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STEM EDUCATION



Courtesy photos

— BUILDING FOR TOMORROW —

At iLEAD Lancaster, there are a variety of STEM options for students. The first two rows of photos illustrate the various stages of the Glider program: in-class learning, working on a simulator, bringing the glider on campus to give younger grades a look at what they can do when their turn comes, and getting briefings from the pilot. The bottom row from left, is the Mycology program, a study of

mushrooms and yeasts. Fungi have many applications in medicine, industry, and ecology; Empower Generations students build a model of a wave to understand how it works; a Dream Up to Space team uses microscopes to examine their project after its return from the International Space Station; and a glider on the runway, a culmination of that project — flight.



Robotics: 25 years of building robots and skills

By Allison Gatlin

Special to Aerotech News

The seeds of future developments in robotics and other technical fields are being planted today in myriad robotics programs engaging students across the Antelope Valley.

Students are designing, building and operating robotic creations large and small, using them to perform specific tasks in what may be a precursor to future careers.

The programs offer students more than the opportunity to learn how to build or operate a robot; they are a means of teaching numerous “soft skills” such as teamwork and effective communication that apply to their future no matter what field they decide to pursue.

“They get the real-world experience of teamwork, working on deadlines ... cooperation with other teams, not just your own teammates,” Joe Walker STEALTH Academy VEX robotics adviser Matt Anderson said. “They may or may not be an engineer, but the lessons they learn help them later on in life.”

Robotics programs took off in the Valley with the establishment of Lancaster High School’s Eagle Robotics Team 399 in 1999. The team, and other high school programs that followed, are part of For Inspiration and Recognition of Science and Technology, or FIRST, an international organization that promotes science education.

The teams at the high school level each year create robots designed to accomplish a specific task. Teams and their robots face off in regional events, with the competitions culminating at the international finals in April.

Local teams have ventured to the finals many times over the years, and The Palmdale Aerospace Academy’s Gryffingear team won the championship in its inaugural year.

Area teams benefit from the availability of mentors from the



Photo by Allison Gatlin

Robots work at scoring points during the 2024 Aerospace Valley Regional robotics competition, in which 40 teams from California and beyond put their robot creations through their paces in an attempt to earn their way to the international finals.



Photo by Allison Gatlin

LEFT: Student “drivers” from Lancaster High School’s Eagle Robotics Team 399 control their robot during a match at the 2024 Aerospace Valley Regional robotics competition.

local aerospace industry and Edwards Air Force Base, sharing real-world experience with the students.

As part of their mission, the teams also work hard at outreach efforts to expand science education and STEAM — science, technology, engineering, art, and math — across the Antelope Valley for all age levels. They provide demonstrations

at other schools, engaging younger students who often go on to join programs, and at community events such as the Antelope Valley Fair and the Aerospace Valley Air Show.

Antelope Valley Union High School District Trustee Donita Winn and her husband Duane have volunteered with area robotics programs since 2002, when watching teams compete turned into actively participating.

“These kids were so genuine and so committed to their projects,” Winn said of the programs’ attraction. “All of this just produces students who care, are passionate about what they do, they’re interested in STEM and they care about other kids.”

In 2018, with the local high school robotics programs having grown and wanting to take advantage of the area’s rich technological heritage, organizers worked to establish the Aerospace Valley Regional robotics competition.

The event is part of the FIRST calendar of competitions in which participating teams hope to qualify for the international finals. Teams

from California and beyond — as far away as Turkey and Chinese Taipei — come to Lancaster for the weekend-long competition, engaging with local aerospace professionals who volunteer as judges and other roles.

“Good groups of kids, really good kids,” Winn said of the teams.

The regional competition has grown in the years since to where it has reached the capacity of the Eastside High School gymnasium where it is held and has a waiting list for additional teams that are interested. In 2024, that list had nearly two dozen teams.

Organizers are seeking a new, larger venue to accommodate the interest.

High school students are not the only ones engaging in robotics programs, as various middle and elementary schools have had programs of their own, some through FIRST, over the years.

Joe Walker Middle School STEALTH Academy has hosted VEX robotics teams since 2011, the first in the Valley to do so, Anderson said.



Photo courtesy of Matt Anderson

Members of Joe Walker STEALTH Academy’s VEX robotics team work on their robot. The team uses VEX parts to build their robot, then program it to do specific tasks.

What started as an after-school club is now a regular class with about 30 to 32 students, and fields three separate teams for competition.

The VEX program operates under the auspices of the REC Foundation, which hosts robotics programs for elementary school through college students in 70 countries. Teams build robots using VEX parts to compete in a different game each year in a manner like FIRST, culminating in championships.

Like their high school counterparts, the VEX teams work to encourage others to take part in robotics and similar STEM programs.

“Every kid needs to be exposed to robotics at some point before graduating high school,” Anderson said.

The Joe Walker students have helped start programs at other schools, both within the Valley and beyond, and often demonstrate their projects at community events, as well.

Anderson has sought feedback from the local aerospace industry as to the types of skills they need in their employees and has worked to tailor the program to address those needs. In this way, the robotics program is providing not only a pathway for students to follow for potential future careers, but also helps to develop the future aerospace industry workforce.

Robotics program advisers see the long-term effects of the programs as former students go on to careers in STEM fields, some returning to join the local aerospace industry and many volunteering with local or other robotics programs as mentors.

“They got bit by the STEM bug,” Anderson said of their early introduction through robotics.



Photo by Matt Anderson

Members of Joe Walker STEALTH Academy’s VEX robotics team celebrate during a competition.

'If you can see it, you can be it': Women in aerospace

By KC Rawley

Aerotech News

The goal of getting more under-represented groups interested in STEM is admirable, but not simple.

Some believe you need to catch children's interest early, especially girls. A 2017 survey of 11,500 European girls, commissioned by Microsoft, puts 15-years old as the age when girls stop being interested in STEM subjects.

and future jobs market," the study said.

One of the most important aspects of inspiring girls is representation, a point brought up repeatedly by female pilots and engineers in a 2023 *Aerotech News* special edition. "If you can see it, you can be it," is a familiar refrain.

Here are the stories and advice of those women interviewed who encourage other young girls and women to challenge themselves and find success in STEM-related fields.

these things that I couldn't even believe are possible with an airplane." Naturally shy, the eight- or nine-year-old turned to her father as the plane taxied in and said uncharacteristically, "I wanna meet the pilot; I wanna know how he did that."

As the young girl watched the glamorous female aerobatic pilot Patty Wagstaff step out of the airplane, Worth turned to her father and said, "Now I can be a pilot." "I was exposed to aviation at a young age, but it wasn't until I saw her get out of the airplane that it clicked," Worth said. "I knew then."

Now, after a 21-year military career where she logged more than 5,800 hours of flight time, including more than 1,100 combat hours, and working as an instructor pilot, evaluator pilot, and aircraft commander in multiple aircraft, and aircraft commander in multiple aircraft, including the C-21A, M/HC-130P, and CN-235, Worth is the one speaking to and inspiring young girls to become pilots.

Having that personal connection with someone who looks like you and is doing what you yearn to accomplish is so important in getting underrepresented people into aviation, according to Worth.

"There's a there's a great organization called Sisters of the Skies. And it's made up of Black women, who are less than half of one percent of the aviation world. And that's not even getting into breaking it down into maintenance and air traffic control," Worth said.

That's why she and fellow pilot Jennifer Aupke started The Milieux Project, a 501(c)(3) with a mission to connect girls to aviation.

"We like to go out and volunteer to these lower income neighborhoods and elementary schools where the kids maybe don't have any professional role models in their lives."

"So, it started as a small group of women saying, 'We're just gonna get pictures and videos and information of us out there,' and now it's just grown. It's huge. And they're making a difference because little girls have someone who looks like them."

Now Worth spends time mentoring with TuskegeeNEXT, PreFlight Aviation Camp, and NASA STEM outreach programs, heeding the words of a male commander who told

her, "Carrie, when you have a seat at the table, your job is look around and see who's missing. Be that advocate. Be that voice."

'Patty' Ortiz: TV show solidified dream of space

As a child, Patricia "Patty" Ortiz thought she wanted to be an astronaut. But when she saw a television episode of *Punky Brewster* a few weeks after the Challenger disaster, she was positive. The show, with a cameo by astronaut Buzz Aldrin, was meant to reassure kids that they shouldn't give up on their dreams; that bad things happen, but brave pioneers push on.

And the seven-year-old Ortiz re-committed herself to her dream of space. After many years, she hasn't left Earth's atmosphere yet, but her work has.

In Moscow in 2016 Ortiz collaborated with international partners Roscosmos and Krunichev Space Center to assess a contingency freeze scenario for the Russian segment of ISS Functional Cargo Block on the International Space Station where she was the only woman on the engineering team.

