

REGENERON

**SCIENCE
TALENT SEARCH**

A program of
SOCIETY FOR SCIENCE
Since 1942

**REGENERON SCIENCE
TALENT SEARCH
2025 FINALISTS**



2025 FINALISTS

The Regeneron Science Talent Search (Regeneron STS), a program of Society for Science, is the nation's oldest and most prestigious science and math competition for high school seniors. Alumni of STS have made extraordinary contributions to science and hold more than 100 of the world's most distinguished science and math honors, including the Nobel Prize and the National Medal of Science. Each year, 300 Regeneron STS scholars and their schools are recognized. From that select pool of scholars, 40 student finalists are invited to participate in final judging, display their work to the public, meet with notable scientists and compete for awards, including the top award of \$250,000.

REGENERON SCIENCE TALENT SEARCH 2025

MARCH 6–12, 2025

The 40 finalists of the Regeneron Science Talent Search 2025, a program of Society for Science, were selected based on the scientific rigor and world-changing potential of their research projects. These students are invited to attend the Regeneron Science Talent Institute, where they will compete for \$1.8 million in awards.

The 40 finalists come from 39 schools in 16 states. Finalists were selected from 2,471 entrants, representing 795 high schools in 48 states, American Samoa, Guam, Washington, D.C., Puerto Rico and 14 other countries. US citizens living abroad are eligible to apply.

Unique among high school competitions in the U.S. and globally, the Regeneron Science Talent Search focuses on identifying the next generation of scientists and engineers who will provide critical leadership in solving some of the world’s most pressing challenges while shaping the future of research and development for our nation and the world.

Many projects are the product of a research environment in which scientist mentors and teachers dedicate themselves to the intellectual development and technical training of students who participate in the Regeneron STS. The Regeneron STS 2025 finalists, Regeneron and Society for Science acknowledge with gratitude the guidance, expertise and patience of the experienced researchers who made many of these projects possible.

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HISTORY

The Science Talent Search (STS), a program of Society for Science since its launch in 1942, is the nation's oldest and most highly regarded science competition for high school seniors. The Regeneron STS provides an incentive and a forum for U.S. high school seniors to complete an original research project and to be recognized by a national jury of accomplished professional scientists, mathematicians and engineers.

Regeneron became only the third sponsor of the Science Talent Search, following previous sponsors Westinghouse and Intel. As part of its ten-year, \$100 million commitment, Regeneron significantly increased awards to better reward the nation's brightest young scientists and encourage their continued pursuit of scientific innovation. In total, this year's finalists will receive over \$1.8 million in awards provided by Regeneron, and overall, Regeneron will distribute \$3.1 million in awards to the Regeneron Science Talent Search 2025 finalists, scholars and their schools.

The projects are a result of inquiry-based learning methods designed to nurture critical reasoning skills, where the students experience research through the use of the scientific method and demonstrate how math and science skills are crucial to making sense of today's technological world. Historically, the top 300 applications are identified from a pool of entrants; 40 finalists are then selected from this prestigious group.

Since 1942, the STS has recognized 25,111 finalists and scholars who have received more than \$37 million in awards as they launch their college careers. Many STS participants have gone on to distinguished careers; alumni of the STS include more than 100 recipients of the world's most distinguished science and math honors, including the Nobel Prize, National Medal of Science, Fields Medal, MacArthur Foundation Fellowship and Breakthrough Prize.



THE PROCESS

Students submit an extensive application demonstrating their creativity, leadership and passion for STEM. This application includes a written report of their scientific research and supporting documentation from schools, advisors and mentors. A team of scientific evaluators and judges review applications and select 300 scholars and 40 finalists from the entrant pool.

The top 40 finalists participate in a finals week competition held in Washington, D.C. Finalists meet leading scientists and distinguished national leaders and visit institutions of historic and political importance. Finalists will display their research to the public on March 9. Many of those studying the exhibits are highly motivated younger students who aspire to enter the Regeneron Science Talent Search in their senior year of high school.

AWARDS

Finalists will compete for more than \$1.8 million in top awards – more than half of the Regeneron STS total annual award distribution of \$3.1 million. The top ten awards range from \$40,000 to \$250,000 for the first place winner. Winners are selected by the judging committee and announced at a formal awards gala on March 11.

Each of the 300 students named a scholar in the Regeneron STS 2025 receives a \$2,000 award for their outstanding science research, in addition to any amount that a student may win if selected as a finalist.

Each of their schools receive an award of \$2,000 for each scholar named in the Regeneron STS 2025. The award is used to advance excellence in science, math and/or engineering education at the recipient school.

2025 FINALISTS



Laasya Acharya She/Her/Hers

William Mason High School
OHIO

Laasya Acharya, 17, of **Mason**, developed an unmanned aerial vehicle (UAV) to detect crop disease on a large scale for her Regeneron Science Talent Search **computer science** project. Every year, one in 11 people around the globe struggle with a lack of proper nutrition. Meanwhile, around 30% of food loss worldwide happens during the production and harvest stages. A major reason is the absence of efficient and affordable ways to detect disease. In her project, Laasya built and programmed a UAV to detect crop disease on farms. Her UAV has a camera, a display and an onboard computer with an AI multimodal neural network. She worked with farmers, professors and universities to collect data to train the neural network. The AI analyzes aerial and close-up images and videos of the fields, providing a diagnosis on the spot. Her final prototype had a testing accuracy of 87%. Laasya, the child of Rajeshkumar and Reema Acharya, attends **William Mason High School**, where she is captain of the science fair team. She also founded The Ceres Organization, which raises awareness about food insecurity. Laasya volunteers as a tutor and with her local Science Discovery Camp.



Vidya Ambati

Albemarle High School She/Her/Hers
VIRGINIA

Vidya Ambati, 17, of **Charlottesville**, found a new receptor for the drug haloperidol (Haldol) for her Regeneron Science Talent Search **biochemistry** project. Vidya believes this receptor may be why the drug is linked to a lower risk of inflammatory arthritis, a discovery she made by analyzing health insurance databases. Gout and rheumatoid arthritis are two common causes of joint pain and stiffness. They affect tens of millions of people worldwide, including Vidya's grandmother. Her struggles with arthritis prompted Vidya to find new ways to treat or prevent it. For her project, Vidya studied how cellular proteins interact with haloperidol. She found that it blocks the inflammatory process by binding to the receptor LAMTOR1. It was previously unknown that LAMTOR1 was a receptor for haloperidol — its first new receptor for this drug found in decades. Her discoveries could unlock a new approach to treating these diseases. Vidya, the child of Jayakrishna and Kameshwari Ambati, attends **Albemarle High School**. She founded and leads the Speak to a Scientist Hero program, linking students to inspiring role models in STEM. Vidya is also a co-inventor on several patents for her findings and is a self-taught artist.



