Background on the Exhibits, Students and Competitions at the White House Science Fair

The third White House Science Fair celebrates as honored guests 100 students from over 40 states, representing 45 different competitions and organizations that work with students and inspire them to excel in science, technology, engineering and math (STEM) subjects. Approximately 30 student teams will also have the added opportunity to exhibit their projects. In addition, senior Administration officials and leading STEM communicators, advocates, and educators will attend the White House Science Fair and meet the students.

Expected attendees include:

Senior Administration Officials, Appointees, and Members of Congress
- **John Holdren**, Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy (OSTP)
- **Nancy Sutley**, Chair, White House Council on Environmental Quality (CEQ)
- **Francis Collins**, Director, National Institutes of Health (NIH)
- **Cora Marrett**, Director, National Science Foundation (NSF)
- **Charles F. Bolden**, Administrator, National Aeronautics and Space Administration (NASA)
- **Harold Varmus**, Director, National Cancer Institute (NCI)
- **Kathryn D. Sullivan**, Acting Administrator, National Oceanic and Atmospheric Administration (NOAA)
- **Wendy Spencer**, Chief Executive Officer, Corporation for National and Community Service (CNCS)
- **Rosina Bierbaum**, Professor, University of Michigan School of Natural Resources and Environment and member of the President's Council of Advisors on Science and Technology (PCAST)
- Congressman **Chaka Fattah**
- Congresswoman **Eddie Bernice Johnson**

Leading STEM and Media Communicators
- **Bill Nye**, *Bill Nye the Science Guy* and Executive Director, Planetary Society
- **Kal Penn,** Actor, Producer, Host of upcoming series *The Big Brain Theory: Pure Genius*
- **Victor Cruz,** Wide Receiver, New York Giants
- **Bobak Ferdowsi,** Flight Director, Mars Curiosity Rover (aka NASA's "Mohawk Guy")
- **Bill Prady,** Writer, Producer, and Co-Creator, *The Big Bang Theory*
- **LeVar Burton,** Actor, Director, and Producer, *Reading Rainbow* and *Star Trek: The Next Generation*

A sampling of the exhibits that the President will see include:

- Lending a hand for a fraction of the cost: After years of tinkering with robotic arms made of Legos and controlled by Nintendo gloves, **Easton LaChapelle**, 17 of Mancos, **Colorado** was inspired to take his efforts to the next level when he met a girl with an $80,000 prosthetic arm at a science and engineering festival. With that encounter, he

decided that he could find a cheaper way to build a more functional limb at a fraction of the cost. Generating most of the parts through a 3D printer, Easton was able to assemble a fully operational arm at a price of only $250. He is now working on controlling the hand through a headset to further improve its utility for people with limited limb mobility.

- Sports-loving grade-schoolers create new product concept to keep athletes cool: **Evan Jackson** (10), **Alec Jackson** (8), and **Caleb Robinson** (8)—all Flippen Elementary School students from McDonough, **Georgia**—noticed first-hand that dehydration and overheating are common problems on the football field. The students came up with an innovative product concept: COOL PADS for the shoulders, helmet, armpits, and groin that feature temperature sensors and a cooling system to help players maintain safe body temperatures on the field. Evan got his start with science using an at-home science kit and watching YouTube videos of simple experiments; Alec is a Junior Olympic Champion with a penchant for breaking things apart to see what's inside; and Caleb is an avid reader interested in the mechanics of cars, airplanes, and ice–cream-making machines. The Team's design is a Grade K – 3 Regional Winner of the 2012 Toshiba and National Science Teachers Association ExploraVision competition.

- Using the cloud to combat cancer: A self-described teen who never grew out of the "why" phase, **Brittany Wenger**, a high school Senior from Sarasota, **Florida**, recently took home the Grand Prize at the Google Science Fair for developing a computer program that improves cancer detection. Inspired by her cousin's battle with breast cancer, Brittany spent over 1,000 hours researching and creating the Global Neural Network Cloud Service for Breast Cancer, a service that combines multiple data from a single less invasive procedure to improve cancer detection. Originally conceived with the goal of helping hospitals to diagnose and treat more women earlier, the service has already run 7.6 million trials, with 99.11 percent sensitivity. Though science has been her passion since first starting a science club in the third grade, Brittany has managed to master other talents as well as a varsity soccer player and mentor to students in her community.

- Kid "maker" builds paint-bot with artistic flair: 11-year-old **Sylvia Todd**—known to many as "Super-Awesome Sylvia"—hails from Auburn, **California**, and is making the most of being a young maker. Inspired by her first visit to a Maker Faire at age 7, Sylvia quickly learned to solder and started a web show with her father devoted to sharing the fun of "making" with the world. Sylvia had the idea to build a drawing robot that paints with watercolors, and with the help of Evil Mad Scientists Laboratories and lot of hard work, she spent her President's Week school-vacation turning the idea into reality. Today, Sylvia's web videos have been viewed millions of times and she is slated to showcase her art 'bot at the 2013 RoboGames.

- Teens design pedal-powered filtration system: High-schoolers **Payton Karr** and **Kiona Elliott**, from Oakland Park, **Florida**, led a team of inventors who designed a collapsible, transportable, bicycle-powered emergency water-sanitation station that filters E. coli and other harmful pathogens from contaminated water. In emergencies, the device can be assembled and disassembled in under an hour, and can produce enough water to hydrate

20 – 30 people during a 15 hour period. Payton, Kiona, and their Northeast High School classmates received a 2012 InvenTeam grant from the Lemelson-MIT Program, which supported their development of the innovative design. Both Payton and Kiona intend to be the first in their families to attend college.