Now, as deputy project manager of Orion Heat Shield Spectrometer for Team Artemis — she has a part in putting a woman and the first person of color on the Moon for the



Courtesy photograph

Patricia Ortiz is deputy project manager of the Orion Heat Shield Spectrometer for NASA's Artemis II-IV Program being assembled at Johnson Space Center, Houston, Texas.

first time and establishing a base for Mars exploration.

After the *Punky Brewster* airing, "I really was very gravitated towards the math and science courses. Growing up, I excelled in those courses, and so I did quite a bit of making sure that I was keeping up with my math and physics courses, but I also tried to stay really well-rounded," Ortiz said.

She credits her athletic coaches

See **WOMEN**, Page 5



NASA photograph by Lauren Hughes

Research pilot Carrie L. Worth on the steps of a Gulfstream III at NASA's Armstrong Flight Research Center at Edwards, Calif. She joined NASA Armstrong's flight operations staff in March 2021 after 21 years in the U.S. Air Force, and commercial piloting.

"Why Europe's girls aren't studying STEM," points out that female children become interested in math and science around age 11, so there is only a four-year window to spark their curiosity and illustrate how they might fit into an ever-increasing technological work force.

"Across 35 European countries, fewer than one in five computer science graduates are women. Interest in science, technology, engineering and math (STEM subjects) drops off far too early. In fact, the OECD's Programme for International Student Assessment (PISA)2 reveals that boys are far more likely than girls to imagine themselves as ICT professionals, scientists or engineers. This is a major issue for both the current

Carrie Worth: Who is missing at the table?

Carrie Worth, research pilot and Gulfstream lead project pilot at NASA Armstrong Flight Research Center at Edwards, Calif., can tell you the exact moment she decided she wanted to fly.

Growing up in Big Bend, Wisc., with relatives in Fond du Lac about an hour away, the Oshkosh EAA Fly-in was a yearly summer outing for her family, "I distinctively remember one year when I was in grade school, and I was starting to get more interested. I knew I liked airplanes. I thought I might wanna fly," Worth said.

During an aerobatic performance with an EXTRA EA-260 plane, Worth was "watching this pilot do



NASA photograph

Patricia Ortiz and support aircraft mechanics removing the right F-18 wing at NASA Armstrong Flight Research Center at Edwards, Calif., for a shape memory alloy ground test. The F-18 wing was shipped to NASA Glenn Research Center in Ohio to perform the ground test. Ortiz is now the deputy project manager for Orion's OSHU.



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— STEM NATIONAL COMPETITIONS —

Courtesy of the Flight Test Museum Foundation

Congressional App Challenge (ages 13-18)

<https://www.congressionalappchallenge.us/students/>
Winning apps may be displayed in the US Capitol Building and featured on the House of Representatives' website, House.gov. Winning students are invited to #HouseofCode Capitol Hill Reception in Washington D.C., get waived copyright registration application fees through the ARTS Act, and winning apps receive a press release on the Congressional App Challenge website.

Students can enter their apps through Oct. 24, 2024.

First Robotics Competition (ages 15-18)

<https://www.firstinspires.org/robotics/frc>
Under strict rules and limited time and resources, teams of high school students are challenged to build industrial-size robots to play a difficult field game in alliance with other teams, while also fundraising to meet their goals, designing a team "brand," and advancing respect and appreciation for STEM within the local community.

Future City (ages 11-14)

<https://futurecity.org/>
Future City is a hands-on cross-curricular educational program that brings STEM to life for students in grades 6 through 8. Using the Engineering Design Process (EDP) and project management skills, students showcase their solutions to a citywide sustainability issue. This year's challenge asks students build a floating city and provide two innovative examples of how your floating city works and keeps its citizens healthy and safe.

Junior Science and Humanities Symposium (ages 14-18)

<https://jshs.org/>
Perform original research, present findings, and compete for scholarships, aid, and opportunities. JSHS exposes students to diversity of thought, and promotes learning that can be applied to regular studies and real life. The top two finalists in each region compete in oral presentations for the chance to win scholarships ranging from \$4,000-\$12,000. The remaining three finalists from each region compete in the poster competition for a chance to win cash awards. In total, the National JSHS event awarded \$192,000 in scholarships and \$10,800 in cash awards to the national winners.

MathWorks Math Modeling Challenge (ages 16-19)

<https://m3challenge.siam.org/>
M3 Challenge spotlights applied mathematics as a powerful problem-solving tool. United States high school juniors and seniors are eligible, and winning teams receive scholarship prizes totaling over \$100,000. Entirely internet-based, no registration or participation fees and flexible work time. The specific real-world problem that is posed each year is unknown to participants until they login during the Challenge weekend.

Microsoft Imagine Cup (ages 16+)

<https://imaginecup.microsoft.com/en-us>
Registration is open for the next season of the Imagine Cup, a global technology startup competition exclusively for students. Gain access to Azure credits and the latest generative AI models in Founders Hub, receive expert mentorship, and compete for the chance to win

US \$100,000 and an exclusive mentorship session with Microsoft Chairman and CEO, Satya Nadella.

MIT THINK Scholars Program (ages 15-18)

<https://think.mit.edu/>
Rather than requiring students to have completed a research project before applying, THINK caters to students who have done extensive research on the background of a potential research project and are looking for additional guidance in the early stages of their project. The program is organized by a group of undergraduates at MIT. Selected finalists have weekly mentorship meetings with THINK team members for technical guidance, helpful resources, and updates on the projects progress and are given up to \$1,000 in funding for their project.

Additionally, if permitting, finalists are invited to a four-day all-expenses paid trip to MIT's campus, where they tour labs, present their research to MIT students and faculty, and hang out with members of the THINK team.

Regeneron Science Talent Search

<https://www.societyforscience.org/regeneron-sts/>
Each year, around 2,000 students enter the Regeneron STS, submitting original research in critically important scientific fields of study and full application for holistic review. Unique among high school competitions, the Regeneron STS focuses on identifying, inspiring, and engaging the nation's most promising future leaders in STEM. Application Deadline is Nov. 7, 2024 at 8 p.m., EST.

See COMPETITION, Page 16



Pastor Paul Chappell



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WOMEN *(from Page 3)*

and her single mom for modeling leadership and good work ethics. Ortiz is a first-generation American and first in her family to go to college. Her mother immigrated from El Salvador alone with Ortiz's three siblings shortly before the civil war broke out. Growing up in South Central Los Angeles with a single mom and without academic guidance inspired Ortiz to join the Society of Hispanic Professional Engineers at the University of California, San Diego.

"The mission of the organization

is to change lives, to empower the community through STEM awareness — accessing it, supporting it," Ortiz said. "I want to get these young kids excited, and to get them motivated. You know, a lot of times kids get scared of the math and physics. And it is almost crippling for them, and I hope that my story inspires young kids and motivates them to continue to study hard and pursue these STEM fields."

Now Ortiz will oversee Orion Heat Shield Spectrometer on Artemis II through V. Currently, Johnson Space Center is building all of the OHSS box for the four missions.

Ortiz calls it "incredibly exciting" to be a part of the Artemis mission.

"It's a small footprint into getting boots on the Moon and that's extremely exciting to be a part of," she said. "We don't have anyone that looks like me doing these amazing things. So, for me, it's extremely exciting to know that now the first woman will be able to land on the Moon. And — beyond, we're going to continue to explore."

"The sky and beyond is the answer."

Readers can follow Patricia Ortiz at her inspirational Instagram page "Latinas Need Space"



NASA photograph

Elizabeth "Liz" Ruth in her NASA portrait. Before working for Armstrong Flight Research Center, Ruth was an active duty pilot in the U.S. Air Force.

to me that I could be a professional pilot because I never saw a woman professional pilot. Even airlines, you know, there was just no women pilots for me to see," Ruth said.

"I could see myself doing that because she was doing it. And for someone who wanted to fly so much, it's kind of surprising to me now that I didn't have the imagination to see myself as a professional pilot. But it does go to show that it's hard to be what you don't see."

The plan was to go to college, then medical school to have a job that

paid enough so Ruth could afford a plane.

But in 1973, when Ruth was in high school, the U.S. Navy started training aviators for the first time since World War II, and in 1974 the woman graduated who would demonstrate a path to the skies for young Liz Ruth: Rosemary Mariner.

"Rosemary was in the China Lake test squadron and flew airplanes to test missiles for my dad, who was an engineer, and he introduced me to her," Ruth said.

"Once I saw her, then everything became very clear to me. Oh my gosh, I can skip the whole medical school thing, and I can be a professional pilot."

After college, Ruth joined the U.S. Air Force, and became an active-duty pilot serving as an instructor pilot, check pilot and aircraft commander for the T-38 and T-43 from 1981 to 1989. She left the military with the rank of captain and went to work for United Airlines.

She flew the Stratospheric Observatory for Infrared Astronomy (SOFIA), for NASA, a modified Boeing 747SP with the world's largest airborne astronomical observatory. After SOFIA was retired she learned to fly the RQ-4 Global Hawk surveillance drone that does telemetry for missile launches, and in 2023 she was also flying NASA's Gulfstream II.



