

ACS Symposium
Washington DC, Aug. 17-21, 2025

Innovative Nanotechnology & Single Cell Imaging in Biology and Medicine

Organizer: X. Nancy Xu
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This symposium is structured to showcase the latest advances and applications of interdisciplinary chemistry approaches, including nanotechnology, single-cell analysis, and single-molecule spectroscopy, for pushing the frontiers of biology and medicine. The focus is on the development of innovative technologies, methodologies, and nanomaterials aimed at addressing fundamental questions at the intersection of chemistry, biology, engineering, and medicine. These efforts are central to enhancing our understanding of human diseases and unlocking new opportunities for early and effective diagnosis and treatment.

The symposium is co-hosted by the Divisions of Analytical Chemistry, Biological Chemistry, Colloid and Surface Chemistry (COLL), and Physical Chemistry, with the Division of Colloid and Surface Chemistry (COLL) serving as the primary sponsor.

August 19, Tuesday

Day-I: Morning session (8:00 AM): Presider & Organizer: X. Nancy Xu

Topic: DNA-based nanostructures as next-generation live-cell probes

Speaker: **Prof. Chad A. Mirkin**, Northwestern University (**confirmed**) (30 min)

Topic: Advancing Metallomics, Metabolomics, and Glycomics using Functional DNA Nanotechnology

Speaker: **Prof. Yi Lu**, UT Austin (**confirmed**) (30 min)

Topic: Using nanoparticle contrast agents to study nanoplastics in zebrafish

Speaker: **Prof. Edward R. Van Keuren**, Georgetown University (**confirmed**) (30 min)

Recess : 10 min

Topic: Time-Resolved Nonlinear Optical Microscopy of Molecular Adsorption and Transport at Living Cell Membranes

Speaker: **Prof. Hai-Lung Dai**, Temple University (**confirmed**) (30 min)

Topic: Behind Closed Membranes: Illuminating the Chemistry of Immune Defense

Speaker: **Prof. Yan Yu**, Washington University (**confirmed**) (30 min)

Topic: Quantum-defect engineered fluorescent nanosensors: unlocking ratiometric sensing for continuous insulin monitoring

Speaker: **Dr. Ali Alizadehmojarad**, H. Kang, G. Sánchez-Velázquez, X. Gong, Michael Strano, MIT (**confirmed**) (30 min)

August 19, Tuesday

Day-I: Afternoon session (2:00 PM): Presider & Organizer: X. Nancy Xu

Topic: Active Targeting Hyaluronan and Hyaluronan Like Polysaccharide Nanoprobes for Multiple Modality Imaging and Drug Delivery to Breast Cancer

Speaker: **Prof. Xuefei Huang**, Michigan State University (**confirmed**) (30 min)

Topic: Improving the cytosolic delivery of oligonucleotides through chemical tailoring of enzymatically released multi-tailed DNA surfactant conjugates from Nucleic acid Nanocapsules

Speaker: **Prof. Jessica L. Rouge**, University of Connecticut (**confirmed**) (30 min)

Topic: Unraveling Tumor Heterogeneity: Translatable In Vivo Multiplexed Surface-Enhanced Raman Spectroscopic (SERS) Imaging of Live Tumor Models

Speaker: **Prof. Jung Ho Yu**, University of Waterloo (**confirmed**) (30 min)

Recess: 10 min

Topic: Plasmon-enhanced fluorescence imaging and spectroscopy on nanostructures for single cell analysis

Speaker: **Prof. Yao-Qun Li**, Xiamen University (**confirmed**) (30 min)

Topic: Single-particle light scattering microscopy for multi-parameter characterization of gene delivery nanoparticles

Speaker: **Dr. Aaron M. Goldfain**, NIST (**confirmed**) (20 min)

Topic: Colloidal Bismuth Nanoparticles as Diagnostic Imaging Agents

Speaker: **Antonio Martino**, F. Mangano, B. Fallon, E. Greene, R. Willson, N. Mathuria, Carly Filgueira, Houston Methodist Academic Institute (**confirmed**) (20 min)

August 20, Wednesday

Day-II: Morning session (8:00 AM): Presider & Organizer: X. Nancy Xu

Topic: New Analytical Approaches to Probe Nanoparticle Structure and Properties

Speaker: Prof. Howard Fairbrother, JHU (**confirmed**) (30 min)

Topic: Electron Videography of Membrane Nanodiscs and Cells

Speaker: Prof. Qian Chen, University of Illinois Urbana-Champaign (**confirmed**) (30 min)

Topic: Innovative nanobiotechnology for probing single live cells

Speaker: Prof. X. Nancy Xu, Old Dominion University (**confirmed**) (30 min)

Recess: 10 min

Topic: Genetically encoded integrator sensors for detecting neuronal activity

Speaker: Prof. Wenjing Wang, University of Michigan (**confirmed**) (30 min)

Topic: Uniform gold nanospheres capped by citrate species for quantitative imaging and lateral flow immunoassay

Speaker: Prof. Younan Xia, Georgia Institute of Technology (**confirmed**) (30 min)

Topic: Engineering DNA-based tools for chemical and biological sensing

Speaker: Prof. Devleena Samanta, UT Austin (**confirmed**) (30 min)

August 20, Wednesday

Day-II: **Afternoon session (2:00 PM):** Presider & Organizer: X. Nancy Xu

Topic: Controlling single cell migration with nanoparticles

Speaker: **Prof. Catherine J. Murphy**, University of Illinois Urbana-Champaign (**confirmed**) (30 min)

Topic: Determining the nature of interactions and biomolecular condensates in microbes

Speaker: **Prof. Julie S. Biteen**, University of Michigan (**confirmed**) (30 min)

Topic: Single-Molecule Spectroscopy and Force Manipulation Studies of Protein Dynamics and Signaling

Speaker: **Prof. H Peter Lu**, Bowling Green State University (**confirmed**) (30 min)

Recess

Topic: Expansion microscopy using tensile force achieves sub- and single-cell fluorescence and mass spectrometry images

Speaker: **Prof. Lydia Kisley**, Case Western Reserve University (**confirmed**) (30 min)

Topic: Magnetic Cargo (MagCar) for Single-cell Proteomics in the Vertebrate Organizer

Speaker: **Md Tarikul Islam**, J. Li, Peter Nemes, University of Maryland (**confirmed**) (20 min)

Topic: Photocatalytic Crosslinking-Activated Droplet Sorting (PhoCADS): Microfluidics-Free Sorting of Single Cells and Biomolecules

Speaker: **Dr. S. Lennon Luo**, W. Zong, X. Zhao, David A. Weitz, Harvard University (**confirmed**) (20 min)