



### FALL EDITION 2015

MAUREEN PALMER, Public Affairs and Programs Manager

## **CEE Alumni Take Top Awards at Intel**



Noah Golowich and Andrew Jin, RSI 2014 Alumni and First Place Medal Winners at Intel (Photo: Society For Science/Intel)

Research Science Institute 2014 alumni distinguished themselves again this year in the Intel Science Talent Search (STS). Of the three 1st Place Awards, CEE's Rickoids took two of the top Honors. Starting this year, the Intel Science Talent Search tripled the scholarship awards to further recognize finalists and highlight the variety of research conducted. Three first-place Medal of Distinction awards of \$150,000 were presented to students who showed exceptional scientific potential in three categories: Basic Research, Global Good, and Innovation.

Noah Golowich of Lexington High School in Massachusetts was awarded the First Place Medal of Distinction for Basic Research. Noah developed a proof in the area of Ramsey theory, a field of mathematics based on finding types of structure in large and complicated systems.

Andrew Jin of The Harker School in San Jose, California garnered the First Place Medal of Distinction for Global Good. Andrew developed a machine learning algorithm to identify adaptive mutations across the human genome.

(continued on page 3)

### U.S. Flag Waves Proudly With Gold Medal Wins

Each of the four **Team USA 2015** members was awarded a Gold Medal at the 26th International Biology Olympiad (IBO) in Aarhus, Denmark, this past summer. Team USA Member, Boyang (Peter) Dun, also placed *Second in the World* for individual scores at the International Biology Olympiad.

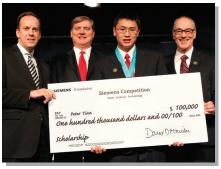
Team USA 2015 Gold Medalists are:

- Grace Chen, Bridgewater-Raritan Regional High School, Bridgewater, New Jersey
- Yilun Du, Pullman High School, Pullman, Washington
- Boyang "Peter" Dun, Canterbury School, Fort Wayne, Indiana
- Varun Mangalick, Mounds View High School, Arden Hills, Minnesota



Team USA 2015 Gold Medalists at IBO: Boyang "Peter" Dun, Varun Mangalick, Grace Chen, and Yilun Du

The mission of the USABO is to encourage excellence in biology education throughout the United States and to challenge students and their teachers to reach the gold standard in biology. Alumni of the USABO have earned MacMillan Grants, Goldwater Scholarships, Hollings Scholarships (National Oceanic and Atmospheric



Peter Tian, Grand Prize Individual Category Winner, at Siemens Award Event

## CEE Alumni Win Big at Siemens and Named as Hertz Fellows

**CEE's Research Science Institute** and **USA Biology Olympiad Alumni** have demonstrated their steadfast commitment to excellence in STEM. Awardees have shone bright at Siemens and as Hertz Fellows.

The Siemens Competition in Math, Science & Technology, a signature program of the Siemens Foundation, is administered by Discovery Education. Each year high school students submit innovative individual and team research projects to the regional and national levels of competitions. They aspire to receive college scholarship awards ranging from \$1,000 to the \$100,000.

The Hertz Fellowship is awarded annually by the Fannie and John Hertz Foundation. Each fellowship consists of up to 5 years of academic fiscal support valued at \$250,000. The Graduate Hertz Fellowship Award is based on merit and is broken down to a cost-of-education allowance and a personal support stipend.

(continued on page 5)

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Congratulations to Research Science Institute (RSI) 2015 scholars.

## The 32<sup>nd</sup> Research Science Institute at MIT

Top achieving U.S. and international scholars attended the **32<sup>nd</sup>** annual **Research Science Institute (RSI)**, jointly sponsored by **CEE** with the **Massachusetts Institute of Technology**. Students conducted original, cutting edge research in state-of-the-art university laboratories, hospitals, and corporate research facilities.

