FRIEDRICH-SCHILLER-
UNIVERSITÄT
JENA
Faculty of Physics and Astronomy
Institute of Applied Physics

Friedrich Schiller University Jena · Institute of Applied Physics· 07737 Jena

Dr. Thomas Siefke
Micro Structure Technology
Albert-Einstein-Straße 15
07743 Jena
Phone: 0 36 41 9-47837
E-Mail: thomas.siefke@uni-jena.de

Jena, 3. Februar 2026

To whom it may concern

Bachelor's / Master's Thesis Position
Automated Dimensional Metrology Using a JEOL IT800i SEM

Background

High-precision dimensional metrology at the nanometer scale is a key requirement in modern micro- and nanotechnology, including semiconductor manufacturing, photonics, and metamaterials research. Scanning electron microscopes (SEMs) are increasingly used as quantitative metrology tools. To achieve reproducible and operator-independent measurements, advanced automation of image acquisition, focusing, and data analysis is essential.

Objective

The goal of this Bachelor's or Master's thesis is to enable the JEOL IT800i scanning electron microscope for automated dimensional metrology. The work will combine software development with systematic experimental investigations of SEM imaging parameters relevant for metrological applications.

Tasks

- Development and implementation of a software framework for automated image acquisition and dimensional analysis
- Investigation and optimization of automatic focusing and astigmatism correction with respect to metrological accuracy
- Quantitative analysis of the influence of focus and astigmatism errors on dimensional measurements
- Validation of measurement uncertainty using suitable secondary standards (e.g. structured reference samples)
- Documentation and evaluation of accuracy, repeatability, and robustness of the automated measurement workflow

Profile / Requirements

- Enrollment in a Bachelor's or Master's program in Physics, Nanotechnology, Materials Science, Electrical Engineering, or a related field
- Strong interest in experimental work, microscopy, and measurement science
- Basic knowledge of programming, image processing, or data analysis (e.g. Python, MATLAB, C++) is an advantage
- Independent, structured, and reliable working style

What We Offer

- Access to a state-of-the-art SEM (JEOL IT800i)
- An interdisciplinary research environment in micro- and nanotechnology
- Close scientific supervision and clearly defined research objectives
- Hands-on experience with high-impact experimental and software-driven research
- An excellent foundation for further academic or applied research projects

Start date: by arrangement
Type: Bachelor's or Master's thesis
Applications to: Thomas.siefke@uni-jena.de