Intel Science Talent Search

2006 Science Talent Institute
March 9-14, 2006

The Intel Science Talent Search (Intel STS), America's oldest and most highly regarded pre-college science competition, provides an incentive and an arena for U.S. high school seniors to complete an original research project and have it recognized by a national jury of highly regarded professional scientists. The projects are a result of inquiry-based learning methods designed to nurture critical reasoning skills, experience science through the use of the scientific method and to demonstrate how math and science skills are crucial to making sense of today's technological world and making the best decisions for tomorrow.

The 40 Finalists of the 2006 Intel Science Talent Search, who will be competing for $530,000 in scholarships, represent about 2.5 percent of those who completed entries in this scientific and educational competition. These 17 females and 23 males are awarded an all-expense-paid trip to Washington, D.C. to attend the Science Talent Institute, March 9 -14, 2006. Each Finalist who participates in the Science Talent Institute will receive an Intel® Centrino™ mobile technology notebook computer and a scholarship of at least $5,000. Ten of the Finalists will be selected by the board of judges to receive one of the following four-year scholarships: First Place: $100,000, Second Place: $75,000, Third Place: $50,000, Fourth - Sixth Places: $25,000, and Seventh - Tenth Places: $20,000.

The Finalists are 16 to 18 years of age and come from 35 schools in 19 states. Chosen from among 1558 entrants, they submitted a report on their scientific research, the official entry form and supporting documents. Completed entries were received from 44 states, the District of Columbia, Puerto Rico, U.S. Virgin Islands and an overseas school. *Finalist ages in this publication are as of March 14, 2006.*

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INTEL SCIENCE TALENT SEARCH
"Finding Tomorrow's Scientists"

History

Created in 1942 by Science Service, one of the most respected non-profit organizations advancing the cause of science, as a means for encouraging talented high school students to pursue a career in science, math, engineering and medicine, the Science Talent Search has become an American institution.

The Science Talent Search has recognized over 2500 finalists with more than $5 million in scholarships. Alumni of the STS include more than 100 recipients of the world's most coveted science and math honors including three National Medal of Science winners, ten MacArthur Foundation Fellows, two Fields Medallists and six Nobel Laureates.

In 1998, Intel Corporation was named the new title sponsor of this competition that was formerly sponsored by the Westinghouse Foundation. Since assuming this role, Intel has significantly reinvigorated the STS by bringing back some of the traditions long associated with the program. Additionally, Intel increased awards and scholarships from about $200,000 to $1,250,000.

Awards and Scholarships

Semifinalists Each of the 300 students named a semifinalist in the Intel STS will receive a $1,000 award for their outstanding science research. These awards will be mailed to the semifinalists after the Science Talent Institute (STI) in the Spring.

Schools Each school will receive an award of $1,000 for each Semifinalist named in the Intel STS. The award must be used to further support excellence in science, math or engineering education at the recipient school. In the case of home schooling, the awards will be given to the affiliated school or school district of the home school. The award will be mailed to the school after the STI in the Spring.

Finalists The top prize will be a $100,000 four-year scholarship. The second place finalist will receive a $75,000 scholarship and the third-prize winner will go home with a $50,000 scholarship. Fourth- through sixth-place finalists each receive a $25,000 scholarship; seventh- through tenth-prize winners will receive a $20,000 scholarship. The remaining 30 finalists will receive a $5,000 scholarship award. In addition to the scholarship awards, each of the finalists participating in the Science Talent Institute will receive an Intel® Centrino™ mobile technology notebook computer.

The Process

Each year, over 1500 seniors enter the Intel Science Talent Search. Each completed entry consists of the student's written report on their scientific research, the lengthy official entry form that elicits evidence of student creativity and interest in science, and supporting documents.

All Intel Science Talent Search entries are reviewed and judged by top scientists from a variety of different disciplines. The top 300 entrants are selected as semifinalists, and from these 300 semifinalists, 40 finalists are chosen to attend an all-expense-paid trip to Washington, D.C. to the Science Talent Institute (STI), where they will undergo final judging. On the basis of a rigorous round of interviews, 10 top scholarship winners are selected.

While in Washington, DC, students meet leading scientists and visit places of historic and political importance. Past winners have met with the President and First Lady, the Vice President and distinguished science advisers. The young scientists display their prize-winning exhibits at the prestigious National Academy of Sciences, where they describe their research to thousands of visitors—many of them important figures in governmental and scientific communities. Many others studying the exhibits are highly motivated students who are planning to enter the Science Talent Search in their senior year.

While the purpose of the Science Talent Institute is the science competition, the students say they most value the opportunity to meet and interact with their scientific peers, often for the first time. Friendships and professional associations made during the STI week continue through and beyond college.

State Representation in the Science Talent Search Since 1942

Since 1942, New York State has produced more finalists than any other state, accounting for 876 or 33%. California, 187; Illinois,160; Pennsylvania, 103; Florida, 97; Maryland, 91; New Jersey, 84; Virginia, 84; Massachusetts, 83; Ohio, 80; Texas, 64; Wisconsin, 51; and Indiana, 47.

Other states with impressive results include Connecticut, 40; Michigan, 40; Oregon, 37; Minnesota, 34; Georgia, 28; Colorado, 25; Arizona 24; Oklahoma, 24; District of Columbia, 21; Missouri, 21;Washington, 21; Nebraska, 19; Alabama, 18; Iowa, 18; Tennessee, 18; West Virginia, 18; New Hampshire, 17 ; Montana, 16, New Mexico, 16; Hawaii, 14; Kansas, 14; North Carolina, 14; Louisiana, 12; and Mississippi, 10.

Intel Corporation

Intel's long-standing commitment to education is fueled by its mission to invest not only in its business and industry, but in the future of young people. Through education programs such as the Intel Science Talent Search, Intel works to inspire and educate children in communities around the world in the areas of science, math and engineering. For more information visit *www.intel.com/education*.

Shannon Lisa Babb
American Fork High School

UTAH

Shannon Lisa Babb, 18, of **Highland**, entered the Intel Science Talent Search with an **environmental science** project identifying water quality problems along the Spanish Fork River and its tributaries. For six months, Shannon collected water samples, measured several chemical and physical parameters, tested for *E. coli*, and collected macroinvertebrates at seven sites. Her data indicated that all seven sites exceeded Utah EPA guidelines for cold-water fisheries at some point during the study. She concluded that human activity was clearly the major factor causing the decline in water quality. She believes the trend can be reversed if proper remediation action is taken. Shannon's interest in water pollution began at age 13 when she tested the rivers near Utah Lake and discovered the most polluted was the Spanish Fork River. First in her class of 482 at **American Fork High School,** Shannon enjoys choir, piano, 4-H and the fantasy writers club. An avid spelunker, she has volunteered during the past three summers at the Timpanogos Cave. To prepare for a career improving water quality around the world, Shannon plans to attend Utah State or University of Utah. She is the daughter of Dr. Stephen and Anita Babb.