NASA photograph

Liz Ruth in front of NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA), which she piloted until the program retired in 2022.

Elizabeth 'Liz' Ruth: Inspired by flying pediatrician

As a child living on Naval Weapons Station China Lake in California's Mojave Desert, Elizabeth "Liz" Ruth received her medical care in an unusual way.

The children on the remote Navy base were visited by a female pediatrician who flew in from Lancaster, Calif., in her own private plane.

"So, at that time, I guess I just really looked up to her and thought well, that would be a great life, you know, be a doctor and have my own airplane."

"So yes, she was my inspiration," Ruth said.

"And it never, even though I wanted to fly, never once occurred

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Lockheed offers \$10,000 scholarships

Lockheed Martin's STEM Scholarship program awarded up to 100 renewable \$10,000 scholarships in 2024 to students pursuing a bachelor's degree in engineering, computer science, math, and physics fields. The number of scholarships may change each year.

They are looking for passionate students who demonstrate financial need and come from an under-represented group or underserved community.

Eligible students must be U.S. citizens, and seniors in high school or undergraduate college students (freshmen, sophomores, or juniors) attending or planning to attend an accredited U.S. four-year college or university full time.

Scholarship applications will undergo an independent review by Scholarship America. Scholarship America is a nonprofit organization with more than 60 years of experience designing and managing scholarship programs. After ensuring applicants meet eligibility requirements, Scholarship America will evaluate applicants' merit in academics and personal experiences (such as extra-curricular activities and work experience).

Scholarship America uses a financial need calculation called



Courtesy of NASA

The X-59 is NASA's newest experimental plane being built by Lockheed Martin at Plant 42 in Palm-dale, Calif. The X-59 is designed to produce a quiet sonic thump instead of a loud sonic boom when it flies faster than the speed of sound. Lockheed's STEM Scholarship program awarded up to 100 renewable \$10,000 scholarships in 2024 to students pursuing a bachelor's degree in engineering, computer science, math, and physics fields.

Suggested Parent Contribution (SPC). This method, which is very similar to the federal methodology process used by college financial aid offices, takes into consideration all information provided on

the scholarship application – adjusted gross income, the income of parent(s), untaxed income, total cash/savings, number of persons in the family, and the number of family members attending post-

secondary school. Family members of Lockheed Martin employees can apply for the Lockheed Martin STEM Scholarship if they meet the eligibility requirements. Scholarship recipients should

be open to outreach from Lockheed Martin recruitment teams regarding possible internship and employment opportunities. Internships and employment opportunities are not guaranteed. As with all Lockheed Martin career opportunities, all interested candidates and scholarship recipients must apply through the Lockheed Martin careers site to be considered.

Scholarship recipients are not required to seek or accept internship or full-time employment at Lockheed Martin, and Lockheed Martin does not guarantee internship or full-time employment to Scholarship recipients.

Although college seniors are not eligible, Lockheed Martin offers many opportunities for them such as innovation challenges, Lockheed Martin Days on campus, and internship opportunities.

To be eligible to renew the scholarship, recipients must continue to be enrolled full-time in an accredited U.S. four-year college or university, pursue an eligible major, and meet the required grade point average.

The application deadline is in April. To learn more and apply, visit lockheedmartin.com/scholarship

FROM YOUR EYES wins Microsoft Imagine World Cup

by Maddy Epstein

Microsoft.com

The Imagine Cup, a visionary global technology competition for student startups building with AI, has just crowned its 2024 World Champion: FROM YOUR EYES.

Using GPT-4 and their own image recognition technology, the Turkish start-up FROM YOUR EYES has built a mobile application and API, which offer real-time visual explanations to users with a vision disability. The mobile application enables users to design their own AI assistant to obtain descriptions of photos, videos, or other visual documents – and works with smart glasses and watches to describe aspects of the users' environment. FROM YOUR EYES also licenses their technology to other developers and businesses via their API and has already secured partnerships with multiple entities.

The exciting finale of this year's Imagine Cup took place at Microsoft Build, where the three world championship finalists showcased their groundbreaking innovations on a global stage, hosted by Microsoft CVP of Ecosystems, Annie Pearl, and Principal Cloud Advocate, Dona Sarkar.

FROM YOUR EYES was created out of a profound personal need and a visionary goal. "After losing my vision completely at the age of 10, I knew I would never be able to see biologically again, but I believed it could be possible with technology," says



Microsoft photograph

Turkish start-up FROM YOUR EYES won the 2024 Microsoft Imagine World Championship Cup. From left are Emre Yildiz; Zülal Tannur, founder and chief executive officer; and Ege Ketrez, chief technical officer. Tannur lost her sight at the age of 10, and the mobile application enables users to design their own AI assistant to obtain descriptions of photos, videos, or other visual documents.

Zülal Tannur, Founder and CEO of FROM YOUR EYES. She encountered various image processing technologies, though none provided the effective real-time solutions she needed; this sparked the idea for FROM YOUR EYES. Through involvement with Microsoft's Seeing AI initiative, Zülal met other developers that were visually impaired from around the world, and they inspired her to delve into coding.

In 2020, FROM YOUR EYES' journey began. They soon won first place in an idea marathon, and over the next year and a half, continued to innovate. In 2021, the team started prototyping and joined Microsoft for Startups Founders Hub where they have since received \$150,000 of Azure credits and access to the Microsoft for Startups Expert Network, which helped them continue growing their business.

Through rigorous development, they have trained their own custom AI model with over 15 million images, achieving an impressive accuracy rate of 98.03 percent and an image processing speed of 15 milliseconds, which is about four times faster than the world standard. Azure Cosmos DB and Blob Storage give users quick access and upload capabilities, and output is sent to GPT-4 for Natural Language Processing.

The team has accessibility at its core. "Being a startup with a visually impaired leader as the founder and CEO naturally leads us to approach these issues with great sensitivity," says Zülal. "For example, our CTO, Ege, is a person with autism, ADHD, and dyslexia. We create the most conducive working conditions for him. Prioritizing acceptance of each other with all our differences and unconditional support are fundamental to us."

It's clear that FROM YOUR EYES has an exciting path ahead, making an impact not just for FROM YOUR EYES users, but for developers and entrepreneurs worldwide. "I want to prove that a leader who is visually impaired can be strong, independently capable of building groundbreaking technology, and that being a young, female entrepreneur doesn't hinder you from establishing and managing a company," Zülal said. With this ethos, Zülal states, "we don't believe there is anything this team cannot achieve when we're together."



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DOD grows STEM talent pool through scholarships, internships

by C. Todd Lopez

DOD News

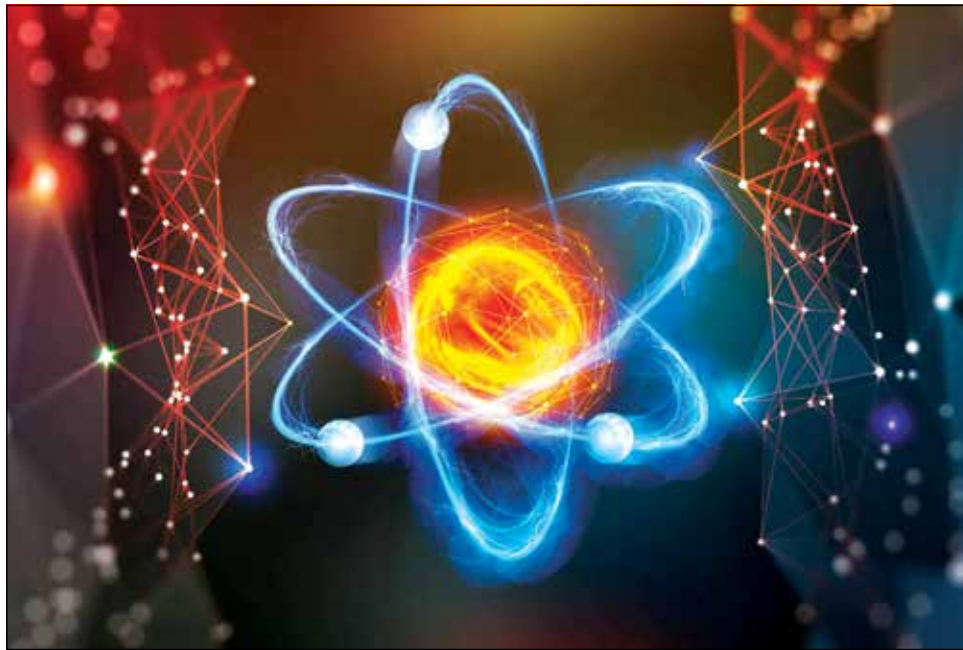
The most sophisticated weapons systems, computers and other technology are important to ensuring the U.S. military keeps its competitive edge. But also important is the talent pool – both military and civilian – that helps develop that technology and keeps it running.

Heidi Shyu, the undersecretary of defense for research and engineering, said DOD, like many businesses in the private sector, struggles to attract talent to fill science, technology, engineering and mathematics roles and has tools in place to help develop and recruit more STEM talent.