The students selected for **RSI** are exemplary as demonstrated by their high school records, personal essays, standardized test scores, teacher recommendations, research experience, potential for leadership, and honors and awards in math and science. **RSI** scholars participate in college-level research under the mentorship of leading scientists, engineers, and researchers in the Boston area.

The students, dubbed **"Rickoids"** after the late Admiral H.G. Rickover, Father of the Nuclear Navy and founder of the Center, with CEE President Joann DiGennaro, are studying pure and applied mathematics, physical and biological science, economics, and humanities.

**Dr. Andrew Charman, RSI '86** alumnus and lecturer of physics at University of California, Berkeley, led the **RSI 2015**. **RSI** Academic Professors included:

- Dr. Steven Byrnes, RSI'02, Harvard University Physics
- Dr. Steven Leeb, Massachusetts Institute of Technology Engineering
- Dr. Forrest Michael, RSI'90, University of Washington -Chemistry
- Dr. Sean Mulholland, Economics, Stonehill College
- Dr. Matthew S. Cain, RSI'97, U.S. Army Natick Soldier Research, Development, and Engineering Center - Biology
- **Mr. Lance Rhoades**, University of Washington -Humanities
- Dr. Christopher Skinner, RSI'88, Princeton University -Mathematics

Thirty-two international students from Australia, Brazil, Bulgaria, Canada, China, Israel, Lebanon, Poland, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Switzerland, and Turkey joined the U.S. students.

The **RSI' 2015** Closing Keynote Address was presented by The Honorable Clarine Nardi Riddle, CEE Trustee and Counsel at Kasowitz Benson Torrres & Friedman, LLP.

**RSI** is offered cost-free by CEE to competitively selected top achieving students in science, technology, engineering, and mathematics (STEM) through collaborations with educational institutions, private foundations, corporations, government agencies, and individuals who share a commitment to educational excellence and leadership. **RSI** has nearly **2,300** successful alumni with an 80% STEM career retention rate of the alumni.

<sup>2015</sup> RSI Closing Keynote Address preented by Clarine Nardi Riddle,



## Research Science Institute 2015 Distinguished Written and Oral Presentations

### <u>Written</u>

#### Abijith Krishnan - Arizona, BASIS Scottsdale High School

- A Secretary Problem with a Sliding Window for Recalling Applicants
- Under the guidance of Dr. Shan-Yuan Ho (Massachusetts Institute of Technology)

#### Kristine Zhang - California, Saratoga High School

- Fracture Mechanics of Monolayer Molybdenum Disulfide using Molecular Dynamics
- Under the guidance of Mr. GangSeob Jung (Department of Civil and Environmental Engineering, Massachusetts Institute of Technology)

#### Yo-whan John Kim - Republic of Korea, Seoul International School

- Improving Gesture Interface Using Bayesian Network Structure Learning and Non-parametric Modeling
- Under the guidance of Dr. Vikash Mansinghka (Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Computer Science and Artificial Intelligence Laboratory)

### <u>Oral</u>

#### Sahaj Garg - New Jersey, Bridgewater-Raritan High School

- Perception and Interpretation of Dynamic Imagery
- Under the guidance of Dr. Jeremy Wolfe (Brigham and Women's Hospital)

#### Venkatesh Sivaraman - Ohio, Bexley High School

- Simplified Audio Production: Live Voice Editing Based on Speech-to-Text Transcription
- Under the guidance of Dongwook Yoon (Cornell University, edX)

#### Victoria Emily Buckland -Singapore, National Junior College

- Design of an Economic and Passive Daylighting System
- Under the guidance of Professor Mara Prentiss (Harvard University)

### Oral & Written

#### Amol Punjabi - Massachusetts, Massachusetts Academy of Math and Science

- Discovering Druggable Binding Sites on Intrinsically Disordered Proteins
- Under the guidance of Dr. Gil Alterovitz (Boston Children's Hospital)

