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TENNESSEE, VIRGINIA STUDENTS WIN REGIONAL SIEMENS COMPETITION AT THE GEORGIA INSTITUTE OF TECHNOLOGY

Regional Winners Move on to Final Phase of Competition: National Finals in Washington, D.C.
Franklyn Wang, Falls Church, VA Wins Top Individual Honors; Gabrielle Liu, Nashville, TN, and Allen Liu, Chattanooga, TN Win Top Team Honors

ISELIN, NJ, Nov. 20, 2017 – Three more 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

Franklyn Wang, of Falls Church, VA earned top individual honors and a $3,000 scholarship for solving a longstanding mathematical problem that has a wide range of potential applications, from creating better algorithms for telecommunications to designing safer infrastructures, like roads and bridges. **Gabrielle Liu** of Nashville, TN, and **Allen Liu** of Chattanooga, TN, shared the $6,000 team scholarship for developing a faster computational system that could lead to improvements in data processing speed and facial recognition software. They were among 101 students selected to compete in regional competitions across the country this month out of a pool of more than 1,860 projects submitted to the competition.

These 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 4-5, 2017, where $500,000 in scholarships will be awarded, including two top prizes of $100,000. Each of the finalists will receive at least $25,000 in scholarship money.

The students presented their research this weekend to a panel of judges at The Georgia Institute of Technology, host of Region Six Finals.

"It’s amazing to see the knowledge and determination students bring to the competition each year," said David Etzwiler, CEO of the Siemens Foundation. "These high school students are presenting top-notch, graduate-level research and they deserve recognition for their efforts to improve so many lives."

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. The competition, administered by Discovery Education, develops a pipeline for the nation’s most promising scientists, engineers and mathematicians.

The Winning Individual for Region Six

Franklyn Wang, a senior at Thomas Jefferson High School for Science & Technology in Alexandria, VA, won the individual category and a $3,000 scholarship for his project entitled, “Monodromy Groups of Indecomposable Rational Functions.”

Using algebra, Franklyn worked through a complicated mathematical problem that has a wide range of potential applications, from creating faster, more secure algorithms for telecommunications to designing safer infrastructures, like bridges resistant to strong winds. His work is broadly relevant to a variety of problems in cryptography and various mechanical systems.

Through his project, Franklyn classified the local *singularities* and behavior of rational geometric functions. In mathematics, a *singularity* is a point at which a given mathematical object is not defined, or a point where it fails to be well-behaved in some predictable way. Building on several previous studies in the field, Franklyn’s work brings this mathematical problem closer to completion.

“For as long as I can remember, mathematicians have been obsessed with mathematical functions that behave erratically," said competition judge Dr. Tom Morley, Professor Emeritus at The Georgia Institute of Technology. "Franklyn worked through a professional piece of mathematics that will almost surely be published in a top mathematical journal. The findings are a significant step toward the understanding of applications requiring unusual function behavior.”

Franklyn became interested in math in the 7th grade when he participated in the MATHCOUNTS National competition, one of many math and science competitions he has joined over the years. He was recognized as a finalist at the 2017 USA Computing Olympiad, placing him in the top 26 among all high school competitors in the country. Franklyn also serves as captain of his school’s National Science Bowl team, which placed 2nd at the national competition in 2017. When he grows up, Franklyn hopes to be a researcher in math, computer science or economics, and use artificial intelligence and machine learning to solve problems facing mankind.

Franklyn’s mentor is Dr. Michael Zieve of the University of Michigan.

The Winning Team for Region Six

Gabrielle Liu of Nashville, TN, and **Allen Liu** of Chattanooga, TN, won the team category and will share a $6,000 scholarship for their project entitled, “Neural Networks without Multiplications.”

Gabrielle and Allen came up with a new mathematical concept for improving the running time in *convolutional neural networks*—a type of artificial intelligence computing system used in new technologies like facial recognition and driverless cars.

By replacing multiplications with addition operations, Gabrielle and Allen’s mathematical framework could lead to significant improvements in data processing speed and machine learning. Today, the computational time for pattern and facial recognition can sometimes limit the application of these technologies to real-world problems, a limitation that will increase in importance as these technologies continue to advance.