Prisha Prakash Bhat She/Her/Hers

Plano East Senior High School
TEXAS

Prisha Prakash Bhat, 17, of **Richardson**, analyzed how increasing gene activity affected drought and arsenic resistance in rice for her Regeneron Science Talent Search **plant sciences** project. Rice is a staple crop worldwide but may contain arsenic from polluted soil. It is susceptible to drought, which can reduce crop yield and may raise arsenic levels. While visiting her sick grandmother in India, Prisha learned the cause of her illness — arsenic poisoning from rice. Once home, Prisha flew into action, spending years studying ways to reduce arsenic levels in rice. She modified rice plants to boost three genes: drought-resistance *OsPIP2;2* and arsenic-resistance *OsNIP2;1* and *OsNIP3;2*. Testing showed that her modified plants trapped arsenic in their roots, reducing levels in the soil and rice grains. She sees this as a sustainable way to make rice more resistant to drought and arsenic, improving health and possibly crop yield. Prisha, the child of Prakash and Shubha Bhat, attends **Plano East Senior High School**, where she is president of the Learning About Science and Engineering Research club. She is also captain and mentor on the debate and speech team. In 2024, Prisha was one of 100 Coolidge Senators who attended a summit on policy and business.



Jolene Cao

Smithtown High School East She/Her/Hers
NEW YORK

Jolene Cao, 17, of **Saint James**, designed a magnetically responsive perovskite quantum dot (PQD) nanomaterial for her Regeneron Science Talent Search **materials science** project. PQDs are tiny crystals that glow when exposed to energy. They have unique optical and electrical properties that make them useful for applications like bioimaging, anti-counterfeiting, encryption and quantum communication. However, they degrade quickly, making commercial fabrication difficult. In her project, Jolene figured out how to make stable cesium lead halide PQDs. She stabilized the PQDs by encasing them in a polymer shell with a magnetic iron oxide rod to make them magnetic. The shell increased stability 53-fold compared to free PQDs. Under a magnetic field, her PQDs assembled, giving off different types of polarized light depending on their structure. With optimization, this material could be used for the next generation of optoelectronic materials. Jolene, the child of Yifang Cao and Le Yan, attends **Smithtown High School East**, where she founded the school's first ChemClub. She is president of several STEM clubs and plays the harp at the Metropolitan Youth Orchestra of New York.

2025 FINALISTS



Ishana Chadha She/Her/Hers

Commack High School
NEW YORK

Ishana Chadha, 17, of **Commack**, researched the genetic factors behind brain cell migration for her Regeneron Science Talent Search **neuroscience** project. As the brain develops, neurons move around, some guided by the *OPHN1* gene. Ishana knew that a genetic change in *OPHN1* can cause problems with brain cell migration, leading to epilepsy or other disorders. She studied the proteins inside brain cells to find another gene, *PACSIN2*, that might play a role. Ishana then looked at how brain cells move in mice with lower levels of *PACSIN2*. In these mice, Ishana found that brain cells called pyramidal neurons didn't migrate normally. She concluded that *PACSIN2* is necessary for healthy *OPHN1* function. She believes her findings improve knowledge of brain development and could one day help treat or prevent health issues like epilepsy. Ishana, the daughter of Manish and Munisha Chadha, attends **Commack High School**. She founded the school's debate club and competes in the Long Island Forensics Association, where she has won individual and team awards. She channels her passion for the arts into bharatanatyam, a style of classical Indian dance. She also creates and organizes K-12 STEAM projects for the nonprofit Bake Back America.



Ava Grace Cummings She/Her/Hers

North Carolina School of Science and Mathematics
NORTH CAROLINA

Ava Grace Cummings, 18, of **Smithfield**, developed a model of *STAC3* disorder in fruit flies to test treatments for her Regeneron Science Talent Search **medicine and health** project. *STAC3* disorder is a rare genetic muscular condition formerly called Native American myopathy. Seeing her friends and family in the Lumbee Tribe struggle with it, Ava felt driven to raise awareness about the disease and the need for new treatments. She successfully created a strain of fruit fly that doesn't express the *DSTAC* gene, mimicking the disorder. Then, she tested the experimental drug Tirasemtiv and an herbal extract of the common nettle (*Urtica dioica*) in her flies. She found that treatment with both the drug and herb, as well as the herb alone, led to adult flies that climbed better and larvae that traveled further. Ava believes that Indigenous remedies are worth studying to treat muscle weakness. Ava, the child of Jason and Synora Cummings, attends the **North Carolina School of Science and Mathematics** (Durham). Ava is president and founder of her school's Natives Rising chapter. As a member of the Lumbee and Coharie tribes, she is passionate about her Native American roots. She also plays piano, is a member of her school soccer team and is a resident life advisor.



Lena Zewdu Feleke She/Her/Hers

Martin Luther King Jr. Magnet High School
TENNESSEE

Lena Zewdu Feleke, 17, of **Antioch**, explored how to deliver genetic therapy to kidney cells for her Regeneron Science Talent Search **cellular and molecular biology** project. She focused on cystinuria, which causes kidney stones due to excess cystine in the urine. Lena knew broken *SLC3A1* genes cause Type A cystinuria and designed a gene therapy to fix it. Using a viral vector, she delivered a working gene to the kidney cells.

The small, single-stranded DNA vector held the correct *SLC3A1* gene and small snippets of DNA that acted as instructions for when and how much to express the gene. She tested multiple variations of these instructions and saw that the DNA entered the cells but didn't increase the protein above control levels. Lena was inspired to take on this project after witnessing her uncle's struggle with kidney disease. Her work is a step forward in kidney cell gene therapy. Lena, the child of Zewdu Feleke and Amy Abebe, attends **Martin Luther King Jr. High School** (Nashville). She does research at the School for Science and Math at Vanderbilt. Lena was both an intern and a mentor in the Yale Center for Clinical Investigation's Exposures program. She volunteers at her local Ethiopian Community Association in Nashville and speaks fluent Amharic.



