

Resources

The Institute researchers have access to outstanding experimental resources, including the **UC Nanofabrication Facility** and the **Advanced Materials Characterization Center**, both located in the new University of Cincinnati Engineering Research Center.

The **Engineering Research Center Clean Room** (www.eng.uc.edu/ercleanroom/) is a central fabrication, processing, and characterization center used by a diverse campus wide research community. The more than 8,000 square foot facility includes class 10, 100, and 1000 clean room spaces, with lithography, deposition, etching, oxidation, diffusion, and characterization capabilities. The newest arrival to the facility is the Raith 150 E-Beam Lithography tool that enables researchers to directly write sub-100 nm features for nanoscale device fabrication. Further information is available at:

www.eng.uc.edu/ucnanoinstitute

Broad Based Focus

The **Institute for Nanoscale Science and Technology** brings together four centers of excellence: The **Center for Nanomaterials**, the **Center for BioMEMS and Nanobiosystems**, the **Center for Nanomedicine**, and the **Center for Nanophotonics**, composed of faculty from the Colleges of Engineering, Arts and Sciences, and Medicine.



On-Chip Electrochemical Analysis System Using Nanoelectrodes and Bioelectronic CMOS Chip
Xiaoshan Zhu and Chong H. Ahn

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Institute for NANOSCALE SCIENCE and TECHNOLOGY

— CENTER FOR NANOMATERIALS

— CENTER FOR BIOMEMS &
NANOBIOSYSTEMS

— CENTER FOR NANOPHOTONICS

— CENTER FOR NANOMEDICINE



Center for NANOSCALE MATERIALS SCIENCE

Researchers in the Center for Nanoscale Material Science are creating materials through the control of matter on the nanometer-length scale, i.e., at the level of atoms and molecules, and then combined to generate larger structures with fundamentally new atomic and molecular organization. These new materials exhibit profoundly different physical, chemical, and mechanical properties than their macroscopic counterparts and, when assembled into larger structures, are expected to enable revolutionary advances in fields such as transportation, microelectronics, and medicine.

Center for BIOMEMS and NANOBIOSYSTEMS

Center for BioMEMS and Nanobiosystems researchers are developing new and innovative biomedical and biochemical analysis systems incorporating BioMEMS and Nanobiosystems. Applications include environmental nanosystems, point-of-care testing, haptics and biosurgery, microfluidics and labs-on-a-chip, and proteomics and genomics.

Center for NANOPHOTONICS

The Center for Nanophotonics brings together researchers from the Departments of Electrical & Computer Engineering (ECE), Physics, and Chemistry. Photonics-based research covers optical information processing and memories, connectivity, optical sensing, solid-state lighting, and basic studies of quantum dot lasers, photonic waveguide devices for optical communications utilizing wavelength multiplexing, and photonic bandgap structures.

Center for NANOMEDICINE

The Center for Nanomedicine spans the Colleges of Engineering, Medicine, and Arts & Sciences. Engineering, medical, physics, and chemistry faculty and students are exploring this new frontier in medicine, in which nanoscale science and technology play an important role in a wide variety of diagnostic and therapeutic options. The purpose of the Center is to foster an interdisciplinary approach in both research and education to formulate, design, and produce nanoscale solutions from "bench to bedside." Principal Center thrusts include nanoscale diagnostics and treatment at the cellular level; synthesis and characterization of nanoscale devices and nanomaterials for medical applications; and nanoscale biocompatibility and safety.

