

NANOFABRICATION SEMINAR | Closing the reproducibility gap: fixing potholes on the 2D roadmap

PETER BOGGILD

March 25, 2026

11:00 to 12:00

Auditorium

ABSTRACT:

With their exposed surfaces and interfaces, 2D materials are highly tunable and engineerable. This has enabled major advances in fundamental research, often accompanied by expectations of transformative technologies. At the same time, the broader reproducibility challenges identified across the natural sciences over the past decade are particularly valid in 2D materials research. Small, often undocumented differences in structure, processing, and measurement conditions can strongly affect results, making many studies difficult to reproduce across laboratories. This talk focuses on structural reproducibility as a practical challenge and an opportunity in 2D research, with a multi-stakeholder perspective that includes publishers, funding agencies, media etc. I will highlight common sources of irreproducibility using concrete examples from fabrication and transport experiments and discuss which parameters matter most in practice. I will then outline simple, realistic measures (such as standardized reporting, reference structures, and metrics) that can improve comparability and reliability without adding significant overhead. The aim is to help close recurring gaps in the 2D research roadmap and support more robust and efficient progress.

BIO:

Peter Boggild is Professor and Head of the 2DPHYS Section at the Department of Physics, Technical University of Denmark (DTU), where he leads research on two-dimensional materials. His work spans fundamental properties, device fabrication and characterisation, scalable production methods, and metrology for 2D systems. Professor Boggild has authored and co-authored numerous publications on nanotechnology, graphene transport, and graphene-based electronics, and recently co-authored a set of recommendations on improving reproducibility in 2D materials research in Nature Reviews Physics, with practical protocols and tools to strengthen reliability and comparability across laboratories. Boggild received his Ph.D. in Physics from the University of Copenhagen, and his research has contributed to both foundational understanding and pragmatic approaches to advancing the 2D materials roadmap.

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