

SYMPOSIUM CM6

Dislocation Microstructures and Plasticity
April 18 - April 21, 2017

Symposium Organizers

Stefan Sandfeld, Friedrich-Alexander University of Erlangen-Nuremberg
Yao Shen, Shanghai Jiao Tong University
Jian Wang, University of Nebraska–Lincoln
Yang Xiang, Hong Kong University of Science and Technology

Proceedings Statement

All authors are invited to submit articles based on their 2017 MRS Spring Meeting presentations to the journals in the MRS portfolio (www.mrs.org/publications-news). Papers submitted and accepted for publication in MRS Advances (www.mrs.org/mrs-advances) will be available as symposium collections. Visit the MRS/Cambridge University Press Publications Booth #100 in the Exhibit Hall to learn more, including MRS Advances print options available at special rates during the meeting week only.

* Invited Paper

SESSION CM6.1: Continuum Dislocation and Plasticity Theories
Session Chairs: Amit Acharya and Yang Xiang
Tuesday Morning, April 18, 2017
PCC North, 100 Level, Room 126 C

10:30 AM *CM6.1.01
Macroscopic Plasticity from Discrete Dislocation Dynamics [Amit Acharya](#); Carnegie Mellon University, United States.

11:00 AM *CM6.1.02
Dislocation Patterning—Meso-Scale Interactive Behavior of Dislocations Studied through Dislocation Density–Function Dynamics [Alfonso H. Ngan](#); University of Hong Kong, China.

11:30 AM CM6.1.03
Homogenisation of Dislocation System and Dislocation Pattern Formation [Yichao Zhu](#); Dalian University of Technology, China.

11:45 AM CM6.1.04
A Systematic Approach to Compare the Energy Densities of Discrete and Continuum Dislocations Models [Nina Gunkelmann](#); Friedrich-Alexander University Erlangen-Nürnberg, Germany.

SESSION CM6.2: Continuum and Discrete Dislocation Dynamics
Session Chairs: Giacomo Po and Jian Wang
Tuesday Afternoon, April 18, 2017
PCC North, 100 Level, Room 126 C

1:30 PM *CM6.2.01
A Continuum Dislocation Model of Wedge Micro-Indentation [Giacomo Po](#); University of California, Los Angeles, United States.

2:00 PM CM6.2.02
Enriching DDD Simulations by Plastic Slip Reconstruction [Dominik Steinberger](#); Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany.

2:15 PM CM6.2.03
Plastic Zone Properties at a Crack Tip Investigated with the Discrete-Continuous Model [Riccardo Gatti](#); LEM UMR 104 CNRS-ONERA, France.

2:30 PM CM6.2.04
Boundary Behaviour and Confinement of Screw Dislocations [Marco Morandotti](#); Technische Universität München, Germany.

2:45 PM CM6.2.05
Ultrahard Amorphous-Crystalline Hybrid Steel Nanolaminates [Wei Guo](#); Oak Ridge National Laboratory, United States.

3:00 PM BREAK

SESSION CM6.3: Discrete Dislocation Dynamics
Session Chairs: Wei Cai and Yao Shen
Tuesday Afternoon, April 18, 2017
PCC North, 100 Level, Room 126 C

3:30 PM *CM6.3.01
Dislocation Junctions and Line Length Distribution during Strain Hardening of Face-Centered Cubic Metals [Wei Cai](#); Stanford University, United States.

4:00 PM *CM6.3.02
3D DD Investigations of the Role of Interfaces on Dislocation Plasticity [Marc C. Fivel](#); SIMaP, France.

4:30 PM CM6.3.03
Discrete Dislocation Dynamics Simulations of Pop-In Events in Nanoindentation [Hengxu Song](#); Johns Hopkins University, United States.

4:45 PM CM6.3.04
On a Causal Stroh Formalism and Mach Cones Radiated by Fast Dislocations in a Linear-Elastic Anisotropic Medium [Yves-Patrick Pellegrini](#); Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France.