#### Claire Burch - California, Mira Loma High School

- Detection and Characterization of Candidate Exoplanetary Systems using Gravitational Lensing Events
- Under the guidance of Dr. Rosanne Di Stefano (Cambridge, Massachusetts, Department of High Energy Astrophysics, Harvard-Smithsonian Center for Astrophysics)

### **<u>RICKOID</u>** of the Year

Award given by peers to **David Zhao** of **Lakeside Upper School** in **Seattle, Washington** at RSI in honor of Admiral H.G. Rickover, Father of the Nuclear Navy and Civilian Uses of Nuclear Power. ◆



### "Only 42% of this year's college-bound seniors met the SAT College and Career Readiness Benchmark. This number has been on the decline over the last five years."

Ed Review September 2015 U.S. Department of Education

#### CEE Alumni Take Top Awards at Intel (from page 1)

**Shashwat** Kishore of Unionville High School in Kennett Square, PA received the Third Place Medal of Distinction for Basic Research. Shashwat's math project focused on a new relationship between these matrices and topology.

Anvita Gupta of BASIS Scottsdale High School in Scottsdale, Arizona also received the Third Place Medal of Distinction for Global Good. Anvita used machine learning to "teach" a computer to identify potential drugs for cancer, tuberculosis and Ebola.

#### U.S. Flag Waves Proudly With Gold Medal Wins (from page 1)

Administration), American Heart Association Undergraduate Fellowships, National Science Foundation Fellowships, The Paul and Daisy Soros Fellowship for New Americans, the Linen Prize in Chinese, and the Clara Levillain Prize. They have also received accolades as Marshall Scholars and Churchill Scholars.

During the two weeks at Purdue, the finalists participated in intensive theoretical and practical tutorials. The high school students studied with leading U.S. biologists who are experts in the fields of cellular & molecular biology, plant anatomy & physiology, animal anatomy & physiology, ethology, genetics & evolution, ecology, ethology, and biosystematics.

## Saudi Arabia Research Science Initiative – First STEM Program in Kingdom to Focus on Young Females

The Research Science Initiative (RSI) at the University of Dammam in Saudi Arabia was sponsored in partnership with the Center for Excellence in Education (CEE), Saudi Aramco and The King Abdulaziz and His Companions Foundation for Giftedness and Creativity (MAWHIBA). It served high-achieving middle school girls. RSI encouraged science, technology, engineering and mathematical (STEM) studies. CEE was chosen by Saudi Aramco to implement the Initiative as a result of its partnership which established the Research Science Institute at KAUST for male and female high school scholars to study together.

The unparalleled academic program provided rigorous instruction, individualized mentorships and laboratory experiences for young female scholars. The Initiative, a 5 week program, was led by Dr. Amy Sillman, RSI'84 with Dr. Hanadi Baghdadi, University of Dammam. Dr. Jenny Sendova, Associate Professor at the Institute



of Mathematics and Informatics, Bulgarian Academy of Sciences (BAS) was the Lead Tutor.

CEE proudly welcomes the **SA-RSI** female alumni to a community of over 2,000 alumni from around the world. SA-RSI alumni with have a lifetime opportunity to network with each other, to participate and assist with year 2 of **SA-RSI**, and to network with other RSI scholars in the U.S., China, Bulgaria, and India STEM Initiatives.



Dr. Jenny Sendova with SA-RSI scholar.

"Hide not your talents... What's a sundial in the shade?" Benjamin Franklin

## CEE introduces the Research Science Initiative at Tsinghua University in China

n partnership with Tsinghua University (Tsinghua), CEE inaugurated the Research Science Initiative 2015 this past summer. This is the first research program that Tsinghua has sponsored with a U.S. organization to focus on high ability high school students.

Professor Benjamin Koo was the Executive Director of RSI. He is an Associate Professor in the Department of Industrial Engineering at Tsinghua University. Robert Rhew, Associate Professor, Department of Environmental Science, Policy, and Management at the University of California Berkeley and RSI'87 alum, and Chee-Kiang Lim, Consultant and RSI'89, were Co-Directors of the program.



