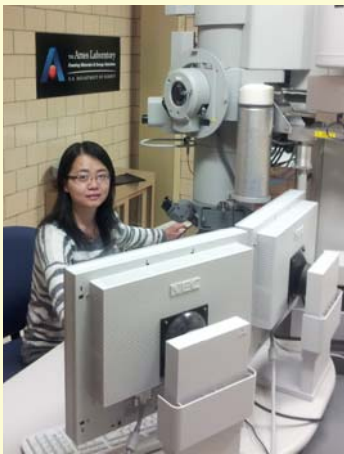


# MATERIALS SCIENCE AND ENGINEERING

IOWA  
STATE  
UNIVERSITY

SPRING  
2014  
SEMINAR  
SERIES



*Lin Zhou*

Assistant Scientist  
Ames Laboratory

*"Applications of TEM Imaging,  
Analysis and Electron Holography to  
Alnico Permanent Magnets and  
III-Nitride Heterostructures"*

Thursday, February 13, 2014

3:00 P.M.

1227 Hoover

## ABSTRACT

The Transmission electron microscope (TEM), with its many different configurations for imaging, diffraction and microanalysis, has become an indispensable tool for structural characterization of materials at nanoscale. Aided by aberration correction, the image resolution can nowadays surpass the one-Ångström level and offers many exciting possibilities for the discovery, exploitation of novel materials. Advanced functional materials are dependent on precise control of structure and chemistry. For instance properly engineered spinodal composition at the nanometer scale is required to form well separated FeCo-rich phase in a matrix of AlNi-rich phase in alnico alloy. In this presentation, various TEM techniques have been used separately or in tandem in our collaborative studies of alnico permanent magnets and III-nitride heterostructures, where spinodal decomposition, ordering and electric/magnetic field were all important considerations that can possibly impair the property of the final material. Representative applications that illustrate the prospects include the following: i) architecture and magnetism of alnico permanent magnets; ii) Mapping of electrostatic potential across III-nitride heterostructures.

