

**PRISMS Center Annual Workshop**  
**August 24-25, 2023**  
**Dow Room 1017**  
**University of Michigan**  
**Final Program**

**NOTE: Times include discussion times. All speakers should allow time for Q+A at the end of their talks!**

**Thursday August 24**

**8:20am Registration**

**8:40am Welcome and PRISMS Center Overview**

John Allison

**Measuring and Modeling Twinning and Detwinning in Mg Alloys**

*Session Chair: Liang Qi and Brian Puchala*

**9:00am Local stress effects on deformation twinning and stress induced phase transformations**

Guest Speaker: Rod McCabe (Los Alamos National Laboratory)

**9:40am 3D in-situ characterization of twinning inside Mg-4Al grains using dark-field X-ray microscopy**

Sangwon Lee, Can Yildirim, Carsten Detlefs, John Allison, Ashley Bucsek

***10:10-10:30 Break***

**10:30am PRISMS-Plasticity Overview and application for Modeling of Twinning & Detwinning in Mg and Mg alloys**

Mohammadreza Yaghoobi, Duncan Greeley, John Allison and Veera Sundararaghavan

**11:00am Quantifying Grain-Scale Twinning and Detwinning Using High Energy Diffraction Microscopy**

Duncan Greeley, Mohammadreza Yaghoobi, Kate Shanks, Darren Pagan, Veera Sundararaghavan and John Allison

**11:25am Experimental Characterization of Twinning Behavior in Mg and Mg Alloys during Monotonic and Cyclic Loading**

Qianying Shi, Tracy Berman, Anto Jerish and John Allison

**12:00-1:00 Lunch (Provided - Blue Lounge GGB Building)**

## ***Twinning: Kinetics and Thermodynamics***

*Session Chair: Anton Van der Ven and David Montiel*

### **1:20pm Kinetics of Deformation Twinning in Hexagonal Metals**

Guest Speaker: Jian Wang, University of Nebraska

### **2:00pm Stability and Growth Kinetics of Twin Embryos in $\beta$ Ti-Alloys**

Liang Qi

### **2:30pm CASM Overview and its application for modeling alloy effects on twinning in Mg**

Brian Puchala, Sessa Sai Behara\* and Anton Van der Ven\*  
\*UCSB

### **3:00-3:20pm Break**

## ***Uncertainty Quantification / Machine Learning / Materials Commons***

*Session Chair: Anton Van der Ven and David Montiel*

### **3:20pm Bayesian uncertainty quantification as applied to cluster expansions**

Derrick Ober and Anton Van der Ven, UCSB

### **3:45pm Predicting microstructurally sensitive fatigue-crack path in WE43 magnesium using high-fidelity numerical modeling and three-dimensional experimental characterization**

Guest Speaker: Brian Phung\*, D.A. Greeley, M. Yaghoobi, J.F. Adams, J.E. Allison, A.D. Spear\*, \*University of Utah

### **4:15pm Automatic Microstructure Segmentation with Computer Vision Techniques**

Kyle Farmer and Liz Holm

### **4:35pm Using Materials Commons to Build Collaborative Materials Communities**

Glenn Tarcea, Brian Puchala, Tracy Berman and John Allison

### **5:00-7pm Poster session and reception with hors d'oeuvres Beyster Lobby (Tischmann Hall)**

*Chair: Liz Holm and Amit Misra*

- 1:40 pm    Mesoscale Investigation of Dislocation-Grain Boundary Interactions in Metals and Alloys**  
Guest Speaker: Abigal Hunter, LANL
- 2:20 pm    Exploring the Influence of Micro-Hall Petch on Mechanical Properties Prediction of Mg-4Al Alloys at Micro and Macro Levels**  
Mohsen Taheri Andani, Veera Sundararaghavan and Amit Misra
- 2:40 pm    Modeling geometrically necessary dislocation accumulation in polycrystals: Crystal plasticity simulations and comparison with experiments**  
Michael Pilipchuk, A. Lakshmanan, M. Taheri Andani, Amit Misra and Veera Sundararaghavan
- 3:00-3:20   Break**
- 3:20 pm    PRISMS Indentation: Multi-scale Elasto-plastic Virtual Indentation Module**  
Guest Speaker: Aaron Tallman, Florida International University and Mohammadreza Yaghoobi
- 3:50pm    A study of grain boundary effect on the strain hardening of Mg-4Al using in situ high resolution (HR) EBSD**  
Eunji Song, M. Taheri Andani and Amit Misra
- 4:10 pm    DFT-FE overview & electronic-structure investigation of <c+a> pyramidal dislocations in Mg and Mg-Y alloy with implications towards ductility enhancement**  
Sambit Das and Vikram Gavini
- 4:40 pm    Wrap-Up**