Diane Jeehea Choi
Syosset High School

NEW YORK

Diane Jeehea Choi, 17, of **Syosset**, entered the Intel Science Talent Search with a **behavioral and social sciences** project that examined *amae*, the uniquely Japanese nonverbal expression of the need to be passively loved, a concept not easily translated to Western understanding. She surveyed both non-Japanese and ethnic Japanese in the U.S., analyzing their identification with the roles of both seeker and giver of this mutual empathy and their expectations of acceptance. Diane found that residence in Japan, more than Japanese ethnicity, increased their identification with the desire for the pleasure gained from participating in passive *amae*, which springs from the early mother-child bond. Fluent in French and Korean, Diane cites the proximity of Korea and Japan and their cultural similarities as sources of her intrigue with *amae*. A flutist at **Syosset High School** with many debate honors, she is also editor-in-chief of the yearbook. Diane is enthralled with the written and spoken word and writes "to clarify her awareness of the world." An avid reader who scored 2400 in critical reading, math and writing on the SATs, she is the daughter of David and Hea Choi. Diane would like to attend Harvard or Yale.

Myers Abraham Davis
Baltimore Polytechnic Institute

MARYLAND

Myers Abraham Davis, 17, of **Baltimore**, entered the Intel Science Talent Search with a **computer science** project that addressed collision detection for physical simulation applications in high-performance graphics processing units (GPUs). Today's GPUs, commonly called graphics cards, use multiple processors, resulting in significantly faster calculations than a traditional CPU with only one microprocessor. According to Abe, "the CPU has become the bottleneck in the graphics pipeline." His project introduced a novel data structure that addresses problems of collision detection in a format that current GPUs are optimized to handle. To buy a computer for his research, Abe authored a winning grant proposal. At **Baltimore Polytechnic Institute**, Abe is captain of the varsity wrestling team and enjoys Japanese classes. Two years ago, for a class assignment on the history of science, Abe decided to make a movie. He filmed and directed his classmates' skits, and he recorded the guitar soundtrack using his bathtub as a recording studio, noting that it had "surprisingly good acoustics." The son of Michael Davis and Julia Pachal Davis, Abe hopes to attend Carnegie Mellon or Stanford.

Allison Mae Gardner
Byram Hills High School

NEW YORK

Allison Mae Gardner, 17, of **Bedford**, submitted a **zoology** project to the Intel Science Talent Search investigating two mosquito-borne illnesses affecting horses in the northeast: West Nile virus and eastern equine encephalitis. Over two summers, Allison studied 19 of the 55 mosquito species known to exist throughout New York. She collected 1,838 female mosquitoes at two area stables and dissected 787 of them to determine their ages. She found that mosquitoes collected at season's end tend to be older and more likely to be infected. She suggests that minimizing the insects' breeding grounds in late summer may help reduce the viral risk to horses and humans. Allison, who began horseback riding at seven, enjoys English jumping and volunteers with the Pegasus Therapeutic Riding program. At **Byram Hills High School** in Armonk**,** Allison is active in the orchestra, newspaper and peer tutoring club. The winner of the University of Chicago Book Award and first oboe for the Greater Westchester Youth Orchestra, Allison hopes to attend college at Williams or Amherst. The daughter of Thomas and Wendy Gardner, Allison plans to become a physics professor or equine veterinarian.

Evan Scott Gawlik
Texas Academy of Mathematics & Science, Denton, TX

NORTH CAROLINA

Evan Scott Gawlik, 17, of **Pinehurst**, studied the noble gases krypton and argon and the organo-compounds they make with fluorine and chlorine for his **chemistry** entry in the Intel Science Talent Search. Intrigued by the concept of noble gas bonding, thought to be impossible until the first synthesis of a noble gas compound in 1962, Evan used a quantum mechanics approach and computational programs to project the existence and stability of six potentially new halogen-containing organo-noble gas compounds. He expects these, as oxidative fluorinators, to have potential value in medicine, laser technology and the cosmetics industry. Evan is first author of a paper on his work that was submitted to *The Journal of Physical Chemistry Part A*. An Eagle Scout and the recipient of numerous academic and music awards, Evan plays French horn with the school orchestra at the **Texas Academy of Mathematics & Science** in Denton. He competes in track and is also active in the sports and math clubs, as well as the school's community service organization. Born in Germany to Dr. John and Darlene Gawlik, he hopes to study mathematics and computer science at MIT or Caltech.

Elyse Autumn Hope
Oregon Episcopal School

OREGON

Elyse Autumn Hope, 18, of **Portland**, compared the movements of sunspots and magnetic regions to forecast their relative rates for her Intel Science Talent Search project in **space science**. Elyse's two-year project was designed to prove the theory that sunspots and magnetic regions are basically the same phenomena. Using three years of images – intensitygrams and magnetograms – from NASA's Solar and Heliospheric Observatory, she measured the average distance from the sun's center to each feature's center in order to calculate arc length and entered the data into a Java program to automate the calculations and perform a regression analysis to forecast movements. She believes her findings statistically and conclusively confirm the theory and plans to expand her research to add predictive capabilities, which she thinks could be used to help overcome solar disruptions to vital communications and satellite activity. Elyse attends **Oregon Episcopal School** where she is editor of the weekly newspaper, *The Blowfish*. A dancer, pianist and vocalist with an interest in opera, she hopes to study music and physics at Stanford or Whitman College. Elyse is the daughter of Paul McClain and Laura Hope.

Minh-Phuong Huynh-Le
Montgomery Blair High School

MARYLAND

Minh-Phuong Huynh-Le, 17, of **Silver Spring**, studied the response of soil organic matter composition to changes in forest density and flora for the **chemistry** project she submitted to the Intel Science Talent Search. Soil organic matter is a virtual reservoir of carbon, and its respiration (conversion to carbon dioxide by bacteria and fungi) constitutes the major flux of carbon in the global carbon cycle. Minh wondered if forest ecosystem management practices, such as thinning, could have a significant impact. She conducted nuclear magnetic resonance, chemopyrolytic and isotopic analyses to characterize soil organic matter and directly assess any differences, but she found none. She concluded that forest cultivation efforts may not change organic matter respiration, at least over a several-year time frame. Minh is on the varsity swim team at **Montgomery Blair High School** and enjoys fencing. An accomplished violinist, she not only performs with the school orchestra and the Prince George's County Community Orchestra, but also instructs elementary school students. The daughter of Thu Thi Thanh Le and the late Dr. Trung Duc Huynh, she was born in the Philippines.

