

Metrology & Test

White Light Interferometer Surface Profiling:

Veeco Interferometer provides high resolution, 3D surface measurements, from sub-nanometer roughness to millimeter step heights for all reflective substrates.

3-D Contact Profiling:

Veeco Dektak 8 provides down to 7.5 angstrom step height measurements with a vertical range up to 1 mm and a maximum scan length of 200 mm. Low stylus forces allow scratch-free measurement of soft materials.

Ellipsometry: Nondestructive measurement technique for determining the thickness and optical constants of single and multilayer films.

SEM, AFM, STM Capabilities: Various SEMs, AFMs and STMs including nm resolution e-beam lithography.

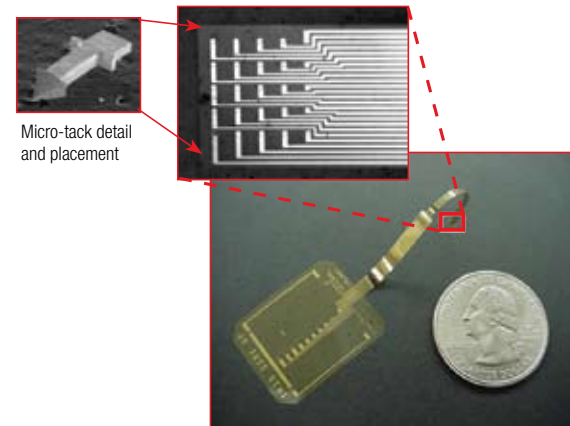
Testing: Various probe stations and electronic instruments for measuring sheet resistance, TCR, IV, CV, LCR and other semiconductor parameters.

Design, Layout and Modeling

Full suite of computer-based tools for photomask layout, custom analog and digital IC design, micro-scale tooling, and 2D/3D finite element models for virtual device evaluation. Software packages include: Tanner EDA, Silvaco TCAD, CoventorWare®, Solid Edge.

Successful Projects

- Lab-on-a-chip systems
- Custom piezoresistive and capacitive sensors
- Optical and thermal microphones
- MEMS flow sensors
- Micro-preconcentrators
- Retinal microtacks
- Micro-needles
- Custom ASIC development
- Micro-hotplates
- Gas sensors
- Retinal electrode arrays
- RFID telemetry circuits
- Spintronics
- Polymer nanofibers
- Implantable medical microdevices



Micro-tack detail and placement



For more information on available services contact:

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University of Louisville
**Micro/NanoTechnology
Center**

**Innovation Through
Miniaturization**



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The University of Louisville Center for Micro/NanoTechnology provides fabrication and design services for numerous MEMS, microelectronic, electro-optic and nanotechnology applications. Services begin at the device design level and continue through single-step processing, complete device prototyping and small-scale production.

The center encompasses core facilities for micro/nano fabrication, packaging, metrology & test, including a 10,000 sq. ft, 7-bay, class 100/1000 cleanroom designed by nationally renowned AGI consultants. Our wide variety of micro/nanoprocessing tools and 10-plus years of operating experience make our state-of-the-art facilities popular not only with researchers at UofL and other universities throughout the Ohio Valley region, but with industry and government laboratories nationwide, too.



Our Services Include:

Thin Film Deposition

Evaporation: Thermal and e-beam assisted evaporation of Cr, Au, ITO and many other materials on up to 6-in. substrates.

Sputtering: RF & DC magnetron sputtering on a variety of substrates: Cr, Au, Ti, W, TiW, Pt, YBCO, ITO and many others.

Parylene Coating: Vapor Deposition of Parylene C and Parylene N. Parylene deposition provides the capability to conformally coat dielectric and biocompatible layers on fabricated devices.

Molecular Vapor Deposition: Deposition of organic surface coatings used as lubricants, antistiction layers, molecular glues or reactive adhesion layers.

Electroplating: MEMS processing for Cr, Au, Cu and Ni using the IKO electroplating system.

Thermal Processing

Oxidation and Diffusion: Thermal processes include wet and dry oxidation and boron and phosphorous diffusion.

Rapid Thermal Processes (RTP): For silicon-based gate oxide growth and rapid thermal annealing.

PECVD: For depositing nitrides and oxides.

Lithography

Photomasks: 4-, 5- and 6-in. masks with linewidths down to 1.0 micron produced with the Hiedelberg DWL66 laser pattern generator.

Contact Lithography: For individual dies to whole 6-in. wafers. Our Suss MA6 and AB-M mask aligners also provide back-to-front alignment capabilities. Nanometer resolution e-beam lithography also available.

Maskless Lithography: Intelligent Micro-Patterning SF-100 provides 5 μ m linewidth lithography with direct imaging using a DMD.

Etching, Machining and Bonding

Deep Reactive Ion Etch (Silicon): Silicon DRIE using the Bosch process. Our STS DRIE has pulsed platen bias to minimize “footing” at oxide etch stops.

Anisotropic Silicon Wet Etching: Extensive experience with KOH, TMAH and EDP wet etchants.

MicroMilling: Dover Instruments Ultra-High-Precision Micro Milling Machine is a CNC milling station with nanometer spatial resolution for machining virtually any solid material (i.e., metals, polymers, ceramics, etc.)

Wafer Level Bonding: Suss MicroTec SB6 for Si/glass anodic bonding, glass/glass thermal compression bonding and Si/Si fusion bonding.

Plasma Etching: RIE systems are capable of providing selective silicon, SiO₂ and Si₃N₄ etches as well as ashing processes.

Xenon Di-Fluoride Etching: Dry anisotropic silicon etching using the Xactix XeF₂ etching

Top 10 in Micro/Nano Technology by Small Times Magazine



system allows for efficient etching of silicon microstructures prone to stiction.

Miscellaneous: Nano-imprinting, micromolding, chemical mechanical polishing, ultrasonic drilling, etc.

Packaging

Dicing: Automated Disco Dicing Saw for silicon, glass and alternative substrate dicing.

Wire Bonding: K&S wedge, ball and deep access bonders for aluminum and gold 1-mil wire bonding.

Flip Chip Packaging: Finetech Fineplacer “pico” system for die placement up to 5 μ m. Can handle SMCs up to 17-mm side length.

Printed Circuit Boards: An automated milling system for custom PCB production.

Lapping and Polishing: Lapmaster system is capable of thinning a variety of substrates as well as final polishing.

www.louisville.edu/micronano

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