Inaugural Research Science Initiative (RSI) Class at Tsinghua University.

Students from throughout China were competitively selected to attend collegelevel classes taught by distinguished professors from Tsinghua University and visiting U.S. professors from leading institutions.

Professors leading the students at Tsinghua University are:

- Mr. Justin Komisarof, RSI'04 MD/ PhD Student at University of Rochester Medical Center – Biology
- Dr. Forrest Michael , RSI'90, University of Washington – Chemistry
- Mr. Lance Rhoades, University of Washington Humanities

- Dr. Edward Su, RSI'02, Independent Consultant – Physics
- Dr. Bai Fengshan, Tsinghua University Mathematics
- Dr. Tsai Wei-Tek, Tsinghua University Engineering

Former alumni of the U.S. based Research Science Institute and the USA Biology Olympiad, along with staff members from Tsinghua University, were tutors and counselors to the scholars.

CEE was proud to host and to nurture the students from throughout China at RSI Tsinghua 2015. ◆



## **CEE Thank You**

Enthusiastic RSI and USABO Alumni gathered in an event at the home of Cynthia Pickett-Stevenson and her husband, Don, in Houston, Texas. Cynthia is a member of CEE's Board of Trustees.

Some guests, left to right: Dr. Soham Roy RSI'86, Siddarth Guha USABO'14, Steve Fast RSI'88, Ms. D, Beebe Parker RSI'06, Ms. Cynthia Pickett-Stevenson, and Matt Thrasher, Ph.D., RSI'98.

### EXCELLENCE ~ LEADERSHIP ~ COMMITMENT Center for Excellence in Education

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"Students who had participated in an accelerated summer program continued a pattern of high academic achievement throughout high school and college. Students, especially females, who took a mathematics class benefitted more than students who took other subjects in the summer."

Olsewski-Kubilius & Grant, 1994. See Olszewski-Kubilius (1998) for a summary of research on fast-paced summer programs.

#### **CEE Alumni Win Big at Siemens and Named as Hertz Fellows** (from page 1)

CEE Alumni Siemens Awardees:

Peter Tian, 2014 Research Science Institute Alumnus, was awarded the \$100,000 Grand Prize in the Individual Category at the Siemens Competition. His project focused on mathematical research on pattern avoidance for multidimensional matrices and was titled External Functions of Forbidden Multidimensional Matrices.

Anvita Gupta, RSI'14 Alumna, garnered a \$10,000 Siemens scholarship for her research, A Novel Method for Targeting Intrinsically Disordered Proteins for Drug Discovery: Application to Cancer and Tuberculosis.

### CEE Alumni Hertz Fellows:

Congratulations to **Katherine Xue**, USA Biology Olympiad (USABO) 2008, and **Maxim Rabinovich**, Research Science Institute (RSI) 2008, named 2015 Hertz Fellows. They will continue to pursue the answers to the "Big Challenges" in science as Hertz Fellows.

Katherine is a PhD candidate studying biology and genome sciences at Washington University. Her goal is to harness the power of genomic technologies to understand evolutionary forcers and their lasting effects.

"Scientific literacy is incredibly important in today's society—it informs decisions ranging from everyday choices to issues of international importance," said Katherine Xue. "I think that scientists have a responsibility to communicate to the public not only about scientific findings, but also about scientific ways of thinking."

Maxim is pursuing his PhD in computer sciences at University of California Berkeley. He is researching machine learning and natural language processing and hopes to develop artificial intel-



Katherine Xue, USABO'08 (Photo Credit: Hertz Foundation) and Maxim Rabinovich RSI'08 (Photo Credit: Hertz Foundation)

ligence tools that support and extend human reasoning.

"The scientific community needs tools, and that's a big part of what artificial intelligence can offer," said Maxim Rabinovich. "I'm interested in building more efficient ways to gather and process information. One of the great things about the Hertz Fellowship is that it puts an emphasis on going out in the world and using science to do interesting things."