Finán Gammell He/Him/His

East Greenwich High School
RHODE ISLAND

Finán Gammell, 17, of **East Greenwich**, created a statistical computer model to find genes linked to cancer progression for his Regeneron Science Talent Search **computational biology and bioinformatics** project. Diseases like cancer are far from one-size-fits-all. Finán knew that studies have found that cancer and other diseases manifest differently based on many factors. To study how gene activity may affect

disease progression, he ran publicly available cancer patient data through his model, THRESHOLD. The model looked for statistically significant patterns in gene activity in patients grouped by cancer type, age, sex and stage. Finán found patterns of gene activity linked to cancer getting worse, coming back or spreading. He believes that his computer model can help find target genes to aid in drug development. His model may also be useful for other diseases. Finán, the son of Elaine and Patrick Gammell, attends **East Greenwich High School**, where he is a leader in several STEM clubs, student body president, captain of the varsity swim team and even an amateur barber. Additionally, he was the youngest Data for Internship Program Supervisor at the Providence Public Library.

2025 FINALISTS



Yurai Gutierrez Morales She/Her/Hers

Princeton High School
NEW JERSEY

Yurai Gutierrez Morales, 20, of **Princeton**, studied vegetarian jumping spiders for her Regeneron Science Talent Search **animal sciences** project. While most spiders eat insects, these jumping spiders get 90% of their diet from plants. They sometimes eat ant larvae. In her project, Yurai studied a possible way these jumping spiders became vegetarian. She collected spiders and ant larvae from Akumal, Mexico.

Next, she identified the different types of bacteria in these samples based on their DNA sequences. She found one bacterial species in both the ant larvae and the spider. This finding hints at the possibility that the bacterium transferred from the larvae to the spiders when the spiders ate them. The bacterium helps ants digest plant material, so it may also help the spiders digest plants. Her work can help better understand how these plant-eating spiders evolved. Yurai, sister of Gabrel Gutierrez, attends **Princeton High School**, where she helped build a demonstration garden in the school's courtyard to showcase sustainable agricultural practices. She is an assistant for the high school's research program, maintaining living organisms and equipment. While in Akumal for her project, she also studied sea turtle nesting activity.



Melody Heeju Hong She/Her/Hers

General Douglas MacArthur High School
NEW YORK

Melody Heeju Hong, 17, of **Wantagh**, developed a powerful, flexible statistical model for her Regeneron Science Talent Search **computational biology and bioinformatics** project. Her model analyzes sites in the human genome called trans-methylation quantitative trait loci (*trans*-mQTL). Changes at these sites can help explain patterns in DNA methylation, which can change gene expression. In her project, Melody

created a model for mapping *trans*-mQTL. She wrote the code for the model herself. Her work could improve understanding of how genetics and the environment are related to complex diseases and aging. Melody, child of Nakgyong Hong and Daeyoung Hong, attends **General Douglas MacArthur High School** (Levittown). She created a zine about flora in her homeland, South Korea, and is passionate about inter-Korean relations. She walked the demilitarized zone during a peacemaking pilgrimage. Melody is the principal cellist for her high school and the New York Laureate Youth Orchestra. She performed in a benefit concert, raising money to help local immigrant families. She is a leader in her school's Science Olympiad club and helps supervise online tournaments.



Jiwu Jang He/Him/His

Lexington High School
MASSACHUSETTS

Jiwu Jang, 18, of **Lexington**, answered a key open question about symmetry for his Regeneron Science Talent Search **mathematics** project. He studied geometric objects called type D quiver varieties. These spaces encode information about relationships between things like particles. They often appear in physics (string theory) and math (representation theory). In his project, Jiwu discovered formulas for type D quiver varieties, found a pattern in them and proved that it universally holds for these objects. Jiwu's work advances the fields of math and physics, as it could improve understanding of how 3D mirror symmetry holds for more general objects, which is only conjectural as of now. Jiwu, child of Soyoung Lee and Suyoung Jang, attends **Lexington High School**. He spends his spare time reading about advanced math subjects like algebraic geometry. He is the creator and developer of pryst, a computer programming language. He has also worked as a software developer at the robotics startup Dogu in Korea. Jiwu has spent more than 500 hours mastering the art of blindfolded tea tasting. While living in Korea, he played on a varsity high school lacrosse team and won two national titles. He also sings tenor and baritone in the choir in languages such as Basque, German, French and Italian.

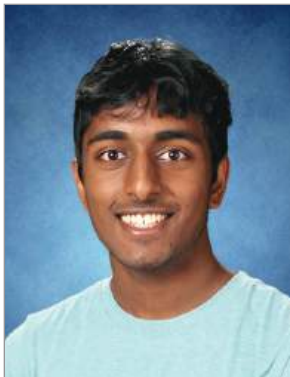


Vishwum Kapadia He/Him/His

University School
OHIO

Vishwum Kapadia, 17, of **Orange**, studied how to improve the success of a heart valve repair procedure for his Regeneron Science Talent Search **medicine and health** project. Problems with the heart's mitral valve can cause blood to leak backward. A procedure called mitral transcatheter edge-to-edge repair (M-TEER) can help. In M-TEER, doctors use a clip to fix the valve, but positioning the clip is a challenge. In his project, Vishwum explored whether the dicrotic notch index (DNI), a measure of blood flow in the heart, is related to the success of M-TEER. In 145 patients who had M-TEER at Cleveland Clinic, Vishwum found that higher DNI was linked to procedure success. Patients with a DNI increase of at least 2.71% had fewer hospitalizations and deaths. He believes that DNI is a sign that clips are positioned correctly, and that tracking DNI during M-TEER procedures could help doctors. He published his findings in the *Structural Heart* journal. Vishwum, the child of Samir and Manasvee Kapadia, attends **University School** (Hunting Valley), where he is head prefect. He also co-leads the Spanish honor society and the varsity tennis team. Vishwum co-founded IntersectSTEM, a nonprofit that mentors refugee and international students in the Cleveland area.