- <u>Young inventors design alarm system to save swimmers' lives</u>: **Julie Xu, Spencer Ottarson**, and a team of ambitious high-schoolers from Willamston, **Michigan**, invented the Offshore Rip Current Alert System (ORCA)—a buoy outfitted with a solar-powered flow-meter and alarm system that can alerts swimmers to dangerous conditions in the water. The students, who were selected to be a 2012 Lemelson-MIT program InvenTeam, built the device with the goal of reducing the number of drowning deaths due to rip currents in the Great Lakes. Julie moved to the United States from China in 1999 and plans to study biomedical engineering in college. Spencer is a freshman computer science major at Michigan State University who hopes to harness his entrepreneurial spirit to someday build and run his own software start-up.

- <u>High-school "fly boys" launch rockets (and stellar aviation careers)</u>: As rocketry-loving students at Wooddale High School's aviation program in Memphis, **Tennessee**, **Wesley Carter** and **Darius Hooker** trained for private pilot's licenses and studied rocket science alongside their traditional coursework. Sometimes called "fly boys" by their peers, Wesley and Darius received financial support from their community to travel to Washington for the Team America Rocketry Challenge—which dared competitors to propel eggs to a certain altitude and return them to the ground unbroken in less than a minute. Darius is now earning his aircraft mechanics license at the Tennessee Technology Center and plans to attend college before taking a job with FedEx, and Wesley is studying at Middle Tennessee State University.

- <u>Girl Scout Troop develops non-pharmaceutical remedy for sleeplessness in senior citizens</u>: When faced with the challenge of alleviating insomnia without complicated drug interactions, The Atomic Flying Pickles, a FIRST Lego League team of 6th grade Girl Scouts hailing from Los Alamos, **New Mexico**, came up with a novel idea. After reading about a circulating water cooling cap that was used in a University of Pittsburgh School of Medicine sleep study, the girls set about creating a cheaper, lighter, and less onerous solution—the cooling headband. **Summer Bronson**, **Catherine Rousculp**, and their teammates have already begun to test the model to the great enthusiasm of their subjects. When not helping seniors to rest easy or designing Lego robots, Summer and Catherine both enjoy computer programming and rock climbing.

- <u>Young problem solvers make fuel wood-alternative from bio-waste</u>: **Jon Kubricki** and **Bridget Zarych**, both 16-year-old students at Pinelands Eco Regional High School in Little Egg Harbor, **New Jersey**, are winning team-members of the Siemens We Can Change the World Challenge. Jon, Bridget, and their teammates designed a low-cost, easy-to-ship mini-press that can turn biomass waste products, such as banana peels, into a viable wood-alternative for cooking. Jon lived the first two years of his life in a Guatemala City orphanage, before moving to New Jersey with his adopted family. He is a football player, wrestler, and fisherman who hopes to pursue a fisheries science degree in

college. Bridget is deeply involved in theater arts at school, and says her hero is her Mom.

- Multi-heritage city-design team innovates for urban water management: **Emily Ocon** (13), **Catalina Rincon-Arcila** (14), **and Amanda Gonzalez** (12) are students at St. Thomas the Apostle School in Miami, **Florida**, whose city-design, *Infinitum X*, earned them a Future City National Award for Best Management of Water Resources. The students designed a progressive urban environment that can handle large amounts of storm-water runoff by using green technologies and major roadways as storm-water filtration and transport surfaces. Teamwork and sharing diverse perspectives are important to these students, whose parents come from Colombia, Nicaragua, Italy, and Cuba. Emily, Catalina, and Amanda recently learned that they will receive a student recognition award at an upcoming Association of Cuban Engineers Gala.

- Student leader inspires community youths to pursue STEM: Portland, **Oregon**'s **Meghana Rao** is a Jesuit High School junior who—in addition to researching the ability of a class of charcoal known as biochar to store carbon—founded and directs a student-run non-profit organization, Portland Junior Scientists (PJS). Her organization connects high school students with underprivileged youths through collaborative hands-on science experiments, with the aim of inspiring all participants to pursue higher education. Meghana started PJS in 2011, after learning that severe budget cuts where forcing local elementary schools to cut back on science curricula. Through her organization, local students can attend weekly 1-hour afterschool science programs, participate in science fairs, and attend summer science programs. Her hard work helped her earn a 2013 Young Naturalist Award from the American Natural History Museum, and brought PJS a $5,000 grant from the Pepsi Refresh Project and an $11,500 grant from the Case Foundation's Finding Fearless program.

- Small school achieves heavy lift: As the smallest middle school in a field of 57 competitors that were mostly high schools, odds were against the St Vincent de Paul BEST Robotics Team from Theodore, **Alabama**. Yet their remarkable robot, "Vator" (short for Ele-Vator), which was designed to mimic space elevators by carrying cargo up a 10 foot pole, emerged triumphant, winning a 1st Place Robot Award. For **Victoria Fletcher** (13), **Rush Lyons** (14), **Thomas Shields** (13), and their teammates, the experience of designing a product and marketing it to judges not only reinforced the value of teamwork, but demonstrated the applications that science and math can have on Earth and beyond.

