High School Student Roger Wang Won Nation's 5th Place in The 2006-2007 Siemens Competition in Math, Science & Technology with His Summer Nanotechnology Research Project

The summer research of **Guannan (Roger) Wang,** a student at Horseheads High School, Horseheads, New York, in Professor C. J. Zhong's Laboratory at SUNY-Binghamton, brought him to the Nation's 5th place in **The 2006-2007 Siemens Competition in Math, Science & Technology** (http://www.siemens-foundation.org/competition/). The Siemens Competition in Math, Science & Technology recognizes remarkable talent early on, fostering individual growth for high school students who are willing to challenge themselves through science research. Through this competition, students have an opportunity to achieve national recognition for science research projects that they complete in high school. For a list of the **National Finalists,** go to (http://www.siemens-foundation.org/competition/2006/Nationals.htm). For a list of the **Siemens Competition National Winners Announced**, go to (http://www.siemens-foundation.org/documents/2006-07NationalWinnersReleaseFINAL.pdf). In USA Today, there was also a report about this event (http://www.usatoday.com/tech/science/2006-12-05-siemens-competition_x.htm).

Roger Wang at his poster presentation in the Final of Siemens Competition.

In his summer research project, Roger Wang investigated the electrical properties for thin films assemblies of gold nanoparticles of highly-monodispersed sizes (<5 nm) using alkyl dithiols of different chain lengths (<3 nm). His experimental results have shown that the activation energy increases with chain length and decreases with particle size. The electron tunneling decay term decreases with particle size. The results have revealed that the conductivity and activation energy data for the nanoparticle thin film assemblies quantitatively matches the calculations from electrostatic model of granular metals through the electron tunneling mechanism. The strong correlation between the experimental and the theoretical data was attributed to a combination of the high monodispersity of the nanoparticles and the uniformity and stability of the thin film assemblies. These findings have provided an important set of conductivity data supporting the applicability of the activated electron tunneling theory to the molecularly-mediated thin film assemblies of nanoparticles, which have important implications to the design and fine-tuning of the nanostructured thin films as chemical and biological sensing materials.