

THE WORLD COMES HERE.
TMS 2025
154th Annual Meeting & Exhibition



March 23–27, 2025
MGM Grand Las Vegas
Hotel & Casino
Las Vegas, Nevada, USA
#TMSAnnualMeeting



SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2025 SYMPOSIUM:

DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

Algorithms Development in Materials Science and Engineering

A foundational aspect of Materials Science is to understand, characterize, and predict the underlying mechanisms and behaviors of materials. Computational modeling and simulation provide many critical insights in these efforts, but also require constant development, validation, and application of numerical techniques. This symposium invites abstracts on the development and application of novel algorithms for materials science and engineering.

This year's symposium will especially focus on (but is not limited to) the following topical areas:

- Novel methodologies for data mining, machine learning, image processing, microstructure generation, high-throughput databases and experiments.
- Surrogate and reduced-order modeling, and extracting useful insights from large data sets of numerical and experimental results.
- Algorithm development to enhance or accelerate classical computational materials science tools including density functional theory, molecular dynamics, Monte Carlo simulation, dislocation dynamics, phase-field modeling, CALPHAD, crystal plasticity, and finite element analysis.
- Development of novel physics-based, multiscale, multi-physics materials modeling.
- Algorithm development for fusing and evaluating the quality of multimodal data and their incorporation into computational materials workflows.
- Uncertainty quantification, statistical metrics from image-based synthetic microstructure generation, model comparisons, and validation studies related to novel algorithms and/or methods in computational material science.
- Development of novel methodologies for the analysis and management of data, including best practices for 'FAIRization' of data (FAIR: Findable, Accessible, Interpretable, Reproducible), as well as best practices for research software development and dissemination.

Selected presentations will be invited to submit full papers for an issue of *Integrating Materials and Manufacturing Innovation* (5-10 papers).

ORGANIZERS

Remi Dingreville, Sandia National Laboratories; **Saaketh Desai**, Sandia National Laboratories; **Hojun Lim**, Sandia National Laboratories; **Jeremy Mason**, University of California, Davis; **Vimal Ramanuj**, Oak Ridge National Laboratory; **Sam Reeve**, Oak Ridge National Laboratory; **Douglas Spearot**, University of Florida

SYMPOSIUM SPONSORS

TMS Materials Processing & Manufacturing Division, TMS Computational Materials Science and Engineering Committee, TMS Integrated Computational Materials Engineering Committee, TMS Phase Transformations Committee, TMS Process Technology and Modeling Committee, TMS Alloy Phases Committee

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QUESTIONS?

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