Additional exhibits at the White House Science Fair include:

- Progress on economically-viable biofuel: **Sara Volz**, 17-years old, is the national winner of the Intel Science Talent Search, for ground-breaking work to make algae an economically-viable biofuel. From Cheyenne Mountain High School in Colorado Springs, **Colorado**, Sara's cutting-edge research showed new method to increase microalgae oil yields and make algae biofuel. Sara is also captain of the speech and debate team, and her long-term goal is to understand the universe. As the national winner

of the Science Talent Search competition, Sara competed against 1,700 other students and won $100,000 scholarship.

- Filling a void in fighting eye fatigue: Junior High School student **Jessika Baral** noticed a trend in her community in Freemont, **California**: her friends were spending long periods of time looking at screens, a phenomenon that can lead to eye muscle fatigue. Known at home for her kitchen-table experiments and love of building solar cars and catapults, Jessika decided to design a device to strengthen tired eye muscles and improve peripheral vision. Through her research –conducted between trombone recitals, contemporary Indian dance performances, and computer programming sessions – she found that regular exercise with the device significantly improved peripheral vision in children and adults by as much as 87%. No device like this exists today, so Jessika aims to manufacture 200 of them using her prize money from awards she has earned in competitions like the Broadcom MASTERS in order to donate them to local high schools across California.

- Creating an app to connect caregivers to parents: **Shaquiesha Davis** is a Chicago Tech Academy high-schooler who grew up in Addams-Brooks-Loomis-Abbot housing development in Chicago, **Illinois**. Shaquiesha is determined to be leader of positive change in her community. She designed a mobile app—Baby B 4 Me – to help give parents a sense of comfort while their children are in the care of a babysitter or nanny. Inspired by her own experience as a babysitter, Shaquiesha built the app to feature a real-time chart function that allows parents to record, for example, what time their child should have lunch and enables a care provider to update the chart once a task has been completed. Shaquiesha's app earned her a second place award at Chicago's city-wide Future Founders Competition. She plans to leverage her entrepreneurial spirit to someday own her own business.

- Teen inventor is on the cutting-edge of turbine blade design: 18-year-old **Caleb Meyer**, of Hope, **North Dakota**, won a Third Award at the 2012 Intel International Science and Engineering Festival for his innovative design of a high-speed, small-scale wind turbine that can be used in the home. Caleb got interested in wind power when a 300-tower wind farm was built near his home. Upon learning that each tower could cost as much as $1.5 million, he decided to seek out ways to make turbines as efficient as possible. When not researching innovative turbine-blade design, Caleb sings bass in his school choir, lends a hand on his family's farm, and uses his two 3D printers to manufacture objects from plastic. He hopes to study mechanical engineering and aerospace in college.

- Student engineers steady the hands of tremor-patients: **Lauren Arkoosh** (19)**, Kevin Brandecker** (18)**, Patrick Schultz** (20), and their Bishop Kelly High School classmates from Boise, **Idaho**, invented MagWrite and MagMouse—two portable devices that help people suffering from hand and forearm tremors to write and mouse-click more accurately. The device prototypes are small enough to fit on any home or office desk-top and focus on dampening tremors that interfere with fine motor control. Aside from engineering, Lauren, Kevin, and Patrick boast skills as diverse as pole vaulting, car restoration, and software development. Their inventions grew out of earlier Science Olympiad and AbilityOne Design Challenge projects, and were funded with an

InvenTeam grant from the Lemelson-MIT Program.

- Life-long video-gamer makes it fun to multiply: Fourteen-year-old **Gustavo Zacarias** from San Antonio, **Texas** has been playing video games since he was 4 years old. Gustavo designed and programmed an original video game called "the Dark Labyrinth" with the goal of making it fun for young students to learn basic multiplication skills. His game challenges players to navigate through a maze while solving multiplication problems and racing against the clock. Gustavo built his game using Kodu Game Lab, a game creation platform that allows young people to make games using a simple visual programming environment. His creation earned him a winning spot at the National STEM Video Game Challenge. Gustavo hopes to one day become a professional game designer.

- Middle-schooler takes tech-centric stand against bullying: Sixth-grader **Cassidy Wright** is a student from Boston, **Massachusetts** who decided to be a force of positive change in her school. As a project for her school's TechnoSWAG learning-apprenticeship program, Cassidy created a light-up banner out of LED lights and conductive wire that is computer-programmed to flash the phrase "BE YOUR SELF." She built the banner to make a statement against bullying in middle schools and to encourage other students to accept themselves, and others, as they are. Cassidy has a diverse array of goals and dreams, including becoming a crime-scene-investigation scientist, a chef, a photographer, and a business owner. When it comes to her own individuality, she likes to tell herself something she first heard from her mom, "I'm specially gifted in my own way and I don't try to be like everybody else."

- Sax-playing, teenage black-belt invents sustainable water purification system: **Deepika Kurup** is a Nashua, **New Hampshire** 9th-grader skilled in sustainable science, saxophone, and the martial arts. During a family trip to India, Deepika noticed a critical lack of access to clean drinking water—a problem, as she later learned, that affects more than one billion people around the world. To help solve this global problem, she developed a cost-effective, sustainable water-purification system that harnesses solar energy to disinfect contaminated water—an invention that earned her the grand prize of the Discovery Education 3M Young Scientist Challenge. When not traveling, or engineering solutions that could someday save lives, Deepika enjoys putting her black belt in Shaolin Kempo martial arts to good sparring use and jamming on both the clarinet and alto-sax.

