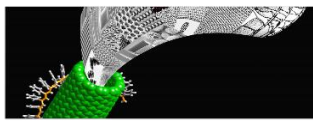
RESEARCH INTERSTS

Nan Yao's research focuses on utilizing advanced imaging, diffraction, spectroscopy and in-situ techniques, in tandem with computer simulation, to conduct fundamental studies of the structure-composition-processing-property relationships in complex materials for applications in nanotechnology, energy, environment and health. Yao has published two books entitled Handbook of Microscopy for Nanotechnology (Kluwer/Springer Publishers 2005, Chinese edition: Tsinghua University Press 2006, Russian edition: Springer Publishers 2011) and Focused Ion Beam System: Basics and Applications (Cambridge University Press, 2007). He has also authored 18 book chapters, 2 patents, and more than 270 research publications in scientific journals, including *Science*, *Nature*, and many others.

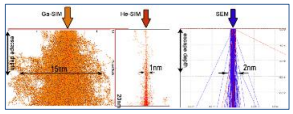
Major research areas

(a) Fundamental studies of complex materials of natural and synthetic origins and their applications in nanotechnology, energy, environment, and medical science.
(b) Investigation of visible light, electron, ion, X-ray, atomic force properties and their interactions with materials for advancing imaging and analysis technology from micrometer to pico-meter scale.
(c) Physical examination of structure and properties of organic-inorganic (soft-hard) interfaces of nanostructured materials.
(d) Interface of materials, biology, microscopy hardware, and imaging software to push the boundaries of interdisciplinary education and research.

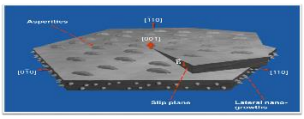
Selected works


Microscopy for nanotechnology

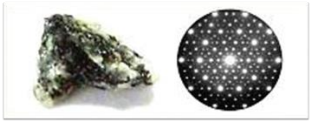

Focused ion beam systems

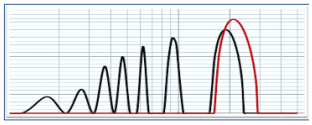


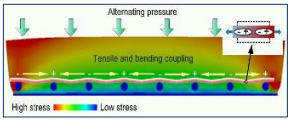
Superior He-ion imaging resolution



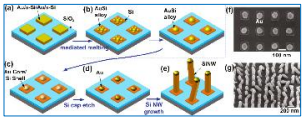
Organic-inorganic interfaces

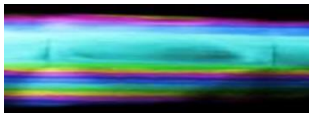

The first natural quasicrystal

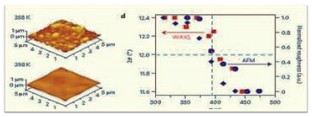

Nano super-harmonic resonance



1.6 V nano-generator using PZT

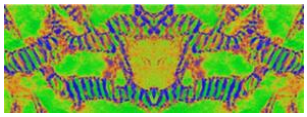

Growth of Si nanowires

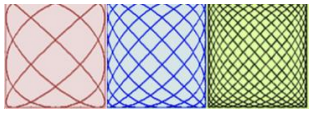

Quantum effect of surface

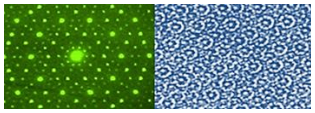


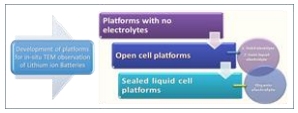
Ultra-stable polymer glasses


Flexible PMN–PT device

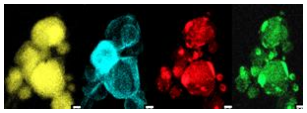

Natural quasicrystals formation


Scanning probe lithography

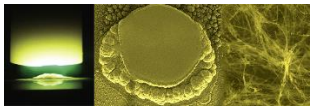

The second natural quasicrystal



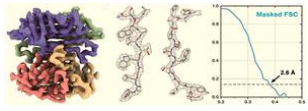
Advances for in-situ TEM


Boron nitride nanotubes

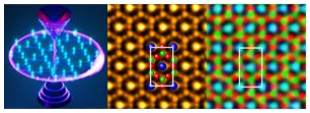
Nano-medicine for drug delivery

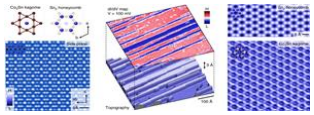

S-variations of the cathode

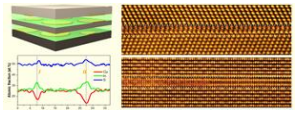

Structures in petro-molecules



Monolayer graphene Cryo-EM


New quantum-limit Chern magnet


Fermion in a kagome paramagnet


Triplets defect in $CuInS_2$


New material for transmon qubits