



**Department of  
Mechanical Engineering  
The University of Hong Kong**



## SEMINAR

**Title: Elasticity, Plasticity, and Fracture of Two-Dimensional Materials**

**Speaker: Prof. Jiong Zhao**  
**Department of Applied Physics**  
**The Hong Kong Polytechnic University**

**Venue: Inno Wing Two**

**Date: September 10, 2025 (Wednesday)**

**Time: 10:30am – 11:30am**

### **Abstract**

The extraordinary elasticity, ultra-large plasticity of certain van der Waals materials, and intriguing fracture behaviors of two-dimensional (2D) materials have attracted widespread attention in recent years. In this talk, I will primarily introduce a series of fascinating nanomechanical findings obtained by our research group through in situ transmission electron microscopy (TEM) techniques. For example, we discovered a novel structure in monolayer iron films using in situ TEM techniques and determined the bending modulus of 2D materials via 3D reconstruction. We investigated the origins of the ultra-large plasticity in 2D MX materials and revealed atomic-scale crack propagation mechanisms in 2D materials through in situ TEM observations. These advances not only expand the potential applications of 2D materials but also provide opportunities for deeper experimental understanding of the mechanical behavior of solid materials at the atomic scale. Additionally, I will discuss fundamental research and applications related to 2D phase transitions and ferroelectric materials.

### **Short Bio:**

Professor Jiong Zhao graduated from Tsinghua University in 2012 under the supervision of Prof. Jing Zhu. Following his PhD, he worked as a Research Fellow at the IFW-Dresden in Germany and Sungkyunkwan University in South Korea. In 2017, he joined the Department of Applied Physics at The Hong Kong Polytechnic University, where he served as Assistant Professor, Associate Professor and currently as Professor.

Specializing in *in situ* transmission electron microscopy (TEM) and the study of two-dimensional (2D) materials, Professor Zhao has published over 130 papers in prestigious journals, including *Science*, with an H-index of 46. His outstanding contributions have earned him numerous accolades, such as: NSFC Distinguished Young Scientist Award, RGC Fellow, Young Member of Hong Kong Academy of Engineering, Excellent Young Scientist Fund (Hong Kong & Macau), Nanyang Assistant Professorship (Singapore), Director's Award (Institute for Basic Science, South Korea), Young Faculty Award for Outstanding Achievement in Research (The Hong Kong Polytechnic University), etc.

**ALL INTERESTED ARE WELCOME**