- Star sibling inventors help seniors stay safe on the road: **Alexandra and Alden Pratt**— 12 and 13 years old from Middletown, **Rhode Island**—are team-leaders and multi-year veterans of the First Lego League competition. This year, the Pratts and their team developed a device, called Xcelerite, that helps seniors retain their independence by enabling safer driving. The device monitors vehicle acceleration and—the moment an aggressive acceleration is detected—reverts the vehicle's throttle back to "idle." Dialing back potentially unintended accelerations can help prevent accidents and empower seniors to stay safe on the road. Alex is a tennis player who hopes to someday study medicine and who previously designed a video game for visually impaired kids that

allows users to play using auditory commands. Alden is an honors student, cross-country runner, and karate black-belt who intends to pursue a STEM degree in college.

- <u>Teen brings the sound (and touch) of music to the hearing-impaired</u>: Fifteen-year-old **Jonah Kohn**, of San Diego, **California**, doesn't just like to play music—he likes to build it. Three years ago, Jonah built an electric guitar from scratch, starting with a block of wood and an idea. He designed the instrument himself and soldered all of its internal electronics. Today, he says, the guitar is still making beautiful music. Jonah's science project, called "Good Vibrations," led him to build a device that can help hearing-impaired people enjoy music through tactile vibration. The device uses vibrating speakers to impart listeners with vibrations of different frequencies at different points on their bodies, in conjunction with auditory sound. When he tested the device on hearing-impaired subjects, more than 90 percent reported improvement in their perception of music. His invention earned him a top prize at the Google Science Fair.

- <u>High school senior studies genes that may link sleep and health outcomes</u>: **Jasmine Johnson** is an 18-year-old sleep-scientist from Conyers, **Georgia**, whose research on the links between sleep and obesity revealed new connections between certain sleep-regulating genes and physical outcomes such as body weight and cardiac defects. The genes Jasmine identified could ultimately help scientists better understand the relationship between sleep patterns and diseases and functions of the body. She was inspired to study the topic of sleep after noticing the harmful effects of sleep-depravation on those around her. Jasmine is currently choosing between colleges, but says that wherever she goes, she intends to apply her love of science and research to benefit her community.

- <u>High school trio launches rocket with STEM savvy and girl power</u>: **Isabella Marie Leighton, Dalia Ivon Castillo, and Ruth Marie Moltz Long**, all from San Antonio, **Texas**, say they are showing the country just how far—or in this case how high—a little "girl power" can take them. To meet the Team America Rocketry Challenge (TARC), the trio of high school freshman designed and built a rocket that safely launched a payload of raw eggs to a precise altitude and landed them back on the ground within a specified time window. Isabella enjoys hands-on science projects and playing with numbers and math; Dalia is proud to have worked on an all-girl TARC robotics team; and Ruth loves to communicate complex concepts in a way that is engaging to everyone. The team's ambition has rubbed off on their peers. Today, at Isabella, Dalia, and Ruth's school, four all-girl teams are competing for a spot at the next TARC competition.

- <u>Illness no obstacle, teen roboticist leaves hospital to lead team victory</u>: Jaimaican-born teen **Chevanne Binns-Wallace** from Baltimore, **Maryland**, who suffers from sickle cell anemia, literally begged doctors to let him out of his hospital bed to practice with the team he ultimately led to victory at the Baltimore SeaPerch Challenge. Chevanne and his teammates built an underwater robot with a propulsion system, wire circuit board, and controller that could quickly navigate an underwater obstacle course. Chevanne says working with robots has taught him invaluable design and programming skills and

inspired him to someday become an engineer. His dream is to apply his passion for programming and robotics to a future job serving his country.

- Innovative teen turns idea into patented technology: **North Carolina** 11th-grader **Greyson McCluskey** got an early start with STEM by watching PBS and playing with Legos. When he first entered his "Baby Safe Rider" idea into Time Warner Cable's "Wouldn't It Be Cool If…" competition, he never imagined it would turn into a patented technology. Today, it has. The technology, called "Tempro: Thermal Protection Solutions," is a device capable of recognizing the presence of a child, animal, or elderly person while simultaneously monitoring its temperature. The device can detect severe temperature fluctuations and send out notifications in order to prevent the possibility of a hyper- or hypo-thermia related injury or fatality. Using the device in a baby's car seat, for example, could help prevent heatstroke casualties for children left unattended in cars. Thanks to Time Warner Cable's Connect a Million Minds and innovation agency Fahrenheit 212, Greyson is on his way to establishing a business around his innovative concept.

- Facing rejection while revolutionizing pancreatic cancer detection: For 16-year old **Jack Andraka** of Crownsville, **Maryland**, the road to discovering a novel pancreatic cancer detector that is 28 times faster, 28 times cheaper, and 100 times more sensitive than previous tests was not an easy one. The 2012 Intel Science and Engineering Fair champion was denied approximately 200 times before he was finally granted space in an academic research lab to pursue the work on pancreatic cancer detection that he started after his uncle died of the disease. A competitive kayaking champion in his spare time, Jack hopes that his new test, which senses a protein produced by pancreatic tumors, will help improve early detection for the 44,000 Americans who are annually diagnosed with the disease.

- Harnessing nature to help others: When a massive flood hit his town of Munster, **Indiana** several years ago, **Nathan Kondamuri** was moved by the potential of natural phenomena to profoundly impact human health and wellbeing. Thereafter, he envisioned a world where the power of nature, such as the immense power of the sun, could be harnessed in a more efficient manner to provide energy to various parts of the world. For the past three years, he has conducted cutting-edge research in the pursuit of a unique solar cell that creates electricity by mimicking photosynthesis. As finishes his senior year at Munster High School, he hopes to continue studying renewable technologies that will help to alleviate the negative effects of energy demand on society and the environment.