SESSION CM6.4: Poster Session: Dislocation Microstructures and Plasticity
Session Chairs: Yao Shen and Yang Xiang
Tuesday Afternoon, April 18, 2017
8:00 PM - 10:00 PM
Sheraton, Third Level, Phoenix Ballroom

CM6.4.01
Electrical Properties of Dislocations within the Nitride Based Semiconductors Gallium Nitride and Indium Nitride [Stephen K. O'Leary](#); University of British Columbia, Canada.

CM6.4.02
Experimentally-Informed Large-Scale Atomistic Simulations of Nanoporous Gold [Arun Prakash](#); Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany.

CM6.4.03
Non-Isothermal Precipitation Hardening of AZ91 Magnesium Alloy [Anneliese Bals](#); Santa Clara University, United States.

SESSION CM6.5: Grain Boundaries and Dislocations
Session Chairs: Stefan Sandfeld and Peter Voorhees
Wednesday Morning, April 19, 2017
PCC North, 100 Level, Room 126 C

8:00 AM *CM6.5.01
A Disconnection Model for Grain Boundary Structural, Mechanical and Dynamical Properties [Jian Han](#); University of Pennsylvania, United States.

8:30 AM *CM6.5.02
Three-Dimensional Grain Growth—The Role of Dislocations [Peter W. Voorhees](#); Northwestern University, United States.

9:00 AM CM6.5.03
Continuum Framework for Dislocation Structure, Energy and Dynamics of Dislocation Arrays and Low Angle Grain Boundaries [Luchan Zhang](#); Hong Kong University of Science and Technology, Hong Kong.

9:15 AM CM6.5.04
Dislocation Assisted Rafting in Nickel-Based Superalloys—A Coupled Phase-Field/Continuum Dislocation Dynamics Model [Stefan Sandfeld](#); University Erlangen-Nuremberg, Germany.

9:30 AM CM6.5.05

Multiscale Simulation of Dislocation-Interface Reactions in Heterogeneous Materials [Liming Xiong](#); Iowa State University, United States.

9:45 AM CM6.5.06

Dislocations on $\Sigma\{013\}$ Grain Boundaries in Mono-Cast Si—Atomistic Structure and Effects on Mechanical Properties [Yutaka Ohno](#); IMR, Tohoku University, Japan.

10:00 AM BREAK

SESSION CM6.6: Multiscale Models of Dislocations

Session Chairs: Yao Shen and Bob Svendsen
Wednesday Morning, April 19, 2017
PCC North, 100 Level, Room 126 C

10:30 AM *CM6.6.01

Comparative Atomistic-Continuum Modeling of Nanoscopic Dislocation Processes in Single and Bicrystals [Bob Svendsen](#)^{1,2}; ¹RWTH Aachen University, Germany; ²Max-Planck Institute for Iron Research, Germany.

11:00 AM CM6.6.02

Improvements of the Peierls-Nabarro Model and Its Applications [Yao Shen](#); Shanghai Jiao Tong University, China.

11:15 AM CM6.6.03

Multiscale Model for Interlayer Defects in Bilayer Material [Shuyang Dai](#); Wuhan University, China.

11:30 AM CM6.6.04

Viscous Evolution in a Phase Field Model for Dislocations with Forest Hardening [Patrick Dondl](#); Albert-Ludwigs-Universität Freiburg, Germany.

11:45 AM CM6.6.05

Heterogeneous Residual Stress in Nanocrystalline Cu [Lei Cao](#); University of Nevada, Reno, United States.

SESSION CM6.7: Dislocation Microstructures I

Session Chairs: Nan Li and Jian Wang
Wednesday Afternoon, April 19, 2017
PCC North, 100 Level, Room 126 C

1:30 PM *CM6.7.01

The Coupling of Phase Transformations and Plasticity in NiTi Shape Memory Alloys [Peter M. Anderson](#); The Ohio State University, United States.