David Bruce Kelley
Highland High School

NEW YORK

David Bruce Kelley, 18, of **Highland**, submitted a particle **physics** research project concerning low-energy neutrino detection in liquid neon to the Intel Science Talent Search. David's project explored the brief delay, called trapping time, that electrons experience when they move through the liquid-vapor boundary in cryogenic liquids. Some researchers believe this delay is due to the tunneling effect, which occurs when an electron approaches a potential barrier that it could not pass according to the laws of classical physics. By comparing data published in two journal articles with his experimental measurements, David concluded that both papers have incorrect trapping time predictions and that quantum tunneling is not the primary cause of the electrons' delay. At **Highland High School**, David enjoys the math and science clubs and is a multiple Science Olympiad medal winner. He is principal French horn in the College/Youth Symphony at SUNY New Paltz, which he joined in eighth grade. A soccer referee, he enjoys music, running, cooking and traveling. David hopes to attend MIT or Cornell and become a research scientist. He is the son of Bruce Kelley and Joan deVries Kelley.

Sheela Krishnan
Suffern High School

NEW YORK

Sheela Krishnan, 17, of **Suffern**, researched the antimicrobial activity of over 1,000 bacterial isolates from the honey sacs of honeybees (*Apis mellifera*) against seven pathogens for her Intel Science Talent Search project in **microbiology**. Her two-year study included *Paenibacillus larvae*, which causes American Foulbrood Disease (AFB) – the most virulent and fatal bacterial disease that devastates bee farms worldwide. She identified the most effective bacterial isolates and combined them into a probiotic cocktail for preventative therapy against AFB. This novel research on antimicrobial compounds may lead to the production of a broad spectrum of new antibacterial and antifungal compounds for combating multidrug-resistant diseases. Sheela attends **Suffern High School** where she co-founded the Model UN and is concert mistress of the orchestra. Trained in Indian classical music, she performs both Carnatic and Hindustani variations. Her interest in honey was ignited after visiting India her freshman year, when her grandfather informed her of its natural health benefits. The daughter of Drs. Raghavan and Lalitha Krishnan, she hopes to pursue a career as a physician.

Jerrold Alexander Lieblich
Ward Melville High School

NEW YORK

Jerrold Alexander Lieblich, 17, of **East Setauket**, performed a cognitive psychology study for his Intel Science Talent Search project in **behavioral and social sciences**. Jerry built his study around an audio-visual illusion called the McGurk effect, in which a subject seeing a person on video pronounce /gi/ while hearing the phoneme /bi/ dubbed over it will perceive /di/. His study tested if the perceived /di/ is processed in the same manner as a true /di/ by placing the illusory /di/ in a lexical context (within a word – e.g. armadillo, armagillo, armabillo). He found that subjects exposed to McGurk stimuli and those exposed to actual /d/ phonemes both had high confidence in the /d/s, demonstrating that even with the lexical context, the brain processes the McGurk /di/ in a different manner than a true /di/. The son of Dr. Lawrence Lieblich and Perri Fitterman, Jerry hopes to attend Princeton or Yale. As president of the Philosophy Club at **Ward Melville High School**, he led an effort to amend the school's censorship policy to permit greater access to research resources. The winner of numerous math and Latin awards, Jerry is a member of the Latin Honor Society and writes for the school paper.

Kate Elizabeth Lowry
Louisiana School for Math, Science & the Arts

LOUISIANA

Kate Elizabeth Lowry, 17, of **Slidell** studied gully images on Mars to determine how much water was needed to form them for her Intel Science Talent Search project in **space science.** While a NASA intern at the Ames Research Center, Kate evaluated more than 900 Mars Orbiter Camera (MOC) images, identified and measured 391 gullies in the northern hemisphere, processed the data, and estimated it would take 2.5 billion gallons of liquid water to form them. By overlaying gully location with ice content maps, Kate noted that the majority of gullies are found in ice-poor regions, suggesting that they were probably created by liquid aquifers. While at Ames, Kate also discovered a new way of manipulating MOC images that is currently benefiting research there. Kate hopes her research will eventually lead to manned Mars missions. At the **Louisiana School for Math, Science & the Arts**, in Natchitoches, Kate is president of the Honor Court, vice president of the French Club, treasurer of Beta Club and has received the Ambassador Award. A certified scuba diver, she intends to study marine biology at Stanford or Rice University. She is the daughter of James Lowry and Barbara Waelde.

Eric Allan Meyerowitz
Northport High School

NEW YORK

Eric Allan Meyerowitz, 17, of **Northport**, analyzed two-dimensional nuclear magnetic resonance (NMR) spectra to determine the structure of two neuropeptides for his Intel Science Talent Search project in **biochemistry**. In past studies of allatostatins (a family of neuropeptides believed to play a key role in the development and reproduction of insects and crustaceans), Eric had learned that Allatostatin-5 and Allatostatin-8 had nearly opposite functions but very similar amino acid compositions. To find the structural reason for their disparate functions, he designed and performed NMR experiments and restricted molecular dynamic (RMO) simulations. He is first author of the resulting manuscript that will be submitted to the *Journal of Neuroscience*. Eric believes he has made a significant contribution to our understanding of how a family of neuropeptides can elicit multiple functions, and that the new model, which his evidence supports, may extend to other systems as well. Eric is first in his class of 449 at **Northport High School**, where he plays varsity tennis and belongs to the community service club. The son of Steven Meyerowitz and Dr. Joanne Figueiredo, he hopes to study at Harvard or Columbia.

Lucas Edward Moller
Moscow High School

IDAHO

Lucas Edward Moller, 17, of **Moscow**, submitted an **earth and planetary science** project to the Intel Science Talent Search that investigated new approaches for understanding dust behavior on Mars. After participating in the 1999 Student Nanoexperiment Challenge, Luke concentrated his efforts of examining patterns of dust deposit formation and mechanics. His research focused on designing, building and testing new approaches for understanding Mars dust dynamics and statics in laboratory simulations and for Mars lander configurations. This work has applications in industrial processes such as mineral ore, agricultural commodity and industrial powder transport, as well as analysis of terrestrial mechanics such as landslides, avalanches and encroaching sand dunes. He is sole author of a paper presented at the 32nd Lunar and Planetary Science Conference, and his findings have been utilized by NASA in two Mars lander missions, including the 2001 Odyssey Lander. Luke, a Davidson Fellow, is a student at **Moscow High School** where he competes in cross-country and track. The son of Dr. Gregory and Laurie Moller, he hopes to be on the team that sends astronauts to Mars.

John Pease Moore, IV
Dayton Christian High School

OHIO

John Pease Moore, IV, 18, of **Bellbrook**, submitted an Intel Science Talent Search project in **engineering** that involved the development and optimization of a remotely piloted Micro Air Vehicle (MAV). In this three-year project, he sought to design, test, fabricate and ultimately optimize a fully functional MAV that adhered to both DARPA and the International-MAV competition regulations. Applying low Reynolds number aerodynamics, John developed two prototype MAVs using novel wing geometry. The first, a 4-inch MAV, achieved a flight time of 25 minutes. The second, a 5.5-inch MAV, achieved a 15-minute flight time, and was equipped with video surveillance equipment capable of transmitting live video over a range of one kilometer. Test results of both indicated an increased efficiency in control response, flight stability, flight time, airframe weight, and a production cost thousands of times less than larger Unmanned Aerial Vehicles that are currently used in military operations. An Eagle Scout, John is a student at **Dayton Christian High School** in Miamisburg. The son of Dr. John and Cynthia Moore, III, he plans to study aeronautical engineering at Princeton or Stanford.