2025 FINALISTS



Hrithik Ketineni He/Him/His

Westview High School
OREGON

Hrithik Ketineni, 17, of **Portland**, created a quantum search algorithm for his Regeneron Science Talent Search **computer science** project. New computing paradigms like optical and quantum computing have very complex circuits that consist of reversible logic gates. In his project, Hrithik found a way to efficiently optimize reversible circuits for both quantum and classical technologies. These optimizations are essential to building the next generation of computers. Hrithik, the son of Hrushi and Usha Ketineni, attends **Westview High School**. He once led his junior physics class in a three-week engineering project during which they built an 8-bit computer from scratch. Today, he helps his former physics teacher as a teacher's assistant for first-year physics. Hrithik also founded the Future of Science and Engineering club to support his fellow students as they work on science research projects. In 2024, Hrithik and two friends created an interactive computer game to teach logic synthesis. He enjoys cooking — his specialty is a Cantonese stir-fry technique.



Rania Sophia Lateef She/Her/Hers

The Governor's School @ Innovation Park
VIRGINIA

Rania Lateef, 17, of **Manassas**, studied circadian dysfunction and sleep disruption in fruit flies for her Regeneron Science Talent Search **animal sciences** project. In humans, circadian rhythm can affect digestive health, memory, mood and more. Long-term artificial light and screen exposure can disrupt sleep cycles. Rania tested how sleep and circadian rhythm disruptions affect physical and mental health.

In her project, Rania disturbed fruit flies' circadian rhythms by exposing them to light and shaking each hour for two days. She found that sleep and circadian disruptions worsened the flies' moods and behaviors. Then, she looked at the effects of eight- or 12-hour blue light exposure, finding that it harmed lifespan, memory, addictive behavior and intestinal health. Flies exposed to blue light for longer fared worse. Rania, the child of Tara and Babur Lateef, attends **The Governor's School @ Innovation Park**. She is the founder and president of Maternal and Child Health Upliftment and Progress. This organization supports the reproductive health of women and promotes gender equality. Rania also studied the sense of smell and its effects on physical and mental health as an intern at the National Institute of Mental Health.



Allison Lee She/Her/Hers

East Brunswick High School
NEW JERSEY

Allison Lee, 17, of **East Brunswick**, developed a convolutional neural network (CNN) to search space for galactic collisions for her Regeneron Science Talent Search **space science** project. Cosmologists rely on vast troves of galaxy images to study the universe. Processing and correcting data at that scale is a mathematical challenge. In her project, Allison found a bias in the datasets that cosmologists typically use. So, she created a CNN called MergeFinder to correct that bias. Allison trained MergeFinder on simulations of galaxies merging and invented a new machine-learning technique to sort galactic data more efficiently. Her technique, called sequential classification, uses key features to sort data into categories and subcategories before recombining it for a final classification round. When used on the flawed datasets, MergeFinder found 2,208 new potential merger sites. These sites could give us clues about the large-scale structure of the universe and its origins. Allison is the child of Eileen Liang and Yi-Horng Lee. She attends **East Brunswick High School**, where she produces and records the school's daily announcements for the video newsmakers club. Allison also responds to local medical emergencies as part of the all-volunteer Milltown Rescue Squad.



Chloe Yehwon Lee She/Her/Hers

Plano East Senior High School
TEXAS

Chloe Yehwon Lee, 17, of **Murphy**, explored a way to lower the toxic effects of acetaminophen (Tylenol) on the liver for her Regeneron Science Talent Search **chemistry** project. The painkiller is used by over 60 million Americans each week, but it is also the leading cause of acute liver failure in the United States and the second most common cause of liver transplant worldwide. Chloe studied chemical changes to the acetaminophen molecule's benzene ring to see if they could reduce liver toxicity. She developed computer models of the modified molecules to test their ability to relieve pain and toxic effects. She found and synthesized a modified acetaminophen molecule that may be less toxic and may even kill pain better than the original. Her new molecule could be a first step in creating safer and more effective forms of acetaminophen. Chloe is the child of Jiyong Lee and Eul Hyun Suh. At **Plano East Senior High School**, she is president of the school's orchestra program and first violinist in the Greater Dallas Youth Orchestra. She is also president of Ensembles for Elderly, which plays at assisted living and memory care centers and works with people with Alzheimer's. She is the founder and president of her school's Girls in STEM club.

2025 FINALISTS



Logan Lee He/Him/His

‘Iolani School
HAWAII

Logan Lee, 18, of **Honolulu**, studied how to better control mosquito populations for his Regeneron Science Talent Search **animal sciences** project. More than 30 native Hawaiian birds are extinct because of avian malaria from invasive mosquitoes. Currently, mosquito populations are controlled by releasing reproductively incompatible males into the wild. When they mate, the wild females lay eggs that don't hatch. This lowers the mosquito population, but reproductively incompatible males often struggle to survive in the wild. In his project, Logan improved their survival by inoculating them with wild mosquito bacteria. Wild mosquitoes have important bacteria that benefit their health and development. His bacterial transplant helped the sterile males grow faster and survive better in the cold. Logan, the child of Jan and Justin Lee, attends **‘Iolani School**, where he is president of the school's Surfrider Club. In the 2023–2024 school year, the club cleaned up 2,000 pounds of trash from shorelines. Logan is also the co-outreach director of the Hawaii Youth Climate Coalition, which advocates the youth perspective on climate change. He also mentors youth in rowing at Ikaika Hawaii Watermans Academy and the Honolulu Rowing Club. Logan makes lei, a traditional Hawaiian flower adornment, with his grandmother.



Benjamin Li He/Him/His

Millburn High School
NEW JERSEY

Benjamin Li, 18, of **Short Hills**, created an AI tool to identify brain tumors from low-quality MRI scans for his Regeneron Science Talent Search **computational biology and bioinformatics** project. AI models that analyze medical images can help doctors make a diagnosis quickly and accurately. However, many conventional models are only trained on high-quality data and struggle to handle low-quality images. This makes it harder to diagnose brain tumors in places with fewer resources, like Sub-Saharan Africa, and in populations that are not often used in training sets. Delayed or incorrect diagnoses lead to worse outcomes. For his project, Benjamin developed a model, MD-SA2, adapting and transforming aspects from state-of-the-art image segmentation algorithms. This model was more efficient than existing models and more accurate with low-quality images. Benjamin's AI tool can make it easier to diagnose brain tumors using limited imaging equipment. Benjamin, the child of Shijian Li and Rong Chen, attends **Millburn High School**. He leads the computer science club and runs his school's computer science and engineering magazine. Benjamin has a passion for ethical AI and volunteers at Jersey Cares. He received the President's Volunteer Service Award and recently finished the 6.6-mile Loon Mountain Race.



