



MONASH
University

MONASH
CENTRE FOR
ELECTRON
MICROSCOPY

MONASH CENTRE FOR ELECTRON MICROSCOPY SEMINAR

Inside Porous Framework Materials: From Nanoscale Structure to Functional Performance

Date: Tuesday, 18 August 2026

Time: 11:00 – 12:00PM

Venue: Theatre S9, 16 Rainforest Walk,
Monash Clayton Campus

ABSTRACT

Metal-organic frameworks (MOFs) and related porous materials are increasingly important for applications in catalysis, carbon capture, biocatalysis, and environmental remediation. However, the nanoscale features that govern their performance - including hierarchical morphology and pore architecture as well as defects - remain challenging to characterize in these highly beam-sensitive materials.

In this seminar, I will show how advanced characterization approaches, combining electron microscopy with complementary spectroscopic techniques, can reveal quantitative structure-function relationships in porous framework materials. Through examples spanning MOF pyrolysis for electrocatalysis, MOF-enzyme composites for carbon capture, and MOF gels for PFAS remediation, I will highlight how nanoscale characterization can connect synthesis, structure, and performance across multiple length scales. Finally, I will highlight new opportunities enabled by the DTU VISION center and the recently commissioned Spectra Ultra ETEM for studying dynamic processes and beam-sensitive materials under realistic conditions.

BIOGRAPHY

Prof. Joerg R. Jinschek is Professor of Electron Microscopy at DTU Nanolab, Technical University of Denmark, where he leads the research group “Nano-Micro-Macro. Structure in Materials”. He is also a Principal Investigator in VISION, the Center for Visualizing Catalytic Processes, at DTU Physics.

Prof. Jinschek received his PhD in Physics from Friedrich Schiller University Jena, Germany. He subsequently held research positions at Lawrence Berkeley National Laboratory and Virginia Tech in the United States before joining FEI (now Thermo Fisher Scientific) in the Netherlands. At FEI, he served as Senior Research Scientist and later led the development and commercialization of advanced in situ electron microscopy solutions. He returned to academia in 2017 as Associate Professor at The Ohio State University and, since 2021, has held his current professorship at DTU.

His research focuses on developing and applying advanced electron microscopy methods to understand how atomic-scale structure, defects, interfaces, morphology, and chemistry govern the functionality of complex materials. By combining high-resolution imaging, diffraction, spectroscopy, and in situ approaches, his work seeks to establish quantitative structure-function relationships that enable the rational design of functional materials for energy and environmental applications, including catalysts, metals, framework materials, and hybrid nanostructures.



Professor Joerg R. Jinschek,

*DTU Nanolab & DTU VISION
Technical University of
Denmark (DTU), Kgs Lyngby,
Denmark*

Convener: Professor Jian-Min Zuo

Email: mccem@monash.edu Tel: 9905 5563