Anna Jolene Mork
Shorewood High School

WASHINGTON

Anna Jolene Mork, 17, of **Shoreline**, entered the Intel Science Talent Search with a **botany** project that investigated molecular autofluorescence in the alga *Acetabularia acetabulum* and the multicellular plant *Arabidopsis thaliana*. Fluorescent markers and probes are an important tool in cellular biology, but in order to use them effectively it is important to understand the autofluorescence of the organism under study. Jolene examined two fluorescence imaging techniques – confocal laser scanning microscopy (CLSM) to determine which fluorescent molecules were present in *Acetabularia* and *Arabidopsis* and epifluorescence microscopy (EM) – to determine the presence of certain fluorescent molecules. She found that chlorophyll was the primary autofluorescence compound in plants and concluded that CLSM can be a more preferable tool when the fluorescence is of unknown origin, but notes that EM provides clearer pictures of organisms. First in her class of 385 at **Shorewood High School**, Jolene plans to study chemistry and biochemistry at Pomona College or Swarthmore. The daughter of Loren and Laura Mork, she enjoys recreational soccer, playing the clarinet, cooking and volunteering.

Kiran Reddy Pendri
Choate Rosemary Hall

CONNECTICUT

Kiran Reddy Pendri, 17, of **South Glastonbury**, synthesized a new type of organic compound, a novel macrocyclic alkene dithiolactone for his Intel Science Talent Search project in **chemistry**. Building on recent Noble Prize-winning research in chemistry, Kiran's efforts utilize macrocyclization, which is a Ring-Closing Olefin Metathesis reaction that allows for the creation of a mid-sized molecular ring that serves as a precursor for the synthesis of large-ring alkenes. He believes his research could contribute to manufacturing chemicals and pharmaceuticals in an efficient and environmentally friendly way. Kiran is the son of Drs. Yadagiri and Annapurna Pendri. He attends **Choate Rosemary Hall** in Wallingford, where he is coxswain of the varsity crew, serves on the judicial committee, and is a member of the Choate Indian Association and the varsity math team. A member of an investment club, Kiran has been investing since he was 10 years old. The recipient of many English, math and science honors, he achieved perfect SAT scores in critical reading, math and writing. Kiran hopes to study chemistry at Harvard or Princeton to prepare for a career in scientific research in industry or academia.

Sukrit Ranjan
Glenbrook North High School

ILLINOIS

Sukrit Ranjan, 18, of **Northbrook**, examined polar cloud formation on Mars in his **earth and planetary science** project for the Intel Science Talent Search. His computer analysis of surface topography data collected by the Mars Orbiting Laser Altimeter (MOLA), launched aboard the 1996 Mars Global Surveyor, was contrary to prevailing thought. Although it had been theorized that most clouds form only over the planet's eastern slopes, Sukrit found that while this was true in the northern hemisphere, it was not true in the southern hemisphere where clouds form on the western slopes. He believes that understanding cloud formation and past water distribution on Mars may provide insight to future climate changes that could occur on Earth. The two-year president of the space science club GADGET at **Glenbrook North High School**, Sukrit helped increase membership through outreach workshops. He has a passion for math competitions and mentors fellow forensics competitors. Born in India, Sukrit is fluent in Hindi. Also fluent in Spanish, he has been honored by the governor as an adult literacy tutor. The son of Rajiv Ranjan and Sangeeta Prasad, he hopes to study physics at MIT or Caltech.

Sarah Kate Rapoport
Horace Mann School

NEW YORK

Sarah Kate Rapoport, 17, of **New York**, investigated early embryonic development on a molecular level for the **bioinformatics and genomics** project she entered in the Intel Science Talent Search. Through *in vitro* experiments and mathematical modeling, she illustrated the importance of motor proteins myosin and kinesin in propelling neuron migrations. These enable the early mammalian embryo to distinguish right from left, resulting in the asymmetric arrangement of organs and the lateralization of specific brain functions. At **Horace Mann School** in Riverdale, Sarah is president of the science and math club, captain of the fencing team and first chair oboist in the symphonic wind ensemble and jazz band. Her many honors include the Neuroscience Creativity Prize sponsored by the American Academy of Neurology and The Child Neurology Society. She holds a provisional patent for her signature verification machine and methodology for minimizing identity theft, and is author of the recently published *History's Real-Life Cinderellas: Four Remarkable Stories of Women Who Changed the World.* The daughter of Dr. Samuel and Sandra Rapoport, she hopes to attend Brown or Harvard.

Brittany Nicole Russo
Sanford H. Calhoun High School

NEW YORK

Brittany Nicole Russo, 17, of **Merrick**, studied how best to teach subjects to "see by sound" for her Intel Science Talent Search project in **behavioral and social sciences**. Intrigued by a system that converts visual information to soundscapes allowing the blind to "see" but taking years to learn, Brittany designed visual and tactile experiments to test learning approaches. In the visual experiment, subjects listened to a soundscape and selected one image out of four images shown on a computer. In the tactile version, blindfolded subjects listened to a soundscape and chose from four objects by feel. Both groups improved over time, however subjects over 30 did better in the tactile version while those under 30 did better on the visual version. Brittany believes further experiments could lead to the development of a teaching method that would facilitate learning a universal soundscape language. Brittany is president of the Key Club and a member of the Calhoun Leadership Academy at **Sanford H. Calhoun High School**. An accomplished pianist, drummer and dancer, she is the daughter of Joseph and Lori Russo. She hopes to attend Harvard or Brown and looks forward to a career in research or medicine.

Carmiel Effron Schickler
Paul D. Schreiber High School

NEW YORK

Carmiel Effron Schickler, 18, of **Port Washington,** entered the Intel Science Talent Search with a **behavioral and social sciences** project that explored Doran's Power-Cycle theory, which states that nations behave predictably when undergoing major shifts in power called critical points. According to Doran, war is more likely during these shifts in relative power. Carmiel quantitatively expanded the theory, and showed that between 1700 and 1920 all violent conflict, not just war, increased during critical points for the nine most powerful nations in the world. The chances of conflict increased when these critical points were accompanied by changes in national leadership. Ultimately, Carmiel hopes to develop a Conflict Alert System that would help predict and prevent violent conflict 6 to 24 months in advance of the possible triggering events. In his spare time, Carmiel enjoys fantasy sports, travel baseball and theoretical physics. He was state winner of the National Peace Essay Contest, and he intends to pursue a political science career after attending Stanford or UC-Berkeley. Carmiel attends **Paul D. Schreiber High School** and is the son of Stanley Schickler and Lucy Effron.

