SIEMENS | Foundation   **NEWS RELEASE**

MASSACHUSETTS AND NEW YORK STUDENTS WIN REGIONAL SIEMENS COMPETITION AT CARNEGIE MELLON UNIVERSITY

Regional Winners Move on to Final Phase of Competition: National Finals in Washington, D.C.

**Blake Hord (Dobbs Ferry, NY) Wins Top Individual Honors;
Louis Golowich (Lexington, MA) and Richard Zhou (Lexington, MA) Win Top Team Honors**

ISELIN, NJ, Nov. 21, 2016 – Three students have been named National Finalists in the Siemens Competition in Math, Science & Technology after earning top spots in one of two regional competitions that took place this past weekend. The Competition is the nation's premier science research competition for high school students and promotes excellence by encouraging students to undertake individual or team research projects. For more information, go to: www.siemens-foundation.org.

Blake Hord of Dobbs Ferry, NY, earned top individual honors and a $3,000 scholarship for his project which improved on a computer simulation of a planet in formation. The findings of this project could be used to trace planets beyond our solar system, known as exoplanets. **Louis Golowich** and **Richard Zhou** of Lexington, MA, shared the $6,000 team scholarship for their work examining a mathematical problem related to how efficiently messages can be transmitted over a noisy communications network in which the original signal may be corrupted. They are among 96 students overall selected to compete in regional competitions across the country this month out of a pool of more than 1,600 projects submitted for the competition this year.

These top regional winners now move to the final phase of the Siemens Competition to present their work at the National Finals in Washington, D.C., December 5-6, 2016, where $500,000 in scholarships will be awarded, including two top prizes of $100,000.

The students presented their research this weekend to a panel of judges at the Carnegie Mellon University, host of the Region Four Finals.

"The complexity of these topics and the depth of knowledge required to tackle them showcases these students' capacity to make significant and meaningful contributions to the STEM field," said David Etzwiler, CEO of the Siemens Foundation. "These talented competitors show us the future of research is in good hands."

The Siemens Competition, launched in 1999 by the Siemens Foundation, increases access to higher education for students who are gifted in STEM and is based on the culture of innovation, research and educational support that is the hallmark of Siemens. This competition, administered by Discovery Education, recognizes and builds a strong pipeline for the nation's most promising scientists, engineers and mathematicians.

The Winning Individual for Region Four

Blake Hord, a senior from Dobbs Ferry High School in Dobbs Ferry, NY won the individual category and a $3,000 scholarship for his project entitled, "High Mass Planet Spiral Shocks as a Source of Infrared Emission in Protoplanetary Disks."

Blake's project improved on a computer simulation modeling a planet in formation. Using this model, Blake was able to reproduce features identified in a previous observation of the gas and dust around a forming star. His work demonstrates that a massive planet can produce a phenomenon known as a "spiral arm in the disk," which is a pattern of dust and gas that forms around a developing star that could be directly observable by a current telescope. The findings of this project could be used to trace planets beyond our solar system, known as exoplanets.

The search for exoplanets has seen breakthroughs over the last several years, including the work of the Kepler telescope, which has discovered thousands of exoplanets. In fact, some estimates now suggest that as many as half of all stars could host a rocky planet. However, the search to identify more exoplanets often relies on new technologies.

"There is currently a large effort trying to directly observe exoplanetary systems," said competition judge, Dr. Francois Lanusse, a postdoc at McWilliams Center for Cosmology at Carnegie Mellon University. "Improving our knowledge of how these systems form is vital to answer questions about our own solar system and about our chances of a finding another Earth somewhere in the Galaxy."

Blake is most passionate about the future of space exploration, which he thinks may eventually save the human race from extinction. He believes it is essential for us to become a multi-planetary species in order to provide a safety net in case another mass extinction event (either human-caused or not) occurs in the near future. Blake is a member of the National Honor Society and a National Merit Semifinalist.

Blake says that Elon Musk is his role model because of Musk's desire to mix technology with business in a way that benefits the entire human race, and the ability to do it extraordinarily

well. He looks forward to pursuing a career in physics or the broader field of science someday.

Blake's mentor is Wladimir Lyra, assistant professor of physics and astronomy at California State University, Northridge.

