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TMS 2026

155th Annual Meeting & Exhibition

March 15–19, 2026
San Diego Convention Center
and Hilton San Diego Bayfront
San Diego, California, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

High Performance Steels

Steels are indispensable structural alloys, forming the backbone of modern industry and manufacturing due to their cost-effectiveness and versatility, making them useful for many applications. As global priorities shift toward decarbonization and sustainability, the steel industry faces dual challenges. Firstly, enhancing the performance of steels to meet evolving engineering demands, and secondly, reducing their environmental footprint and impact. Addressing these challenges requires efforts that combine multidisciplinary approaches integrating advanced experimental techniques, computational modeling, innovative alloy design, and validation through physical simulation tools such as laboratory and small-scale processing and manufacturing. This symposium focuses on cutting-edge research aimed at developing sustainable, high-performance steels.

Topics of interest include, but are not limited to:

1. Sustainable Steel alloy Design: Innovations in alloy compositions and processing technologies to reduce production energy and emissions, enhance recyclability, and create low-density and stiffer steels for lightweight applications, such as automotive and aerospace industries.
2. Integrated Computational Materials Engineering (ICME) for high performance steels: Development and validation of computational tools, including physics-based and data-driven models, to understand and predict microstructure-processing-property relationships in steels.
3. Advanced Characterization of high-performance steels: Utilization of state-of-the-art methodologies such as high-resolution transmission electron microscopy (HRTEM), atom probe tomography (APT), and in-situ synchrotron/neutron diffraction to reveal the underlying mechanisms governing steel microstructure formation and mechanical response.
4. Novel Testing Approaches: Implementation of conventional and innovative mechanical testing methods to evaluate the performance of steels under static, dynamic, and failure conditions; furthermore, novel techniques that allow for high-throughput and accelerated mechanical testing, enabling rapid deployment of steels for critical applications.

By fostering collaboration among academia, industry, and national laboratories, this symposium aims to accelerate the development of steels that are not only high-performing but also aligned with the principles of sustainability. Contributions that integrate experimental, computational, and design methodologies are especially encouraged, providing a platform to shape the future of steel research and applications.

SPONSORED BY:
TMS Structural Materials Division; TMS Steels Committee

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