Rivka Lipkovitz She/Her/Hers

Proof School
CALIFORNIA

Rivka Lipkovitz, 18, of **San Francisco**, used statistical modeling to study U.S. voter ID laws for her Regeneron Science Talent Search **social sciences** project. Some believe these laws prevent fraud; others say they stop people from voting. Research on their effects on voter turnout has mixed results. For her project, Rivka analyzed voter turnout data between 1984 and 2020. She compared states with strict voter ID laws to those without. Rivka used statistical methods called matrix completion and synthetic difference-in-differences. She created a counterfactual estimate of voter turnout if states had not passed voter ID laws. States that passed strict laws after 2008 had a 2.4% drop in presidential election turnout. States that passed laws before or during 2008 had no change in turnout. In midterm elections, voter turnout appeared to increase. She believes her findings can help policymakers decide whether to pass or change voter ID laws. Rivka, the daughter of Eisar and Uyen Lipkovitz, attends **Proof School**. She writes a blog about using statistics to study bias in fencing tournaments, earning her the nickname “the fencing statistician.” Rivka is fascinated by methods to “mathematically explore alternative paths of history” and hopes to work at the Federal Reserve.



Vivek Malik He/Him/His

Hackley School
NEW YORK

Vivek Malik, 17, of **Chappaqua**, explored the role of the protein Plexin D1 in macrophage behavior for his Regeneron Science Talent Search **cellular and molecular biology** project. Macrophages are a type of immune cell that can raise or lower inflammation in the body. Encouraging macrophages to lower inflammation could help treat diseases like cancer and hardening of the arteries. In his project, Vivek used an antibody to block the activity of Plexin D1, a receptor on the cell surface. Blocking Plexin D1 placed macrophages in an anti-inflammatory state. It also allowed them to travel to other areas to fight infection. Finally, Vivek found that blocking Plexin D1 boosted the “eating” activity macrophages use to remove invaders. His findings suggest that targeting Plexin D1 could help treat inflammatory diseases. Vivek, the child of Rajeev Malik and Priya Chandran, attends **Hackley School** (Tarrytown). He is captain of the varsity swim team and co-leads the STEM club. He also leads his school’s debate team and helps organize a regional Model United Nations conference. Vivek is also a nationally registered EMT with more than 500 hours on ambulances. He also plays piano.

2025 FINALISTS



Atreya Manaswi He/Him/His

Orlando Science High School
FLORIDA

Atreya Manaswi, 19, of **Orlando**, developed BeetleGuardAI, an eco-friendly, low-cost pest management system, for his Regeneron Science Talent Search **animal sciences** project. Honey bees are crucial to biodiversity and are important in pollinating crops. However, these insects have been dying at alarming rates. One cause is small hive beetle (SHB) infestations. In his project, which spanned five years, Atreya made and tested a low-cost beer-based oil blend to attract and bait SHBs. He then created the BeetleGuardAI system. It uses a 3D-printed, sensor-equipped trap loaded with the beer-based bait. A machine learning model uses the sensor data to predict future hive infestations. Using the tool's app interface, beekeepers can make tailored pest control plans. Atreya's traps captured over 99% of SHBs, while the AI model predicted future infestations with 94% reliability. Atreya, child of Sonia Oberoi and Abhijit Manaswi, attends **Orlando Science High School**. He founded and leads the school's Red Cross club and also founded a nonprofit that provides equitable access to STEM and research in underserved schools and communities. He's also a second-degree black belt in taekwondo. He is treasurer of the drama club and was the lead actor in two plays. Atreya is also the author of a kids' picture book called "The Bee Story."



Siddharth Nirgudkar He/Him/His

Acton-Boxborough Regional High School
MASSACHUSETTS

Siddharth Nirgudkar, 17, of **Acton**, created a better way to diagnose disease from patient data for his Regeneron Science Talent Search **computational biology and bioinformatics** project. He used a new approach called contextualized transfer learning (CTL) to build an AI tool. AI diagnosis tools are not new, but current versions don't work well in settings with scarce data and a diverse patient population. Current methods often struggle with individual cases. Others work well only when they have a lot of data available. In his project, Siddharth used publicly sourced data to build the CTL model. His model allowed data to be shared across outcomes, cases and predictors. CTL uses an underlying layer, called a latent space, that captures patterns in the data and applies them to unique cases. In tests, his model was more accurate in diagnosing Alzheimer's disease than other methods. Siddharth, the child of Shailesh and Durga Nirgudkar, attends **Acton-Boxborough Regional High School**, where he mentors students in his school's STEM research club. He also founded Acton Computational Linguistics to share his love of linguistics. Siddharth is also driven to solve the school shooting problem, patenting a gun tracking device in his free time.



Thanush Patlolla He/Him/His

Enloe Magnet High School
NORTH CAROLINA

Thanush Patlolla, 17, of **Cary**, solved a major problem plaguing quantum computing for his Regeneron Science Talent Search **physics** project. Quantum computing methods depend on predicting exactly how quantum particles respond to one another. All the particles in a quantum system affect each other, so measuring the energy of any one particle can cause unpredictable changes in another. In his project, Thanush approximated the density of electrons using a finite nuclear model. This could help physicists avoid extensive computation to know how the nucleus affects electrons. Using a mathematical strategy called a density function, Thanush used the model to map electron distribution in a nuclear simulation. The map increased the accuracy of energy distribution predictions by 0.6%. This is an essential step toward effective quantum computing, which will rely on measuring quantum particles with near-perfect accuracy. Thanush, son of Bhasker Patlolla and Bhavana Solipuram, attends **Enloe Magnet High School** (Raleigh). He organizes competitions as the founder and president of the physics club. Thanush is captain of the varsity Science Olympiad team. He enjoys playing jazz and classical guitar.



