Nanofabrication Cleanroom

umass.edu/ials/nanofabrication

Located on the 1st floor in the Silvio O. Conte National Center for Polymer Research the Nanofabrication facility is part of a network of cleanroom laboratories that offer both unique and complimentary capabilities. Training can be tailored to the specific set of processes or techniques needed to fabricate and test various devices or materials. Films of numerous metals and ceramics can be applied and patterning as small as 10 nm can be accomplished. A wet chemistry area provides a safe environment for the use of a variety of coatings, solvents, and etchants.

The facility accepts samples and will perform requested analysis. We offer training to users to conduct experimentation for use on a fee for service basis to both internal and external researchers, academic or industry based. Following an initial consultation, covering experimental parameters training and access is arranged through the director.

ACCESS

To request access, training, or additional information please contact John Nicholson at jnicholson@research.umass.edu. All lab users must complete UMass EH&S lab safety training prior to lab orientation tour and training. Our rates are competitive and tiered based on needs and usage. Visit our website at *umass.edu/ials/nanofabrication* for current listing.

TRAINING

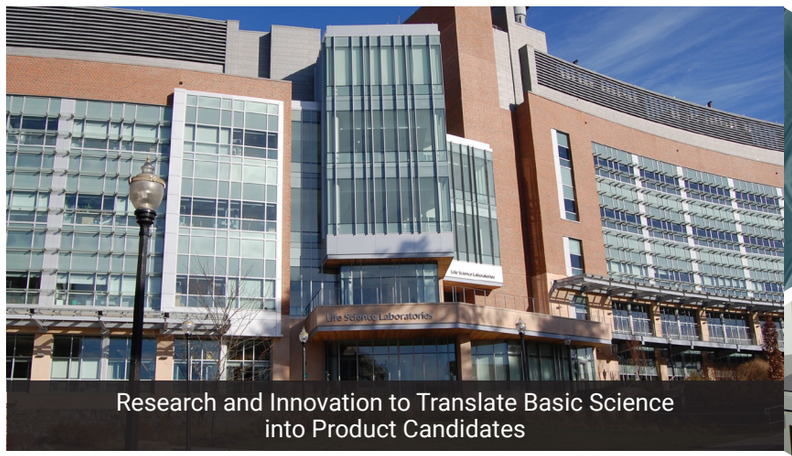
Training for new users consists of:

- lab orientation tour,
- explanation of clean room policies and lab safety,
- training on operation of needed equipment,
- consultation on photomask design and layout,
- assistance in designing process procedures,
- training on safe use of wet chemistry benches.

Once the training is complete, researchers may schedule their experiments through the director of Nanofabrication (John Nicholson) or online through FOM (Facilities Online Manager) at *fom.umass.edu/fom*

UMassAmherst | Core Facilities

Institute for Applied Life Sciences
University of Massachusetts Amherst
Life Science Laboratories
240 Thatcher Road
Amherst, MA 01003



Research and Innovation to Translate Basic Science into Product Candidates

PARTNER WITH US!

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Revision (01/29/19)

UMassAmherst | Core Facilities

Nanofabrication Cleanroom

Institute for Applied Life Sciences
University of Massachusetts Amherst

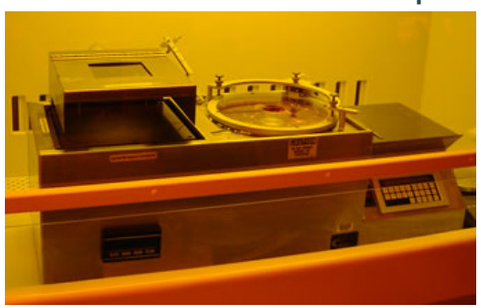
Technologies for the Fabrication of Micro and Nano Devices

EQUIPMENT

AJA International Orion 8 Sputtering System

The load-locked AJA ORION 8 Sputtering System currently has three RF and four DC confocal magnetron sputtering sources installed. Source materials available include copper, aluminum, silicon dioxide, titanium dioxide, aluminum oxide, indium tin oxide, magnesium oxide, tantalum oxide, cobalt, palladium, niobium, silver, nickel, tantalum, sammarium, sammarium cobalt, zirconium, chromium, vanadium, and Permalloy (Ni/Fe). Programmable control of deposition parameters and cycling allows simultaneous or sequential deposition and repetition of deposition cycles. Substrate heating up to 750°C is also programmable.

