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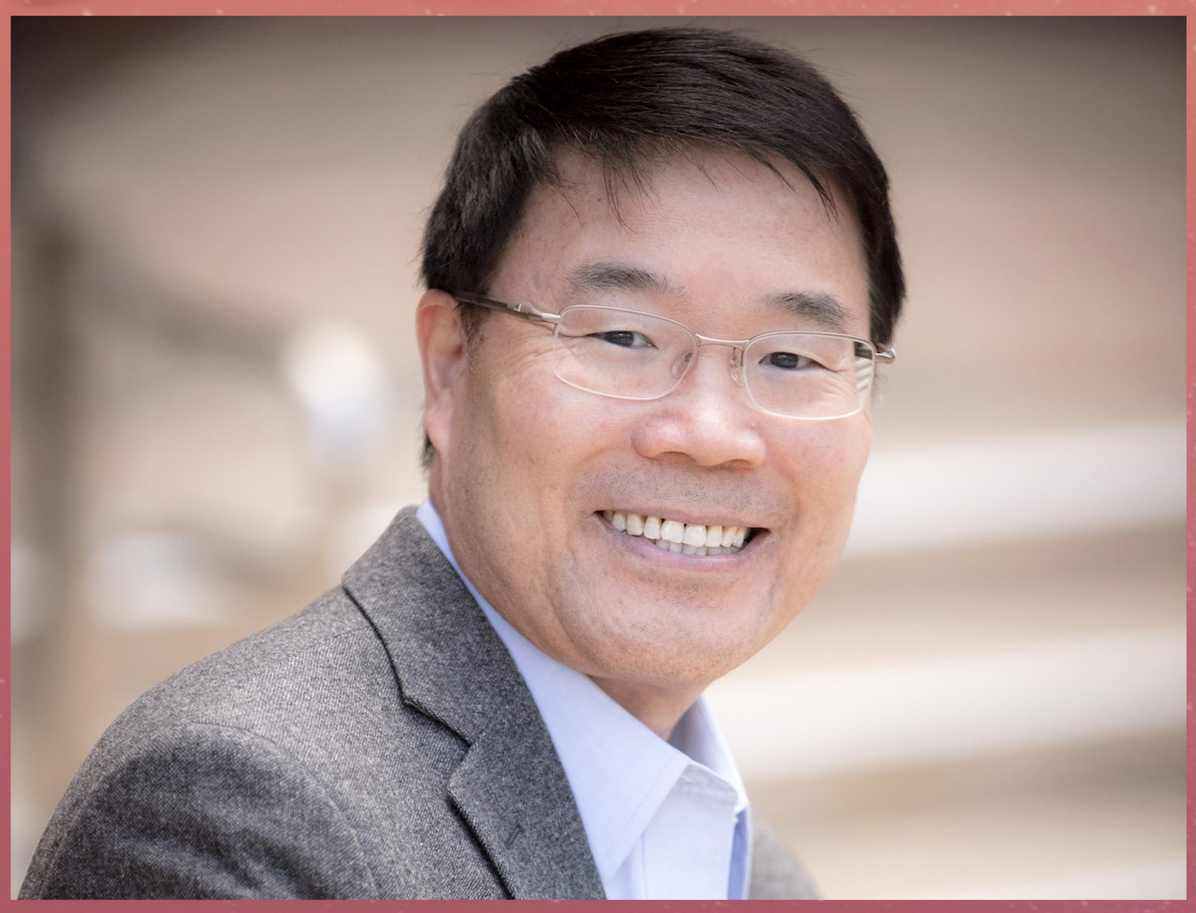
TÜBİTAK TBAE-MAM: JOINT SEMINAR



Xiaoqing Pan

University of California, Irvine (USA)

Probing the Emergent Properties and Dynamics of Interfaces by Electron Microscopy

October 20 2022, 11:00 - 12:00 (GMT +3)

The advent of aberration correctors, direct electron detectors and monochromators marks major milestones in the advance of transmission electron microscopy (TEM). Today, one can study the atomic scale structure, composition, properties, and dynamic behaviors of single defects and interfaces by electron microscopy. In this talk, I will present novel four-dimensional scanning transmission electron microscopy (4D STEM) method that enables to measure charge density, dipole moment, valence electron distribution in nanocrystals, interfaces, and single defects. I will also introduce a recently developed, space- and angle-resolved vibrational electron energy-loss spectroscopy (EELS) method which allow us to probe local phonons, vibrational modes, and their dynamic behaviors at a single defect, interface, or quantum dot. These new TEM techniques can be used to study actual nanodevices and unveal the mechanisms of electrical and heat transport at the nanometer or atomic scales, which is crucial for future high-performance nanoelectronics.

The Research Institute for Fundamental Sciences organizes a lively program of seminars, which is an integral part of its productive research environment. These events are held with the participation of internationally renowned foreign and Turkish scientists, with the aim to discuss the current developments and new ideas in the research areas of the institute and to become the focus of attention of young researchers and students. Seminar programs are announced in advance to welcome broad participation from the scientific and educational community.

This seminar is organized jointly with TÜBİTAK MAM (Marmara Research Center).

Bio: Xiaoqing Pan is the Henry Samueli Endowed Chair in Engineering, professor of materials science and engineering, and professor of physics and astronomy. He is also the inaugural director of the Irvine Materials Research Institute (IMRI), and founding director of the Center for Complex Active Materials – an NSF MRSEC. Pan is an internationally recognized materials scientist and electron microscopy expert due to his pioneering development and applications of novel transmission electron microscopy (TEM) methods for probing the atomic scale structure, properties and dynamic behaviors of materials. His work has led to the discoveries of new materials and novel functionalities. Pan has received the NSF CAREER Award and the Chinese NSF's Outstanding Young Investigator Award. He is an elected fellow of the American Ceramic Society, American Physical Society, Microscopy Society of America, and the Materials Research Society. He has published over 400 peer-reviewed scientific papers in high impact journals.

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