Matteo Paz He/Him/His

Pasadena High School
CALIFORNIA

Matteo Paz, 18, of **Pasadena**, surveyed nearly 200 terabytes of astronomical data in search of undiscovered brightness-variable objects for his Regeneron Science Talent Search **space science** project. After over a decade of scanning the sky, NASA's WISE space telescope collected all-sky infrared data, creating a treasure trove of nearly 200 billion lines of data for time-based astronomical research. In his project, Matteo developed waveform-based machine learning methods to sort the entire catalog and efficiently detect and characterize potential variables within the telescope's data, including a machine-learning algorithm dubbed VARnet. He produced a complete census of 1.9 million infrared variable objects, 1.5 million of which are new discoveries, including supermassive black holes, newborn stars and supernovae. His project was carried out as a staff researcher under NASA funding. Matteo, the child of Amy and Pedro Paz, attends **Pasadena High School**. He is president and founder of the research club, where he mentors others in science contests. Matteo also served on his district's first unified student council and as a student assembly representative for the school board.

2025 FINALISTS



Yash Ranjith He/Him/His

Westmont High School
CALIFORNIA

Yash Ranjith, 18, of **San Jose**, created a neural network to speed up the prediction of how pollution spreads for his Regeneron Science Talent Search **environmental science** project. Environmental disasters can release pollutants that move with wind and water currents, putting local life at risk. Emergency plans like evacuations rely on computational methods to predict how pollution will move. Current models can take from hours to days to calculate these predictions, especially over wide areas and long time periods. In his project, Yash designed a physics-informed neural network to generate predictions based on partial differential equations. It could model the spread of pollution around obstacles over 2,520 times faster than traditional methods, with minimal cost to accuracy. What would have taken several days can now be completed in seconds with his network. Yash, the child of Ranjith Thiagarajan and Jayasree Mahadevan, attends **Westmont High School** (Campbell). He is an intern at the NASA Ames Research Center researching reinforcement learning to prevent collisions in crowded airspace. In his spare time, Yash writes on Medium about AI applications in climate sciences and has more than 6,500 followers. He also enjoys outdoor bouldering.



Charlotte Ava Rosario She/Her/Hers

The Nueva School
CALIFORNIA

Charlotte Ava Rosario, 17, of **Hillsborough**, studied links between gender, mental health and brain volume for her Regeneron Science Talent Search **neuroscience** project. Changes during puberty can shape brain areas linked to depression and anxiety. Researchers don't know why brain structure differs by gender identity or how it affects mental health. In her project, Charlotte analyzed data from 20 transgender and 23 cisgender teens. They had their brains scanned and filled out surveys. Transgender teens had more signs of anxiety and depression than their peers. They also had differences in volume in certain brain areas linked to mental health. Charlotte also found a link between brain volume and mood. Transgender males with more volume in the right thalamus had greater depression symptoms. She believes her work offers a more nuanced view of teen health and can help tailor mental health care to each person. Charlotte, the daughter of Nancy Lee, attends **The Nueva School** (San Mateo), where she leads the varsity soccer team. Spurred by her father's suicide, Charlotte has devoted herself to improving mental health care. She built and launched SearchMentalHealth, an AI tool that connects people to mental health support.



Akilan Sankaran He/Him/His

Albuquerque Academy
NEW MEXICO

Akilan Sankaran, 17, of **Albuquerque**, built a mathematical model to learn about a puzzling phenomenon in fluid dynamics for his Regeneron Science Talent Search **physics** project. A droplet of fluid that falls into a vibrating bath acts in strange ways that don't correspond to classical physics. The droplet "walks" by sliding along the fluid's surface and even seems to "tunnel" between cavities in the shaking fluid.

Akilan used a mix of simulations and experiments, as well as theoretical proofs involving partial differential equations. He built a model of a droplet system that could make it easier to study its most surprising elements in three dimensions. Lessons from models of systems like these could also shed light on complex environmental threats like shoreline erosion. The son of Sivasankaran Rajamanickam and Sridevi Kumaravelu, Akilan attends **Albuquerque Academy**, where he is captain of the varsity cross-country team. Akilan helped found the Student Wellness Advisory Board to help support his fellow students' mental health. He is also a talented pianist who has performed with the New Mexico Philharmonic. In his free time, Akilan enjoys waking up at odd hours to cheer on his favorite Formula One drivers as they compete in races across the world.



Aiden Rubin Sanxhaku He/Him/His

Julia R. Masterman High School
PENNSYLVANIA

Aiden Rubin Sanxhaku, 18, of **Philadelphia**, studied redox flow batteries (RFBs) for his Regeneron Science Talent Search **materials science** project. RFBs are a promising large-scale energy storage technology – they can last 25 years or more. They are also nonflammable, nontoxic and environmentally friendly. Aiden proposed a simple solution to increase the efficiency of iron-based aqueous RFBs. This battery type has

a much lower power density than lithium batteries. In his project, Aiden found that low levels of metal additives improved RFB power density and sped up charge/discharge. It also reduced resistance by up to 115%. His work brings iron-based aqueous RFBs closer to the commercial efficiency of lithium-ion batteries. This would enable more widespread use of this tech in renewable energy systems. Aiden, son of Jemin and Teuta Sanxhaku, attends the **Julia R. Masterman High School**. He is co-captain of the Science Olympiad, plays clarinet and tenor saxophone in orchestra and jazz band and is on the varsity soccer team. He shares his love for building rockets as the founder and leader of his school's physics and engineering club and a district-level competition called The Philadelphia Rocketry League.

2025 FINALISTS



Sandeep Sawhney He/Him/His

Herricks High School
NEW YORK

Sandeep Sawhney, 18, of **New Hyde Park**, developed a DNA container to deliver toxic cancer therapies for his Regeneron Science Talent Search **bioengineering** project. Gallium-based drugs are a promising cancer treatment. They can damage tumor cells but are toxic to healthy ones, too. These drugs dissolve typical gel capsules before they can reach their target. For his project, Sandeep first mapped out the positions of the atoms in 10 proposed crystal structures. He tested the structures to find one that bound gallium drugs at three points. He then used self-assembly techniques from DNA crystallography to build the structures, called tensegrity triangles, out of artificial DNA. He believes these stable nanostructures could deliver gallium drugs without hurting healthy tissues if made with higher-grade artificial DNA. It may also reduce the risk of inflammatory side effects. Sandeep, son of Tarveen and Gagandeep Sawhney, attends **Herricks High School**. He runs the Rube Goldberg Club. In 2024, Sandeep raised over \$5,000 for the Leukemia & Lymphoma Society as a Student Visionary of the Year. He also has a passion for high-quality clothing. He sells his own streetwear designs under the clothing startup Luminarae.