The Winning Team for Region Four

Louis Golowich and **Richard Zhou** of Lexington, MA, won the team category and will share a $6,000 scholarship for their project entitled, "Maximum Size of a Family of Pairwise Graph-Different Permutations."

Louis and Richard's work examined a mathematical problem describing how efficiently communication can take place over an imperfect communication channel. Their research aims to make progress on a problem in mathematics central to information theory, which concerns how information can be efficiently encoded and transmitted.

How we transfer information between places and how we accelerate the ability to communicate can make significant impacts on everything from the internet, to mobile phone data, to missions into space and much more.

"We were particularly impressed that Louis and Richard were able to tackle a very real problem with little input," said Wes Pegden, assistant professor in the Department of Mathematics at Carnegie Mellon University. "This research makes a meaningful contribution to the fields of mathematics and computer science."

Louis began competing in math competitions in middle school, and quickly developed an interest in learning mathematics. His interest in computer science, and specifically algorithms, has grown throughout his high school years as he has competed in the USA Computing Olympiad. During Louis' sophomore year, he began working on this research project in extremal combinatorics through MIT PRIMES, a program that gives research opportunities to high school students. He was one of 26 high school students in the US to be selected for the USA Computing Olympiad in 2015-2016. One day he hopes to apply math and computer science to help solve real-world problems.

Richard's interest in mathematics also began as a middle school student, when his math teacher inspired him to think of math as an exploratory subject rather than a mundane set of tools designed to solve problems from other sciences. Richard's love for math and his ability to see its beauty stems from a quote he read by his role model, Paul Erdos, a 20th century Hungarian mathematician who said, "It's like asking: Why is Beethoven's Ninth Symphony beautiful? If you don't see why, someone can't tell you. I know numbers are beautiful. If they aren't beautiful, nothing is." Richard also admired Erdos' keen eye for tweaking and modifying problems that appeared impossibly difficult until they were still highly nontrivial, but more

within reach. This is a strategy that Richard and Louis have found to be extremely valuable to their research, and one that he hopes to employ effectively in future endeavors.

Louis and Richard's mentor is Chiheon Kim, graduate student in theoretical computer science, optimization and combinatorics at Massachusetts Institute of Technology.

Regional Finalists

The remaining regional finalists each received a $1,000 scholarship.

Regional Finalists in the individual category were:
- **Dylan Li**, Hunter College High School, New York, NY
- **Sharon Lin**, Stuyvesant High School, New York, NY
- **Erika Nemeth**, Smithtown High School East, Saint James, NY
- **Nestor Tkachenko**, Ward Melville Senior High School, East Setauket, NY

Team Regional Finalists were:
- **Sarah Adamo**, Smithtown High School West, Smithtown, NY; **Susell Contreras**, Brentwood High School, Brentwood, NY
- **Heidi (Hyunsun) Kim**, Trinity School, New York, NY; **Seung Hwan An** and **Daniel (Joo Sung) Yi**, Taft School, Watertown, CT
- **Eric Pun** and **Nikhil Saggi**, Syosset High School, Syosset, NY
- **Stephen Lee** and **Fred Chu**, Manhasset Senior High School, Manhasset, NY,

The Siemens Competition
For the 2016 Siemens Competition, 2,146 students (1271 individuals, 304 2-person teams and 89 3-person teams) submitted applications from 46 states plus the District of Columbia and 7 countries with more than 1,600 projects submitted for consideration. 498 students were named Semifinalists from which 96 were named Regional Finalists. For the regional finals, the students present their research in a closed, online forum, and entries are judged by esteemed scientific experts at six leading research universities which host the regional competitions: Georgia Institute of Technology and Massachusetts Institute of Technology (November 4-5), California Institute of Technology and University of Notre Dame (November 11-12), and Carnegie Mellon University and The University of Texas at Austin (November 18-19).

The winners of each regional weekend are announced at 12 noon (ET) on the following Monday at *http://siemensusa.synapticdigital.com/US/Siemens-Foundation.* For news and announcements about the Regional Competitions and the National Finals, follow us on Twitter @sfoundation (#SiemensComp) and like us on Facebook at Siemens Foundation.

Interviews, video and photos available by
visiting http://siemensusa.synapticdigital.com/US/Siemens-Foundation.

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