SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2022 SYMPOSIUM:

CHARACTERIZATION

Seeing is Believing—Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson

Since his arrival in the United States in 1982 with a Doctor of Metallurgy from the University of Oxford, Ian M. Robertson has advanced our physical understanding of materials response under extreme conditions, including gaseous hydrogen atmospheres, corrosive environments, high stress/strain rates, and exposure to radiation. Over forty years of research at the University of Illinois Urbana-Champaign and Wisconsin-Madison, he has pioneered a range of in situ TEM techniques in the areas of environmental TEM, thermomechanical testing, and MEMS-based quantitative mechanical testing, as well as advanced focused ion beam (FIB)-based sample preparation. These techniques were developed with the goal of elucidating the basic physical mechanisms governing plasticity, material degradation, and failure processes. The contributions from his lab permitted the development, refinement, and validation of many theories and theoretical models, most notably the Hydrogen-Enhanced Localized Plasticity (HELP) mechanism for hydrogen embrittlement and determining the criteria for dislocation-grain boundary interactions. His research coupling TEM with advanced theory and simulation has shaped the current state-of-the-art in multiple fields and continues to be applied to increasingly complex materials and environments.

Specific topics include, but are not limited to:

- Development of advanced in situ TEM techniques
- Analysis of late-stage plasticity near crack tips and fracture surfaces
- Understanding hydrogen embrittlement mechanisms
- Exploring the fundamentals of stress corrosion cracking
- Investigating dislocation-interface interactions
- Quantifying the stability of materials to irradiation damage

This symposium was rescheduled from the TMS 2021 Virtual Annual Meeting & Exhibition.

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