

9th International Conference on

Nanoscience and Nanotechnology

July 09-10, 2026 | London, UK

Volume: 09

Programmable Nanomaterials and Spherical Nucleic Acids: Transforming Precision Medicine and Advanced Nanotechnology

Chad A. Mirkin

Northwestern University, United States

Nanotechnology has revolutionized materials science, biotechnology, and medicine by enabling the design of functional nanomaterials with precisely controlled physical, chemical, and biological properties. This presentation explores recent advances in programmable nanomaterials, spherical nucleic acids (SNAs), and nanoparticle engineering for applications in disease diagnostics, targeted drug delivery, gene regulation, and precision medicine. Advances in nanoscale fabrication techniques and molecular self-assembly have significantly enhanced the stability, specificity, and therapeutic efficacy of nanoparticle-based systems.

The session discusses emerging applications of nanomaterials in biosensing, molecular imaging, cancer therapeutics, and regenerative medicine. Artificial intelligence-assisted nanomaterial design, smart nanocarriers, and responsive biomaterials are improving clinical translation while reducing toxicity and enhancing therapeutic precision. Future perspectives include personalized nanomedicine, multifunctional nanoplatforms, and sustainable nanotechnology for healthcare, environmental monitoring, and advanced manufacturing.

Biography

Chad A. Mirkin is Professor of Chemistry at Northwestern University, United States, and Director of the International Institute for Nanotechnology. His research focuses on nanomaterials, nanomedicine, biosensors, nanoparticle synthesis, and molecular diagnostics. He is internationally recognized for pioneering spherical nucleic acid technology and has authored hundreds of high-impact scientific publications.