Brewer Science CEE 100CB Spin Coater



The Brewer Science CEE 100CB Spin Coater and Hot Plate is capable of storing up to 10 spin regimes which may include spin speed ramp rate, stepped spin speeds, and a nitrogen float or vacuum hot plate contact mode for photoresist curing. Chucks for substrates from 1” to 6” diameter are available.

Metrology

Varous measurement systems are available including a profilometer, ellipsometer, and probe station with a Keithley SCS4200 parametric analyzer and computer controlled probe manipulators.

Live web cameras of lab activity can be seen at *nano.pse.umass.edu*.

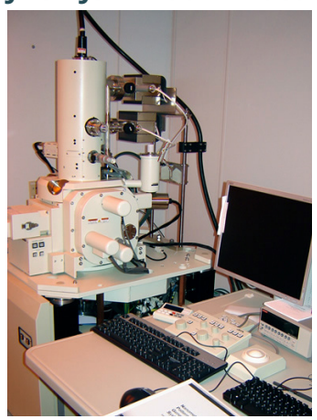
Cambridge NanoTech Atomic Layer Deposition (ALD) System

The Cambridge NanoTech Savannah 100 Atomic Layer Deposition (ALD) system is available to deposit very conformal and precise thicknesses of various thin films. Our unit can currently be configured with the precursor chemicals to deposit hafnium oxide, aluminum oxide, titanium dioxide, zinc oxide,and platinum.

CHA Electron Beam Evaporator with Cryopump

The CHA SE-600 electron beam evaporator with a 4 pocket hearth has been retrofitted with a cryopump to decrease the pumping cycle time. More than twenty different metals can be evaporated including gold, platinum, palladium, silver, copper, aluminum, nickel, and titanium.

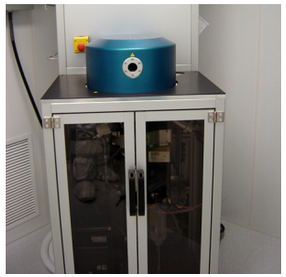
JEOL JSM-7001F Ebeam Write System

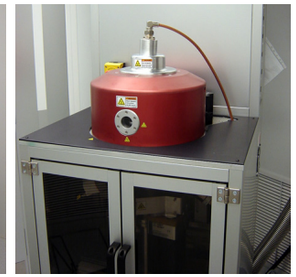


The Electron Beam Lithography system is based on a JEOL JSM-7001F Thermal Field Emission SEM equipped with a Nabity Nanometer Pattern Generation System which supports e-beam lithography and an image database.

STS RIE and PECVD Systems

The STS Vision 320 Reactive Ion Etch system is configured to etch silicon dioxide, silicon nitride, and amorphous silicon. Available gases are hydrogen, methane, sulphur hexafluoride, trifluoromethane, oxygen, argon, and nitrogen.





The STS Vision 310 Plasma Enhanced Chemical Vapor Deposition system is equipped with a patented frequency generator that allows for the deposition of low stress films. It is configured for the growth of silicon dioxide, silicon nitride, and amorphous silicon. Available gases are 2% silane/nitrogen, ammonia, nitrous oxide, tetrafluoromethane, oxygen, methane, and nitrogen.

Suss MicroTec MA6 Mask Aligner

A UV mask aligner and exposure system with split screen stereo camera alignment system capable of both front and back side alignment of from 2” to 6” diameter substrates.

MASSACHUSETTS LIFE SCIENCES CENTER

A significant portion of core equipment has been purchased through MLSC grant funding support.

TESTIMONIAL

“During our year long association with John over the use of sputtering tool, and other thin film/material characterization services, we have always received high-quality service, reliable samples, with a quick-turn around time. John has facilitated the use of these tools according to our research needs, and was very cooperative and flexible throughout, from our requests for varying process parameters to time constraints as we progressed with our industrial R&D project deadlines. His technical expertise in the field has been of great help to us. We were also impressed by the coordination and upkeep of the tools and the clean room at large.” – Saumya Sharma, ABB Inc., USA