



**SUBMIT AN ABSTRACT BY JULY 1**

**MARCH 14-18, 2021 • ORLANDO WORLD CENTER MARRIOTT  
ORLANDO, FLORIDA, USA  
[www.tms.org/TMS2021](http://www.tms.org/TMS2021) • #TMSAnnualMeeting**

**SUBMIT AN ABSTRACT TO:**

## **CHARACTERIZATION**

## **ADVANCED REAL TIME IMAGING**

Real time observations can provide important information needed to understand materials behavior, as these techniques can provide temporal and spatial insights free from artifacts otherwise induced from conventional experimental techniques. Traditional and emerging advanced imaging techniques, which may be optical or non-optical, would allow such observations. Methods may be enhanced with capabilities that enable heating and cooling, controlled atmospheres, and application of stresses; and can be used to generate real time thermodynamic and kinetic data needed to study a variety of materials and processes. This symposium encompasses a broad range of materials science topics enabling cross-cutting opportunities for multiple disciplines (energy materials, functional materials, structural materials, biomaterials, etc.) while similar topics are categorized in the same scope in the technical program. Presentations are solicited on the application of these methods to materials science and industrial processes, as well as on development of such techniques.

Topics include, but are not limited to:

- Studies using real time optical (e.g., visible light, white light, laser, IR, and UV) and non-optical (e.g., electron and ultrasound) imaging techniques
- Researches using in-situ, in-operando, in-vitro, and in-vivo observation imaging techniques, such as thermal imaging furnace and other real time imaging methods.
- Confocal techniques, including fluorescence and reflection types, which may be equipped with capabilities such as heating/cooling chambers, gas chambers, mechanical testing, Raman spectroscope, mass spectrometry, and FTIR.
- Microscopic or telescopic imaging methods include hot thermocouple, resistance heating, and sessile drop techniques used for high temperature phenomena.
- Thermodynamic and kinetic data from these techniques, useful for phase diagram constructions, oxidation/corrosion modeling, phase formation kinetics studies, etc.
- Work using high speed and slow speed cameras
- Materials used in manufacturing real time imaging devices
- Novel technologies and methodologies for emerging imaging devices

The symposium plans to have joint sessions with:

- The Bio-Nano Interfaces and Engineering Applications symposium
- The Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling symposium

*Respective papers may participate in part of the dedicated sessions.*

### **ORGANIZERS**

**Jinichiro Nakano**, National Energy Technology Laboratory, USA

**David Alman**, National Energy Technology Laboratory, USA

**Il Sohn**, Yonsei University, South Korea

**Hiroyuki Shibata**, Imram, Tohoku University, Japan

### **SYMPOSIUM SPONSORS**

TMS Functional Materials Division

TMS Structural Materials Division

TMS Advanced Characterization, Testing, and Simulation Committee

TMS Alloy Phases Committee

**Abstract Deadline is July 1, 2020. Submit online at  
[www.programmaster.org/TMS2021](http://www.programmaster.org/TMS2021).**

**Questions?  
Contact [programming@tms.org](mailto:programming@tms.org)**