Our researchers are world leading innovators of nanophotonic devices, plasmonic materials, neural prosthetics, biomedical microfluidic systems, microsensor/actuators and biosensor chips. The Utah Nanofab provides the equipment, processes, and expertise necessary to design, build and package revolutionary micro and nanoscale devices. Our facilities include device modeling, design layout, mask fabrication, thin film deposition and patterning. We provide complete surface analysis and nanoscale imaging, including multi-scale, correlative analytical microscopy: creating contextually-enriched analyses on a specific location of interest, spanning the dimensional range from 10's of cm to 10's of Å. Our scanning transmission electron microscope is the first of its kind in the country, with the ability to simultaneously image atomic lattices, while in the same scan collect meaningful, nm-resolution compositional maps of distributed elements.

Every year, we teach 8 to 12 formal lab-based courses inside our facility, beginning with freshman-level courses taught each semester. We also deliver hands-on demonstrations and curriculum support modules for use in STEM programs to help students gain intuition for the dominant physical phenomena that must be accounted for when designing in the micro- and nanometer scale. Our professional staff provide short courses to our interns and researchers in specific analysis techniques as well as in statistical experimental design techniques.

The discoveries made in the Nanofab help create life-saving medical devices, faster microchips and more efficient energy systems, resulting in scientific publications, new companies and improved quality of life.

TECHNICAL EXPERTISE & CAPABILITY
MULTI-SCALE, CORRELATIVE ANALYTICAL MICROSCOPY
• Fluorescence mapping of elements in mm resolution over 10% of (µSpot XRF)
• Stitch-montage imaging of samples in µm resolution over mm-cm scale (Keyence VHX5000, ESEM-FEG/EBSD/EDS, Zygo)
• Surface chemistry with mono-layer resolution in depth, 10 µm lateral pixel resolution (XPS, Auger)
• 3D tomographic reconstruction of 5µm x 5µm x 5µm volumes in mm resolution (dual-beam FIB)
• Surface morphology and roughness at the atomic scale (atomic force microscopy)
• Lattice resolution imaging concurrent with fast, nm-resolution EDS elemental mapping. 3D EDS Tomography (JEM 2800 S/TEM with dual EDS)

CLEANROOM FABRICATION
For biomedical and implantable micro systems, nanophotonics, environmental monitoring sensors and micro machines:
• A full portfolio of thin film deposition and patterning tools
• Industry experienced staff (statistics, SPC, DOE, process development, product development, facilities and safe materials handling)
• 12 dedicated sputtering cathodes (cryo-pumped with load locks)
• 3 user-configurable sputtering cathodes (cryo-pumped)
• 3 e-beam evaporators
• Specialty materials (parylene, TEOS, LTO, PSG)

INTEGRATION ENGINEERING
• Conceptualization from function to architecture design
• Advanced packaging
• Electrical testing

BACK-END PROCESSING & PACKAGING
• CMP/planarization
• Die singulation
• Wafer bonding/hemispheric sealing
• Wire µEDM
• Laser micro welding

MICROFLUIDICS PROTOTYPING
• Laser micro machining
• POMS & SU-8 processing and molding
• 3D patterning

ELECTRICAL CHARACTERIZATION
• Vibrating Sample Magnetometer
• Advanced O-scope, network analyzer user lab
• ASIC ATE (design)
• Microprobe stations

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CREATE
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We helped a local company (Blackrock Microsystems) solve an important metalization problem and create a more robust product through the use of multi-scale analysis.

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The Utah Nanofab advances leading edge research and facilitates economic growth by providing world-class nanofabrication facilities, infrastructure and expertise to academia and industry.

**Vision**
The Utah Nanofab will become a premier nanotechnology center with an interface to biomedical sciences. Outcomes of our efforts include expanding the frontiers of nanotechnology research, educating the next generation of engineers and leaders and supporting economic growth by the sustainable transfer of technology into meaningful commercialization outcomes.

**Facilities**
- 18,000 ft clean space with 7,000 ft under ULPA filter
- ISO 5/6/7
- 5,300 ft microscopy and materials characterization suite
- Member of the NSF Materials Research Facilities Network
- Host of UGIM, an international conference of peer research cleanroom administrators

**Economic Impact**
- Supporting more than $100 million in research funding across campus
- Providing technical services to more than 75 companies, national labs and universities
- Training engineers and scientists for employment in semiconductor, research and biomedical device companies

**Industry Support and Services**
- Industrial and academic access
- R&D facilities and equipment
- Consulting and engineering assistance and training
- Design, fabrication and characterization services
- 24/7 operation
- Funding programs available for reduced rates and prototype development
- Preliminary data seed fund for competitive grant writing

**Utah Nanofab**
Sorenson Molecular Biotechnology Building
A USTAR Innovation Center
36 S. Wasatch Drive
Salt Lake City, UT 84112

**Naming Sponsor**
Micron Technology Foundation Inc., Microscopy Suite

**Extramural Research Sponsors**

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