



MARYLAND NANOCENTER
FABLAB
MICRO AND NANO FABRICATION LABORATORY

www.fablab.umd.edu

A cutting-edge complex for nano- and micro-fabrication

Supporting research, education, and technology development

Open to and serving the University of Maryland, industry, government labs, and external academic and nonprofit organizations

Nanotechnology starts and flourishes with making things at the nanoscale—from fabricating prototype materials and devices for R&D, to piloting the means to manufacture key nano components, microsystems, and products made from them. The FabLab provides the needed equipment and skilled personnel to support academic, corporate and government partners, as well as University of Maryland researchers.

The FabLab is part of the Maryland NanoCenter, a partnership among the A. James Clark School of Engineering, the College of Chemical and Life Sciences, and the College of Computer, Math and Physical Sciences at the University of Maryland.

The FabLab supports the Maryland NanoCenter's mission of providing cutting-edge nanotechnologies and services for engineering and science researchers in academia, industry and government; developing future professionals who have hands-on experience in nanotechnology; and promoting a vibrant nanotech economy in the state of Maryland through interactions with established and emerging companies.

3D microcompressor device formed by MEMS-based gray scale technology.

FOR INFORMATION, PLEASE CONTACT:

DR. JIM O'CONNOR
DIRECTOR, FABLAB
(301) 405-5018
joconnor@umd.edu

PROF. GARY RUBLOFF
DIRECTOR, NANOCENTER
(301) 405-2949
rubloff@umd.edu



UNIVERSITY OF
MARYLAND

CAPABILITIES

DEPOSITION AND GROWTH

Nanowire and nanotube growth*
Atomic layer deposition (ALD)*
Physical vapor deposition (PVD)
(thermal and e-beam evaporation,
sputtering, in-situ clean)
Chemical vapor deposition (CVD)*
Thermal oxidation*

ETCHING

Dry etching (RIE, ICP)*
Wet etching, surface cleaning*

LITHOGRAPHY

Electron beam*
Optical lithography, wafer bonding*

FOCUSED ION BEAM

PLANARIZATION

CHEM-MECH POLISHING (CMP)

ION MILLING

CHARACTERIZATION

ENVIRONMENTAL SEM

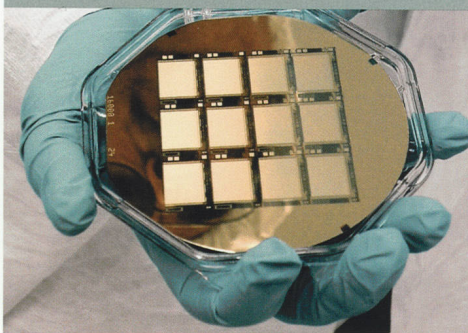
ATOMIC FORCE MICROSCOPY

OPTICAL MICROSCOPY

ELECTRICAL & DEVICE

THIN FILM PROPERTIES

* Major, new or newly-enhanced
capability



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THE FABLAB IS PART OF THE
MARYLAND NANOCENTER, A
PARTNERSHIP AMONG:



A. JAMES CLARK
SCHOOL OF ENGINEERING

COLLEGE of CHEMICAL
AND LIFE SCIENCES

cmPS

at the edge of discovery ...

College of Computer, Mathematical
and Physical Sciences

APPLICATIONS

NANOSTRUCTURES

Nanowire growth
Carbon nanotubes
Nanostructure templates
Atomic layer control

MATERIAL DEPOSITION

Soft materials (polymers, plastics)
Multilayer metal films
Insulators (oxide, nitride, high-K)
Semiconductors (Si, III-V, ...)

PATTERNING AND PROCESSING

Ultrafine pattern generation
(electron beam)
Alignment and wafer bonding
Optical lithography
Dry etching (reactive ion etching,
high density plasma)
Wet etching for material removal
Chemical-mechanical planarization
Focused ion beam processing

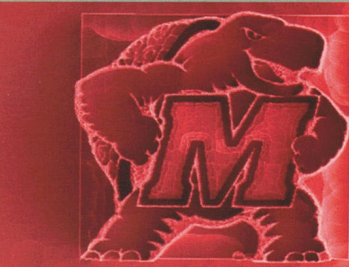
DEVICES

Ultrasmall semiconductor devices
Nanotube and nanowire devices
and circuits
Molecular electronics
Thin film transistors
Nanostructured devices for energy
capture and storage, displays, and
sensors
Flexible electronics
Optoelectronics

MICROSYSTEMS

Microelectromechanical systems
(MEMS)
Microfluidics
Biomolecular and chemical
microsystems
Chem-bio sensor systems
Cell-based microsystems
Microsystem packaging

SUPPORTED IN PART BY:



E Beam Spot Magn Det WD Exp | 50 µm
10.0 kV 3.0 800x SE 25.2 1 MSAL/JUMD