



UNIVERSITÄT
DES
SAARLANDES

1st Colloquium on Theoretical and Experimental Micro-Mechanics

18.-19. Nov. 2019, Metz, France



Recent advances in the characterization of mechanical properties at small scales by experimental and numerical methods

This colloquium aims for current developments in experimental and numerical methods to characterize and understand the mechanical behavior, influence of interfaces, damage evolution, influence of environment and more at small length scales. New advanced experimental as well as numerical methods will be addressed. The colloquium will take place in the nice city of Metz (Lorraine) in the triangle of France, Germany and Luxembourg. Contributions are welcome.

KEYNOTE SPEAKERS:

- Dr. Christoph Kirchlechner, Max-Planck-Institut für Eisenforschung, Düsseldorf
- Dr. Marc Fivel, SIMAP, CNRS, Université Grenoble Alpes, Grenoble

ORGANIZERS :

Dr. Stéphane Berbenni, Laboratoire LEM3, Université de Lorraine, CNRS
Prof. Dr. Christian Motz, Experimental Methods, Universität des Saarlandes

VENUE :

Grand Amphitheater, UFR MIM, Université de Lorraine, Technopole
7, rue Felix Savart, 57070 Metz, France

Scientific Program

MONDAY NOVEMBER 18, 2019	
10:00 am to 10:50 am	Welcome, Breakfast, Coffee
10:50 am to 11:00 am	Opening session
Christian Motz	
<i>Saarland University, Institute of Material Science and Methods, Saarbrücken, Germany)</i>	
Stéphane Berbenni	
<i>LEM3, CNRS, Université de Lorraine, Metz, France</i>	
11:00 am to 11:50 am	Keynote lecture
Using experimental small scale mechanics and spatially resolved Laue diffraction to understand dislocation grain boundary interactions	
Christoph Kirchlechner	
<i>Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany</i>	
Morning session	
11:50am to 12:15 pm	Fast Fourier Transform simulation of X-Ray diffraction peaks of single crystals: application to reference cases
Komlavi Senyo Eloh	
<i>Institut Jean Lamour, Université de Lorraine, Nancy & LEM3, Labex DAMAS, Metz, France</i>	
12:15 pm to 12:40 pm	Stress partitioning in a near- β Titanium alloy induced by elastic and plastic phase anisotropies
Ravi Purushottam Raj Purohit	
<i>IRT M2P, Metz & LEM3, CNRS, Université de Lorraine & PIMM, CNRS, Paris, France</i>	
12:40 pm to 02:30 pm	Lunch
Afternoon session	
02:30 pm to 02:55 pm	3D-Laue micro diffraction to characterize damage in bi-crystalline micro cantilevers
Jean-Baptiste Molin	
<i>Max-Planck-Institut für Eisenforschung GmbH, Düsseldorf, Germany</i>	

02:55pm to 03:20 pm	
3D characterization of the plastic zone in deformed tungsten microcantilevers by HR-EBSD	
Szilvia Kalácska	
<i>Empa Swiss Federal Laboratories for Materials Science and Technology, Laboratory for Mechanics of Materials and Nanostructures, Thun, Switzerland</i>	
03:20 pm to 03:45 pm	
Fine characterization of a deformed nanostructure by coupling on-axis Transmission Kikuchi Diffraction with Digital Image Correlation	
Clement Ernould	
<i>LEM3, Labex DAMAS, Université de Lorraine, Metz, France</i>	
03:45pm to 04:15 pm	Refreshment & Coffee
04:15 pm to 04:40 pm	
Slip across complex interfaces: the case of Mg based Laves phases	
Julien Guénolé	
<i>Institute for Physical Metallurgy and Materials Physics, RWTH Aachen University, Germany</i>	
04:40 pm to 05:05 pm	
A molecular dynamics study of irradiation creep deformation mechanisms in α -zirconium	
Nargisse Khiara	
<i>Service de Recherches Métallurgiques Appliquées, CEA-Saclay, Gif-sur-Yvette, France</i>	
05:05 pm to 05:30 pm	
Continuum microstructure evolution of fcc microwires under torsion	
Kolja Zoller	
<i>Institute for Applied Materials (IAM), KIT, Karlsruhe, Germany</i>	
05:30 pm to 05:55 pm	
Experimental/simulation analysis of plastic deformation mechanisms in a new generation Fe-TiB ₂ steel composite	
Julien Genée	
<i>LEM3, Labex DAMAS, Université de Lorraine, Metz & ArcelorMittal R&D, Maizières-Les-Metz, France</i>	

