NORTHWESTERN UNIVERSITY'S DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING AND MATERIALS RESEARCH SCIENCE AND ENGINEERING CENTER PRESENT:

2022 MSE FUTURE LEADERS SEMINAR SERIES

Yichao Zhang

Postdoctoral Associate, University of Illinois Urbana-Champaign

Yichao Zhang is currently a Postdoctoral Associate in the Department of Materials Science and Engineering at the University of Illinois at Urbana-Champaign. Her general research interest is using time-resolved electron microscopy to understand structural dynamics in various solid-state materials systems. Her current work focuses on using in situ aberration-corrected scanning transmission electron microscopy to gain insight into structural transformation in moiré systems. She received her PhD in Materials Science from the University of Minnesota as the Louise T. Dosdall fellow and Phi Kappa Phi doctoral dissertation fellow. Her doctoral work focused on investigating coherent-acoustic-phonon dynamics in transition metal dichalcogenides using ultrafast electron microscopy.

Visualizing Nano- to Atomic-scale Dynamics with Time-resolved Electron Microscopy

Solid-state dynamic processes span many orders of magnitudes in the time domain while exhibiting spatial heterogeneity at the nano- to atomic scales. Modern (scanning) transmission electron microscopy enables access to sub-Å to micrometer spatial ranges and meV to keV energy ranges, versatile in probing a wide variety of dynamics in solids. However, the temporal range associated with dynamics spans from attoseconds to minutes and beyond, which can be partially accessed by fast detectors, but not beyond sub-millisecond temporal resolution. In this talk, an overview will be provided on direct imaging of nano- to atomic scale dynamics with time-resolved (S)TEM beyond detector-enabled temporal resolution and peak dose rates. Transition metal dichalcogenides (TMDs) are used as model systems due to their exceptional strain-tunable properties and emerging phenomena associated with moiré superlattice. Two topics will be discussed: 1) photoinduced, defect-mediated coherent-acoustic-phonon dynamics imaged with 4D ultrafast electron microscopy; 2) thermally-activated, local reconstruction of twisted bilayer TMDs imaged with in situ aberration-corrected scanning transmission electron microscopy.

Thursday, May 26 • 10 AM CDT • Zoom Link

Meeting ID: 958 6172 3631 • Password: mse_FLS

Questions? Contact Elena.Lindstrom@northwestern.edu

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