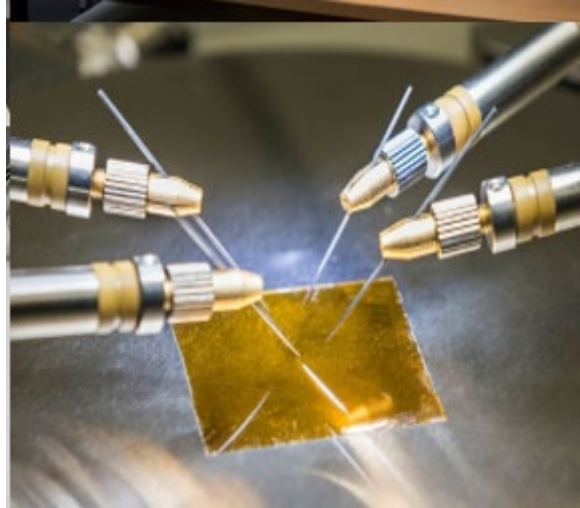


Master Thesis: High-Resolution Printing of Metallic Micro- and Submicron Structures by Scanning Probe Lithography

The increasing demand for miniaturized electronic devices, sensors, and integrated functional systems requires fabrication techniques capable of producing conductive structures with ever higher spatial resolution. Among emerging direct-write approaches, scanning probe lithography (SPL) has attracted significant attention due to its ability to locally deposit and pattern materials with micro- and nanoscale precision. By using a sharp probe to control material delivery, SPL enables maskless fabrication under ambient conditions while offering exceptional flexibility for rapid prototyping and fundamental studies of structure–property relationships.



This project aims to develop and optimize processes for the fabrication of high-resolution metallic micro- and submicron wires using scanning probe lithography. Particular focus will be placed on understanding how process parameters influence feature geometry, morphology, material quality, and electronic performance. Printed metallic structures will be systematically characterized to establish correlations between fabrication conditions and resulting electrical properties, providing insights into the limits and opportunities of high-resolution additive manufacturing approaches for future electronic applications.

The project combines process development, microfabrication, and advanced materials characterization techniques.

Tasks:

- Fabrication of metallic micro- and submicron wires using scanning probe lithography.
- Systematic variation and optimization of printing process parameters.
- Morphological and structural characterization of printed structures (optical and electron microscopy methods).
- Investigation of material quality and structure-property relationships.
- Electronic characterization of printed structures (e.g., conductivity and transport measurements).

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