but the competition at ISEF, and event our fair, has reached such a high level I cannot begin to identify the projects the judges will choose.

The Regeneron ISEF in Dallas was no exception. We were represented by 8 young women and 4 young men, all presenting outstanding projects.

It is a long week. We leave on the Saturday to get settled in our rooms, eat after a long flight and register



with the fair. There is no entry without a color-coded lanyard and badge, and security is tight. Then there was the challenge of finding food for vegetarians in Texas!

Sunday is set up day - and if you think we are picky at the Championship, wait until you see the folks carrying around 2-meter sticks to measure the boards, and check

every label. Each board is set up, and then the student waits for not one, but two Display and Safety inspectors to sign off on the project. Then it is off to pin trading for the students; adults are not allowed.

Monday is a long day of trying to get any final project checks completed or fix any infractions, and having the group listen to each other's presentations. I'm always impressed by the wide range of understanding of our young people, and grateful for additional chaperones who are up on much of the technology. On Monday night we are treated to an opening ceremony.

Tuesday there are talks by Nobel Laureates and workshops to attend while the judges preview the boards. No participants are allowed into the hall. We also try to see something of local interest - this year we took photos

with the life-size bronze longhorn roundup in a nearby park, and visited the John F. Kennedy Memorial Plaza. Our chaperones held "office hours" in the hotel, helping anyone who wished to put a bit more polish on their presentation the night before judging.



Wednesday is the Big Day - and we are up and dressed early, because 1800 participants

are trying to get into the hall at the same time. Students have a schedule of judges at their booth. We are always eager to hear how the interviews are going when they come out for lunch. After lunch they go back in for round two. After the day there is a chance to get into something more casual and participate in a student social. The chaperones enjoyed time at a science museum.



Thursday morning we are back at our boards for public viewing. Local middle school students come through to see the science superstars. We then go out for a nice group meal before the first round of awards. This year we guessed something special might be in store as there was someone taking some very professional

shots of one of our group member's boards. We had a good sponsored award ceremony - 6 awards, plus a \$10,000 renewable scholarship awarded to our sophomore participant!

Friday morning is a scramble to get packed up and out of the rooms before the final ceremony. Not only did 8 of our 12 participants win category awards, one of our young astronomers found herself in the middle of the risers being showered with confetti as the winner of the George D. Yancopoulos Innovator Award of \$75,000!

## What's New With the James Webb Space Telescope?

Written by Gauri Todur, 2023 Synopsys Champion

The James Webb Space Telescope (JWST), launched in 2021, is a space telescope orbiting the sun that allows astronomers and cosmologists to peer further back into the universe at resolutions many times higher than previous missions, like the Hubble Space Telescope. By capturing infrared light from distant galaxies, stars, and planets, the JWST provides invaluable insights into the origins, evolution, and composition of the universe.

So, what's the latest news?



Prior to Webb, it was always a mystery whether supernovae (explosive death of a star) that core-collapse turned into neutron stars or black holes. Using the JWST, scientists have made an incredible discovery about a new supernova called SN 1987A. This supernova, which happened about 160,000 light-years away, was a big deal when it burst into our view in 1987. Now, researchers have found strong evidence that a neutron star was born at the center of the explosion. Neutron stars are like cosmic leftovers from massive star explosions! This discovery not only helps us understand how these cosmic explosions happen but also shows how amazing our universe really is. It's like uncovering a hidden treasure chest in the vastness of space!

JWST has also unveiled a remarkable discovery: the smallest brown dwarfs ever! Brown dwarfs are celestial objects that are too massive to be planets but too small to sustain nuclear fusion like stars. The discovered brown dwarfs challenge conventional theories of stellar evolution. The smallest one weighing just three to four times the mass of Jupiter, they blur the boundary between planets and stars. Additionally, the presence of a mysterious hydrocarbon molecule in the atmospheres of two of these brown dwarfs adds an intriguing layer to our understanding of cosmic chemistry!

These are just two of the latest developments using the James Webb Space Telescope. With each new finding, the JWST sparks wonder and excitement, inspiring us to dream bigger and explore the cosmos further. The adventure has only just begun!