“If you look at the number of STEM students that we have, we’re short nationally,” Shyu said at the Reagan Institute’s National Security Innovation Base Summit in Washington, D.C. “It’s not just within DOD that we have a problem. Companies are also short of a talent base that we can draw from. We’re competing for the same pool of talent.”

One tool to increase STEM talent, Shyu said, is DOD’s Science, Mathematics and Research for Transformation Scholarship Program, or SMART Scholarship.

In 2023, DOD handed out 468 SMART scholarships for undergraduate, graduate and doctoral studies across 24 academic disciplines critical to national security and DOD’s future.



Graphic courtesy of U.S. Army

For each year of school DOD funds, recipients are obligated to do one year of work for the department. “We’re trying to increase the number of SMART Scholarship that we have,” Shyu said. “In the ... last 2 1/2 years, we have awarded 1,400 STEM scholarships, and the STEM scholarships help the students. It’s a fee for service. I pay for four years of college;

you owe me four years of time within the DOD laboratory.”

One scholarship recipient, Shyu said, benefitted from the SMART Scholarship when DOD paid for his master’s degree and doctorate.

“Now, he is doing underwater sonar research at the Naval Underwater Warfare Center,” she said. “This is the power of

having the SMART Scholarship so we can grow our talent pool.”

Recently, Shyu visited a handful of universities in Texas to meet with leaders to talk about challenges facing students as they pursue educations in STEM fields.

“I really gained a much better understanding when talking to the professors, the deans, the presidents and the chancellors,” she said.

Shyu said she told those she met with about an internship that is part of the SMART Scholarship undergraduate program. She said she learned that some students might not be able to participate in that internship because they’re needed at home to help their families due to financial hardships.

Now, she said, the department has modified that internship to enable students to participate while continuing to help support their families.

Shyu proposed letting interns spend the first week of their internships at their DOD lab to learn about their project and meet the people, then work from home for the rest of the five weeks. “And that was a huge benefit to some of the students, so that’s one thing we’ve done,” she said.

Shyu said better understanding the challenges facing students has improved options for helping those students stay in and grow within STEM fields - and that will ultimately increase the STEM talent pool.



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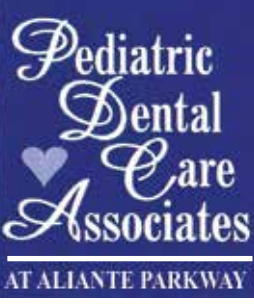
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3. Must be physically able to perform all work of the trade.
4. Must be legally residing in the United States, genuinely interested in learning the trade, and willing to comply with all terms and conditions of the Apprenticeship Standards, Rules, and Regulations.
5. Possess a High School Diploma, G.E.D. Certificate or Certificate of High School Equivalency
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STEM learning is hands-on at iLEAD

By KC Rawley

Aerotech News editor

When it comes to American education, most educators agree: the “sage on the stage” is dead.

Gone are the days when a teacher stands in front of note-taking students who parrot the information back on a test. Pedagogy has been moving to group work, experiential learning, and computer research. Nowhere is hands-on learning more important than in STEM or STEAM education.

At iLEAD California that takes many forms: flight simulators, flying in gliders, creating models to illustrate physics principles, and designing experiments that are carried to the International Space Station and examined upon their return.

“At iLead, we believe wholeheartedly in a hands-on, experiential approach to learning, because we don’t remember the things we memorize; we remember the experiences that we have. So we have developed a curriculum of project-based learning that allows for this type of experience and being located where we are in Aerospace Valley, STEM education is extremely important to us,” said Matthew Watson, executive director of development at the iLEAD California regional office in Castaic, Calif.

The Glider Program was created by Kathleen Fredette, who flew four missions with NASA’s SOFIA project. She said that “completely moved me into aerospace.” She has a master’s degree in STEM Education, Curriculum and Design, and multiple as well as single, subject teaching credentials.

Fredette says they are teaching Common Core eighth-grade physics in the form of “Why do things fly,” and “How do they fly,” with “fun and deep content,” which ultimately leads to an opportunity to fly in a glider.

“Each site has different demographics, but in Lancaster, some of those children have never been to the beach, but they’ve been to Las Vegas. A lot of them don’t even know the kind of aerospace things that are happening in our Valley,” said Fredette.

She said students are shown horizons that they never knew existed.

Fredette also oversees Dream up to Space, which has sent 18 experiments to the International Space Station. Students create experiments, which are flown in space and returned to them for analysis. One such project sought to answer the question: “Will oyster mycelium develop in microgravity?”

Students are taught how to find subject matter experts, then “onboard that person into the



Students at iLEAD Agua Dulce designed mission patches for Dream Up to Space, which flew with the experiment.



Students at iLEAD Lancaster work on their mycology experiments and journal the results.

work they are doing,” according to Fredette. “That’s where the magic happens: getting our kids together with experts and being able to articulate, receive input, and ask questions.” They have to create a proposal for their experiment and then pitch it to real scientists.

“It teaches those soft skills of communication and relationship, and being able to work next to someone who might be kind of intimidating,” she said.

When they fly out of Skylark North in Tehachapi, Calif., students are meeting “pilots who are

testing jets, pilots who are astronauts,” and Fredette sends them over to have a conversation, which they then must write about. She said some of her students have been published and have spoken at space conferences.

The “A” in STEAM stands for art, and iLEAD students had an opportunity to enter an art contest to design a mission patch to fly along with the science projects.

All iLEAD students must prove their learning by creating presentations with visuals. “Our kids come out being able to present.”

Another program, Intro to Piloting, is designed to help students who want to learn how to fly a plane themselves. “We connect them to pilots, and get them more time in a plane,” so they can learn what it takes to be a pilot,” Fredette said.

Fredette is a pilot herself, something she took up after her SOFIA experience.

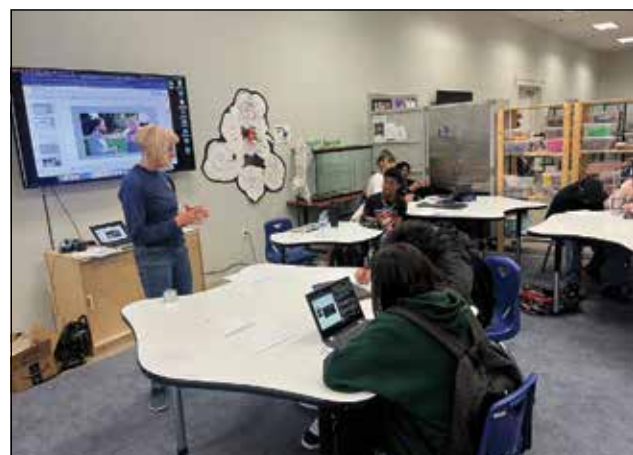
The impact of these projects is “letting our students know you don’t have to wait until you’re in

college to do something real or say ‘Maybe I want to start flying;’ you can start flying now. We’ll help you write scholarships because they’re out there,” Fredette said.

iLEAD California is a service provider for the many iLEAD charter schools in the Antelope Valley such as iLEAD Lancaster, iLEAD AV, iLEAD Agua Dulce, iLEAD Exploration, and iLEAD Empower Generations. They create programs that can be adopted by the various school models: in-person, online, and homeschooling.

“I think we are so very fortunate to have the different community partners that we do, that allow us to develop the projects like Dream Up to Space, and the Glider Project.

“And it’s something that gets our kids excited about learning and doing real things. Because that’s the reason we learn in the first place—to do real things. So, we’re excited to deliver these opportunities to our learners,” said Watson.



Photos courtesy of iLEAD

Kathleen Fredette teaches physical science to students at iLEAD Empower Generations. She also oversees the Glider Program and Dream Up to Space.



A close-up view of the “mix stick” used in the Dream Up to Space experiment that flew to the International Space Station. The experiment was planned and pitched by seventh-grade iLEAD Lancaster students.



Seventh-grade iLEAD Lancaster students, Delilah Perez, Elizabeth Alvarado, and Lula Ann Carr unpack the “mix stick” in preparation for post-flight analysis.

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AFIT PhD student wins Women of Color in STEM Student Leadership Award

by Katie Scott

Air Force Institute of Technology

Kara Combs, a doctoral student at the Air Force Institute of Technology and an associate computer engineer at the Air Force Research Laboratory, has been selected to receive the Women of Color in STEM Conference's Student Leadership Award – Graduate Level.

This award recognizes a graduate student with creative verve, an accomplished academic record, inspiring grades, and a proven desire to help others succeed. Combs will receive the award at the Women of Color STEM DTX Conference Awards Ceremony on Oct. 5, 2024, in Detroit.

In the selection notification letter, Tyrone Taborn, CEO and publisher of *Career Communications Group's Women of Color* magazine, wrote, "Combs' numerous achievements stood out among her peers." Across all the awards presented at the conference, there were hundreds of nominees deemed to be the "largest and strongest [group] we have seen yet."

