

EUROMECH COLLOQUIUM 559

**Multi-scale computational methods
for bridging scales
in materials and structures**

23 February 2015 – 25 February 2015
Eindhoven, The Netherlands

Organizing Committee



University of Stuttgart
Germany

Sponsoring



Eindhoven Multiscale Institute



| Monday, 23 February, 2015 | |
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| 8:30-8:55 | Registration, Coffee |
| 8:55-9:00 | Opening and Welkom |
| Session 1 , chair Varvara Kouznetsova | |
| 9:00-9:30 | Coarse-grained atomistics with free surfaces <i>Dennis Kochmann</i> |
| 9:30-10:00 | Towards coarse-grained molecular dynamics simulations of polymers for self-healing materials <i>Giovanni Samaey</i> |
| 10:00-10:30 | Anisotropic viscoplasticity as a phenomenon emerging from fluctuations <i>Markus Hütter</i> |
| 10:30-11:00 | Coffee Break |
| Session 2 , chair Julien Yvonnet | |
| 11:00-11:30 | Continuum multi-scale modeling of propagating fracture in quasi-brittle materials <i>Xavier Oliver</i> |
| 11:30-12:00 | New developments in multiscale formulations for material failure <i>Alfredo Huespe</i> |
| 12:00-12:30 | FEM-DEM multiscale analysis in geomechanics: strain localisation and 2nd gradient regularization <i>Jacques Desrues</i> |
| 12:30-13:30 | Lunch in restaurant De Zwarte Doos |
| 13:30-14:30 | Poster session (see last page for the list contributed posters) |
| Session 3 , chair Christian Miehe | |
| 14:30-15:00 | Spatio-temporal multiscale modeling of composites for fatigue life prediction <i>Caglar Oskay</i> |
| 15:00-15:30 | Fourier-based schemes with modified Green operator for computing the electrical response of heterogeneous media with accurate local fields <i>François Willot</i> |
| 15:30-16:00 | A two-scale analysis of Li-ion battery cells <i>Alberto Salvadori</i> |
| 16:00-18:30 | Visit to Multi-scale Laboratory and informal reception (GEM-Z -1.103) |

| Tuesday, 24 February, 2015 | |
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| 8:30-9:00 | Coffee |
| Session 4, chair Marc Geers | |
| 9:00-9:30 | Numerical plate testing for composite plates <i>Kenjiro Terada</i> |
| 9:30-10:00 | Mutiscale computational homogenisation to predict the long-term durability of composite structures <i>Chris Pearce</i> |
| 10:00-10:30 | Multi-scale modeling of random or imperfect composites <i>Michal Sejnoha</i> |
| 10:30-11:00 | Coffee Break |
| Session 5, chair Samuel Forest | |
| 11:00-11:30 | Reduced basis heterogeneous multiscale methods <i>Assyr Abdulle</i> |
| 11:30-12:00 | A model order reduction approach for realizing three-dimensional two-scale simulations on desktop computers <i>Felix Fritzen</i> |
| 12:00-12:30 | Construction of micropolar continuum models of architected materials by discrete homogenization <i>Jean-François Ganghoffer</i> |
| 12:30-13:30 | Lunch in restaurant De Zwarte Doos |
| Session 6, chair Kenjiro Terada | |
| 13:30-14:00 | Identifying viscoelastic substitute models for seismic attenuation in heterogeneous poroelastic media: A computational homogenization approach <i>Ralf Jänicke</i> |
| 14:00-14:30 | Effective properties of fluid-filled deformable porous media from computational homogenization <i>Kenneth Runesson</i> |
| 14:30-15:00 | Wave propagation in residual-saturated porous media: A multi-scale discrete-continuum approach <i>Holger Steeb</i> |
| 15:00-15:30 | Coffee Break |
| Session 7, chair Dennis Kochmann | |
| 15:30-16:00 | A constitutive model for granular materials with microstructures using the concept of energy relaxation <i>Klaus Hackl</i> |
| 16:00-16:30 | Macroscopic model with evolution of structural anisotropy based on micro-macro, particle-to-continuum methods <i>Stefan Luding</i> |
| 16:30-17:00 | A FE2 model for hydro-mechanical coupling in a brittle material <i>Pierre Bésuelle</i> |
| 18:00-... | Visit to Van Abbe Museum & Banquet |