TUESDAY NOVEMBER 19, 2019

09:10 am to 10:00 am

Keynote lecture

Mesoscopic plasticity: From Dislocation dynamics to mechanical behaviour

Marc Fivel

SIMAP, CNRS, Université Grenoble Alpes, Grenoble, France

Morning session

10:00 am to 10:25 am

Effect of anisotropic elasticity on dislocation pile-ups and stress-induced slip transmission at grain boundaries

Xiaolei Chen

LEM3, CNRS, Université de Lorraine, France & Department of Materials Science and Technology, Saarland University, Germany

10:25 am to 10:50 am

All-Twin-Variants polycrystal modelling approach to decipher strain hardening, microstructure and texture evolution in Magnesium alloy with experimental validation including individual grain analysis

Sudeep K. Sahoo

Dept of Metall. Mater. Engng, Indian Institute of Technology, India & Labex DAMAS, Université de Lorraine, Metz, France

10:50 am to 11:20 am

Refreshment & Coffee

11:20 am to 11:45 am

Virtual DMA performed on heterogeneous microstructures with FFT- spectral solver: Application to an amorphous glassy system

Stéphane André

LEMETA, CNRS, Université de Lorraine, Nancy, France

11:45 am to 12:10 pm

An invariant-based yield function for body-centered cubic metals

Selina Neuhaus

Chair of Applied Mechanics (LTM), Saarland University, Saarbrücken, Germany

12:10 pm to 12:35 pm

In-situ SEM dislocation-scale characterization and simulation for BCC deformation during macroscopic tensile testing: New insight on pencil glide in β -Ti21S

Meriem Ben-Haj-Slama

LEM3, CNRS, Labex DAMAS, Université de Lorraine, Metz, France

12:35 pm to 02:30 pm

Lunch

Afternoon session	
02:30 pm to 02:55 pm	
High resolution-digital image correlation techniques to assess slip events	
Damien Texier	
<i>Clement Ader Institute (ICA) ; Université de Toulouse ; CNRS, IMT Mines Albi, France</i>	
02:55 pm to 03:20 pm	
Impact of the architecture / texture on the mechanical behavior of Ni-microwires: how to drive the strength and ductility	
Alla Ndiaye Dieng	
<i>Institut Pprime, CNRS, ISAE-ENSMA, Université de Poitiers, France</i>	
03:20 pm to 03:45 pm	
In-situ micromechanical testing of Nickel specimens charged by an Ar-H2 plasma	
Dominic Perius	
<i>Saarland University, Institute of Material Science and Methods, Saarbrücken, Germany</i>	
03:45 pm to 04:15 pm	Refreshment & Coffee
04:15 pm to 04:40 pm	
High temperature micromechanical testing for meso/microscale characterizations under controlled atmospheres	
Damien Texier	
<i>Clement Ader Institute (ICA) ; Université de Toulouse ; CNRS, IMT Mines Albi, France</i>	
04:40 pm to 05:05 pm	
Transverse compression tests of monofilaments	
Gilles Arnold	
<i>LPMT, Université de Haute Alsace, France</i>	
05:05 pm to 05:30 pm	
Interface Controlled Ductile Hybrid Crystal/Amorphous Nanolaminates	
Hui Wang	
<i>Institute of Mechanics Materials and Civil Engineering, IMAP, UCLouvain, Louvain-la-Neuve, Belgium</i>	
05:30 pm	End of the colloquium