Dr. Adedeji Badiru, dean emeritus of AFIT's Graduate School of Engineering and Management, nominated Combs for the award. In his nomination letter, Badiru stated, "Combs stands out as truly exceptional and is poised to make significant contributions within the STEM field."

Combs is pursuing her doctorate in operations research part-time while holding a full-time engineering position at AFRL. Despite her dual responsibilities, she maintains high academic performance while actively representing AFIT in various local and national organizations.

She was recently re-elected for a second term as secretary for AFIT's chapter of Tau Beta Pi, the oldest engineering honor



society in the U.S. Additionally, she is the sole officer with student status for the local Cincinnati-Dayton Chapter of the Institute for Operations Research and the Management Sciences. She helped coordinate the chapter's Spring Research Symposium, which returned in April following a pause due to the COVID-19 pandemic.

At the national level, Combs is in her second year as the co-lead editor for *OR/MS Tomorrow*, the student-led magazine of INFORMS. During her tenure with the bi-annual publication, she has managed a diverse team of 15-20 students worldwide, awarded more than \$2,000 in prize money for student engagement competitions, and expanded the team by over 25%.

In early 2024, Combs was named an INFORMS Diversity, Equity and Inclusion Ambassador for championing a K-12



Contributed photographs

Kara Combs, right, poses with summer interns Arya Gadre, left, and Isaiah Christopherson, center, atop the Air Force Research Laboratory's radar towers in 2023. Combs, a doctoral student at the Air Force Institute of Technology and an associate computer engineer at AFRL, has been selected to receive the Women of Color in STEM Conference's Student Leadership Award – Graduate Level.

outreach project that introduced children from underrepresented backgrounds to operations research. Combs collaborated with her INFORMS Cincinnati-Dayton, Ohio, Chapter officers on the proposal that was selected by the highly competitive INFORMS DEI Ambassador program,

which had a selection rate of less than 45 percent for proposals submitted for 2024.

"Kara's passion, intellect and leadership potential are truly exceptional, and I am confident that she will continue to inspire others and effect positive change wherever her journey may take her," Badiru said.

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American industry has embraced it in the form of digital assistants, and people are using it to plan meals, rearrange their computer desktops, write emails, brainstorm, create graphics, summarize documents, write letters, and so much more.

Want to learn what AI can do for you in the classroom? Then join other teachers and educational professionals at TEACH for AV: AI Tools for Educators Conference, where current and future educators will explore innovative AI tools to enhance teaching practices.

Participants can discover how AI can support both teachers and students, improving learning outcomes and classroom experiences. This opportunity for educators to expand their knowledge, and network with like-minded professionals dedicated to advancing education through technology.

The conference is hosted by the Antelope Valley College's Teacher Accelerated Preparation Program (TAPP). TAPP's mission is to provide support to students who are interested in a career in education (teacher, teacher's aide, para-educator) and provide professional development for in-service teachers.

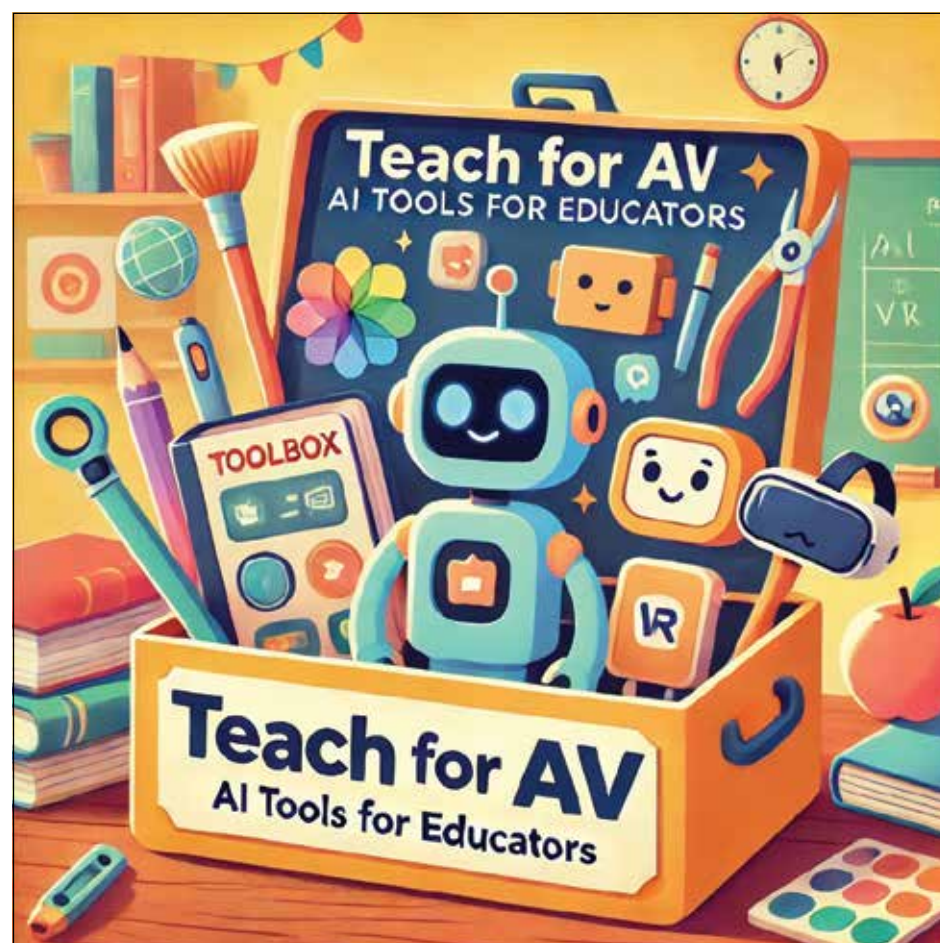
When: Saturday, Oct. 26

Time: 9 a.m. to 3 p.m.

Location: Meets on Zoom

Register now to save your spot: <https://forms.office.com/r/f4EidShVYE>

Questions? Email TAPP@avc.edu



RIGHT: This is the logo for TEACH for AV: AI TOOLS for Educators conference created by WALL-E AI program with alt-text by CHAT GPT "image featuring an open toolbox with AI tools like a virtual assistant, data analytics software, a chatbot, an automated grading tool, and a VR headset, all in a playful, cartoon-like style on a warm, cheerful background."

NASA beats the “summer slide”

From www.nasa.gov

Although many children are now going back to school, for some there still a few precious days of summer. Parents and educators often worry about the “summer slide,” the concept that students may lose academic ground while out of school. But summer doesn’t mean students’ imaginations have to stay grounded. If your children are already back, try some of these STEM activities on weekends as a family.

Are you hoping to slow the summer slide or simply to beat back boredom with some fun options that will also keep young minds active? **NASA’s Office of STEM Engagement** has pulled together this collection of hands-on activities and interesting resources to set students up for a stellar summer vacation. Read on for ways to keep students entertained and engaged, from learning about NASA’s exciting missions, to exploring the world, to making some out-of-this-world art and more.

Take NASA with you

Whether you’re whiling away the hours on a quiet summer day or setting out on a travel adventure, NASA offers fun resources for young explorers to learn while passing the time.

Prepare for air travel with the **Four Forces of Flight**, a set of four activities explaining the forces that make airplanes work, and **NASA’s Junior Pilot Program**, in which Orville the flying squirrel teaches youngsters about sustainable aviation that’s making airplanes safer and faster. Students can also learn about **NASA’s X-59 experimental aircraft**, which will fly faster than the speed of sound while reducing the sound of sonic booms to mere “sonic thumps,” and the whole family can sign up as virtual



Courtesy of NASA

Learn how to create a paper rocket that can be launched from a soda straw – then, modify the design to make the rocket fly farther!

passengers on NASA’s upcoming flights through the **NASA Flight Log**.

Traveling to somewhere new? Astronauts living and working in low Earth orbit take many photographs of Earth as it rotates. Explore the world using the **Explore Astronaut Photography** interactive map, or test geography knowledge through the “Where in the World” **Expedition I** and **Expedition II** interactive quizzes.

Of course, some kids prefer to kick back with a good book while on the couch, at the beach, in the backseat, or on a plane – and NASA is ready with reading material!

Kids aged 3 to 8 can learn about the Space Launch System (SLS) rocket that will return humans to the Moon with the “**Hooray for SLS**” children’s book and related activities. Students of all ages are invited to take their imaginations on a lunar adventure with fictional astronaut Callie Rodriguez through the **First Woman** graphic novel series.

Blast boredom with STEM crafts and creativity

Making, baking, coloring, or drawing – there are plenty of ways to keep kids’ artistic abilities engaged while learning.

Students can download and create their own Artemis illustrations through **Learn How to Draw Artemis**, featuring the SLS rocket and Orion spacecraft, and younger kids can learn the ABCs of human spaceflight with the **Commercial Crew A to Z Activity and Coloring Booklet**. Learn about the search for life in the universe while getting creative and colorful with **Astrobiology Coloring and Drawing Pages**.