2:00 PM *CM6.7.02

Dislocation-Templated 1-nm Gd Nano-Fiber Patterns in Mg Alloys [Guozhen Zhu](#); Shanghai Jiao Tong University, China.

2:30 PM BREAK

SESSION CM6.8: Dislocation Microstructures II

Session Chairs: Nan Li and Jian Wang
Wednesday Afternoon, April 19, 2017
PCC North, 100 Level, Room 126 C

3:30 PM *CM6.8.01

Enhanced Fracture Toughness of Mg/Nb Laminated Composites [Nan Li](#); Los Alamos National Laboratory, United States.

4:00 PM *CM6.8.02

Monitoring the Elastic Response of Individual Subgrains of a Dislocation Structure during Small Changes in the Imposed Strain [Wolfgang Pantleon](#); DTU Mechanical Engineering, Denmark.

4:30 PM CM6.8.03

About the Role of the Microstructure in the Plasticity of Sub-Micron Al and Be Wires [Frederic Mompiau](#); CEMES-CNRS, France.

4:45 PM CM6.8.04

Experimental Studies of Dislocation Density and Stress Distributions near Grain Boundaries in Deformed Materials [Angus J. Wilkinson](#); University of Oxford, United Kingdom.

SESSION CM6.9: Atomistic Simulations of Dislocations

Session Chairs: Chun-Wei Pao and Arun Prakash
Thursday Morning, April 20, 2017
PCC North, 100 Level, Room 126 C

8:00 AM *CM6.9.01

Plasticity of Nanocrystalline Thin Films—New Insights from Atomistic Simulations [Arun Prakash](#); Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany.

8:30 AM CM6.9.02

Plastic Deformation of Nanostructures Induced by Focused Ion Beam Irradiation—Insights from Atomistic Simulations [Chun-Wei Pao](#); Academia Sinica, Taiwan.

8:45 AM CM6.9.03

Exploring the Energy Landscape for Screw Dislocation Motion in Tantalum [Amit Samanta](#); Lawrence Livermore National Laboratory, United States.

9:00 AM CM6.9.04

Dislocation Migration in Silicon-Germanium Superlattices [Weixuan Li](#); University of Florida, United States.

9:15 AM CM6.9.05

Atomistic Simulations of Dislocation/Precipitate Interactions in Mg-Al Alloys [Javier Llorca](#); IMDEA Materials Institute & Technical University of Madrid, Spain.

9:30 AM CM6.9.06

Frictional Properties of Multi-Asperity Surfaces at the Nanoscale [Arun K. Nair](#); University of Arkansas, United States.

9:45 AM CM6.9.07

Symmetry Coupling between Phase Transitions and Crystalline Defects [Yipeng Gao](#); The Ohio State University, United States.

10:00 AM BREAK

SESSION CM6.10: Dislocation Core Related Mechanisms

Session Chairs: Satish Rao and Christopher Weinberger
Thursday Morning, April 20, 2017
PCC North, 100 Level, Room 126 C

10:30 AM CM6.10.01

Screw Dipole Annihilation in FCC Crystals [Satish Rao](#); Ecole Polytechnique Federale Lausanne, Switzerland, Switzerland.

10:45 AM CM6.10.02

Microplasticity in Ag₃Sn—Experiments and Modeling [Christopher Weinberger](#); Colorado State University, United States.

11:00 AM CM6.10.03

Dislocation Trajectory and Schmid Law Deviation in BCC Metals [Lucile Dezerald](#); Institut Jean Lamour, France.

11:15 AM CM6.10.04

Grain and Indentation Size Effect of Nanocrystalline Ceramic Nanoindentation [Heonjune Ryou](#)^{2,1}; ¹US Naval Research Laboratory, United States; ²ASEE, United States.