Kimberly Megan Scott
Wellesley High School

MASSACHUSETTS

Kimberly Megan Scott, 17, of **Wellesley**, combined algebra and logic for her Intel Science Talent Search project in **mathematics** to analyze Ehrenfeucht-Fraïssé games, named after the two logicians on whose work these games are based. E-F games measure the similarity of two mathematical structures. She showed how many plays of the games are required before differences are certain to be discovered, in the concrete instances of fields and vector spaces. For algebraically closed fields of equal characteristic, she found an exact bound on the length of the game; this bound is given in terms of the transcendence degrees of the fields. In the more complicated vector space setting, she provided lower and upper bounds in terms of vector space dimension and minimal number of generators for the base field. At **Wellesley High School**, Kim is captain of the Science Olympiad team and earned perfect SAT scores in verbal and math. Her hobbies include drawing, reading and playing trombone and flute. The daughter of Dr. Steven and Laurie Scott, her German fluency has earned her acceptance in the German Honor Society. She hopes to study mathematics at Caltech or MIT.

Jonathan Blake Sellon
Staples High School

CONNECTICUT

Jonathan Blake Sellon, 18, of **Westport**, researched a new way of examining human audio processing which can be applied to current speech recognition technology and cochlear implants for his Intel Science Talent Search project in **medicine and health**. Jon focused on the theory that the inner hair cells (IHCs) located on the ear's basilar membrane help control which signals or sound frequencies the brain focuses on, allowing the listener to distinguish one sound among many. Although many computer algorithms struggle to effectively eliminate background noise or differentiate between two sources of input, this is easily managed by the human brain. By creating a computer model simulating the response of IHCs to stimuli and integrating the model into current auditory nerve stimulation software, Jon believes he increased the accuracy of the separation algorithm. Captain of the award-winning engineering team at **Staples High School**, Jon also competes on the varsity cross country team. The son of Christopher and Lynn Sellon, Jon is a certified medical response technician who plans to study computer science at Princeton or Columbia, focusing on neuroscience applications.

Adam Daniel Sidman
William J. Palmer High School

COLORADO

Adam Daniel Sidman, 18, of **Colorado Springs**, entered the Intel Science Talent Search with an **engineering** project designed for the motion picture industry. As a feature film intern, and head of his own freelance production company, Adam had first-hand experience with the heavy, bulky camera stabilization rigs currently in use, and believed they could be improved. His solution – built in his basement woodworking shop with used and sample electronic equipment – is a lightweight, handheld stabilizer using micro-electromechanical system-based gyroscopic sensors and servo motors. When the gyros sense rotation, they signal the corresponding motor to apply opposing torque, virtually eliminating unwanted movement. He believes his invention is clearly superior to the purely mechanical devices now available and has applied for a patent. The son of Dr. Michael and Renee Sidman, Adam's research received eight awards at the 2005 Intel ISEF in Phoenix. He is design, layout and photography editor of the school paper at **William J. Palmer High School**. Adam was a national finalist in the National History Day competition and plays the saxophone. He hopes to study at Yale or USC.

Adam Ross Solomon
John F. Kennedy High School

NEW YORK

Adam Ross Solomon, 16, of **Bellmore**, entered the Intel Science Talent Search with a **space science** project on brown dwarfs – one of the busiest new fields in astronomy – and established a new methodology for determining their age and mass. Brown dwarfs are too massive to be considered planets, but not massive enough to fuse hydrogen into helium as true stars do. They exhibit significant variation in their near-infrared spectra as they grow progressively dimmer and cooler with time. Adam analyzed light spectra from 53 brown dwarfs, and found that certain features were closely linked to youth, which provided a means to estimate a brown dwarf's age and mass. His findings on age estimation have been submitted to *The Astrophysical Journal*. Prior to this project, Adam discovered a binary star, research that is also submitted for publication. He is fluent in Hebrew, and his honors include the Richard Sipala Award for Most Distinguished Categorical Project in Earth, Space, Energy. Adam attends **John F. Kennedy High School,** where he is assistant editor of the school newspaper and runs track. He plans to study astrophysics at Harvard or Caltech, and is the son of Dr. Scott and Edna Solomon.

Justin Moore Solomon
Thomas Jefferson High School for Science & Technology

VIRGINIA

Justin Moore Solomon, 18, of **Oakton**, presented an Intel Science Talent Search project in **computer sciences** in which he created novel algorithms for the development of a 3D face recognition system from video. His algorithms, based on differential geometry and graph theory, generated data from which he reconstructed the three-dimensional shape of a face. Preliminary testing suggests that his algorithms contribute to a workable method of facial recognition, in which faces may be identified in various poses, expressions and light conditions. In addition, the algorithms could be adapted and extended to include innovative applications ranging from human-computer interaction to geology or robotics. Justin is senior captain of the Computer Team at **Thomas Jefferson High School for Science & Technology** and is an active Eagle Scout. A cellist in the Washington Metro Philharmonic Orchestra, he is also an award-winning pianist and frequently volunteers throughout the community. A Davidson Fellow, Justin is sole author of a paper published in the *Learning & Leading with Technology* journal. The son of Rodney Solomon and Nancy Griesemer, he hopes to study computer science at Stanford or Harvard.

Yi Sun
The Harker School

CALIFORNIA

Yi Sun, 17, of **San Jose**, submitted an Intel Science Talent Search project in **mathematics** that involves the winding number of a function, which, in the case of the plane, is the number of times it encircles the origin. The functions he considers are discrete random walks on the set of points in the plane with integer coordinates. A random walk here is a sequence of vertices such that with equal probability 1/4, a vertex in the sequence will be followed by the vertex directly above, below, to the left, or to the right of it. Yi asked how many steps one expects to take, in order to wind around the origin; he shows that this expected number of steps is infinite. A student at **The Harker School**, Yi reads French and Chinese fluently, captains the Quiz and Science Bowls, and enjoys swimming on the varsity team. Recipient of gold medals at international Olympiads in physics and math, he also received several awards in French and first place in the Mandelbrot Math Competition in 2005. The son of Dr. Lizhong Sun and Tianjing Shen, Yi was born in China. After completing mathematics studies at Harvard or MIT, he hopes to become a professor or research scientist.

