

KEVIN ROCCAPRIORE

PROFESSIONAL EXPERIENCE

R&D Associate

2021 - Present

Oak Ridge National Laboratory
Center for Nanophase Materials Sciences

- Electron microscopist utilizing advanced aberration-corrected STEM techniques including monochromated EELS and 4D-STEM.
- Enabling automated workflows in electron microscopy
- Machine learning, artificial intelligence, and active learning for physics discovery and materials modification down to atomic scale

Post Doctoral Researcher

2019 - 2021

Oak Ridge National Laboratory
Center for Nanophase Materials Sciences

- Aberration corrected STEM, monochromated EELS, and 4D STEM
- Vibrational and optical spectroscopy with STEM-EELS
- ML/AI applied to atomic and hyperspectral STEM data
- In-situ beam induced transformations in 2D and 3D materials

PhD Candidate

2014 - 2018

University of North Texas
Department of Physics

- Device fabrication: EBL, e-beam evaporation, magnetron sputtering, ALD, RIE and chemical etching
- Characterization with optical and Raman spectroscopy, AFM, SEM, time-resolved PL, surface plasmon resonance sensing
- Cleanroom experience

EDUCATION

Doctor of Philosophy

2018

University of North Texas
Physics (Nanophotonics of plasmonic and two-dimensional metamaterials)

Master of Science

2014

University of North Texas
Major: Physics

Bachelor of Science

2011

University of Florida
Major: Food Science

AWARDS

RD100 2023 recipient

PROFESSIONAL ORGANIZATION

Symposia organizer and chair, Microscopy and Microanalysis (M&M) 2023

Symposia organizer, International Microscopy Congress (IMC) 2023

Workshop organizer and chair, CNMS User Meeting 2023

SELECTED PEER REVIEWED JOURNAL ARTICLES

Kalinin S.V., Mukherjee D., **Roccapriore K.M.**, Blaiszik B., Ghosh A., Ziatdinov M.A., Al-Najjar A., Doty C., Akers S., Rao N.S., Agar J.C., Spurgeon S.R. "Deep Learning for Automated Experimentation in Scanning Transmission Electron Microscopy" *npj Comp. Mat.* (accepted 2023)

Kalinin S.V., Vasudevan R., Liu Y., Ghosh A., **Roccapriore K.M.**, Ziatdinov M. "Probe microscopy is all you need" *Mach. Learn.: Sci. Technol.* 2023, 4 023001.

Roccapriore K.M., Kalinin S.V., Ziatdinov M. "Physics discovery in nanoplasmonic systems via autonomous experiments in scanning transmission electron microscopy" *Adv. Sci.* 2022, 9, 36, 2203422

Roccapriore K.M., Boebinger M.G., Dyck O., Ghosh A., Unocic R.R., Kalinin, S.V., Ziatdinov M. "Probing Electron Beam Induced Transformations on a Single Defect Level via Automated Scanning Transmission Electron Microscopy." *ACS Nano* 2022 10.1021/acsnano.2c07451

Roccapriore K.M., Huang N., Oxley M.P., Sharma V., Taylor T., Acharya S. Pashov D., Katsnelson M.I., Mandrus D., Musfeldt J.L., Kalinin S.V. "Electron-Beam Induced Emergence of Mesoscopic Ordering in Layered MnPS₃" *ACS Nano* 2022, 16, 10, 16713-16723.

Roccapriore K.M., Dyck O., Oxley M.P., Ziatdinov M., Kalinin S.V. "Automated Experiment in 4D-STEM: Exploring Emergent Physics and Structural Behaviors." *ACS Nano* 2022, 16, 5, 7605-7614. 10.1021/acsnano.1c11118

Roccapriore K.M., Ziatdinov M., Lupini A.R., Singh A.P., Philipose U., Kalinin S.V. "Discovering Invariant Spatial Features in Electron Energy Loss Spectroscopy Images on the Mesoscopic and Atomic Levels." arXiv:2202.00657

INVITED CONFERENCE PROCEEDINGS

"Probing single atom dynamics in the STEM", Transient, 2023

"AI-enabled automation of atomic manipulation and characterization in the STEM" Microscopy and Microanalysis, 2023.

"AI-driven experiments in the STEM" Microscopy and Microanalysis, PMC 2023.

"Autonomous Atomic Manipulation and Characterization in the STEM" MRS Spring, 2023.

"Direct Atomic assembly and physics studies of defects and artificial molecules in 2D materials via electron beam" MRS Spring, 2023

"Microscopy is all we need" MRS Spring, 2023.

"AI-driven atomic manipulation and characterization in the STEM" APS, March 2023.

"Building Atomic and Plasmonic Devices via Electron Beams: from Desired Structures to Desired Properties" Microscopy and Microanalysis, 2022.