- Student contracts with Army for novel photodetector: **Saumil Bandyopadhyay**, a high-school senior at Maggie L. Walker Governor's School in Richmond, **Virginia**, didn't wait until graduation to begin growing novel technologies for use by cutting edge organizations. Already, his research has resulted in four peer-reviewed journal publications (he is lead author in two) and a fifth is currently under review. He co-holds a provisional US patent for his discovery of a novel photodetector, and one year ago, he was hired by the US Army to develop a frequency-selective infrared photodetector with high light-to-dark contrast ratio. Yet despite the high demand and long hours of research

and competing in contests like the Siemens Competition in Math, Science and Technology and the Junior Science and Humanities Symposium, Saumil still finds time to share his love of science by mentoring underrepresented students in his community.

<u>In addition to the those exhibiting, honored student winners invited to the White House Science Fair include:</u>

- **Ben Mattinson, 18**
  Phoenix Country Day School, Pleasant Valley, <u>Arizona</u>
  2012 For Inspiration and Recognition of Science and Technology (FIRST) Robotics Competition Future Innovator Award winner

- **John Rangel, 17 Dillon Dayea, 17 & Bianca Rodriguez, 17**
  Carl Hayden High School, Phoenix, <u>Arizona</u>
  2013 FIRST Robotics Competition Regional Winner

- **David Runneals, 17**
  Nevada High School, Nevada, <u>Iowa</u>
  National 4-H GIS/GPS Technology Team

- **Hayden Hilst, 13, Riya Kaul, 12, and Rebecca Mackey, 13**
  Jenks Middle School, Jenks, <u>Oklahoma</u>
  eCYBERMISSION 2013 Regional Finalists

- **Savannah Cofer, 13 and Varun Vallabhaneni, 14**
  Columbus Academy, Gahanna, <u>Ohio</u>
  Christopher Columbus Awards 2012 Gold Medal Winner

- **Andrew Dicken, 17 and Abhinav Jambulingam, 18**
  Springbrook High School, Silver Spring, <u>Maryland</u>
  Microsoft Imagine Cup, 2nd Place, Game Design

- **Cecilia Poole, 16**
  Caraval Academy, Newark, <u>Delaware</u>
  Dupont Challenge Science Essay Competition

- **Mike Espy, 15**
  Little Snake River Valley School, Baggs, <u>Wyoming</u>
  Dupont Challenge Science Essay Competition

- **Rian Walker, 17**
  Ocean Springs High School, Ocean Springs, <u>Mississippi</u>
  National Center for Women & Information Technology (NCWIT) Aspirations in Computing

- **Jeffrey Rubel, 17 and Riley Sloan, 17**

Pembroke Hill School, Kansas City, <u>Missouri</u>
Envirothon National Champions

- **Mike Novak, 16 and Brandon Zalinsky, 16**
  Mountain Home High School, Mountain Home, <u>Arkansas</u> and Londonderry High School, Londonderry, <u>New Hampshire</u>
  FIRST Robotics Competition

- **Claire Telfer, 15**
  Lincoln-Sudbury Regional High School, Lincoln, <u>Massachusetts</u>
  FIRST Lego League 2012 Champions

- **Karlin Yeh, 17**
  Livingston Senior High School, Livingston, <u>New Jersey</u>
  FIRST Technology Challenge Inspire Award

- **Nikita Rau, 16**
  Bronx High School of Science, Bronx, <u>New York</u>
  Girls Who Code, National Runner-Up, NCWIT Aspirations in Computing

- **Senqué Little-Poole, 15**
  Pittsburgh Science and Technology Academy, Pittsburgh, <u>Pennsylvania</u>
  Pennsylvania Regional Science and Engineering Fair (PRSEF)

- **Chris Hillenbrand, 15**
  Regis High School, New York, <u>New York</u>
  International Chemistry Olympiad Gold Medal Winner

- **Chad Qian, 14**
  Exeter Academy, Exeter, <u>New Hampshire</u> (hometown: Indianapolis, <u>Indiana</u>)
  Winner, 2012 National MATHCOUNTS Competition

- **Zainab Oni, 16**
  Hudson High School of Learning Technologies, New York, <u>New York</u>
  MOUSE Corps

- **Sydney Wallace, 13 and Austin Jang, 14**
  Union High School, Vancouver, <u>Washington</u>
  National Science Bowl

- **Wilfried Hounyo, 17 and Golden Rockefeller, 16**
  McKinley Technology High School, Washington, <u>District of Columbia</u>
  National STEM Video Game Challenge

- **Magdalena Wegrzyniak, 14 and Morgan Ziegler, 18**

Sport & Medical Science Academy New Britain, <u>Connecticut</u>
Network for Teaching Entrepreneurship (NFTE)

- **Anthony Halmon, 17**
Perspectives Leadership Academy, Chicago, <u>Illinois</u>
Network for Teaching Entrepreneurship (NFTE)

- **Melissa Mercado, 17 and Josh Emig, 18**
Rancho High School, Las Vegas, <u>Nevada</u> and Massachusetts Institute of Technology, Cambridge, <u>Massachusetts</u>
Real World Design Challenge

- **Henry Lin, 17**
Caddo Parish Magnet High School, Shreveport, <u>Louisiana</u>
Siemens Competition in Math, Science and Technology

