

Postdoc in nanoscale magneto-optical imaging using scanning spin probe microscopy, University of Nebraska-Lincoln, USA

The [Quantum Sensing & Defect Discovery and Spectroscopy Lab](#) led by Abdelghani Laraoui at the University of Nebraska Lincoln (UNL) seeks a highly motivated postdoctoral candidate for a project in developing novel optically detected magnetic resonance platforms based on nitrogen-vacancy (NV) color centers in diamond, for nanoscale probing of spin-textures, spin-waves, and spin current in topological materials and low-dimensional magnetic materials.

This is a highly multidisciplinary project that combines new techniques in scanning probe microscopy (tuning-fork quartz-based atomic force microscope (AFM)) with optical microscopy (confocal, far-field) and magnetic microscopy using NV centers in diamond nanostructures (nanodiamond, nanopillar, thin films). The goal is to develop ultra-sensitive quantum microscopes, operating at variable temperatures and magnetic fields, to perform nanoscale magnetic imaging of exotic phenomena (chiral-spin-textures, surface spin-current, magnon modes, etc.) in recently discovered topological materials, oxide heterostructures, and two-dimensional magnetic films.

While working on the project, the postdoc will: ★ Apply quantum mechanics, spintronics, nanophotonics, and scanning probe microscopy to emerging new fields. ★ Learn semiconductor and magnetic device nanofabrication techniques in world-class cleanrooms ([NCMN](#), [NERCF](#)). ★ Collaborate with partners in academia (UNL, Japan Advanced Institute of Science and Technology, Australian National University, IMEC-Belgium, etc.), and national labs (Sandia National Labs in Albuquerque, NM). The position will be based in Laraoui's labs at the Mechanical & Materials Engineering Department in Lincoln, NE. His group is part of the [MRSEC](#) funded NSF center that is unique in the midwest. Only 12 centers are funded in the US, mainly at big universities like Harvard, Berkeley, etc. [NCMN](#) and [NERCF](#) feature state-of-the-art nanofabrication cleanrooms and characterization tools.

This position is funded by projects from NSF and UNL, and it is for one year, renewable up to 3 times based on available funding. A PhD in Physics, Chemistry, Engineering, or a related field is required. Experience in scanning probe microscopy (AFM, MFM, NSOM) and magneto-optical (or optical) setups development. Strong background in programming (LabView, Python, Matlab, etc.) is very desired. Experience in magnetometry, quantum optics, or NV centers is also helpful. Compensation is commensurate with experience. More information is available on our [webpage](#). Interested candidates, please send the following application materials to Abdelghani Laraoui (alaraoui2@unl.edu): 1. Cover letter describing research interests and career goals 2. CV with complete publication record 3. Contact information for 3 references (including PhD supervisor). UNL is an equal opportunity employer.