If crafts are more appealing, create and launch a **soda-straw rocket** and use printable templates to build a model of the **Orion spacecraft** or the **Parker Solar Probe**. Kids can even **create a sundial** and use the Sun to tell time on a sunny day.

Finally, summer isn’t complete without a sweet treat, so bake some **sunspot cookies**. Real sunspots are not made of chocolate, but in this recipe, they are!

Hungry for more?

Don’t let the summer doldrums get you down. NASA STEM offers an entire universe of activities, resources, and opportunities for STEM fans at a variety of grade levels. Go to <https://stem.nasa.gov> to find resources for parents and educators.

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TPAA a contender in STEM competitions

By KC Rawley

Aerotech News Editor

There are many ways for students to measure success, and competing head-to-head with other schools with STEM programs is only one.

But it can be very satisfying.

The Palmdale Aerospace Academy, in Palmdale, Calif., has a thriving robotics program, and yearly sends a team of 15 students to compete in the regional Science Olympiad at Antelope Valley College.

The TPAA robotics team Griffingear 5012, took first place in the inaugural “For Inspiration and Recognition of Science and Technology,” or FIRST, competition held in the Antelope Valley. Griffingear and other high school programs are part of an international organization that promotes science education.

This year, Griffingear 5012’s robot won a “Best in Show,” trophy.

In February of 2024, the TPAA Science Olympiad team had an impressive performance at the Los Angeles County Regionals at AVC, where they competed against 30 other teams from Southern California.

Yvette Todd, who teaches anatomy, biology, and physiology at the school, is the coach of the Olympiad team along with Amanda Goff and Hilda Maya.

The team placed in the top 10 in 18 of the 23 total events and earned a medal in 12 events. Overall, the team earned third place at Regionals and earned a spot to compete at the state competition for the first time since 2017.

At the California Institute of Technology State Competition, a group of 15 students from TPAA competed against the top 32 teams from around Southern California. Their strongest performances were in Optics (10th), Tower



Photo by Allison Gatlin

(14th), and Forensics (16th). The 2023-2024 competition season was the most successful in the history of TPAA, according to Todd.

Todd said the team is always looking for mentors who can help their team perform better in all fields of STEM. Anyone who works in a STEM-related field is a likely candidate: doctors, nurses, mathematicians, scientists, engineers, and those who work in aerospace.

If you are interested in mentoring, please contact Yvette Todd at ystodd@tpaa.org or call the school office at 661-273-3680.

The Mission

The Palmdale Aerospace Academy states that their mission “utilizes an effective articulation between learning levels, TK [transitional kindergarten] to 12th grade, that creates an environment that inspires students to explore, expand and innovate ways to learn.”

“At all levels of learning, students are supported, encouraged,

and challenged to go beyond the borders of their current experience to develop talents and skills that they will use for the rest of their lives,” according to their website.

Their programs “emphasize the integration of science, technology, engineering, and mathematics and are influenced by the aerospace industry.” TPAA “will continue to evolve its programs thus improving the successes of students.”

The Vision

TPAA says that their vision is to “provide an environment for learning with purpose at all levels of learning, TK-12th grade, where students will be supported, encouraged, and challenged to develop the skills they will use for the rest of their lives.”

In U.S. News and World Report’s “Best High Schools Rankings,” TPAA earned an overall score of 80.72 out of 100, and 43% of students have taken an Advanced Placement test, with a “total minor-



Photo courtesy of TPAA

TOP LEFT: The 5012 Griffingear robot works at scoring points during the 2024 Aerospace Valley Regional robotics competition, in which 40 teams from California and beyond put their robot creations through their paces. The 5012 cheering section can be seen in the stands in their iconic burgundy and gold colors.

TOP RIGHT: Students in the Griffingear 5012 robotics team make adjustments to their robot at the 2024 FIRST robotics tournament.



Photo courtesy of TPAA

The Griffingear 5012 team shows off their 2024 “First in Show” Imagery Award from FIRST, complete with a “Golden Snitch.”

ity enrollment of 95%, and 55% of students are economically disadvantaged.”

According to their website, TPAA is a charter “school of choice, therefore any student going into grades TK to 12 may apply, regardless of the district school they are assigned to.”

The lottery application window opens on Dec. 1. The last day to submit applications for the 2025 lottery

will be the Wednesday before lottery day, the last Saturday in February. Applicants are given a code and can check the website in March to see if their child has won a space.

For information, access <https://www.tpaa.org/> and hit the “Apply” button.

Editor’s note: Please see companion stories on Robotics, page two, and the AVC Science Olympiad on page 18.



Photo courtesy of TPAA

Students from The Palmdale Aerospace Academy work on an event at the Science Olympiad at Antelope Valley College, under the watchful eye of a judge. All the judges and organizers of the event are volunteers.



Photo courtesy of TPAA

Students Randall DeLeon and Joshua Sosa from TPAA take their creation on a Robot Tour during the eponymous Science Olympiad event. In the timed event they had to build a robot and program it to complete the tour.



Photo courtesy of TPAA

Students in the Griffingear 5012 robotics team use a laptop to program their robot at the 2024 FIRST robotics tournament.



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3D Printer solves engineering challenges

By Lt. Zachary Anderson

U.S. Pacific Fleet

When the team of engineers from the Consortium for Advanced Manufacturing Research and Education (CAMRE) loaded their 3D hybrid-metal printer onboard USS *Somerset* as part of the experimentation sector of Exercise Rim of the Pacific 2024, they had no idea that they would soon be asked to solve a real-world engineering casualty.

Hours after being loaded on board, a critical component of the reverse osmosis pump, which generates clean water for the crew — an absolute necessity for ships spending long periods at sea — shattered.

“What we didn’t expect was that we would have the opportunity to directly help ship readiness so soon,” said Lt. Charles Wallace, a mechanical engineer from the Naval Postgraduate School, and one of the team members onboard. “Especially for something as mission essential as a reverse osmosis pump, where if you run out of water, you’re going to be coming home pretty quick.”

3D printing, or additive manufacturing (AM), has been a major area of interest for Department of Defense in recent years. In January 2021, DOD published its first-ever Additive Manufacturing Strategy to “provide a shared set of guiding principles and a framework for AM technology development and transition to support modernization and warfighter readiness,” across the military.

“For Trident Warrior, CAMRE organized the largest distributed advanced manufacturing demonstration the Department of Defense has ever conducted to date,” explains Lt. Col. Michael Radigan with the Marine Innovation Unit, and government lead on the CAMRE team. “This was accomplished by linking advanced manufacturing equipment, joint subject matter experts, and commercial partners to tackle real-life readiness solutions.”

The benefits of successfully implementing additive manufacturing on ships include saving time, money, space, and increasing overall warfighting readiness by allowing for repair and replacement of equipment in a contested environment. In the case of *Somerset*, had the reverse osmosis pump failed during their 6-month deployment, it would have reduced their ability to produce drinking water for the Sailors and Marines.

“If the crew had to rely on a replacement part without using additive manufacturing, it would have taken weeks or months,” said Staff Sgt. Jordan Blake, a member of the Marine Innovation Unit, and tasked with technical oversight of the project aboard ship. “With this technology, we’ll have the new component printed and ready for installation before the order for a replacement would be completed.”



Navy photograph by PO2 Evan Diaz

Hull Technician 3rd Class Mario Enriquez Sanchez cuts the baseplate of a 3D printed component aboard the San Antonio-class amphibious transport dock ship USS *Somerset* (LPD 25) during Exercise Rim of the Pacific (RIMPAC) 2024 while underway in the Pacific Ocean, July 15, 2024.

While 3D printing on Navy ships is still in its infancy, *Somerset* is not the first ship to utilize AM. In April 2024, the amphibious transport dock USS *San Diego* (LPD 22) piloted a liquid metal jetting additive manufacturing process fielded by the CAMRE team, operationally showcasing this novel technology’s capabilities at sea.

What makes the *Somerset* demonstration unique, is that the machine is a metal hybrid design, combining subtractive and additive manufacturing in one machine. Subtractive manufacturing is an umbrella term for the process by which solid blocks of material are shaped into the desired object via cutting, boring, drilling, and grinding. This is in contrast to additive manufacturing, which builds something by adding material one layer at a time — hence additive.

Oftentimes, constructing a replacement part involves both additive and subtractive manufacturing. Before they tested the model on *Somerset*, this meant alternating between different machines, however by combining the two processes it effectively streamlines the overall workflow.

“The benefit of a system like this is that

you’re able to computerize , send the code, then once you’ve printed something, it becomes replicable,” said Wallace when asked how the hybrid machine represents a step forward for the military.

Not only is 3D printing faster and safer than traditional machinery repair, but the replacement parts are often stronger as well. The weld is nearly as strong, or stronger, than the parent metal. AM is essentially building through welding, which means the replacement pump will potentially surpass the strength of the previous version.