11:30 AM CM6.10.05

Role of Dislocation Core Structures in Tension/Compression Asymmetry in HCP Titanium Using DFT and MEAM [Max N. Poschmann](#); University of California, Berkeley, United States.

11:45 AM CM6.10.06

Study of Kink Propagation along Screw Dislocation in Body Centered Cubic Iron [Anshuman Choudhury](#); CEA-Saclay, France.

SESSION CM6.11: Dislocations and Nanoparticles
Session Chairs: Dan Mordehai and Stefan Sandfeld
Thursday Afternoon, April 20, 2017
PCC North, 100 Level, Room 126 C

1:30 PM *CM6.11.01
The Temperature-Dependent Strength of Metallic Nanoparticles [Dan Mordehai](#); Technion, Israel.

2:00 PM CM6.11.02
Coupling Dislocations and Cavities with Phase Field Methods [Antoine Ruffini](#); LEM CNRS/ONERA, France.

2:15 PM CM6.11.03
Solute Effects on Dislocation Core Structure in BCC Metals and Consequences on Dislocation Mobility [Berengere Luthi](#); CEA, Université Paris Saclay, France.

2:30 PM CM6.11.04
Dynamics of Interactions between Point Defects and Dislocations in BCC Iron [Luis Casillas](#); University of Tennessee, United States.

2:45 PM CM6.11.05
Dislocation Dynamics Simulations of Spatial Distribution Effect in Particle Strengthening [Jian Sheng Wang](#); Retired, United States.

3:00 PM BREAK

SESSION CM6.12: Irradiation and Dislocations
Session Chairs: Weizhong Han and Jian Wang
Thursday Afternoon, April 20, 2017
PCC North, 100 Level, Room 126 C

3:30 PM *CM6.12.01
Radiation-Induced Helium Nanobubbles Enhance Ductility in Submicron-Sized Single-Crystalline Copper [Weizhong Han](#); Xi'an Jiaotong University, China.

4:00 PM *CM6.12.02
Irradiation Effects on Hardening and Strain Bursts at the Microscale [Yinan Cui](#); University of California, Los Angeles, United States.

4:30 PM CM6.12.03
Physically-Based Crystalline Law for Irradiated Steels [Ghiath Monnet](#); EDF - R&D, France.

4:45 PM CM6.12.04
Atomistic Based Study of Creep in Model Materials [Marie Landeiro Dos Reis](#); CEA, France.

SESSION CM6.13: Interfaces and Dislocations
Session Chairs: Nik Chawla and Yang Xiang
Friday Morning, April 21, 2017
PCC North, 100 Level, Room 126 C

8:30 AM CM6.13.01
A Concurrent Atomistic-Continuum Study of Sequential Slip Transfer of Curved Dislocations across Tilt Grain Boundaries [Shuozhi Xu](#); Georgia Institute of Technology, United States.

8:45 AM CM6.13.02
Novel Dislocation Dynamics Model to Study Contact Deformation of Self-Affine Metal Surfaces [Syam Parayil Venugopalan](#); Delft University of Technology, Netherlands.

9:00 AM CM6.13.03
Cohesive Zone Failure of Al-Cu Misfit Dislocation Networks Using Hybrid Adhesion Method [Nicholas Brown](#)^{1,2}; ¹Northwestern University, United States; ²Los Alamos National Laboratory, United States.

9:15 AM CM6.13.04
3D Microstructural Characterization of Aluminum Alloys using Transmission X-Ray Microscopy (TXM) [Nik Chawla](#); Arizona State University, United States.

9:30 AM CM6.13.05
Work Hardening Stages, Structural Transitions and Scaling Laws [Darcy Hughes](#); Consultant, United States.

9:45 AM CM6.13.06
Using *In Situ* SEM Fatigue Test and Advanced Ex-Situ TEM Techniques to Investigate Fatigue Mechanisms in Single and Bi-Crystal Nickel Micropillars [Vahid Samaeaghmiyoni](#); University of Antwerp, Belgium.