Jennifer Ann Taylor
Florence High School

ALABAMA

Jennifer Ann Taylor, 18, of **Florence**, evaluated the antibiotic resistance of microorganisms in the Tennessee River for her Intel Science Talent Search **environmental science** project. Building on research she had begun as a sophomore, Jenny studied bacterial cultures taken from river water samples for susceptibility to 11 common prescription antibiotics. In addition to finding bacteria that showed resistance to multiple antibiotics, her samples also revealed low-level concentrations of some of the antibiotics. Water samples taken from cattle farms along streams bound for the Tennessee River also revealed trace levels of these antibiotics. Jenny concluded that water contamination from a variety of possible sources could notably affect the development of antibiotic-resistant bacteria in the environment. First in her class of 247 at **Florence High School**, Jenny enjoys choir, Scholars' Bowl and Science Olympiad. Her state science fair project earned a first place award in environmental science and a trip to World Expo in Aichi, Japan. In her spare time, she enjoys classical guitar and digital photography. The daughter of John and Pamela Taylor, Jenny plans to study biology and chemistry in college.
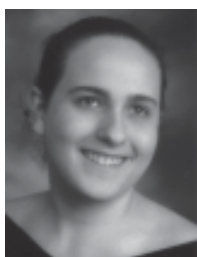
Shoshana Sophie Rothman Tell
Pine Crest School

FLORIDA

Shoshana Sophie Rothman Tell, 18, of **Coral Springs**, studied the role of Wnt, a secreted glycoprotein, in the pediatric eye cancer retinoblastoma, for her Intel Science Talent Search project in **medicine and health**. The role of Wnt can be either pro- or anti-apoptotic (cell death) depending upon the cell line and tissue and has been implicated in more than 20 types of cancers. In her study, Shoshana demonstrated that activation of the Wnt signaling pathway may slow retinoblastoma tumor progression. Her novel approach of using human tumors for her research has allowed her to generate medically relevant conclusions that could benefit patient care by potentially being applied to diagnosis, prognosis and therapy. First in her class of 190 at **Pine Crest School** in Fort Lauderdale, Shoshana is fluent in Spanish and Hebrew. She plays violin in the school orchestra, viola in the Florida Youth Orchestra and sings in the school chorus. Shoshana also volunteers in the pediatric unit of a local hospital. She has traveled to Spain for Crypto-Jewish genetic research and presented a paper on her findings. The daughter of Peter and Meah Tell, she would like to pursue biochemistry and Middle Eastern studies at Harvard and become a researcher.

Joseph Daniel Vellone
Byram Hills High School

NEW YORK

Joseph Daniel Vellone, 17, of **Armonk**, investigated a method of improving the performance of proton exchange membrane (PEM) fuel cells for his Intel Science Talent Search project in **engineering**. Micro PEM fuel cells have the potential to replace lithium-ion batteries and operate 300 percent longer. However, they have a critical problem: water accumulates at the cathode, decreasing performance. Using micro-electromechanical systems (MEMS) fabrication technology Joseph developed a novel gas diffusion media (GDM) to passively remove water. He was able to increase fuel cell performance by as much as 82 percent by making the GDM hydrophilic, adding a supplemental carbon-fiber wick and employing novel pore designs. Joseph believes his research could help advance PEM fuel cells and reduce our reliance on foreign oil. Joseph is captain of the debate and mock trial teams at **Byram Hills High School**, as well as president of the Interact and Amnesty International clubs. Fluent in Italian, he plays piano and tennis, which he has also coached in summers past. The son of E. Joseph and Janis Vellone, he hopes to study at Princeton or Yale and pursue his passions for science and diplomacy.

Michael Anthony Viscardi
Josan Academy

CALIFORNIA

Michael Anthony Viscardi, 17, of **San Diego**, considered for his Intel Science Talent Search project in **mathematics** when it is possible to solve a key problem in complex analysis. The Dirichlet problem asks about the existence of a function which behaves well on a domain, and which agrees with a given function continuous on a neighborhood of the boundary of the domain. Michael provided geometric and algebraic characterizations of those domains over which all solutions of the Dirichlet problem in one complex variable take the following nice form: if the data of the problem is rational, then so is the solution. (The domains he considered satisfy natural but technical conditions: they are simply connected bounded domains with smooth real-analytic boundary.) The Dirichlet problem arises in a wide variety of physical settings, making information about its solution valuable in many applications. Michael attends the **Josan Academy**, earned perfect SAT scores in verbal and math, and published his research in the journal *Computational Methods and Functional Theory*. The son of Anthony and Dr. Eunjee Viscardi, his plans include Harvard and the New England Conservatory of Music.

Nicholas Michael Wage
Appleton East High School

WISCONSIN

Nicholas Michael Wage, 17, of **Appleton**, studied generalized Paley graphs, an important class of graphs, for his Intel Science Talent Search project in **mathematics**. Given a prime p such that 4 divides p-1, we obtain a Paley graph by taking as vertices the integers (0, 1, ..., p-1), with an edge between x and y just in case x - y is a square modulo p. These, together with similarly defined graphs and directed graphs form the class called "generalized Paley." In the case above, when p - 1 is divisible by 4, Nick found the asymptotic limit, as p increases, for the number of complete subgraphs of a fixed size. He showed that this limit equaled that which Paul Erdös (incorrectly) conjectured for all graphs. Nick also counted the number of three cycles for members of the larger family of generalized Paley graphs. His proofs used results from number theory, including Weil's deep theorem on the Riemann Hypothesis for finite fields. Nick, who attends **Appleton East High School**, earned 800s on his critical reading and math SAT scores. His paper is published in the journal *Integers*. Son of Drs. Michael Wage and Kathy Vogel, he plans to study math at Harvard or the University of Wisconsin.

Xin Wang
Illinois Mathematics & Science Academy

ILLINOIS

Xin Wang, 17, of **Geneva**, mapped the gene and specific DNA mutation that causes complete black-and-white colorblindness – achromatopsia – in mice for her Intel Science Talent Search project in **biochemistry**. In one-quarter of the people affected by achromatopsia, the disease is attributed to mutations on the *CNGA3* gene, and is known as achromatopsia 2. Using genetic and gene sequence analysis, Cindy found the mouse strain *nm2608A* had a mutation on the *Cnga3* gene, making it the only naturally occurring mouse model for human achromatopsia 2. This strain provides a murine model for research, which could lead to new drug treatments for human achromatopsia 2. Born in China and fluent in Mandarin Chinese, Cindy is the daughter of Drs. Shiying Wang and Bin Liu. Cindy is co-captain of the Science Olympiad and copy editor of *The Acronym* at **Illinois Mathematics & Science Academy** in Aurora. A violinist, she earned first chair honors in the District and All-State orchestra and is a co-founder of the Serendipity String Quartet. She has earned numerous honors and scored a composite score of 36 on the ACT. Cindy hopes to attend Harvard or MIT and become a science professor.