The project builds upon a unique cross-sectional effort from DOD and industry partners to provide hands-on experience for military students. The printer test itself falls under the umbrella of CAMRE, which funded the project and sent four NPS students to study advanced manufacturing capabilities in an operational scenario. Two soldiers on the team operate the printer and three Marines operate the polymer printers which help augment the capabilities of the metal printer.

A project engineer and representative for the industrial printer’s parent company, is

also on hand to teach the *Somerset* crew to operate the printer independently. This includes a combined effort with ship’s company machinery repairmen, providing feedback and guidance to correctly build and fit the new component.

The intent of Trident Warrior and, more broadly, Fleet experimentation is to allow the Navy and its partners to incorporate real-world warfighter feedback early in the acquisition process by exposing the Fleet to emerging capabilities. Repairing the reverse osmosis pump on *Somerset* in an operational scenario demonstrates why operationalizing 3D printing capabilities remains a focus for many leaders in DOD.

3D printing will directly contribute to *Somerset* accomplishing something previously impossible — the creation, repair, and replacement of vital equipment at sea. While the Department of Defense may face various material readiness issues to come, there is no doubt that advanced manufacturing will be a part of future solutions. 3D printing opens new avenues to ensure the U.S. Navy can provide continuous security and stability from any place, at any time.

COMPETITION (from Page 4)

Society for Science (ages 15-18)

<https://www.societyforscience.org/iseif/>

The top winners were honored during two award ceremonies. In total, over \$9 million USD was awarded to the finalists based on their projects’ creativity, innovation and depth of scientific inquiry. The competition featured nearly 2,000 young

scientists representing 49 U.S. states and nearly 70 countries, regions and territories across the world.

Team America Rocketry Challenge

<https://rocketcontest.org/>

Registration for the 2025 American Rocketry Challenge is open.. This STEM competition invites middle and high school students to design, build, and launch model

rockets, providing hands-on experience in solving engineering problems. Registration will close on Dec. 1 or once 1,000 applications have been submitted.

USA Stockholm Junior Water Prize (ages 14-18)

<https://www.wef.org/SJWP>

The competition is open to all high school students in grades 9-12 who have

reached the age of 15 by August 1 of the competition year, and have conducted a water-science research project. State winners are sent to the in-person national competition in June. The U.S. SJWP winner receives a cash prize of \$10,000, a crystal trophy, and represents the U.S. at the international competition each August at held at World Water Week in Sweden.

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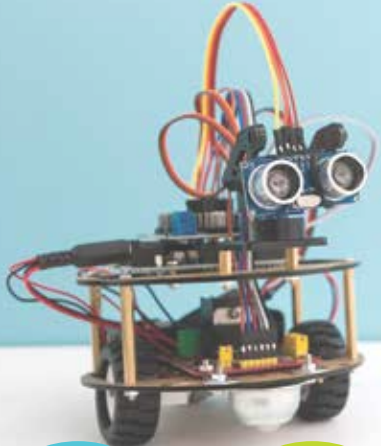




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AVC hosts 2024 Science Olympiad

By KC Rawley

Aerotech News editor

Antelope Valley College has positioned itself as a pathway to aerospace industry employment. They offer an Aerospace, Industrial Arts and Applied Technologies field of study, and in 2016 added a bachelor's program in Airframe Manufacturing Technology, specifically designed for the needs of local aerospace industry employees.

A Bachelor of Science degree in computer science is in the planning stages through the California State University Bakersfield AV Campus.

They even have the Undergraduate Research Center, mostly for the hard sciences, that connects students with mentors, internships, research opportunities, and coaches them in scholastic writing. Some of the students graduate or transfer from AVC having already published peer-reviewed scholarly articles, according to Dr. Zia Nasani, the center's coordinator.

So, it makes perfect sense that since 2013, AVC's campus has hosted the Southern California Regional Science Olympiad. The first AV Regional Science Olympiad at Antelope Valley College took place March 16, 2013, with 20 middle school teams competing.

The Science Olympiad is a national all-volunteer non-profit organization that allows schools from elementary through high school to compete in events that test their reasoning skills, scientific knowledge, ingenuity, and dexterity.

In 2024 there were events such as Robot Tour, where students had to build a robot and program it to execute certain maneuvers, all while being timed.

In the Scrambler event, teams "design, build, and test a mechanical device, which uses energy from a falling mass to transport an egg along a track as quickly as possible and stop as close to the center of a Terminal Barrier without breaking the egg," according to the SO website.

Other events have names like Tower (building one), Meteorology, Fossils, Optics (lasers), Potions & Poisons, Air Trajectory, Disease Detectives, Reach for the Stars, Microbe Mission, Crime Busters, and Road Scholar.

The volunteers are mostly college students and professors at AVC, according to Ryan Wong, the Los Angeles Regional Director.

Many of the volunteers are also past participants, like Wong, an undergraduate at University of California at Los Angeles majoring in computation and systems biology, a STEM field he says is "up and coming."

"We love to have the competition at AVC because the local schools are very passionate about science education, and we want to spread information about science to that area."

In 2023, Quartz Hill High School's team made it to the state competition. They scored in fifth place overall, and in the Top Ten in eight of the 23 events.

In the 2024 Regional Science Olympiad, Antelope Valley schools scored as follows:

Division A (elementary school) Five of the six top schools were from Palmdale, Calif.:



Courtesy photos

Randall DeLeon and Joshua Sosa from The Palmdale Aerospace Academy huddle over a computer at the 2024 Science Olympiad at Antelope Valley College while a judge times them. The event Robot Tour, tasked them with building a robot and putting it through a particular routine with a time limit.



Two participants from The Palmdale Aerospace Academy work on the Tower event at the 2024 Science Olympiad at Antelope Valley College, where they must build it to specific requirements.

the number one school was Horace Mann Elementary from Beverly Hills, and in descending order were Los Amigos School, Golden Poppy Elementary, Tamarisk Elementary, Palmdale Learning Plaza, and Manzanita Elementary.

Division B (middle school) Two schools in the Top 20 were from the outer edges of the Antelope Valley: Ridgecrest Intermediate (11th), Gorman Learning Plaza (13th), and the Palmdale Learning Plaza came in 14th.

Division A (high school) The top three schools in this division go to the State Sci-

ence Olympiad at California Institute of Technology in Pasadena, Calif. This year, the Palmdale Aerospace Academy came in third and competed at CalTech.

At the Cal Tech state competition, 15 students from TPAAC competed against the top 32 teams from around Southern California. Their strongest performances were in Optics (10th), Tower (14th), and Forensics (16th). The 2023-2024 competition season was the most successful in the history of TPAAC, according to Yvette Todd, one of the team's coaches.



Diego Ochoa and Jayden Escobedo of The Palmdale Aerospace Academy competed in the Air Trajectory event where students design and build a device to launch a ball using a falling mass.



The Palmdale Aerospace Academy's banner for the 2024 Science Olympiad at Antelope Valley College. The team came in third in Regionals and went on to the next level of competition at California Institute of Technology.

