

Mission

The mission of the Connecticut State Colleges & Universities (ConnSCU) Center for Nanotechnology is to foster collaborative, interdisciplinary research and educational initiatives/programs in micro- and nanotechnology with the goal of enhancing Connecticut's workforce competitiveness in nanotechnology and materials science. The Center builds upon existing collaborations with Yale University, The University of Connecticut and the Connecticut Community Colleges to create programs enhancing Science, Technology, Engineering, and Mathematics (STEM) education for the ConnSCU community and beyond. The ConnSCU Center for Nanotechnology is the primary resource for SCSU's Nanotechnology Graduate Certificate, the Applied Physics Masters: Nanotechnology/Materials Science track, as well as an array of research opportunities and professional development for students and faculty. Center instrumentation and programs are partially funded by grants from the National Science Foundation [NSF] and the Department of Energy [DOE].

Our Equipment

Equipment in the NanoCenter supports synthesis, processing, and characterization of micro- and nano-scale materials. Synthesis options include wet chemical methods for thin films and nanoparticles (quantum dots), and chemical vapor deposition systems for carbon nanotube (CNT) growth and thin film deposition. Transmission Electron Microscopy (TEM) sample preparation is well supported with options for polishing, milling, and slicing samples. Nanocharacterization is a strength at SCSU that is built around the data acquisition and analysis from an array of transmission, scanning electron, and force microscopy instruments. The NanoCenter is active in efforts to expand its equipment and expertise capabilities.



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For more information:

Dr. Christine Broadbridge
Director, ConnSCU-CNT
(203) 392-6461
broadbridgC1@southernct.edu

Dr. Matthew Enjalran
(203) 3925444
enjalranm1@southernct.edu

Dr. Todd Schwendemann
(203) 392-6431
schwendemat1@southernct.edu

Southern Connecticut State University
501 Crescent Street
New Haven, CT 06515
SouthernCT.edu



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Scanning Electron Microscopy

Zeiss Sigma VP

This is a field emission SEM capable of spatial resolutions of 1.5 nm. This is a variable pressure system allowing for examination of insulating samples without addition of conducting coatings. The system contains In-lens SE, Everhart-Thornley, Backscatter and EDS detectors.



Transmission Electron Microscopy

Phillips EM400



120kV TEM capable of resolving down to 0.3 nm; the system is heavily used in nano-scale investigations of interfaces and thin films. An Oxford EDX attachment is added allowing high spatial resolution elemental analysis.

Scanning Electron Microscope (tabletop)

Hitachi TM1000

The system is a portable SEM with a 10,000 X magnification. Ideally suited for looking at a wide variety of small samples. It also contains an EDS detector allowing elemental composition.



Dip Pen Nanolithography (DPN)

Nanoink NLP-2000

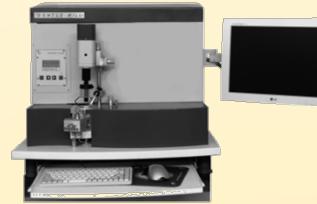


Nanolithography instrument capable of depositing a wide variety of materials with sub-micron accuracy and precision. Used for multiplexed protein printing, biosensor functionalization, nanopatterning studies, polymer patterning.

Ion Mill

Gentle Mill TL-GM1

Low Energy Argon Ion bombardment beam instrument designed for preparing TEM samples to thicknesses < 100 nm.



Ultra-Microtome

Sorvall Porter Ultramicrotome MT-2

Used for sectioning of polymer or biologic samples with thickness between 50 nm - 100 microns.

Chemical Vapor Deposition Carbon Nanotube Synthesis

Nanotech Innovations SSP-354

Growth of multi-wall carbon nanotubes using a nanoparticle catalysis infused liquid precursor.



UV-Vis-NIR

Shimadzu UV-3600

Contains three detectors and high performance double monochromator. Used for ensemble average quantum dot-size measurements.



Scanning Probe Microscope (AFM and STM)

Vecco Multimode Rev 8 Nanonis RT control electronics

Atomically sharp tips raster across a sample surface generating topography map with atomic scale detail. The multimode SPM can examine conductive as well as non-conductive samples. Additionally, biological samples can be examined using a fluid cell attachment.



Optical Microscope

Olympus BH2



Optical Microscopes

Zeiss Axio Lab A1

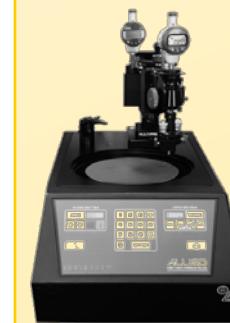
and

Zeiss Axio Scope A1



TEM Prep

Allied High Tech 15-2000 GI MultiPrep



The MultiPrep enables precise semi-automatic sample preparation



Precision Low Speed

Diamond Saw

Allied High Tech

A low speed saw excellent for cutting small delicate samples. Cutting of crystals and very hard materials with precision is also possible.



Inverted Optical Microscope

Olympus Gx71

An inverted optical microscope for metallurgical images.

Additional Instrumentation is available to the ConnSCU Nanotechnology Center with collaboration from all Connecticut state universities.

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