The James Webb Space Telescope's 21.3-foot (6.5 meter) diameter primary mirror. (Image credit: NASA/C. Gunn)



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Raneem Abu-Nimeh Inika Adapala Kavin Agarwal Akhil Agarwal Lakshva Agrawal Ziya Ahmad Adiyat Ahsan Ruchi Alavilli **Ricky Rex Alexias** Malek Alhussien Yuval Amit Youngjun An Sahana Anamika **Rrishi Anand** Akshay Anand Nandini Anantha Victoria Anderson Oscar Anderson Krish Arora Mahita Arun Sadhana Arun Sneha Arun Dawud Ayub Aditi Badriprasad Ben Balteriski Bhavan Balusu Snikitha Banda Anika Basu Nikhil Bawa DiyaBengani Juan Bermeo Ananya Bharathapudi Anchal Bhardwaj Anya Bharti Shiven Bhatt Rohan Bhatt Krishna Bhatt Adyant Bhavsar Anish Bhethanabotla Rohan Bhowmik Azalea Bieber Rodrigo Cantu Valadez Orchita Chakraborty Pria Chandarana Sanjay Chandrasekar Tiffany Chang Silas Chao Alexandra Chatwin Hua Cheng Sahithi Cherukuri Clarisse Cheung Connor Chin Jacob Chiu Harika Chodavarapu Woong Choi Sahana Chowlur Sharanya Chudgar David Clark Ryan Co Grace Crites Lynn Dai

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#### Congratulations to the 2023 Synopsys Championship Winners!

Samarth lyer Ajay Jagadish Arisha Jain Kanishk Jain Tanisha Jain Ritik Jalisatgi Vedant Janapaty Taara Javarai Amanda Jin Sera John Antone Jung VariniKadakia Shripriya Kalbhavi Aanya Kandala Chaaruhaas Kandregula Hasini Kandula Saanchi Kapoor Kashish Kapoor Hunar Kaur Zeyneb Kaya Ruhi Kelkar Tanvi Kenkre Umar Khan Rohit Khorana Netra Khot Rvan Kim Tebin Kim Anish Kosaraju Reshma Kosaraju Isha Kotalwar Aakash Kumar Vaishnavi Kunapuli Brandon Labio Anish Lakkapragada Ella Lan Alexander Lan Korey Latimer Nidhi Lawange Alan Lee Lauren Lee Andrew Li Olivia Li Canis Li Raeanne Li Richard Li Andrew Liang Ethan Liang Kyleen Liao Daniel Lin Connor I in Claire Liu Iona Liu Spencer Liu Bridget Liu Jeremy Lu Sofia Lukac Yuqin Ma Richa Madala Sucheer Maddury Nandana Maheskumar Harshika Manapragada

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**Emmanuel Swenson** Youngwoo Tahk Kshitij Teotia NatashaThombre Claire Tian Aadittya Tiwari Gauri Todur Sophie Tong Aayush Trivedi Audrey Tsai Betul Tulu Reva Ukkadam Aayush Upalekar Aditi Vaduri Aleksey Valouev Angely Vargas Aarush Vashi Siddhanth Venkatesan Avni Vohra Sooraj Vydyanathan Junhao Wang Cynthia Wang Cynthia Wang David Wang Harold Wang Heather Wang Kaitlyn Wang Michelle Wei **Collin Wentzien** Sophie Woo Nolan Woo Vince Wu Austin Wu Iona Xia Claire Xu Anne Xu Saamya Yadav Aiden Yang Franklin Yang Charlotte Yang Matthew Yang Henry Yao Nicki Yazdi Tristan Ye Ella Yee Nathan Yee Melody Yin Gahyeon Yoon Sihyeon Yoon Kiyomi Yoshimura Amelia Yu Evan Yuan Tiffany Yuan Samuel Yuan Selina Yum Erick Zaragoza Linda Zeng Elizabeth Zhang Ryan Zhang Amy Zheng