Addison Shea She/Her/Hers

Lakewood Ranch High School
FLORIDA

Addison Shea, 18, of **Bradenton**, examined how changing currents in the Arctic Ocean affect whale migration patterns for her Regeneron Science Talent Search **environmental science** project. The current she studied, the Beaufort Gyre, is a major current in the Arctic Ocean. In the past, it reversed direction every 5–7 years. However, it hasn't done so for at least 21 years, causing more freshwater to enter the region, an increase in the current's rotation speed and greater water movement. These changes may affect animals in the area as well as the ocean's food webs. In her project, Addison used spatial statistics to analyze the location of bowhead whale sightings. These sightings spanned the whales' autumnal migration from 1989 to 2018. She found that as the currents changed, so did the bowhead whales' migratory patterns. Addison, the child of Julie and Ty Shea, attends **Lakewood Ranch High School**. She is captain of the cross-country team. She also leads her school's Girl Up chapter and peer tutoring organization. In past summers, she has volunteered at the Mote Marine Laboratory & Aquarium and the Bishop Museum of Science and Nature. She was a NASA Langley summer knowledge management intern.



Kevin Shen He/Him/His

Olympia High School
WASHINGTON

Kevin Shen, 18, of **Olympia**, created a method to enhance the control and stability of oblique-wing aircraft for his Regeneron Science Talent Search **engineering** project. Increasing fuel efficiency is one of the main goals of airplane design. Decades ago, engineers discovered that setting a plane's wings at an oblique angle to its body lowers its overall drag, making flight more efficient. However, oblique-wing aircraft are harder to control, limiting their progress. For his project, Kevin programmed a flight computer to control an oblique-wing model airplane he designed and built using 3D printed parts. The flight computer assesses the effect of various angles and acceleration states to automatically stabilize the oblique wing aircraft. Kevin's flight tests showed that the flight system enabled better aircraft control and additional computational fluid dynamics simulations demonstrated reduced drag. His craft used 9.2% less fuel than a similar aircraft with a regular wing design. Kevin, the child of Wenjing Yan and Charles Shen, attends **Olympia High School**. He founded and leads the popular Olympia Aerospace Club to share his passion for flight. Kevin also played in his state's 2023–24 4A tennis tournament and competes on the varsity tennis team.



Emma Lee Wen She/Her/Hers

John L. Miller Great Neck North High School
NEW YORK

Emma Lee Wen, 17, of **Great Neck**, studied a new pancreatic cancer treatment for her Regeneron Science Talent Search **medicine and health** project. Pancreatic cancer is often diagnosed late, has limited treatment options and has a poor five-year survival rate of under 13%. As a cancer survivor herself, Emma searched for better treatment for this aggressive cancer. She used pancreatic cancer cell lines to create 3D organoids, miniature structures of cancer cells. Emma studied AUM-302, a drug that targets three pathways of cancer progression. She tested it against other possible compounds used to treat pancreatic cancer, which target just one. She showed that AUM-302 killed more cells with smaller doses than current treatments. It shows promise for better pancreatic cancer treatment and possibly improved survival. Emma, the child of Chihi Lee and Hung Yang Wen, attends **John L. Miller Great Neck North High School**, where she is a Science Olympiad officer. Emma also volunteers at North Shore University Hospital and the Little Neck-Douglaston Community Ambulance Corps. She attended the International Young Researchers' Conference in 2022, where she published research on acute lymphoblastic leukemia.

2025 FINALISTS



Amy Xiao She/Her/Hers

Garden City High School
NEW YORK

Amy Xiao, 17, of Garden City, studied how a protein called Citrin is linked to cancer survival for her Regeneron Science Talent Search **biochemistry** project. Amy encountered Citrin while studying cancer metabolism. It plays a role in how cancer cells manage energy, but its metabolic importance is unknown. Using existing genetic data, Amy found that some changes to the *citrin* gene correlate with better outcomes in cancer patients. She wanted to understand why Citrin mattered. She used the AI-powered AlphaFold system to create a 3D model of normal and altered Citrin proteins. It showed that some gene changes affected how the protein worked. Amy used CRISPR to turn down the *citrin* gene in colon cancer cells and saw they were depleted of an essential nutrient. Using computer simulations, Amy identified existing FDA-approved drugs that could inhibit Citrin. Targeting Citrin could lead to new cancer treatments. Amy, child of Wenbin Xiao and Hong Hong, attends **Garden City High School**. She is co-founder and president of her high school's programming club and active in the VEX robotics club. Amy is also the co-president of the Science Olympiad team. She is a prolific violinist, playing around the world, including the Manhattan School of Music Precollege program.



Phoebe Xu She/Her/Hers

Enloe Magnet High School
NORTH CAROLINA

Phoebe Xu, 18, of Cary, studied how human immunodeficiency virus (HIV) infection changes how immune cells use energy for her Regeneron Science Talent Search **medicine and health project**. In early HIV infection, immune cells make more energy to fight the virus. Over time, the cells get worn out, which is how an HIV infection turns into acquired immune deficiency syndrome (AIDS). In her project, Phoebe studied how HIV infection changes gene expression in individual immune cells. She studied cells from people with untreated HIV, those on antiretroviral therapy (ART) and people without HIV. She found that HIV infection changed more than 50 metabolic pathways in the immune cells. Treatment with ART partially restores activity to normal levels. Phoebe believes that creating new drugs targeting these pathways could improve care for people with HIV and AIDS. Phoebe, the child of Xiaojiang Xu and Zhihong Shen, attends **Enloe Magnet High School** (Raleigh). She is the founder of the Enloe entrepreneurship club, a national leader in Future Business Leaders of America, plays clarinet in the orchestra and is captain of the golf team. As an intern at the Alliance of AIDS, she promoted awareness of sexually transmitted infections.



Elisa Zhang She/Her/Hers

Dougherty Valley High School
CALIFORNIA

Elisa Zhang, 17, of **San Ramon**, developed an AI system to automatically patch software bugs across multiple locations for her Regeneron Science Talent Search **computer science** project. Multi-location bugs can span thousands of lines of code. They plague real-world programs and are hard to address. Unfixed bugs can cause problems ranging from system crashes to security breaches, costing billions of dollars a year. In her project, Elisa programmed unique large language model (LLM) agents with individual prompts and contexts. The LLM agents worked together to code, verify and select the best possible fix. Elisa tested her system on a dataset of 190 Java bugs, and it outperformed existing repair methods. She believes her system can simplify bug fixes. Elisa, the child of Qing Zhang and Qian Zheng, attends **Dougherty Valley High School**, where she is an officer of the math club. As external vice president of the Promoting Leadership in Aspiring Youth (PLAY) nonprofit, she leads the PLAY Times newsletter, helps manage the website and is co-president of its math club. She presented her research at computer science conferences in 2023 and 2024. Elisa is also a competitive dancer, performing lyrical, contemporary and traditional Chinese dances.