- **Mabel Wheeler, 13**
Lake Ridge Junior High School, Orem, <u>Utah</u>
Broadcom MASTERS

- **Megan Waples, 16**
University School of Milwaukee, Milwaukee, <u>Wisconsin</u>
International Science and Engineering Fair

- **Naethan Sid Mundkur, 17**
DuPont Manual High School, Louisville, <u>Kentucky</u>
Intel Science Talent Search

- **Grant Feldhege, 16, Neil Molitor, 16, and Tyler Tran, 16**
St. Cloud Tech High School, St. Cloud, <u>Minnesota</u>
State Skills USA Competition in Engineering Technology and Design

- **Jacob Hoffman, 17, Jacob Lemanowicz, 17, and Theodore Poulos, 17**
Westlake High School, Westlake, <u>Ohio</u>
Great Big Home and Garden Show Student Model Home Design Contest

- **Parth Thakker, 17 and Monal Depani, 18**
North Carolina School of Science and Mathematics, Durham, <u>North Carolina</u>
Conrad Foundation Spirit of Innovation Challenge

- **Richard Kopelow, 17 and Ruiqi Mao, 17,**
Montclair High School, MontClair, <u>New Jersey</u> and Mira Loma High School, Carmichel, <u>California</u>
Zero Robotics

- **Achuth Nair, 15 and Stephanie Zhu, 17**
  Solon High School, Solon, Ohio
  Science Olympiad

- **Jana Washington, 13 and Afiya Tyus, 14**
  Howard University Middle School of Math and Science & Sidwell Friends, Washington, District of Columbia
  Girls, Inc.

More details on the more than 40 competitions and organizations represented by students include:

- **4-H**
  In response to the President's call to improve youth participation and performance in STEM, 4-H has elevated the STEM content and skill development in traditional 4-H programs, expanded opportunities in new areas such as robotics and geospatial technology, and launched the annual 4-H National Youth Science Day to engage youth across the country in an interactive, hands-on science experiment to spark their interest in science. http://www.4-h.org/

- **BEST Robotics**
  BEST Robotics (Boosting Engineering, Science and Technology) is a volunteer-based robotics competition inspiring students to pursue careers in engineering, science, technology and math. Friends of BEST in Alabama is a recognized partner of BEST Robotics, providing educational and workforce development resources to communities, focused on skill sets for a 21st century high-tech highly-skilled workforce. http://www.friendsofbest.org/

- **Broadcom MASTERS**
  The Broadcom MASTERS, a program of Society for Science & the Public, is a national science, technology, engineering, and math competition for U.S. 6th, 7th, and 8th graders. It inspires and encourages thousands of the nation's young scientists, engineers, and innovators each year. http://www.societyforscience.org/masters

- **ChiTech**
  Chicago Tech Academy (ChiTech) is a non-profit, 4-year contract school located in University Village founded to inspire, educate and connect the next generation of leaders. ChiTech also seeks to increase the number of minority and low income students that pursue science, technology, engineering, and math (STEM) in college and careers. http://www.chitech.org/

- **Christopher Columbus Awards**
  The Christopher Columbus Awards is a national, community-based STEM competition for sixth, seventh and eighth graders. Working in groups, teams identify a problem in their community and apply the scientific method to create an innovative solution to that problem. http://www.christophercolumbusawards.com/

- **Citizen Schools**
  Citizen Schools apprenticeships are 10-week hands-on learning opportunities led by volunteer professionals who teach their expertise in Science, Technology, Engineering, Math or other topic areas to middle school students. Apprenticeships provide students with access to mentors and connect what students learn in school to real-world college and career pathways. http://www.citizenschools.org/about/model/apprenticeships/

- **Conrad Foundation Spirit of Innovation Challenge**
  The Conrad Foundation's Spirit of Innovation Challenge celebrates the life and entrepreneurial spirit of astronaut Pete Conrad, third man to walk on the Moon. 13 - 18 year old students from around the world use STEM skills to develop business and technical plans for innovative products and services in one of four categories: Aerospace and Aviation, Cybertechnology and Security, Energy and Environment, and Health and Nutrition. http://www.conradawards.org/pages/conrad-foundation

- **Discovery Education 3M Young Scientist Challenge**
  To help cultivate the nation's next generation of great thinkers and innovators and keep them interested in STEM-related issues, Discovery Education and 3M have teamed up to reward students for their science acumen and curiosity, while encouraging them to share that passion by creatively communicating their findings through this national competition. http://www.youngscientistchallenge.com/

- **DuPont Challenge Science Essay Competition**
  As part of the U.S. Army Educational Outreach Program, is a web-based, STEM competition free to students in grades six through nine, that awards teams based on their ability to identify a problem in their community and use the scientific method/inquiry or the engineering design process to propose a solution. http://www.usaeop.com/

- **eCYBERMISSION**
  eCYBERMISSION is a web-based, Science, Technology, Engineering and Mathematics (STEM) competition free for students in grades 6-9 that challenges students to think about real-world applications of STEM by working in teams to identify a problem in their community and using the scientific method, scientific inquiry, or engineering design process to find a solution. http://www.ecybermission.com/

- **Envirothon**
  Envirothon is North America's largest high school environmental education competition, which requires hand-on application of students' knowledge of our environment and natural resources. Students compete outdoors in the areas of Aquatic Ecology, Soils & Land Use, Forestry, Wildlife, and Current Environmental Issue and present their solution to an environmental problem by giving an Oral Presentation to a panel of judges. http://www.envirothon.org/

