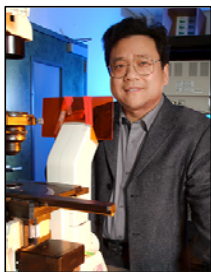
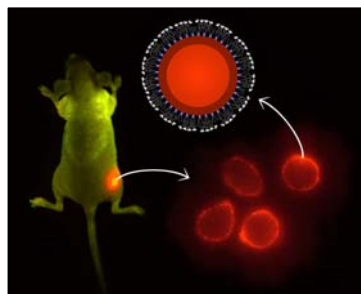




Center for Nanoscale
Chemical-Electrical-Mechanical
Manufacturing Systems

Nanotechnology and Bioengineering for Personalized Medicine

Nanotechnology and bioengineering are enabling technologies with broad applications in molecular and cell biology as well as in disease imaging and treatment at the molecular level. The basic rationale is that nanometer-sized particles such as semiconductor quantum dots (QDs) have novel optical, electronic, magnetic, and structural properties that are not available from either individual molecules or bulk solids. When linked with biotargeting or biorecognition ligands such as monoclonal antibodies, peptides, or small molecules, these nanoparticles can be used to target tumor antigens (biomarkers) as well as tumor vasculatures with high affinity and specificity. In the “mesoscopic” size range of 10-100 nm (diameter), quantum dots and polymeric nanoparticles also have more surface areas and functional groups that can be linked to multiple diagnostic (e.g., optical, radioisotopic, or magnetic) and therapeutic (e.g., anticancer) agents. In one example, we have recently developed a new class of self-assembled and biodegradable nanostructures for delivery and targeting of anticancer drugs, and have achieved dramatically improved efficacy and reduced toxicities in in-vivo animal models. This type of interdisciplinary research raises exciting opportunities for personalized and predictive medicine, especially biomarker-enabled diagnosis, prognosis, and individualized therapy of major human diseases (e.g., malignant tumors, vulnerable cardiovascular plaques, infectious and neurodegenerative diseases).



Shuming Nie

Department of Biomedical Engineering and the Winship Cancer Institute
Emory University and the Georgia Institute of Technology

Dr. Shuming Nie is the Wallace H. Coulter Distinguished Chair Professor in Biomedical Engineering at Emory University and the Georgia Institute of Technology, with joint appointments in chemistry, materials science and engineering, and hematology and oncology. He is also the Principal Investigator and Director of the Emory-Georgia Tech Nanotechnology Center for Personalized and Predictive Oncology, one of the eight national centers funded by the National Cancer Institute (NIH/NCI). His research interest is broadly in biomolecular engineering and nanotechnology, with a focus on bioconjugated nanoparticles for cancer molecular imaging, molecular profiling, pharmacogenomics, and targeted therapy. His research program is currently supported by three large-scale grants (more than \$30 million in total) from the National Institutes of Health. During the last 10 years, Professor Nie has published nearly 100 scholarly papers, filed 20 patents/inventions, and has delivered more than 350 invited talks and keynote lectures. In recognition of his work, Professor Nie has received many awards and honors including the Cheung Kong Professorship (The Ministry of Education of China, 2006), the Rank Prize in Opto-electronics (London, UK, 2005), the Georgia Distinguished Cancer Scholar Award (Georgia Cancer Coalition, 2002-2007), the Beckman Young Investigator Award, the National Collegiate Inventors Award, and the NSFC Overseas Young Scholar Award. Dr. Nie serves on the scientific advisory/editorial boards of 5 biotech companies and 6 scientific journals. Professor Nie received his BS degree from Nankai University (China) in 1983, earned his MS and PhD degrees from Northwestern University under the direction of Professor Richard P. Van Duyne (1984-1990), and did postdoctoral research at both Georgia Institute of Technology and Stanford University (1990-1994).

Wednesday, April 18, 2007
4:00 pm
B02 Coordinated Science Lab