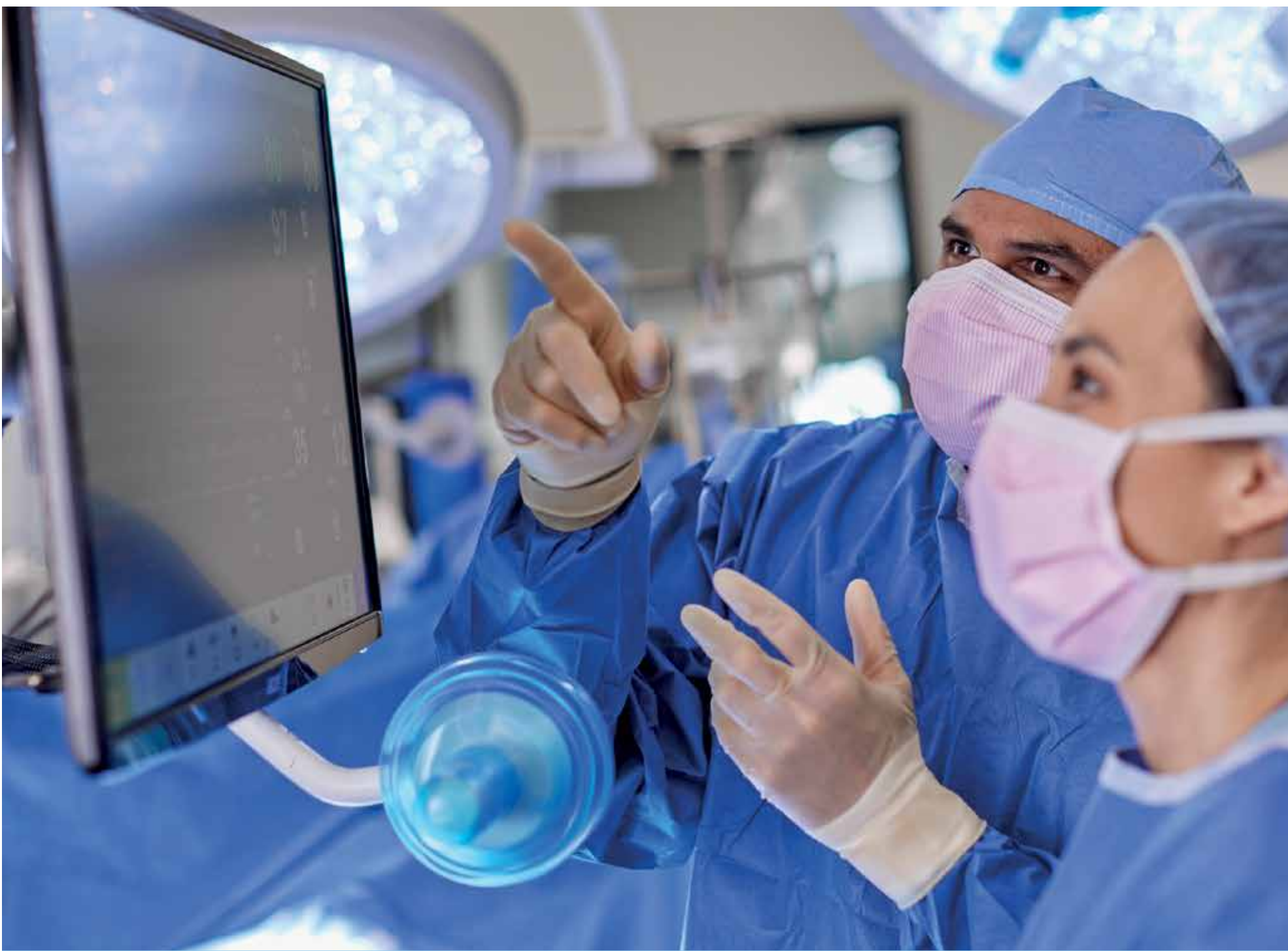
Contestants in Division C (high school) are 15 or fewer on a school team, and there are 23 events to cover. Because of this, it behooves a team to recruit members with a wide variety of interests and knowledge. A team can forgo an event if they really can't cover it, but they will lose points on their overall score.

Todd said that some of the events are a hard sell. While many events are active, like building robots, towers, using lasers, or solving a crime from evidence, others are just taking a test. She calls those "orphan events."

The yearly process is to go to the SO website, peruse the events, and start dividing them up, or recruiting fellow students who may be interested or knowledgeable in certain subjects.

Some of the Science Olympiad sponsors are The Aerospace Company, Northrop Grumman, CalTech and the Southern California Gas Company.

To volunteer for the 2025 Regional Science Olympiad at AVC, contact Ryan Wong at director@socalscioly.org. For information on the 2025 events, or organizing a team at your school, go to <https://www.soinc.org/events/2025-division-c-events>.



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dic surgeons, who can earn \$275,500 per year.

Third is New York, with an average annual salary of \$114,437. Neurologists, anesthesiologists, and cardiologists have the biggest paychecks, with \$285,500, \$275,000, and \$264,000, respectively.

Further down on the list, Nevada ranks fourth with an average salary of \$111,767 annually.

Maryland rounds up the top five, with an average salary of \$110,226.

Massachusetts, Idaho, Hawaii, Colorado and Connecticut rank sixth to tenth, with average salaries ranging from \$109,807 to \$107,625.

Yafees Sarwar, Director of Marketing at CYTENA, commented on the findings. "STEM professions are widely renowned for being highly remunerative positions. However, individuals who dream of pursuing them must go through many years of studies and various career steps before reaching their goals, often including a dream salary that can provide for a comfortable lifestyle.

"This dataset shows in which states working within certain professions is the most advantageous, providing suggestions to whoever dreams of said goals of where to pursue these careers."



NASA photograph

Engineers in a clean room at NASA's Jet Propulsion Laboratory in Pasadena, Calif., April 2023 examine the imaging spectrometer that will ride aboard the first of two satellites to be launched by the Carbon Mapper Coalition. The instrument will help researchers detect emissions of carbon dioxide and methane from sources on Earth's surface from space. A new report says that workers employed in STEM fields make more money in California than any other state.

Girls from North Carolina build award-winning robot

By David Vergun

DOD News

Four girls from North Carolina — along with the large robot they built — visited the Pentagon in January to brief European participants of the State Department's International Visitor Leadership Program on increasing inclusivity in Science, Technology, Engineering, Arts, and Mathematics, or STEAM.

G-Force Robotics is a 12-member, all-girl team that was named Rookie All Star winners at the 2023 FIRST Robotics Competition world championship in Houston. Nearly 3,500 high school teams from all over the world competed, with 620 advancing to the world championship.

G-Force Robotics is one of 1,185 robotics teams sponsored by the Defense Department and industry, located throughout the world. More than 86,000 students in grades K-12 compete and only 2 percent of teams are all-female.

"The G-Force team's mission is to inspire and encourage girls' participation at all levels in science, technology, engineering and math and help guide them on their career pathways — be that with DOD, other U.S. government agencies, industry or whatever else they choose," said Air Force Lt. Col. Shannon Mann, the team's coach.

Mann said the girls have achieved amazing success in a short period of time. "A little over a year ago, these girls didn't know how to use power tools, code in Java or build robots. Working as a team, they built their winning robot in about eight weeks for a competition. Twenty years from now, these girls could be going to Mars. They can be the leaders that will deter our next global enemy," she said.

In addition to building the winning robot, Mann said the team collectively logged 3,200 hours of volunteer service that mostly focused on STEM outreach in their communities.

During the team's discussion with the IVLP participants, they shared details of their outreach programs, including a book donation and reading program for elementary school students — a partnership with their local libraries and STEM classes for middle school girls; and a career-oriented



Air Force photo by Tech. Sgt. Jack Sanders

Members of G-Force Robotics, a Defense Department-sponsored all girl's robotics team, operate their robot at the Pentagon, Jan. 23, 2024.

breakfast for high school girls with female, STEM-industry leaders.

The girls also shared G-Force Robotics' experiences, a DOD-affiliated exhibitor at the Fall STEAM Expo at Charlotte Motor Speedway in Charlotte, N.C. STEAM stands for science, technology, engineering, arts and math, with arts referring to fine arts which drives creativity and innovation.

Beyond being sponsored by the department's STEM professionals, dubbed DOD STEM, the team has a robust relationship with Seymour Johnson Air Force Base and

the 4th Fighter Wing in North Carolina. At the base, the team has hosted two "Aviation & Robotics Day" events for about 300 participants; participated in a large Project Quesada event with 600 students in 2022; and helped organize and host the first STEM Hangar at the Wings Over Wayne Air Show in May for 62,000 attendees.

While at Seymour Johnson, the girls met female pilots and other aviators and STEM-focused airmen who discussed what they do and opportunities in the Air Force and the other services.

IVLP participants had many questions for the G-Force team members. Neda Zutautaitė, executive director of the nongovernmental organization Knowledge Economy Forum in Vilnius, Lithuania, asked the girls what sparked their interest in joining the robotics team.

Claire Fendrick, a 10th grader who's been in robotics for two years, said that she once read about a girl who wanted to be an astronaut.

Fendrick said that got her thinking about the many opportunities for "really cool" jobs. "Then, when I saw online about an all-girls robotics team forming, I just decided, 'Hey, I'm gonna' try it.' I tried it and loved it. And I've learned so much."

Sloan Mann, a 10th grader who has been in robotics for six years, said she initially joined a middle school robotics team where she was the only girl, but she got pushed aside from building and coding to make posters and prepare judging material. So she started an all-girl robotics team where she could increase her technical skills and help other girls with theirs, too.

Yelizaveta Korenko, the leader of STEM is FEM — a nongovernmental organization that arranges programs to inspire young women in STEM fields in Ukraine — asked the team if they ever tried to reach out to other girls to join them.

Fendrick said, "I talked with friends. Everybody's like, 'Oh, that's so cool.' And then the second thing they say is, 'I could never do that.'"

"We need to show girls that they are capable of doing anything," she added.

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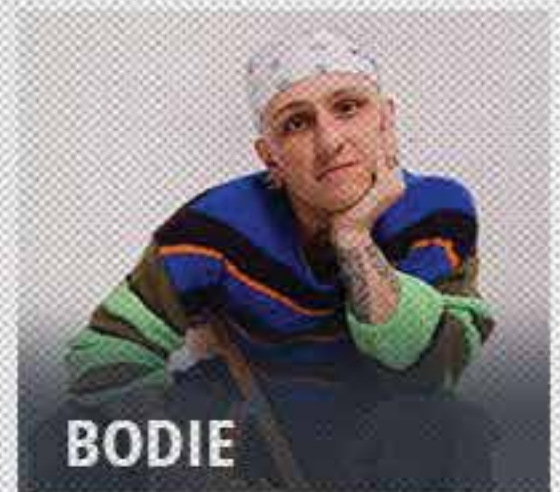
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