- **FIRST Lego League**
  In this competition created by inventor Dean Kamen, FIRST (For Inspiration and

Recognition of Science and Technology) LEGO League Teams (grades 4-8), build LEGO-based robots and develop research projects to develop valuable life skills and discover exciting career possibilities while learning that they can make a positive contribution to society. http://www.firstlegoleague.org/

- **FIRST Robotics Competition**
  This international high school robotics competition run by FIRST (For Inspiration and Recognition of Science and Technology) has been dubbed by its creator Dean Kamen as a "varsity sport for the mind." It challenges teams of 25 students (grades 9-12) or more to raise funds, design a team "brand," hone teamwork skills, and build and program a robot to perform prescribed tasks against a field of competitors.
  http://www.usfirst.org/roboticsprograms/frc

- **FIRST Tech Challenge**
  FIRST® Tech Challenge is a robotics competition for high school students based on a sports model. Teams of up to 10 students are responsible for designing, building and programming their robots to compete as alliances against other teams.
  http://www.usfirst.org/roboticsprograms/ftc

- **Girls Inc.**
  Girls Inc. inspires girls to be strong, smart, and bold through life-changing programs and experiences that help girls navigate gender, economic, and social barriers. Mentors equip girls to achieve academically; lead healthy lives; manage money; and discover an interest in science, technology, engineering, and math. The network of local Girls Inc. nonprofit organizations serves 125,000 girls ages 6 - 18 annually across the United States and Canada. http://www.girlsinc.org/

- **Girls Who Code**
  Launched in spring 2012, Girls Who Code is a national nonprofit organization working to close the gender gap in technology and engineering. Together with leading educators, engineers, and entrepreneurs, Girls Who Code has developed a new model for computer science education, pairing intensive instruction in robotics, web design, and mobile development with high-touch mentorship led by the industry's top female developers and entrepreneurs. http://www.girlswhocode.com/

- **Google Science Fair**
  Google Science Fair is an online science competition seeking curious minds between 13 and 18 years of age from the four corners of the globe. In the first year, over 10,000 students from over 91 countries participated, with three exceptional young women from the United States winning. http://www.google.com/sciencefair

- **Great Big Home and Garden Show Student Model Home Design Contest**
  In this design competition, students were challenged to design a mixed-use commercial/residential structure addition, incorporating appropriate and creative use of building elements, such as energy efficient and environmentally conscious products and systems to reduce energy costs.

http://www.greatbighomeandgarden.com/Resource.ashx?sn=StudentModelHomeContest Flyer

- **International BioGENEius Challenge**
  The Biotechnology Institute's BioGENEius Challenge provides high school students the opportunity to compete and be recognized for outstanding research in biotechnology. Over 1600 high school students participants over the last eleven years have designed an original independent biotech research project, with winners showcasing their research at the BIO International Convention to over 12,000 convention attendees.
  http://www.biotechinstitute.org/go.cfm?do=page.view&pid=2

- **Intel Science Talent Search**
  Intel Science Talent Search is a program of Society for Science & the Public, is the United States' oldest and considered the most prestigious pre-college science competition. Every year, roughly 1,600 students enter with original science projects and the winners represent some of the brightest young minds in the United States.
  http://www.societyforscience.org/sts

- **Intel International Science and Engineering Fair**
  Intel ISEF is a program of Society for Science &the Public, is the premier science competition in the world and provides a forum for more than 1,500 high school students from 70 countries, regions, and territories to showcase their independent research and projects for a chance to win over $4 million in prizes and scholarships annually.
  http://www.societyforscience.org/isef

- **International Chemistry Olympiad**
  Organized by the American Chemical Society, the International Chemistry Olympiad is a competition that identifies the top chemistry students across the nation.
  http://www.acs.org/olympiad

- **Junior Science and Humanities Symposium**
  Jointly sponsored by the Military Services and administered through the Academy of Applied Sciences, is a program that encourages students (grades 9-12) to do original research in STEM disciplines by competing for scholarships and recognition.
  http://www.jshs.org/

- **Lemelson-MIT InvenTeams**
  This initiative inspires young people to pursue creative lives and careers through invention by granting teams up to $10,000 each to conceptualize, design, and build technological solutions to real-world problems, the products of which are showcased at MIT at the Lemelson-MIT Program's EurekaFest event.
  http://web.mit.edu/inventeams/index.html

- **MakerEd**
  The mission of the Maker Education Initiative (Maker Ed) is to create more opportunities for young people to make, and, by making, build confidence, foster creativity, and spark

interest in science, technology, engineering, math, the arts—and learning as a whole.
http://makered.org/

- **MATHCOUNTS**
  A national club and competition program that promotes middle school mathematics achievement in every U.S. state and territory through a number of activities including a national 100,000 student multi-level math competition. https://mathcounts.org/

- **Microsoft U.S. Imagine Cup**
  One of the premier technology competitions for students ages 16 and up, providing an opportunity for students to use their creativity, passion, and knowledge to help solve global challenges and make a difference in the world. Since 2003, over 1.4 million students have participated and last year, over 358,000 students from 183 countries participated. http://www.imaginecup.com/

- **MOUSE Corps**
  Founded in 1997, MOUSE trains and empowers underserved youth to become digital media and technology experts in their schools, improving the use of technology to enhance learning and building confidence and developing skills for 21st century innovation. MOUSE Corps is a NYC youth-centered design and technology program in which students explore career pathways and develop technology projects that address a social need. http://www.mouse.org/programs/mouse-corps

