NANOBIOTECHNOLOGY CENTER

Facility Capabilities & Techniques

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www.nbtc.cornell.edu

NBTC user facilities provide a multidisciplinary environment with Level 1000 clean-room and laboratory space, equipped with state-of-the-art tools for nanobiotechnology research

Biology and Chemistry Labs

The labs are primarily designed to function as an integrated environment where nanotechnology related research projects and device characterization can be performed outside the cleanroom.

Atomic Force Microscopy

The NBTC second floor labs are equipped with an MI PicoPlus system specially designed for environmental and liquid imaging. The PicoPlus is well suited for in-vitro studies of both biological/soft materials as well as standard ambient imaging and it can be mounted on top of the TIRF fluorescent microscope for simultaneous fluorescent imaging of samples.

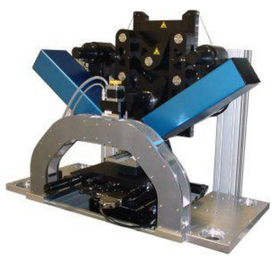
Dynamic Light Scattering

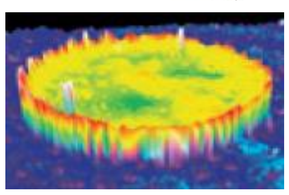
The Nano-ZS instrument provides the ability to measure three important characteristics of particles or molecules (polymers, proteins etc.) using Dynamic Light Scattering (DLS): Particle size, Zeta potential and molecular weight.

Fluorescence Microscopy

In addition to the Nikon TIRF microscope, there are two fluorescent microscopes:

- Olympus BX51 *upright* with a Cool Snap CCD camera
- Olympus IX71 *inverted* with a DP70 full color CCD camera





Imaging Ellipsometer

Ellipsometry is a well-known non-destructive optical method for determining film thickness and optical properties. Imaging Ellipsometry combines the power of ellipsometry with microscopy to allow spatial information on film thickness. Liquid measurement capability allows for in-vitro real-time measurements of thin film growth/corrosion.

Alliance HPLC

Waters Alliance HPLC comes with:

- Separations Module
- Fraction Manager-Analytical
- Photodiode Array Detector
- Evaporative Light Scattering Detector

CHA MARK 50 E-beam Deposition

Fully automatic conformal or lift-off deposition system for 57 4” or 24 6” wafers, 6 pocket gun, heating to 300 ^{0}C, pumps down in 15 min. Ag, Al, Au, Cr, Cu, Ge, Ni, Pt, and Si in stock, others available upon request.

FTIR

Surface sensitive infrared spectroscopy for acquiring chemical information on bulk samples as well as thin films on solid substrates.

Potentiostat

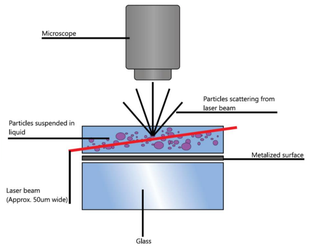
Sensitive potentiostat for impedance and other electrochemistry measurements such as cyclic voltammetry. Possible to connect to Picoplus AFM for nanometer scale impedance/potential imaging.

Spectrophotometer

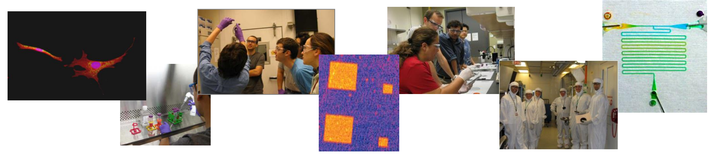
UV/VIS spectrophotometer for basic and advanced applications. Full spectral range:
190 - 1000nm, tunable in 1nm increments with 2nm bandwidth.
Single cuvette and microplate reader combined in the same system.

Malvern Nanosite

Nanoparticle Tracking Analysis (NTA) to characterize nanoparticle from 10-2000nm in solution. Each particle is individually but simultaneously analyzed by direct observations of diffusion. This particle-by-particle methodology produces high resolution results for particle size distribution and concentration while visual validation gives users extra confidence in the data.
As well as particle size and concentration, protein aggregation, viscosity and zeta potential can all be analyzed while a fluorescence mode provides speciation of labeled particles.



Minicourses



NBTC Staff offer workshops and minicourses for users embarking on a new field of research.
Workshops: 1-3 hour seminar discussion of a topic relevant to many NBTC users. The purpose of these workshops is to rapidly give researchers a sense of the particular factors and challenges which need to be considered when doing research in that field.
Minicourses: Intensive, hands-on classes that allow researchers to develop practical lab skills in new fields over several days. Instruction takes place in groups of 6 or less to ensure individual attention.
Minicourse/Workshop topics include:
•Mammalian Cell Culture
•Electronics Testing
•Fluorescent Cell Staining
•Surface Analytical Methods
•Microfluidic systems

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