| Wednesday, 25 February, 2015 | |
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| 8:30-9:00 | Coffee |
| Session 8 , chair Xavier Oliver | |
| 9:00-9:30 | Constitutive models for porous metals: Microstructure evolution and implications for shear localization <i>Pedro Ponte Castaneda</i> |
| 9:30-10:00 | Sliding friction across the scales: thermomechanical interactions and dissipation partitioning <i>Ilker Temizer</i> |
| 10:00-10:30 | From fibrils to toughness in stretchable electronics interfaces: a multi-scale approach <i>Marc Geers</i> |
| 10:30-11:00 | Coffee Break |
| Session 9 , chair Pedro Ponte Castaneda | |
| 11:00-11:30 | Variance reduction approaches for random materials homogenization <i>Frederic Legoll</i> |
| 11:30-12:00 | Stochastic continuum modeling of random interphases from atomistic simulations <i>Johann Guilleminot</i> |
| 12:00-12:30 | Propagation of uncertainties using probabilistic multi-scale models <i>Ludovic Noels</i> |
| 12:30-13:30 | Lunch in restaurant De Zwarte Doos |
| Session 10 , chair Paul Steinmann | |
| 13:30-14:00 | Homogenization schemes and phase field approach of diffusive phase transformation accompanied by viscoplastic deformation processes <i>Samuel Forest</i> |
| 14:00-14:30 | Multi-scale modeling of chiral mass-in-mass dynamic systems <i>Luigi Gambarotta</i> |
| 14:30-15:00 | A level set-based generalized tessellation for the generation of complex microstructural RVEs <i>Thierry Massart</i> |
| 15:00-15:30 | Coffee Break |
| Session 11 , chair Kenneth Runesson | |
| 15:30-16:00 | Aspects of computational homogenization at finite strains <i>Paul Steinmann</i> |
| 16:00-16:30 | Variational stability analysis in computational homogenization of electro-magneto-active composites <i>Christian Miehe</i> |
| 16:30-17:00 | Computational homogenization with neural networks <i>Julien Yvonnet</i> |
| 17:00 | Closure |

Posters

1. Franz Bormann *Modelling approach for phase boundary decohesion due to dislocations*
2. Emanuela Bosco *A computational homogenization framework for propagating discontinuities based on X-FEM*
3. Sebastien Brisard *Hydromechanical couplings in the clay matrix of argilite: some methodological aspects of the atomistic-to-continuum upscaling*
4. Tom de Geus *Relating microstructural morphology and mechanics to the onset of fracture in multi-phase materials*
5. Kun Gao *A homogenization approach for acoustic poroelastic materials*
6. Md Khairullah *Accelerating the hierarchical multi-scale (HMS) model by exploiting quasi-homogeneous subdomains*
7. Julian Kochmann *Phase-field modeling of martensitic phase transformations in polycrystals based on fast Fourier transforms in a homogenization-based framework*
8. Anastasiia Krushynska *Influence of elastic moduli on the wave propagation in acoustic metamaterials*
9. Francesco Maresca *Multiscale modeling of plasticity of hierarchical laminated microstructures*
10. Chris Pearce *Perturbation-based stochastic multiscale computational homogenisation method*
11. Tommaso Ristori *Breaking the computational barrier to simulate dynamic stress fiber remodeling in 3D*
12. Mohammad Rizviul Kabir *Modelling of fracture of single crystal lamellar TiAl alloys using a two-scale finite element approach*
13. Saba Saeb *Aspects of computational homogenization at finite strains*
14. Ashwin Sridhar *Multiscale analysis of acoustic metamaterials using transient computational homogenization*
15. ThomasWeinhart *Multiscale modelling of segregation in granular avalanches*