

Ruoyi Jiang of Ward Melville H.S. Mentored at SBU, Named Individual Grand Prize Winner in 2009 Siemens Competition

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Stony Brook University (SBU) issued the following news release today. Ruoyi Jiang's research using NewYorkBlue, an IBM supercomputer owned by SBU and operated by Brookhaven Lab, was crucial to the success of his project. Jiang also participated in the Regional Science Bowl held at Brookhaven Lab earlier this year. He was a member of the Ward Melville High School Science Bowl team that competed against 19 other Long Island high school teams and placed first in this fast-paced academic contest.

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STONY BROOK, N.Y. — Ruoyi Jiang, a senior at Ward Melville High School in East Setauket was named the individual Grand Prize winner in the prestigious nationwide 2009 Siemens Competition in Math, Science & Technology. Mr. Jiang conducted his research at Stony Brook University and Brookhaven National Laboratory under the mentorship of Professor of Chemistry, Carlos Simmerling; and was supported by his advisor at Ward Melville, George Baldo, director of the InSTAR program there.

Mr. Jiang, 17, won a \$100,000 scholarship for his research on chemotherapy drug resistance. He is the first Grand Prize winner of the Siemens competition to have done research at Stony Brook University in the "individual" category; twice previously, the Grand Prize "team" winners worked with Stony Brook University faculty mentors, including Professor Iwao Ojima (in 2007) and Professor Miriam Rafailovich (2001).

The annual awards were presented today at New York University. The competition is a program of the Siemens Foundation and is administered by the College Board.

Referring to all student Grand Prize winners, Thomas McCausland, Chairman of the Siemens Foundation, said, "These students have just earned the highest recognition for original high school research projects in the United States. We know this is just the beginning. Their dedication to excellence and passion for math and science will no doubt change the world."

Working as part of Prof. Simmerling's team, Mr. Jiang won for a project entitled "Targeting Loop Dynamics in Beta1 / BetaIII Isotype Tubulin: The Application of In Silico Techniques in Combating Chemotherapy Drug Resistance." Mr. Jiang evaluated drugs that prevent cancer cells from developing resistance to chemotherapy. Mr. Jiang's success also relied on his ability to learn to use NewYorkBlue, the IBM supercomputer owned by SBU and operated by BNL which is currently among the 50 fastest computers in the world. His research was sponsored by the Academy of Applied Scientists and used computational resources at the New York Center for Computational Sciences at Brookhaven National Laboratory.

"The significance of this study was that through computational methods we were able to provide detailed insights into an extremely complex mechanism of chemotherapy drug resistance," Mr. Jiang said in his project presentation. "We were also able to provide insight into the means by which a newly discovered drug is able to overcome this drug resistance mechanism. Based on this it is possible to design drugs that are even more effective and can overcome this form of resistance in clinical studies."

Professor Simmerling said the project involved an understanding of the complex cancer drug Taxol and an extremely complicated mechanism of drug resistance. The research required Mr. Jiang to have an understanding of organic chemistry, physics and molecular biology, as well as to be able to use the New York Blue supercomputer at Brookhaven National Laboratory, he said.

"I actually tried to talk him out of his project a few times. I kept telling him it was too complicated," said Professor Simmerling, who worked with Mr. Jiang for two years. "I've never had a high school student do this type of quantum physics calculations."

Professor Simmerling said Jiang's work with the cancer drug Taxol was unique. "Nobody has ever gone all the way from quantum physics to the biology in one experiment. His project had the range we expect in a Ph.D. thesis."

"This is an incredible accomplishment," said Stony Brook University President, Samuel L. Stanley, Jr., M.D. "For a high school senior to dig this deeply into such a complex problem, and present it in such acute detail, well, he will be an asset to any institution lucky enough to have him. My congratulations to all at Stony Brook and Brookhaven National Lab who supported Ruoyi in his research process."

Mr. Jiang has placed at a variety of science competitions including the National Science Bowl. He received an Honorable Mention in the Toshiba ExploraVision Competition as well as recognition for his involvement in the Science Olympiad. He is editor of his school newspaper, Kaleidoscope, and a member of the Science Bowl

Team. His favorite subject is AP Physics.

Mr. Jiang hopes to become a research lab director upon completion of his studies. In addition to his academic accomplishments, he spends his free time doing volunteer work at Stony Brook University Hospital. He enjoys playing the violin and tennis and loves to draw. He also speaks fluent Mandarin.

Regional finalists and semifinalists in the 2009 Siemens Competition had included 31 high school students who worked with Stony Brook faculty mentors. New York had 16 regional finalists, with the 7 mentored by Stony Brook accounting for 44 per cent of the total —believed to be the largest representation of any university in the country. New York State had 63 semifinalists, with the 24 mentored by Stony Brook accounting for 38 percent of the total — one of the largest representations of any university in the country.

Eight awardees worked with faculty from the Department of Chemistry. Seventeen awardees (three regional finalists and 14 semifinalists) were mentored by Miriam Rafailovich, Department of Materials Science and Engineering and Director of the Garcia Center. She is one of the nation's leading mentors of research competition talent and has formed collaborative networks with faculty across campus, spanning departments in the College of Arts and Sciences, College of Engineering and Applied Sciences, School of Dental Medicine, and School of Medicine. Many of the competition winners participated in summer research programs offered at Stony Brook, including the Garcia Center for Polymers at Engineered Interfaces program and/or the Simons Summer Research Program.

Faculty mentors came from various departments, including Nancy Hollingsworth, Biochemistry and Cell Biology; Wei Lin and Yi-xian Qin, Biomedical Engineering; Elizabeth Boon, Benjamin Hsiao, Roy Lacey, Iwao Ojima, and Carlos Simmerling, Chemistry; Marcia Simon, Dental School/Oral Biology; Miriam Rafailovich, Materials Science & Engineering; Marivi Fernandez-Serra, Physics and Astronomy; and Martin Rocek, C.N. Yang Institute for Theoretical Physics.

The Siemens regional finalists from New York who worked with SB faculty included: Jiang and Kevin Zhao of Ward Melville High School, East Setauket; Michelle Leonetti of Long Beach High School, Lido Beach; Joshua Pfeffer of the North Shore Hebrew Academy High School, Great Neck, and Salonee Shah of W. Tresper Clarke High School, Westbury. Out of state regional finalists include: Sahil Khetpal of Texas Academy of Math & Science, Denton, Texas; and Anirudh Nandan of Los Alamitos High School, Los Alamitos, California.

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