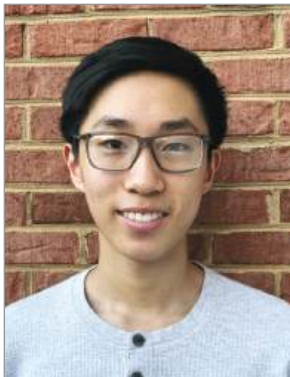
Owen Jianwen Zhang He/Him/His

Bellevue High School
WASHINGTON

Owen Jianwen Zhang, 18, of **Bellevue**, developed a solution to a problem about objects called 3-uniform hypergraphs for his Regeneron Science Talent Search **mathematics** project. This project is in an area of theoretical math called combinatorics, which focuses on counting and the properties of certain structures. Combinatorics has applications within other fields of math and computer science.

3-uniform hypergraphs are like clusters of people in social networks. Each edge of the hypergraph connects three points called vertices. These connected points are like three close friends in the network. These structures can vary by how these vertices are connected, creating unique formations. For his project, Owen used computer programming techniques to answer a long-standing question about the maximum number of unique connection conformations that can be found in 3-uniform hypergraphs with the same vertices. Owen believes his result is the first time such a problem has been solved in a hypergraph setting. Owen, the son of Yunjing Ma and Geqiang Zhang, attends **Bellevue High School**, where he leads the math club. He competes in DECA events, where his team analyzes business scenarios and presents strategic solutions.

2025 FINALISTS



Ray Zhang He/Him/His

Thomas Jefferson High School for Science and Technology
VIRGINIA

Ray Zhang, 17, of **Chantilly**, studied how to treat fungal infections for his Regeneron Science Talent Search **cellular and molecular biology** project. The fungus *Fusarium* causes infections in people and crops. *Fusarium* often forms sticky communities of cells called biofilms that better withstand drug treatments. When Ray was volunteering at the Prince William Medical Center, he met a child with a rare fungal infection. This inspired him to find better treatment options for these infections. In his project, Ray studied how *Fusarium* builds biofilms. He used fluorescence spectroscopy to see how the fungi grew under different nutrient sources and temperatures. Then, he tested the effects of three antifungal drugs on the biofilms. He found that when he combined the three drugs, they better treated the biofilms than each drug used alone. The child of Yun You and Guohua Zhang, Ray attends **Thomas Jefferson High School for Science and Technology** (Alexandria). There, he is co-captain of the congressional debate team and founder of the Voices of Healthcare Policy podcast. Ray is the co-founder and co-president of STEMology Learning, which promotes health literacy. He also helps with communication and marketing in his mother's tech repair business.



Angeline Zhao She/Her/Hers

Phillips Academy Andover
MASSACHUSETTS

Angeline Zhao, 18, of **McLean, Virginia**, used mathematical modeling to study voting districts in New York City for her Regeneron Science Talent Search **social sciences** project. Communities of interest (COIs) are groups of people who may share interests and voting patterns. Drawing voting districts with COIs in mind can help give these groups a stronger voice in elections. For her project, Angeline gathered data on voting districts, election results and demographics. The data came from Google Maps and New York City's elections and city planning departments. Angeline used a statistical approach called a Monte Carlo merge-split algorithm to test thousands of ways to draw district lines. Her findings showed how to define districts that create strong COIs with shared racial and political traits. She believes her algorithm could ensure voting laws support fair representation. This can empower minority groups to defend their rights. Angeline is the daughter of Qing Feng and Xinli Zhao. At **Phillips Academy Andover**, she leads the math club and team. Her passion for journalism inspired her to launch SPRING Editorials, which publishes student opinion pieces. She is also managing editor of Youth Voices at The Teen Magazine.



Ashley Zhu

She/Her/Hers

Hunter College High School
NEW YORK

Ashley Zhu, 17, of **Bayside**, studied how a process called curve-shortening flow acts on self-intersecting curves for her Regeneron Science Talent Search **mathematics** project. She focused on n-loop curves, a type of curved line in which the different parts intersect. It's a generalized idea of a figure-eight curve. In her project, Ashley coded a curve-shortening flow simulation and found that a three-loop curve existing under specific conditions was unique. She has also made progress toward solving a question about five-loop curves. Her work adds to the understanding of curve-shortening flow. It could have applications in certain chemical systems, image processing and computer vision. Ashley, the daughter of Xiaowei Xu and Xinze Zhu, attends **Hunter College High School** (New York City), where she leads the school's math team. She also captains the New York City Math Team and attended the Mathematical Olympiad Program, Canada/USA Mathcamp and MIT's Research Science Institute. She's president of Math Koritsia, a free middle school math competition for girls and nonbinary kids. Ashley is editor-in-chief of Hunter's Radicals (math) and Precipice (environmental) magazines and runs the Hunter Immigration Youth Alliance.



Minghao Zou

He/Him/His

Valley Christian High School
CALIFORNIA

Minghao Zou, 18, of **Santa Clara**, simulated particle motion near sources of neutrinos for his Regeneron Science Talent Search **space science** project. Neutrinos are nearly massless subatomic particles. They are abundant in the universe but very difficult to detect, so they are shrouded in mystery. In his project, Minghao used simulations instead of direct observations to study neutrinos. He created an algorithm that considers phenomena that affect particle motion in extreme astrophysical conditions. These include electromagnetic and gravitational forces and interactions with nearby particles. He tested his model on known cases of neutrino emission, comparing what he found to known solutions. He made the code open-source and public for astrophysicists to study these simulations on a larger scale. Minghao, the child of Yi Zou and Xiaoyan Liu, attends **Valley Christian High School** (San Jose). He is a leader in the math and physics clubs. He also leads his school's International Space Station research lab. Minghao is an award-winning pianist and earned a silver medal in the 2024 U.S. Physics Olympiad. He founded the nonprofit One People One Cosmos, which offers free astronomy resources to communities that are under-resourced.

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