
Geyou Ao

ASSISTANT PROFESSOR

Department of Chemical & Biomedical Engineering

GEYOU AO IS AN ASSISTANT PROFESSOR in the Department of Chemical and Biomedical Engineering. Following completion of her Ph.D. in chemical engineering at Auburn University, she was a postdoctoral research associate at the National Institute of Standards and Technology (NIST) through the joint NIH/NIST Postdoctoral Program sponsored by the National Research Council Research Associateship Programs of The National Academies. She launched her Bio-Nano Hybrid Materials Laboratory at CSU in fall 2016.

Dr. Ao's research falls within the areas of nanotechnology, colloid science, and rheology. She is particularly interested in integrating fundamental colloid science, molecular interactions of biomolecules-nanomaterials, and applications development of nanomaterials by utilizing chemical engineering concepts for property control and processing materials at the nanoscale. At Auburn, she studied the liquid crystalline phase behavior and rheology of carbon nanotubes that are non-covalently complexed with biomolecules such as DNA and lysozyme, and their macroscopic assemblies for applications in high strength antibacterial fibers and optical films. During that time, Dr. Ao noted the significance of the structure control of nanomaterials on many fundamental studies and novel technological development. She continued her professional training in the area of carbon nanotubes at NIST, and her research was focused primarily on developing effective selection methods for atomic structure-based sorting of carbon nanotubes using the special recognition capabilities of sequence controlled biopolymer such as single-stranded DNA.

At CSU, Dr. Ao launched her advanced nanomaterial research programs with the overarching theme of utilizing a powerful biomolecular approach to achieve structure control and manipulation of nanomaterials for applications development. Dr. Ao studies the structure-processing-property relationships in nanomaterials, with a special interest in structure control, surface functionalization and self-assembly of bio/nano

hybrid molecules. This holds promise for advancing scientific knowledge in imposing control over nanomaterial properties as well as in developing processing and applications of nanomaterials in biology and engineering materials. Her current research programs involve post-synthesis separation of nanomaterials with defined structure and property including carbon nanotubes and boron nitride nanotubes using sequence controlled biomolecules such as DNA. She also studies the mechanistic behavior of nanomaterials in biological media as well as the phase behavior and rheology of nanomaterials in liquid media to predict and control their macroscopic properties.

Various nanomaterial processing and characterization techniques that are routinely used in the lab include dispersion and structure sorting of nanomaterials, spectroscopy (e.g. optical, Raman, fluorescence), microscopy (e.g. polarized-light optical, atomic force, electron microscopy), kinetics of molecular exchange reactions, thermal gravimetric analysis, and rheology of nanomaterial dispersions. Developing novel applications of structurally controlled nanomaterials with unique properties is currently underway in the lab including using intrinsic near-infrared photoluminescence of carbon nanotubes for biological imaging and sensing, and exploring advanced coatings of boron nitride nanotubes that provide temperature and corrosion protection for aerospace applications.

Integrating research and education is also one of the key aspects in Dr. Ao's lab. She drives to impact the education and career development of both graduate and undergraduate students of all backgrounds, particularly encouraging and empowering those from traditionally underrepresented groups including women. Dr. Ao and her students have also been involved in outreach programs geared toward high school students through Fenn Academy and will continue to explore fun and rewarding outreach activities for supporting the advancement of next-generation scientists and engineers within the STEM community.

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