Genevieve Williams
Redondo Union High School

CALIFORNIA

Genevieve Williams, 17, of **Palos Verdes Estates**, submitted an Intel Science Talent Search project in **zoology** that researched the behavioral foraging process and food preferences of Argentine ants – one of the most invasive ant species in the world – that continue to displace native ant species. Genevieve tested the response of the Argentine ants to seven food groups and varied bait dimensions in order to identify food preference and the ability of the ants to communicate bait size. Her research suggests that their preference for meat, coupled with their ability to efficiently monopolize bait, may be a contributing factor to their invasive dominance. A student at **Redondo Union High School** in Redondo Beach, Genevieve has been active in the 4-H Club for eight years and reads French fluently. Her awards include the Bausch and Lomb Honorary Science Award and the Society of Women Engineers award in math. The daughter of John and Leila Williams, her hobbies include Chinese painting and playing the harp. She plans to study chemistry and biochemistry at Stanford or MIT, and hopes to contribute towards cures for AIDS, Alzheimer's and cancer.

Jeffrey Chunlong Xing
River Hill High School

MARYLAND

Jeffrey Chunlong Xing, 17, of **Clarksville**, entered the Intel Science Talent Search with a **medicine and health** project exploring the relationship between a single nucleotide polymorphism (SNP) and its impact on human follicular thyroid cancer. Examining 503 thyroid tumor samples, Jeff screened for the thymine-quanine SNP on the 105th nucleotide (T105G) of intron 9 of the *PIK3CA* gene, which is a cancer-related gene. He found this SNP to be associated with a dramatically decreased risk for the development of follicular thyroid cancer, concluding that the T105G SNP is a novel cancer suppressor. First in his class of 376 at **River Hill High School**, Jeff is president of the Spanish club, an academic coach and winner of multiple awards in math, Spanish, poetry and English. His hobbies include table tennis, swimming, jogging, poetry and magic. A Baltimore hospital volunteer, Jeff, who was born in China, has used his Chinese language skills to help emergency room workers there. The son of Drs. Michael Xing and Lynn Ling Tao, Jeff plans to attend MIT or Harvard. One day, he hopes to pursue a biomedical or biophysics research career that allows him direct contact with patients.

Irina Vladimirovna Zaitseva
Centereach High School

NEW YORK

Irina Vladimirovna Zaitseva, 18, of **Centereach,** entered a **materials science** project in the Intel Science Talent Search that might result in the formulation of the next generation of sunscreens. The nano-sized particles of titanium dioxide (TiO_2) contained in commercial sunscreens are known to photocatalyze when irradiated, generating oxidative radicals that may cause DNA damage on skin. Irina treated TiO_2 particles with a surface monomer that subsequently permitted the attachment of a polymer shell. She characterized the particle and surface polymer structure via atomic force microscopy, secondary ion mass spectroscopy and confocal microscopy, and demonstrated the efficacy of the polymer-coated TiO_2 particles for limiting degradation of model DNA compounds. Her methodology and results are being considered for patent application, and future journal publication. Irina enjoys playing the clarinet, and currently attends **Centereach High School.** She plans to study chemistry or psychology at the University of Pennsylvania or Brown, and ultimately pursue a career in chemistry. She was born in Russia and is the daughter of Dr. Vladimir Zaitsev and Irina Zaitseva.

Sergio-Francis Mellejor Zenisek
Oregon Episcopal School

OREGON

Sergio-Francis Mellejor Zenisek, 17, of **West Linn**, submitted a **biochemistry** project to the Intel Science Talent Search concerning the chemistry behind the origins of life on Earth, a subject he has researched since eighth grade. Sergio's project explored the reaction of RNA molecules in cell-like structures as a model for the encapsulated chemical reactions that may have led to the first living things. Unlike DNA molecules, which merely carry a genetic code, RNA molecules can both carry a genetic code and enzymatically catalyze chemical reactions that suggest mechanisms involved in the origin of life. By encapsulating RNA in water droplets suspended in oil, Sergio concluded that when RNA is compartmentalized by membranes, recombination can take place, supporting theories of RNA molecules preceeding DNA-based life. At the **Oregon Episcopal School** in Portland, Sergio is active in soccer and track, co-captain of the Science Bowl and orchestra concertmaster. The son of Joseph and Renelia Zenisek, he has received awards in science, writing and poetry, including the Harvard Book Prize. Sergio hopes to pursue studies in the physical sciences at Harvard, Yale or Stanford.

Harley Huiyu Zhang
Ward Melville High School

NEW YORK

Harley Huiyu Zhang, 17, of **East Setauket**, entered a **physics** project exploring the role of general relativity in explosions of certain supernovae to the Intel Science Talent Search. These explosions are caused by the rapid gravitational collapse of massive stars, thus creating a shockwave that expels matter from the supernova. For his project, Harley developed a computer program subroutine that evolved the relativistic hydrodynamic conservation laws and Einstein field equations forward in time. By integrating his subroutine into existing supernova modeling code, he compared the Newtonian and general relativistic models, to study the dynamics of the collapse of a star's core. He concluded that general relativistic effects should be incorporated into supernova mechanism models. At **Ward Melville High School,** Harley is principal violist in the chamber orchestra. Winner of numerous awards in science, math and music, he teaches viola and plays with the All-State String Orchestra. Born in China to Dr. Minghua Zhang and Ying Zhang, Harley is fluent in Mandarin Chinese. Harley, who has perfect SATs in critical reading, math and writing, hopes to study applied mathematics at Harvard or MIT.

Letian Zhang
Illinois Mathematics & Science Academy

ILLINOIS

Letian Zhang, 18, of **Chicago**, entered the Intel Science Talent Search with a **mathematics** project that studied the number P of positive lattice points contained in a given n-dimensional tetrahedra. These tetrahedra are given by sums of n terms, each of the form x/a where x is a positive real and a is at least 1, with the n terms adding up to at most 1. A positive lattice point is a point in n-dimensional space all of whose coordinates are positive integers. Letian proved the "General Estimate Granville-Lin-Yau conjecture," which is an estimate for P which is true for all $n > 2$. From this he deduced the Durfee Conjecture, asked in 1978, and thereby provided a necessary condition for the zeros of a certain kind of function to form a hypersurface. He also related his work to questions of interest in number theory involving Dedekind sums. Letian has co-authored two papers submitted to mathematics journals. He is a student at the **Illinois Mathematics & Science Academy** in Aurora, and a U.S.T.A.-ranked tennis player. Born in China, he speaks fluent Chinese and is the son of Xiaotian Zhang and Jing Li. He plans to study astronomy at Harvard or MIT, and one day hopes to visit the moon and Mars.

Yuan Zhang
Montgomery Blair High School

MARYLAND

Yuan Zhang, 17, of **Rockville**, submitted a project in **medicine and health** to the Intel Science Talent Search. Chelsea studied the molecular mechanisms behind atherosclerosis, or arterial plaque buildup, a disease in which lipid-laden macrophages – fat-filled white blood cells – build up in the vessel wall. The cell-adhesion chemokine molecule CX3CL1 has been implicated in the process. In her study using human cells, Chelsea demonstrated that the adhesion of macrophages to arterial muscle cells was largely CX3CL1-dependent and that components of oxidized lipids increased its expression. She believes targeting the upregulation of CX3CL1 by oxidized lipids could yield drug treatments for atherosclerosis. Chelsea has perfect SAT scores in critical reading, math and writing and has earned numerous awards in writing, science and math. She hopes to attend MIT or Harvard and pursue a career applying information technology to research. She is managing features editor of the school newspaper and co-president of the computer team at **Montgomery Blair High School** in Silver Spring. The daughter of Ruiqiu Zhang and Jingfen Wu, Chelsea was born in China and is fluent in Chinese.