Peter, Anvita, Katherine, and Maxim are examples of the fine scholarship of the Center for Excellence in Education's program alumni. ◆

## **CEE Congressional Luncheon**

The Kennedy Caucus Room, one of the grandest and most historic rooms in the nation's Capital, was the setting of the annual CEE Congressional Luncheon sponsored by Capital One Bank. The event honored corporate donors and friends of CEE, highlighted the Center's programs and alumni, and celebrated the Senator Joseph I. Lieberman Awardee for Outstanding Achievement in Science and Technology.



Dr. Feng Zhang was presented with the Senator Lieberman Award and \$10,000 Prize by Mel Chaskin, Chairman of the CEE Board of Trustees, was with Joann DiGennaro, CEE's President.

**Dr. Feng Zhang**, RSI'99 was recognized as the recipient of the Joseph I. Lieberman Award for Outstanding Achievement in Science and received a \$10,000 prize. This special honor is given by CEE every other year in appreciation of Senator Joseph Lieberman's service as a CEE Trustee for 17 years and his steadfast commitment to science, technology, engineering, and math (STEM) education.

Dr. Zhang is a Core Member of the Broad Institute of MIT and Harvard, an investigator at the McGovern Institute for Brain Research at MIT, and an Assistant Professor at MIT with a Joint Appointment in the Departments of Brain and Cognitive Sciences and Biological Engineering. He is designing new molecular tools for manipulating the living brain. He is a leader in the development of the CRISPR-Cas9 system, a genome editing technology that allows scientists to make precise changes to a DNA sequence. Dr. Zhang's scientific advance is expected to transform many areas of biomedical research and lead to the basis of new treatments for human genetic disease. Feng shared the UNC/Perl Prize for his role in the development of optogenetics in 2012.



Noah Golowich, RSI'14

Noah Golowich, Research Science Institute RSI'14 alumnus and one of the 1st place Intel Awardees, was a featured speaker. "During RSI, I had the opportunity to work with MIT faculty on fascinating mathematical problems, to listen to a variety of scientists' lectures about their groundbreaking work, and of course, to meet 82 other talented high school students from around the world."



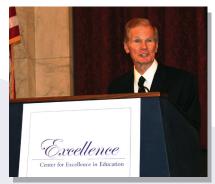
Peter Tian, RSI'14

**Peter Tian**, RSI'14 alumnus and 1st Place Grand Prize Siemens Winner in the individual category addressed the attendees. "RSI was a life changing experience. At RSI, I met some of the brightest students and this community will stay with me forever."



Jonathan Gootenberg, IBO'08 & '09

A PhD student in systems biology at Harvard University and a 2 time Gold Medalist at the International Biology Olympiad "08 and '09, **Jonathan Gootenberg** addressed the audience and explained his journey. He is a scientist in the Feng Zhang Lab at the Broad Institute where he is designing experiments to assess and characterize various genome-editing approaches.



Senator Bill Nelson (FL)

Senator Bill Nelson, Honorary Member of CEE's Board of Trustees, emphasized the importance of steering children towards pursuing careers in STEM education. *"One issue that's central to our future is the education of our children."* 

"I am truly 'blown away' by the achievements and significant breakthroughs by Dr. Zhang in not just one, but two different fields of study and inquiry. His work in 'optogenetics' and genetic engineering is charting new paths that will have transformative impacts on future research for many years to come. Thank you, Dr. Zhang, for leading the way and for bringing your talents to bear through your novel technologies in the study and treatment of diseases." Excerpt of letter from Senator Joseph Lieberman, presented by The Honorable Clarine Nardi Riddle, CEE Trustee and former Chief of Staff to the Senator.

## Don't Leave the Best Behind

By Joann DiGennaro, President of CEE

Believe it or not, there are some placbes where it's now politically incorrect to refer to top students as gifted and talented.

