

PRISMS Center Annual Workshop
August 9-12, 2022
Virtual Program (all times Eastern Time Zone)

Tuesday August 9

9:55am/10:00am **Convene**
10:00 am **Welcome and PRISMS Center Overview**
 John Allison

Grain Strengthening in Mg and Mg Alloys

Session Chairs: Veera Sundararaghavan & Liang Qi

10:20am **PRISMS Grain Strengthening Use Case Overview**
 Veera Sundararaghavan

10:30am **Atomistic Simulation of Dislocation-Grain Boundary Interactions in Mg**
 Yong-Jie Hu, Vaidehi Menon and Liang Qi

11:00am **Estimation of Micro-Hall-Petch Coefficients in Mg-4Al as a Function of Grain Boundary Parameters**
 Moshen Tahari, Aaditya Lakshmanan, Veera Sundararaghavan, John Allison, Amit Misra

11:30am **Modeling Grain Size Strengthening Using PRISMS-Plasticity**
 Gurmeet Singh, Aaditya Lakshmanan, Mohammedreza Yaghoobi and Veera Sundararaghavan

12:00 pm **Break (30 min)**
12:30 am **TEM study of Dislocation Interactions with Grain Boundaries in Mg Alloys**
 Jeremy Yoo, Moshen Tahari and Amit Misra

12:50 pm **Atomistic Simulation of Solute Segregation at Grain Boundaries in Mg Alloys at Finite Temperatures**
 Vaidehi Menon and Liang Qi

1:10pm **Experimental Characterization of Grain Boundary Segregation in Mg Alloys**
 Qianying Shi and John Allison

1:30 pm **DFE-FE 1.0 Overview and Application to Mg Alloys**
 Sambit Das and Vikram Gavini

2:00 pm **Open Discussion (Breakouts)**

Wednesday August 10

9:55-10am Convene/Welcome

Predicting and Measuring Twinning and Detwinning in Mg Alloys

Session Chair: Amit Misra & Ashley Bucsek

- 10:00am Twin Network Formation and Morphology in HCP Metals**
Guest Speaker: Laurent Capolungo (Los Alamos National Laboratory)
- 10:40am An Integrated PRISMS Modeling Framework for Modeling of Twinning & Detwinning in Mg and Mg alloys**
David Montiel, Mohammadreza Yaghoobi, Brian Puchala, Anton Van der Ven, Katsuyo Thornton, Veera Sundararaghavan and John Allison
- 11:00pm Experimental Characterization of Twinning Behavior in Mg and Mg Alloys during Monotonic and Cyclic Loading**
Tracy Berman, Qianying Shi, Zhe Chen and John Allison
- 11:30pm Using HEDM and PRISMS-Plasticity to Quantify and Model Twinning and Detwinning in Mg Alloys**
Duncan Greeley, Mohammadreza Yaghoobi, Kate Shanks, Darren Pagan, Veera Sundararaghavan and John Allison
- 12:00pm Break (30 min)**
- 12:30pm Theoretical Predictions for CRSS of Twinning in HCP Metals**
Guest Speaker: Huseyin Sehitoglu (University of Illinois)
- 1:10pm CASM 1.0 Overview & Application to Twinning in Mg Alloys**
Brian Puchala and Anton Van der Ven
- 1:30pm PRISMS-Plasticity Overview & Application to Simulation of Twinning and Detwinning in Mg Alloys**
Mohammadreza Yaghoobi, Veera Sundararaghavan and John Allison
- 2:00pm Open Discussion (Breakouts)**

Thursday August 11

9:55-10am Convene/Welcome

Modeling and Measuring Microstructural Evolution

Session Chair: Katsuyo Thornton

10:00am Simulation of Precipitation in Al-Li alloy

Guest Speaker: Javier Llorca (IMDEA)

10:40am PRISMS Texture Evolution Use Case Overview

John Allison

10:45am Texture Evolution in Mg-Zn-Ca Alloys: Measurements and Simulation

Tracy Berman, Mohamaddreza Yaghoobi and John Allison

11:10am A multiscale, multimodal approach to characterizing static recrystallization in Mg-3Zn-0.1Ca with in-situ nf-HEDM, ff-HEDM, and DFXM

Sangwon Lee, Reza Roumina, Kate Shanks, Can Yildirim, Tracy Berman, John Allison and Ashley Bucsek

11:40am PRISMS-PF Overview and Application to Recrystallization Simulation

David Montiel and Katsuyo Thornton

12:00pm Break (30 minutes)

Advances in High Energy Diffraction Microscopy (HEDM) & Tomography

Session Chair: John Allison

12:30pm Characterization of Grain Distortions using HEDM

Guest Speaker: Kelly Nygren, Cornell High Energy Synchrotron Source (CHESS)

1:10pm The Development of a Laboratory-scale HEDM Instrument

Ashley Bucsek

1:30pm Evaluating Grain Scale Deformation Behaviors in Complex Alloys via Synchrotron High Energy Diffraction Microscopy

Guest Speaker: Jerard Gordon, University of Michigan

1:50pm New Opportunities to Probe Granular Microstructures in Three and Four Dimensions

Guest Speaker: Ashwin Shanani, University of Michigan

2:10pm Open Discussion (Breakouts)

Friday August 12

9:55/10:00am Convene/Welcome

Capturing and Using Materials Information

Session Chair: Brian Puchala

10:00 am The National Scientific Data Fabric

Guest speaker: Valerio Pascucci, University of Utah

10:40pm Materials Commons 2.0 Overview

Glenn Tarcea, Brian Puchala, Tracy Berman and John Allison

11:10pm Using Materials Commons 2.0 as an Electronic Lab Notebook and Collaboration Platform

Tracy Berman

11:30 pm Break (30 min)

Measuring and Modeling Microstructural Effects on Fatigue in Mg Alloys

Session Chair: Mohamadreza Yaghoobi

12:00pm PRISMS-Fatigue: New Developments and Applications

Guest Speaker: Kris Stopka (Purdue University), Mohamadreza Yaghoobi, Veera Sundararaghavan, John Allison and David McDowell (Georgia Tech)

12:25pm Graph Theory Approach for Modeling Fatigue Crack Paths

Siddhartha Srivastava and Veera Sundararaghavan

12:50pm HEDM Characterization of Fatigue Crack Paths in WE 43 Mg

Duncan Greeley, Jake Adams, Peter Kenesei, Wayne Jones, Ashley Spear and John Allison

1:15pm Concluding Remarks

John Allison

Open Discussion (Breakouts)