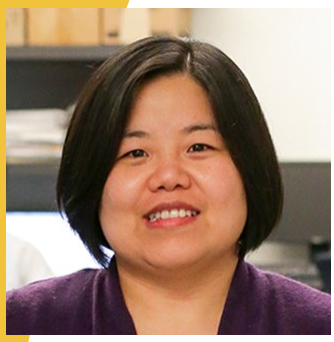
College of Engineering
Department of
Mechanical & Industrial Engineering

The Robert W. Courter Seminar Series

3:00-4:00pm, Friday, October 8th, 2021



ZOOM: https://lsu.zoom.us/meeting/register/tJApd-mhqzssHNAtbx8xlujIXfCf28JLgcJB

Acceleration of alloy design and manufacturing via machine learning and automated design

by Xiaoli Zhang*

Colorado School of Mines

For metal alloy design and additive manufacturing, the processes of design, modeling, and comprehensive control for desirable properties/behaviors are complex, expensive and slow, especially with a large number of input variables and interdependent variable correlations. We have developed an Artificial-Intelligence-powered workflow that integrates feature engineering, machine learning, adaptive design of experiments, and in-situ control for automating and accelerating the design, modeling, and control optimization process of metal alloy design and additive manufacturing. The framework was demonstrated by three projects: (1) Phase clustering and quantification from unannotated HRTEM image for materials design; (2) Physics-informed machine learning for composition-process-property design; and (3) Cross-machine knowledge transfer in metals additive manufacturing.

* Dr. Xiaoli Zhang is an associate professor at Colorado School of Mines. She directs the Intelligent Robotics and Systems Laboratory. She received a B.S. degree in Mechanical and Automation Engineering in 2003 and an MSc. degree in Mechatronics Engineering from the Xi'an Jiaotong University in 2006, China, and a Ph.D. degree from the University of Nebraska Lincoln in 2009. Her current research interests include intelligent control and decision making, human-robot interaction and cooperation, data-driven modeling, prediction, and optimization to automate engineering and science discovery, and adapting these concepts for energy, surgery, assistive living, additive manufacturing, and material discovery applications. Her research has been funded by NSF, AFRL, ONR, DOD-OEA, DOE, and Industrial partners. Dr. Zhang was the recipient of a 2017 National Science Foundation CAREER Award.