I wonder what alternatives would be okay – differently-abled? Special needs students? Above bright? These terms are ridiculous.

So, too, is it ridiculous to contend that all of us are of equal ability in academics or anything else. So I implore the adrift educational transformers to stop the clinical claptrap that "all students are gifted and talented."

The late Julian C. Stanley, founder of the Center for Talented Youth at Johns Hopkins University, identified that the super achievers are 1 in 10,000 students, have an IQ above 140, and are able to complete a year and a half's work of math work in three weeks. Norm Augustine, in his seminal "Beyond the Gathering Storm," reported that these students can often do the work of four individuals.

For more than three decades, the Center for Excellence in Education (CEE) has been providing opportunities and activities to stretch the minds of these talented young scholars here in America.

Our nation faces stiff global competition when it comes to 21st Century challenges. Will our scholars make the scientific breakthroughs to meet the needs in health, energy, the environment, agriculture, and national security?

Unfortunately, scant attention is given in the U.S. to maximize the potential of students with demonstrated academic excellence to make a difference.

Singapore, China, and Korea are examples of nations that concentrate on training their most promising achievers while providing opportunities for all other students. These countries also excel on international high school math and science tests. It's no coincidence that they are emerging economic powerhouses as well.

If the U.S. is to maintain its economic prosperity and global leadership, it must recognize that gifted and talented students must be identified early and nurtured through elementary and secondary school. Teacher training and professional development to identify and assist outstanding academic achievers must be mandated for all elementary and secondary educators.

One thing we know is that achievers and future leaders in science and technology come from all backgrounds and are not restricted to economic status, gender, or race. They are to be found in diverse schools across the country. Let's find them and give them the support they need.  $\blacklozenge$ 

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Honor special occasions or a loved one with a contribution to CEE. A commemorative card will be sent to the recipient or family in your name. For more details, contact Charles Farmer at cfarmer@cee.org

### CEE WELCOMES NEW STAFF MEMBERS

- Ari Goldberg Director of Communications
- Ken Reid Director of Strategic Partnerships
- Abby Mitchell Communications Manager
- Heather Curry Manager, International Strategy
  & Alumni Engagement

Knowledge about talent development suggests that gifted children thrive when given the opportunity to explore their curiosity at a pace that works for them. Accelerated coursework and enrichment programs are critical to the success of such students . . . It's a myth that gifted children would thrive no matter what their learning environment."

Camilla Benbow, New York Times op-ed, Challenge Highly Talented Children

Camilla Benbow, New York Times op-ed <u>Challenge Highly Talented Children</u>. She is the Patricia and Rodes Hart Dean of Education and Human Development at Vanderbilt University's Peabody College.

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### About the Center for Excellence in Education

The Center for Excellence in Education (CEE) nurtures high school and university scholars to careers of excellence and leadership in science, technology, engineering, and math (STEM) and encourages collaborations between and among leaders in the global community. Founded in 1983 by the late Admiral H.G. Rickover and Joann DiGennaro, President of the Center for Excellence in Education, the Center's programs help keep the United States competitive in science and technology. CEE challenges young scholars and assists them on a long-term basis to become the creators, inventors, scientists, and leaders of the 21st century.

As a private non-profit organization, CEE is not subject to federal and state mandates or political pressures. All CEE programs are open to students and teachers, at no cost to them, regardless of race, color, creed, or economic background; the only criterion is academic excellence. CEE sponsors the Research Science Institute (RSI), the USA Biology Olympiad (USABO), and the Teacher Enrichment Program (TEP).

To date, CEE has received funds from the U.S. Department of State, the U.S. Agency for International Development, the National Science Foundation, the National Endowment for the Humanities, the National Security Agency, the Bureau of Indian Affairs, the Department of Agriculture, the Department of Energy, and the Department of Defense. Private individuals and corporations, however, provide most of CEE's funding.