Materials Science and Engineering Department

Winter Seminar Series

High-Throughput Experimentation for Accelerated Development of Alloys

Prof. Ji-Cheng "JC" Zhao
University of Maryland, College Park, MD

January 18th, 2023
3-4PM | Hill Seminar Room (LeBow 240)

Experimental techniques for rapid collections of materials data and holistic approaches to integrate experimental and computational data will be described with examples. Localized property measurements on composition gradients created in diffusion multiples allow high-throughput collection of several materials properties as a function of composition, in addition to phase diagrams and diffusion coefficients. A novel approach was developed to establish reliable diffusion coefficient (atomic mobility) databases by holistically integrating both experimental and computational data. This approach together with much simplified models for diffusion coefficient will enable more reliable diffusion databases to be established rapidly for various simulations of materials processes. Additive manufacturing (AM, 3D printing) also provides a great opportunity to further expand high-throughput experimentation and accelerated materials discovery.

Dr. JC Zhao has been a Minta Martin Professor and Chair of the MSE Department at the University of Maryland since July 2019. He was a Program Director at DOE ARPA-E from 2014 to 2017 and was a professor at Ohio State from 2008 to 2014 and also from 2017 to 2019. Before academia, Dr. Zhao was a Materials Scientist at GE Research Center for 12 years (1995-2007). He holds 49 issued U.S. patents and was the 2001 winner of the prestigious Hull Award from GE. Zhao is a Fellow of ASM, MRS and TMS (Class of 2023); and received the 2021 TMS William Hume-Rothery Award that "*is presented annually to recognize a scientific leader for exceptional scholarly contributions to the science of alloys*". Zhao is also a recipient of a 2022 Humboldt Research Award and was recently named a Fellow of the National Academy of Inventors (Class of 2022).

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