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Sonia Swamy

## **2024 SCVSEFA Patrons of Sponsored Awards**

Access Braille Awards

Al Foster Award

American Institute of Aeronautics and Astronautics (AIAA) Intelligent Systems Award

American Vacuum Society, Northern CA ASEI [American Society of Engineers of Indian Origin]

Association for Computing Machinery, (ACM)

**Bessie Stough Awards** 

Bruce Kawanami Engineering Award

California Science & Engineering Fair Environmental Protection Agency (EPA)

Green Ninja

IBM Award

Inez M. Lechner Award



Institute of Electrical and Electronic Engineers (IEEE)

Kerry Veenstra Awards

The Lemelson Early Inventor Prize

NASA Earth System Science Award National Oceanic and Atmospheric Administration (NOAA)

Northern California Institute of Food Technologists (NCIFT)

Office of Naval Research - U.S. Navy / U.S. Marine Corps

Regeneron Biomedical Science Award

Robby Beyers Innovative Solutions Award

SAMPE – Society for the Advancement of Material and Process Engineering, Santa Clara Valley Chapter

SPV Market Research

SVACS American Chemical Society, Silicon Valley Chapter

SVACS Dave Parker Award

Thermo Fisher Scientific Junior Innovators Challenge

U.S. Agency for International Development (USAID)

United States Air Force

U.S. Stockholm Junior Water Prize

Valley Water

Wireless Communications Alliance

Yale Science and Engineering Association

Zeidman Award

### **2023 SYNOPSYS CHAMPIONSHIP STATISTICS**

Projects & Student Participants			SCIENCE
# of Synopsys Championship Applicants	808		
# of Individual Student Participants*	789	(70 Schools)	
# from Middle Schools (6th - 8th) # from High Schools (9th - 12th)	306 483	<i>(</i> 32 Middle Schools*) (41 High Schools*)	
# Approved Projects in Competition	589		SPACE AND AND
# of Individual projects	443		a share a a bar bar bar bar
# of Team projects	146		When asks all all all all
Students (%) by Number of Years Participating in Synop	osys Cha	ampionship	
1 year	62%		
2 years	19%		
3 years	9%		
4+ years	10%		
*A few private schools teach both 8th grade and 9th gra appear in counts of both Middle Schools (grades 6–8) a 9–12).	de, and s well as	so these schools s High Schools (grades	<b>O</b>

Judges212Category Judges212Grand Prize Award Judges37Special Award Judges94



### 2023 - 2024 SCVSEFA Donors



We gratefully acknowledge the following individuals, groups, and corporations who have donated to the Synopsys Silicon Valley Science and Technology Championship and the Santa Clara Valley Science and Engineering Fair Association for the 2024 Championship.

### Major Sponsors (Donate \$75,000)



## Benefactors

(Donate \$10,000 or more)

### In Memory of Robby Beyers



Patrons (Donate \$2,500 - \$9,999)

Society for Science and the Public



### Sponsors

(Donate \$1,000-\$2,499)

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> \*Gifts in kind \*\*Matching gifts



#### Contributors (Donate \$100-\$999)

Thank Dr. June Anderson You Heidi & Robert Black Dr. Ann D Burrell John and Jennifer Chen Veena & Sunil Jain Veena Jain, in honor of Carole Kalcic Kathy Jarvis, in honor of Ruth Waters Meenaakshi Kasturirangan Dr. Katy Korsmeyer\* Anjaney Kottapalli Sandra Meditch and Christopher Pentony Sally & David Orr, in honor of Pat Castro Saikat Saha\*\* Laurie Toyama Charles Wade Western Digital\* Forrest & Dorothy Williams Xi Zhao-Wilson

## A Journey of a Synopsys Championship Participant

Hello! My name is Saurav Gandhi, and I was a Synopsys Championship participant for six years starting in the 7th grade, while I was a student at the 49ers STEM Leadership Institute at Cabrillo Middle School and Santa Clara High School. My adventure began in the 7th grade with a project inspired by the challenges faced by the visually impaired -I developed a smart cane designed to help blind people safely cross the road. This project was more than an introduction to science fairs; it was the spark that ignited my passion for leveraging technology to assist people with disabilities.