“Gabrielle and Allen won not only because the mathematics for the project were outstanding, but because their framework has broad and important applications across the field,” said competition judge Dr. Eva Lee, Director, NSF-Whitaker Center for Operations Research in Medicine and HealthCare and Virginia C. and Joseph C. Mello Chair Professor of Industrial and Systems Engineering at The Georgia Institute of Technology. “Their results allow for faster running time for computer vision and pattern recognition, and may open up real-time detection possibilities that lead to major breakthroughs for the field.”

Gabrielle, a junior at Ravenwood High School in Brentwood, TN, is most passionate about mathematics and artificial intelligence. She was named a Broadcom MASTERS semifinalist and won the Grand Prize at the Middle Tennessee Science and Engineering Fair. In 2017, she was recognized as a semifinalist at the USA Biology Olympiad and a finalist at the Intel International Science and Engineering Fair. Gabrielle is a member of her school’s Forensics/Speech and Debate Team, the founder and president of the Computational Biology Club, and a member of the Nashville Fencing Club.

Allen, a senior at McCallie School in Chattanooga, TN, is most passionate about math and music. He is a classically trained violinist and has performed at Carnegie Hall with the National Youth Orchestra. He has also served as concertmaster of the Tennessee All-State Symphony Orchestra, and regularly organizes concerts and community projects as an intern with String Theory, a chamber music concert series based in Chattanooga that has performed across the country. Allen’s interest in science led him to placing in the Top 150 in the United States National Chemistry Olympiad. He is President of his school’s Young Democrats Club and co-captain of the Mock Trial team.

The team's mentor is mathematics teacher Peter Lowen of Ravenwood High School in Brentwood, TN.

Regional Finalists

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

Regional Finalists in the individual category were:

- **Saadh Ahmed**, Northview High School, Johns Creek, GA
- **Kevin Jin**, North Carolina School of Science and Mathematics, Durham, NC
- **Karna Morey**, North Carolina School of Science and Mathematics, Durham, NC
- **Jaewon Sung**, McCallie School, Chattanooga, TN

Team Regional Finalists were:

- **Shinbe Choi,** Mclean High School, McLean, VA, **Kelly Cho**, Thomas Jefferson High School for Science & Technology, Alexandria, VA, and **Junhyun Chong**, Thomas Jefferson High School for Science & Technology, Alexandria, VA
- **Ryan Li,** Walton High School, Marietta, GA, and **William Ellsworth**, Walton High School, Marietta, GA
- **Surbhi Mathur**, Loudoun Academy of Science, Sterling, VA, and **Janie Wu**, Loudoun Academy of Science, Sterling, VA
- **Alicia Pan**, Madison High School, Vienna, VA, and **Allen Pan**, Madison High School, Vienna, VA

The Siemens Competition
For the 2017 Siemens Competition, 1,860 projects were submitted for consideration. 491 students were named Semifinalists from which 101 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: Massachusetts Institute of Technology (November 4); University of Notre Dame (November 4); The University of Texas at Austin (November 11); California Institute of Technology (November 11); and Georgia Institute of Technology (November 18); and Carnegie Mellon University (November 18).

The winners of each regional weekend will be announced at 12 noon (ET) on the following Monday at http://siemensusa.synapticdigital.com/US/Siemens-Foundation.

Winners of the regional events will advance to the National Finals to be held at The George Washington University in Washington, D.C., December 4-5, 2017, where $500,000 in scholarships will be awarded, including the two top prizes of $100,000 and one of the most prestigious science honors awarded to high school students in the country today. Every finalist will receive at least $25,000 in scholarship money.

For up-to-date news and announcements about the Regional Competitions and the National Finals, follow us on Twitter @SFoundation and Instagram @SiemensFdn (#siemenscomp) and like us on Facebook at SiemensFoundation.

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

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About the Siemens Foundation
The Siemens Foundation has invested more than $100 million in the United States to advance workforce development and education initiatives in science, technology, engineering and math. The Siemens Foundation's mission is inspired by the culture of innovation, research and continuous learning that is the hallmark of Siemens' companies. Together, the programs at the Siemens Foundation are helping close the opportunity gap for young people in the U.S. when it comes to STEM careers, and igniting and sustaining today's STEM workforce and tomorrow's scientists and engineers. For further information, visit www.siemens-foundation.org or follow us on Twitter @sfoundation or Instagram @SiemensFdn.

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