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**TMS2024**  
153<sup>rd</sup> Annual Meeting & Exhibition

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HYATT REGENCY ORLANDO  
ORLANDO, FLORIDA, USA  
#TMSAnnualMeeting



**SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2024 SYMPOSIUM:**

## NUCLEAR MATERIALS

### **Materials Informatics to Accelerate Nuclear Materials Investigation**

Data-driven machine learning methods are becoming increasingly useful to accelerate materials discovery and qualification for nuclear applications. The investigation of the association between variables such as structure and performance are always essential in developing strong materials for advanced reactors. However, experiments can be very costly and lengthy considering the reactor environments. Similarly, materials modeling can also face critiques in mode inaccuracy and inefficiency in typical multiscale frameworks. Therefore, how to smartly incorporate the modern development of artificial intelligence (AI) in nuclear materials study will be of strategic significance to accelerate nuclear materials investigation and unlock far more useful materials than traditional Edisonian methods for optimization within a high-dimension parametric space.

Recently, increasing work in the nuclear materials community has indicated the efficacy of this powerful tool in improving the accuracy and efficiency of modeling tools, and prediction of radiation effects such as void swelling and embrittlement based on experimental data. Indeed, more integrations of AI and nuclear materials investigation are widely open for exploration, e.g., guiding the material design and synthesis, multi-parameter optimization, and modeling linear or non-linear relations among physical quantities. In this symposium, we hope to bring together the research in nuclear materials taking advantage of materials informatics.

The topics of interest include both experimental and modeling efforts in the investigation of nuclear materials that involve the application of machine learning methods, such as (not limited to):

- Fundamental defects properties
- Microstructural evolution
- Radiation effects (swelling, hardening, embrittlement, etc.)
- Mechanical/Chemical interactions
- Manufacturing and characterization technologies

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