



Next-Generation Transmission  
Electron Microscopy Workshop

## **Beyond Current Limits of Resolution, Environments, and Data Analysis**

A Pre-Meeting Congress for  
Microscopy and Microanalysis 2019

**August 4, 2019**  
**7:30 am – 5:00 pm**

**Oregon Convention Center, Portland**

Organizers: Steven Spurgeon, PNNL | Demie Kepaptsoglou, SuperSTEM | Mitra Taheri, Drexel University

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Registration Details: <https://www.microscopy.org/MandM/2019/program/congress.cfm>

We are pleased to announce that the second annual Next-Generation Transmission Electron Microscopy (NexTEM) workshop will be held as a pre-meeting congress for Microscopy and Microanalysis 2019. This event will bring together researchers from diverse backgrounds to present the state-of-the-art in cutting edge electron microscopy tools and related applications. Specific areas of interest include advanced detector designs for all states of matter, recent developments in electron and phonon optics/instrumentation, in situ and ultrafast TEM, cryo TEM, as well as data analytics and computational methods. Stimulating discussion and presentation of electron microscopy tools at the intersection of these fields will set the stage for advancement in these areas, as well as collaborative approaches to critical scientific issues in materials science, biology and medicine, physics, and chemistry.

*See reverse for topics and speakers*

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## Beyond Current Limits of Resolution, Environments, and Data Analysis

### Topics

#### *Advanced Detector and Spectroscopy Developments*

- Design and use of novel detectors to investigate material structure and functionality, including 4D STEM and ptychography.
- Vibrational and phonon spectroscopies at unprecedented spatial and energy resolution.
- Methods to conduct high-resolution imaging and spectroscopy of beam-sensitive samples.
- Examination of materials structure and chemistry at cryogenic temperatures.

#### *Frontiers of In Situ / Operando Microscopy*

- Advances in S/TEM methods and instrumentation to capture the dynamics of complex materials systems, including alloys, thin films, nanoparticles, and liquids.
- Investigation of materials under stimulus across a range of sample environments and temperatures.
- New workflows for in situ experimentation to ensure reliability, reproducibility, and improve data quality.

#### *Data-Driven Microscopy and Analysis*

- Machine learning-based analysis of materials structure, dynamics, and defects.
- Integration of multiple large-scale imaging and spectroscopic data streams to elucidate physical descriptors of complex systems and phenomena.
- High-throughput simulation approaches to guide the interpretation of experimental datasets.

### Invited Speakers

#### ***David Muller***

Cornell University

#### ***Naoya Shibata***

University of Tokyo

#### ***Stig Helveg***

Haldor Topsoe

#### ***Quentin Ramasse***

SuperSTEM

#### ***Luiz Tizei***

Université Paris Sud

#### ***Paul Voyles***

University of Wisconsin–Madison

#### ***Hamish Brown***

Lawrence Berkeley National Laboratory

#### ***Rama Vasudevan***

Oak Ridge National Laboratory

#### ***Chongmin Wang***

Pacific Northwest National Laboratory