- **National Center for Women & Information Technology (NCWIT)'s Aspirations in Computing**
  NCWIT is a coalition of more than 300 prominent corporations, academic institutions, government agencies, and non-profits working to increase women's participation in technology and computing. NCWIT's Aspirations in Computing is the only nationwide recognition for young women in computing and information technology. http://www.ncwit.org/

- **National Engineers Week Future City Competition**
  A program of the National Engineers Week Foundation that encourages teams of middle school students to work with a teacher and engineer mentor to imagine, design, and build cities of the future. http://www.futurecity.org

- **National Math Science Initiative's Advanced Placement Training and Incentive Program(APTIP)**
  This program focuses on increasing the number of students taking and passing AP math, science, and English exams, and expanding access to traditionally under-represented groups and children of military families.
  http://www.nationalmathandscience.org/programs/ap-training-incentive-programs

- **National Science Bowl**
  DOE's National Science Bowl is a nationwide academic competition that tests students' knowledge in all areas of science. Competing teams of diverse backgrounds are quizzed

on scientific topics in biology, chemistry, physics, astronomy, earth science, general science, and mathematics using a question-and-answer format similar to "Jeopardy." http://science.energy.gov/wdts/nsb/

- **National STEM Video Game Challenge**
  Inspired by President Obama's Educate to Innovate initiative to promote a renewed focus on STEM education, this is a multi-year competition designed to create interest in STEM learning among America's youth by tapping into students' natural passion for playing and making video games. http://stemchallenge.org/

- **Network for Teaching Entrepreneurship (NFTE)'s National Youth Entrepreneurship Challenge**
  A business plan competition that helps young people unlock their potential for entrepreneurial activity. Since 1987, NFTE has reached more than 350,000 students and runs programs in 21 states. http://www.nfte.com/what/competition

- **Pittsburg Regional Science and Engineering Fair (PRSEF)**
  A regional science and engineering competition in its 74th year the PRSEF is open to all students in grades 6-12 from the 26 counties within Western Pennsylvania and West Virginia. In 2012, more than 1,100 students from 120 schools competed for $1M in cash prizes, scholarships and trips. http://www.scitechfestival.org/mainsf.asp

- **Real World Design Challenge**
  An annual competition that provides high school students, grades 9-12, the opportunity to work on real world engineering challenges in a team environment. Each year, student teams are asked to address a challenge that confronts our nation's leading industries. Students utilize professional engineering software to develop their solutions and generate presentations that convincingly demonstrate the value of their solutions. http://www.realworlddesignchallenge.org/

- **Science Olympiad**
  This program encourages teams of students in grades 6-12 to develop their interest in science and technology through competing in 23 events in the areas of chemistry, earth science, physics and technology. http://soinc.org/

- **SeaPerch**
  Sea Perch is a Department of the Navy program that teaches middle and high school students how to build an underwater remotely operated vehicle (ROV) as part of STEM courses or after school program or clubs. Students build a propulsion system, wire a circuit board, develop a controller, and investigate weight and buoyancy, while learning basic skills in ship and submarine design and marine engineering concepts. http://www.seaperch.org

- **Siemens Competition in Math, Science and Technology**
  A premier science research competition for high school students. Administered by the College Board, the Competition is a program of the Siemens Foundation and was

launched in 1998. http://www.siemens-foundation.org/en/competition.htm

- **Siemens We Can Change the World Challenge**
An environmental sustainability challenge in the nation that provides K-12 students the tools and inspiration to improve their schools, their communities and their world through project-based learning. The 2012-2013 finalists and winners will be awarded over $300,000 in grants and prizes. http://www.wecanchange.com/

- **Team America Rocketry Challenge (TARC)**
Created in 2002, TARC is the world's largest rocket contest. Approximately 7,000 students from across the nation compete in TARC each year. Teams design, build and fly a model rocket that reaches a specific altitude and duration determined by a set of rules developed each year. http://www.rocketcontest.org/

- **Toshiba/NSTA ExploraVision**
Since its inception in 1992, this program has involved more than 287,000 students from across the United States and Canada. The competition encourages K-12 students to simulate real research and development as they study a technology of interest and predict and model what the technology might be like 20 years from now. http://www.exploravision.org/

- **Wouldn't It Be Cool If…**
A partnership of Time Warner Cable's philanthropic STEM initiative, *Connect a Million Minds* and i.am FIRST, founded by artist, entertainer and entrepreneur will.i.am, *Wouldn't It Be Cool If…* in 2012 challenged youth ages 10-15 to dream up the coolest thing to make their life, community or the world more awesome, and then explain how science, technology, engineering and math (STEM) could help bring their idea to life. http://www.wouldntitbecoolif.com/

- **Young Naturalist Awards**
Now celebrating their fifteenth year, this a research-based science competition for students in grades 7 through 12 run by the American Museum of Natural History, recognizing the accomplishments of students who have investigated questions they have in the areas of biology, Earth science, ecology, and astronomy. http://www.amnh.org/nationalcenter/youngnaturalistawards/select.html

- **Zero Robotics**
A free robotics programming competition (grades 9-12) where the robots are SPHERES satellites inside the International Space Station (ISS). After several phases of virtual competition, finalists are selected to compete in a live championship aboard the ISS. An astronaut conducts the championship competition in microgravity with a live broadcast. www.zerorobotics.org

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