



Friedrich-Alexander-Universität
Erlangen-Nürnberg



PhD position Data-Driven Thin Film Synthesis

The Friedrich-Alexander-University Erlangen-Nürnberg with the Molecular Foundry Division (MFD) at Lawrence Berkeley National Laboratory (LBNL) invites applicants for a joint PhD position to pursue robot-assisted synthesis and characterization of organic-inorganic chiral halide perovskites via chemical solution processing. *The overall goal of the research project is to architect workflows to enable machine learning (ML)-driven closed-loop experimentation.* Day to day work includes thin film synthesis using an automated robotic platform, python-based batch characterization followed by analysis of large data sets, integrating ML, and tool development by implementing *in situ* optical characterization during thin film formation. The nature of the work is experimental with strong data management focus and will be performed in a fast-paced, interdisciplinary, and collaborative environment. Collaboration with LBNL's Center for Advanced Mathematics for Energy Research Applications (CAMERA) as well as the Foundry's theory and data facilities is envisioned to integrate ML and data management workflows. The ability to work both independently and as part of a multidisciplinary team is essential.

Key Responsibilities

- Automation of thin film synthesis via chemical solution processing using python-based instrument control software to operate a liquid handling robotic platform
- Analysis of material characterization data including results from diffraction, spectroscopy, and optoelectronic techniques
- Architect key components of a machine learning platform to support closed-loop experimentation
- Integrate *in situ* spectroscopic characterization during robotic synthesis
- Design purpose-built datasets alongside material scientists and chemists to tackle scientifically relevant questions about perovskite formation
- Close interaction with researchers to leverage high throughput synthesis and characterization platforms for materials discovery
- Compose manuscripts for submission to peer reviewed journals and give presentations of scientific findings at conferences

Essential Qualifications

- Background in Physics, Materials Science, Chemistry, Mechanical Engineering, Computer Science or related field
- Strong programming experience to handle and analyze large data sets, preferably via Python
- Background in material synthesis and characterization
- Creativity in applying concepts to different research problems
- Demonstrated teamwork skills
- Excellent oral communication skills
- Commitment to working safely at all times

Desired Qualifications

- Develop or modify instrument control software scripts and APIs to enable data flows between the instrumentation systems
- Experience with high throughput thin film synthesis and characterization

Contact: Dr. Carolin Sutter-Fella, csutterfella@lbl.gov; Start date: asap