John Cong Zhou
Detroit Country Day School

MICHIGAN

John Cong Zhou, 17, of **Northville**, developed electromagnetic biomaterials that can be used as molecular transducers in biosensor design for the **materials science** project he submitted to the Intel Science Talent Search. He synthesized and characterized three groups of novel organic polymers/nanocomposites with conductive, magnetic and biodegradable traits, and demonstrated their applications in a pathogen-detecting, electrochemical biosensor. John believes the polymers he developed – all part of a new class of materials known as organic magnets – have broad application in medicine and biosecurity. He is first author of a paper on his research that has been submitted for peer-reviewed journal publication, and a patent disclosure has been filed. At **Detroit Country Day School**, in Beverly Hills, John is a member of the varsity track team and treasurer of the student council. He is also principal clarinetist of the Metropolitan Youth Symphony Orchestra. John has perfect SAT scores in critical reading, math and writing, and was recognized in 2005 as a Davidson Fellow. Born in China, he is the son of Dr. Suwei and Xiaofeng Zhou, and hopes to continue his studies at Harvard or MIT.

2006 Intel Science Talent Search
Finalists Listed by State

Alabama	Jennifer Ann Taylor, *Florence High School*	17
California	Yi Sun, *The Harker School*	16
	Michael Anthony Viscardi, *Josan Academy*	18
	Genevieve Williams, *Redondo Union High School*	20
Colorado	Adam Daniel Sidman, *William J. Palmer High School*	15
Connecticut	Kiran Reddy Pendri, *Choate Rosemary Hall*	11
	Jonathan Blake Sellon, *Staples High School*	14
Florida	Shoshana Sophie Rothman Tell, *Pine Crest School*	17
Idaho	Lucas Edward Moller, *Moscow High School*	10
Illinois	Sukrit Ranjan, *Glenbrook North High School*	12
	Xin Wang, *Illinois Mathematics & Science Academy*	19
	Letian Zhang, *Illinois Mathematics & Science Academy*	22
Louisiana	Kate Elizabeth Lowry, *Louisiana School for Math, Science & the Arts*	9
Maryland	Myers Abraham Davis, *Baltimore Polytechnic Institute*	5
	Minh-Phuong Huyhn-Le, *Montgomery Blair High School*	7
	Jeffrey Chunlong Xing, *River Hill High School*	20
	Yuan Zhang, *Montgomery Blair High School*	23
Massachusetts	Kimberly Megan Scott, *Wellesley High School*	14
Michigan	John Cong Zhou, *Detroit Country Day School*	23
New York	Diane Jeehea Choi, *Syosset High School*	4
	Allison Mae Gardner, *Byram Hills High School*	5
	David Bruce Kelley, *Highland High School*	7
	Sheela Krishnan, *Suffern High School*	8
	Jerrold Alexander Lieblich, *Ward Melville High School*	8
	Eric Allan Meyerowitz, *Northport High School*	9
	Sarah Kate Rapoport, *Horace Mann School*	12
	Brittany Nicole Russo, *Sanford H. Calhoun High School*	13
	Carmiel Effron Schickler, *Paul D. Schreiber High School*	13
	Adam Ross Solomon, *John F. Kennedy High School*	15
	Joseph Daniel Vellone, *Byram Hills High School*	18
	Irina Vladimirovna Zaitseva, *Centereach High School*	21
	Harley Huiyu Zhang, *Ward Melville High School*	22
North Carolina	Evan Scott Gawlik, *Texas Academy for Mathematics & Science*	6
Ohio	John Pease Moore, IV, *Dayton Christian High School*	10
Oregon	Elyse Autumn Hope, *Oregon Episcopal School*	6
	Sergio-Frances Mellejor Zenisek, *Oregon Episcopal School*	21
Utah	Shannon Lisa Babb, *American Fork High School*	4
Virginia	Justin Moore Solomon, *Thos. Jefferson HS for Science & Technology*	16
Washington	Anna Jolene Mork, *Shorewood High School*	11
Wisconsin	Nicholas Michael Wage, *Appleton High School East*	19

Babb, Shannon Lisa	Highland, UT	4
Choi, Diane Jeehea	Syosset, NY	4
Davis, Myers Abraham	Baltimore, MD	5
Gardner, Allison Mae	Bedford, NY	5
Gawlik, Evan Scott	Pinehurst, NC	6
Hope, Elyse Autumn	Portland, OR	6
Hyuhn-Le, Minh-Phuong	Silver Spring, MD	7
Kelley, David Bruce	Highland, NY	7
Krishnan, Sheela	Suffern, NY	8
Lieblich, Jerrold Alexander	East Setauket, NY	8
Lowry, Kate Elizabeth	Slidell, LA	9
Meyerowitz, Eric Allan	Northport, NY	9
Moller, Lucas Edward	Moscow, ID	10
Moore, IV, John Pease	Bellbrook, OH	10
Mork, Anna Jolene	Shoreline, WA	11
Pendri, Kiran Reddy	South Glastonbury, CT	11
Ranjan, Sukrit	Northbrook, IL	12
Rapoport, Sarah Kate	New York, NY	12
Russo, Brittany Nicole	Merrick, NY	13
Schickler, Carmiel Effron	Port Washington, NY	13
Scott, Kimberly Megan	Wellesley, MA	14
Sellon, Jonathan Blake	Westport, CT	14
Sidman, Adam Daniel	Colorado Springs, CO	15
Solomon, Adam Ross	Bellmore, NY	15
Solomon, Justin Moore	Oakton, VA	16
Sun, Yi	San Jose, CA	16
Taylor, Jennifer Ann	Florence, AL	17
Tell, Shoshana Sophie Rothman	Coral Springs, FL	17
Vellone, Joseph Daniel	Armonk, NY	18
Viscardi, Anthony Michael	San Diego, CA	18
Wage, Nicholas Michael	Appleton, WI	19
Wang, Xin	Geneva, IL	19
Williams, Genevieve	Palos Verdes Estates, CA	20
Xing, Jeffrey Chunlong	Clarksville, MD	20
Zaitseva, Irina Vladimirovna	Centereach, NY	21
Zenisek, Sergio-Francis Mellejor	West Linn, OR	21
Zhang, Harley Huiyu	East Setauket, NY	22
Zhang, Letian	Chicago, IL	22
Zhang, Yuan	Rockville, MD	23
Zhou, John Cong	Northville, MI	23

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