

NANOFABRICATION FACILITY

Charles Black, Facility Leader

Our large cleanroom (5,000 sq. ft.) is dedicated to state-of-the-art processing of thin-film materials and devices. Core laboratory capabilities include high-resolution patterning by electron-beam and nanoimprint lithography methods, plasma-based dry etch processes, and material deposition.

Our diverse toolset includes two highly-requested systems serving a variety of user projects. Our JEOL JBX-6300FS electron-beam lithography tool allows rapid printing of sub-20nm features over large sample areas, with overlay and stitching at sub-20 nm accuracy.

CAPABILITIES

Lithography

- E-beam: JEOL JBX-6300FS
Helios dual SEM/FIB, NPGS system
JEOL 6500 SEM, NPGS system
- Imprint: Molecular Imprints Imprio 55
- Optical: Karl Suss MJB-3 UV Mask Aligner

Helios Nanolab dual SEM/FIB system

Thin Film Deposition

- Trion Orion III PECVD (SiO_2 and Si_3N_4)
- K. J. Lesker PVD 75 e-beam evaporator (4-pocket)
- K. J. Lesker PVD 75 sputtering system (3-target)
- Denton bell jar type thermal evaporator
- Denton desktop sputter coater for SEM analysis

Our dual SEM/FIB tool (Helios Nanolab, FEI Co.), is capable of simultaneous focused ion beam milling and SEM imaging. Further capabilities are: gas injector for electron or ion beam assisted deposition of platinum, x-ray detector for EDS analysis, nano-manipulator probe; and high resolution SEM (1 nm), FIB (5 nm), and STEM (0.8 nm) imaging.

The facility supports thin-film material deposition by diverse techniques, reactive ion etch processes, MEMS-type deep silicon etching, and several thin-film characterization techniques.

Reactive Ion Etch (RIE)

- Oxford Instruments Plasmalab 100 (SF_6 , O_2 , CHF_3 , and Bosh process using C_4F_8)
- Trion Phantom III RIE (SF_6 , O_2 , CHF_3 , CF_4 , and Ar)
- Technics PE-IIA Plasma Asher

Thin-film characterization

- Zygo NewView 6000 non-contact profilometer
- Dektak 150 stylus profilometer
- Rudolph Instruments 439 ellipsometer

Miscellaneous

- Rapid thermal annealer
- Spin coaters (Suss, Brewer)
- Optical microscopes (Nikon, Zeiss)