The following year, fueled by my desire to explore and innovate, I ventured into creating an indoor navigation wearable system equipped with computer vision. This device aimed to facilitate more autonomous indoor movement for the visually impaired. My commitment to creating assistive technologies continued to grow, leading me to develop a shopping assistant designed to help blind people navigate grocery stores, and even a socially-assistive robotic companion! These early experiences in the Synopsys Championship instilled in me a fascination with the robotics industry and a resolve to pursue innovation that can help humanity.

Reflecting on my journey, another experience that significantly contributed to my development was the AP Research program at Santa Clara High School. This rigorous academic challenge honed my ability to conduct in-depth research, critically analyze information, and present complex ideas with clarity. It complemented my hands-on experiences at the Synopsys Science Fair, providing a strong academic foundation that propelled my passion for technology and innovation.

I now attend the Jerome Fisher M&T Program at the University of Pennsylvania where I'm pursuing dual degrees in Electrical Engineering and Finance at The Wharton School. At Penn, I've found different ways to continue pursuing my interest in technology. I currently work at the Mack Institute for Innovation Management, where I'm assisting in establishing a healthcare robotics commercialization program. In this role, I conduct comprehensive market studies of emerging healthcare robotics innovations and have the opportunity to speak to faculty working on different research projects. This opportunity has allowed me to explore the intersection of technology, healthcare, and business, furthering my ambition to create impactful technological solutions. Last summer, I interned at a construction robotics startup in Barcelona. Here, I honed my skills in using Robot Operating System (ROS) and robotics simulation tools, gaining invaluable industry-standard expertise.

Reflecting on my journey from those first steps in the Synopsys Championship to my current endeavors, it's clear how pivotal the fair has been in discovering my passion for using technology to help others. It has not just been a platform for competition but a nurturing ground for innovation, learning, and personal growth. As I continue to explore the vast possibilities at the intersection of technology and business, I remain committed to developing solutions that make a meaningful difference in people's lives, inspired by the spirit of the Synopsys Championship that has guided me from the start. 🐼





Summer Internship, Barcelona, 2023

### Thank you to Reviewers of the Projects

#### Institutional Review Scientific Review Committee (SRC) Board (IRB) Renee Fallon Dr. Melissa Auger Dr. Colin Ong Lynn Leibshutz Heidi Black Lew Smith Dr. Ann Burrell Anjaney Kottapalli Jenny Kiratli Dr. Ann Burrell Dr. Srinivas Rao Heidi Black Dr. Karen Gundy-Burlet Dr. Tony Gallo Tarun Bhattacharya Dr. Herman Nikolayevskiy Dr. Lynn Shannon Holly Denton

#### From Councilmember Cohen's March 2024 NEWS LETTER

### **A Commendation For Science Fair Board**



In its 65th year, what's now called the Synopsys Science & Technology Championship is coming to San Jose Convention Center March 13-14th. It's such a pleasure to see our brightest young scientists gathering to share their work. At this week's City Council meeting we recognized the volunteers of the Santa Clara Valley Science and Engineering Fair Association.



### **Please Donate**

Your collective support to the Synopsys Science and Engineering Championship is vital to our continuing excellence & success. We hope that your positive experiences with our event persuades you to join our register of financial benefactors as well as to connect us with prospective major sponsors for the future. We hope that you have personally witnessed how this major event contributes to your student's intellectual growth and advancement that opens multiple fantastic opportunities. We invite you to contribute to preserving this showcase platform for innovation research & learning, ensuring the fair remains a beacon for young minds. Your donation, big or small, is an investment in our children's future and the broader realm of science and engineering. We call on you to help us navigate the present financial challenges by generously donating to this special program.

Thank you so much for your support of the Santa Clara Valley Science and Engineering. Fair Association!





Donate through the QR code or visit www.science-fair.org - click the Donate tab at the top right corner of our website. Or if you prefer to write a check, make it payable to SCVSEFA, and mail to SCVSEFA, P.O. Box 307, Los Altos, CA 94023.