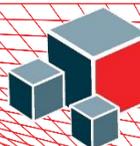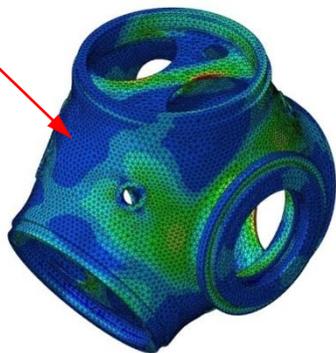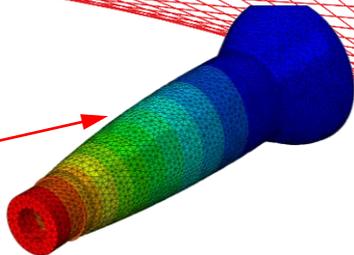**Structural parts made of heterogeneous materials**
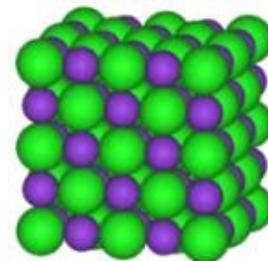

Končar
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Special Workshop

in scope of the project

Multiscale Numerical Modeling of Material Deformation Responses from Macro- to Nanolevel
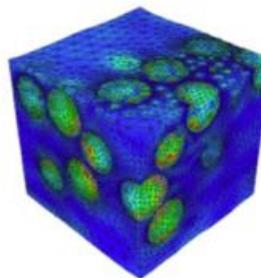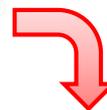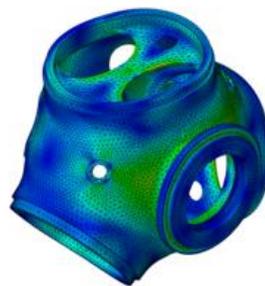
Microstructure of the nodular cast iron, EN-GJS-400-18U-LT

100 μm

Modeling of biological tissues

**May 9, 2016
Zagreb**
*Faculty of Mechanical
Engineering and Naval
Architecture*

AIMS AND SCOPE

The main objective of the workshop is to present the research results obtained in the frame of the project "Multiscale Numerical Modeling of Material Deformation Responses from Macro- to Nanolevel" supported by Croatian Science Foundation during the research period from July 2014 to April 2016. In the three guest lectures the re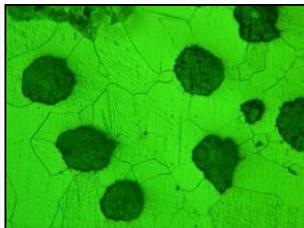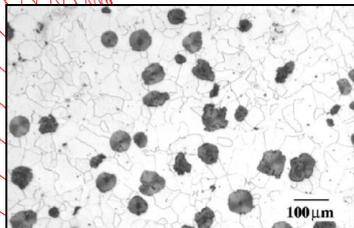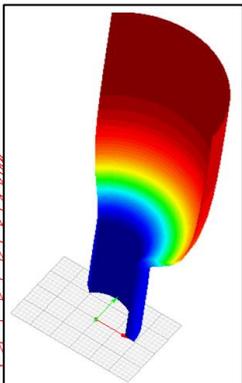search in the similar field supported by the same Foundation and performed at University of Rijeka will also be presented. The state-of-the-art of the research area will be addressed in the keynote presentation.

The research is concerned with the multiscale modeling of deformation responses of heterogeneous engineering materials as well as biological tissues. In order to assess structural integrity and to predict structural lifetime, an analysis at microlevel is required. A special attention has been directed to the investigation of relations between macroscopic properties of materials and their microstructure and to perform a link to atomistic scale as well. The mathematical modeling of arterial growth and remodeling could help physicians to track certain cardiovascular diseases and predict their development. For modeling of engineering materials, a new micro-macro numerical procedure based on the second-order computational homogenization approach employing nonlocal continuum theory is proposed. The damage evaluation which may lead to macroscopic fracture will be modeled.

The results presented will be interesting for Ph.D. students as well as for the engineers working in the development of new materials and advanced computational procedures. In addition, the workshop will provide an opportunity for transfer of the advanced knowledge and computational methods from academia to industry.

Project website**: www.fsb.unizg.hr/mnmn/**

WORKSHOP ORGANIZERS

Chairman: **Jurica Sorić, principal investigator**

Organizing committee: T. Lesičar, F. Putar, I. Skozrit

MORE INFORMATION

E-mail: **filip.putar@fsb.hr**

Web: **www.fsb.unizg.hr/mnmn/**

Workshop location:
Faculty of Mechanical Engineering and Naval Architecture, Ivana Lučića 5, Zagreb, Plava dvorana (Blue hall), east building, third floor, room 326

Please confirm your participation until May 2, 2016.

Participation is free of charge. Coffee break, lunch and workshop materials will be provided.

WORKSHOP PROGRAM

Time	Program
8.00 - 9.00	*Registration*
9.00 - 9.45 *Keynote Lecture*	*M.H. Ferri Aliabadi (Imperial College London)* **MULTISCALE MODELLING OF MATERIAL DEGRADATION AND FAILURE PROCESSES**
9.45 - 10.15	*Coffee break*
10.15 - 10.40	Multiscale Modeling of Heterogeneous Materials Using Gradient Approach *T. Lesičar*
10.40 - 11.05	Modeling of Damage Phenomena Using Strain Gradient Formulation *F. Putar*
11.05 - 11.30	Damage Initiation and Evolution in Nodular Cast Iron for Wind Turbine Components *I. Skozrit*
11.30 - 11.55	Application of Meshless Collocation Methods for Modeling of Material Discontinuities *B. Jalušić, T. Jarak*
11.55 - 12.20	Modelling of Fibers in Concrete *T. Rukavina (University of Rijeka)*
12.20 - 14.00	*Lunch*
14.00 - 14.25	Carbon Nanotube Imperfections: Review and Influence on Mechanical Properties *M. Brčić, M. Čanađija (University of Rijeka)*
14.25 - 14.50	On Mechanical Properties and Dislocation Nucleation in Cu Monocrystals by Atomistic Modeling *I. Trapić*
14.50 - 15.15	Mixed-Mode Delamination in Geometrically-Nonlinear Analysis of Multi-Layered Beam Structures *L. Škec (University of Rijeka)*
15.15 - 15.40	Modelling of Deformation Responses of Arteries Using Finite Elements *L. Virag*
15.40 - 16.30	*Discussion*