VENUE INFORMATION

This is a course offered to Graduate students interested in current research in solid and fluid mechanics. The course runs *September 17-19, 2017*, just before the conference ECCOMAS MSF 2017, held September 20-22, 2017. (webpage: ***http://www.eccomas-msf-2017.eu/***).
With *reduced fees of 250 Euros*, the course students will also be admitted to the conference scientific program, but not to social events. The course students are not expected, in general, to make presentation at ECCOMAS MSF 2017.

The ECCOMAS MSF 2017 Conference Course venue is the capital of Slovenia ***Ljubljana***. The city urban area provides homes to the population of close to three hundred thousand, making it one of the smallest and thus prettiest capital cities in Europe, with a fairytale, picture-perfect old town of pastel colored baroque and art nouveau buildings, tree-lined river, and medieval castle perched on a hill. The city is compact and laid-back, with what feels like more bikes than cars, a youthful artsy population, and delicious food. Each year, over 10,000 cultural events take place in the city, including ten international theater, music, and art festivals.

Ljubljana can easily be reached by a direct flight from most European capitals, or quite conveniently by car thanks to its Central European location with some 320 kilometers south of Munich, 470 kilometers east of Zürich, 250 kilometers east of Venice, 350 kilometers southwest of Vienna, 220 kilometers south of Salzburg and 400 kilometers southwest of Budapest.

Reaching Ljubljana by car also offers possible quick trips (less than an hour ride) to either Alpes or Karst mountains and to Adriatic sea resorts. In mid-September the weather still sufficiently mild for a very pleasant visit, and it is nearly perfect period just after the massive arrival of tourists for summer season.

Conference course venue/ contact E-mail address:
Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo (watch for sign: ECCOMAS *MSF 2017*)
Address: Jamova cesta 2, 1000 Ljubljana, Slovenia
E-mail: adnan.ibrahimbegovic@utc.fr
bostjan.brank@fgg.uni-lj.si,
ivica.kozar@uniri.hr

COURSE OBJECTIVES

The main objective of this course is to provide graduate students and researchers, with an extensive review of numerical models for computational solid and fluid mechanics, and pertinent modern developments in model reduction, probability aspects and uncertainty quantification. It presents the current state-of-the-art in finite element, finite volume and discrete element modeling of nonlinear problems in solid and fluid mechanics, and their coupling with thermal fields and interaction. It will illustrate the difficulties (and their solutions), which appear in a number of applications from mechanical, aerospace and civil engineering or material science. All the sources of nonlinear behavior are presented in a systematic manner, related to kinematics, equilibrium, constitutive equations, or boundary and coupling conditions. Special attention is paid to dealing with a class of problems with nonlinear constitutive behavior of materials, large deformations, and rotations in solid and fluid mechanics. In addition, a detailed presentation of modern probability aspects is given, which is of great interest for current research for quantifying the epistemic uncertainties pertinent to the material heterogeneities, and aleatoric uncertainties pertinent to evolution problems.
Our second objective is to provide the participants with a solid basis for using the FEM, FVM or particle based models and software in trying to achieve the optimal design, and/or to carry out a refined analysis of nonlinear behavior of structures or multibody systems in real-life simulations. The course finally provides a basis to account for any pertinent multi-physics and multi-scale effects, which are most likely to provide significant innovations and break-through in a number of industrial applications.

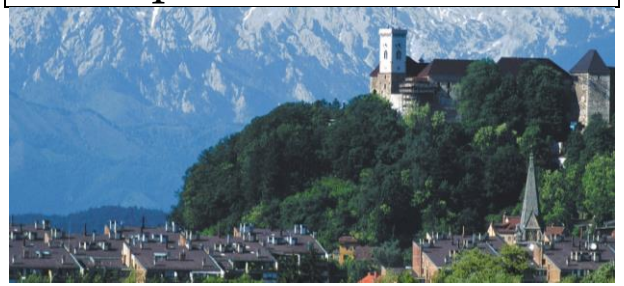
Course Textbooks: Nonlinear Solid Mechanics: Theoretical Formulations and Finite Element Solution Methods (2009 Springer webpage: *http://springer.com/978-90-481-2330-8*)
Computational Methods for Solids and Fluids: Multiscale Analysis, Probability Aspects and Model Reduction (2016 Springer webpage: *http://www.springer.com/fr/book/9783319279947*)

ECCOMAS MSF 2017 Conference Course

Course Announcement & Call for participants

Short Course at 3rd ECCOMAS MSF 2017
Current Research on Solids & Fluids: Computations, FE Code Coupling, Model Reduction, Probability…

September 17 - 19, 2017



Ljubljana, Slovenia

co-organized by:
UT-Compiègne/ Sorbonne Universities, France
TU Braunschweig, Germany
University of Ljubljana, Slovenia

REGISTRATION

The course fees cost **250** Euros, if paid before March 31, 2017 (with cost increase to **350** Euros **after that date**). Mail or fax in the completed registration form (available at the web-site) with check, or copy of money transfer order. Early registration is suggested because enrollment is limited. Visit website: ***http://www.eccomas-msf-2017.eu/***.

COURSE PROGRAM

1. Nonlinear solid mechanics and inelastic behavior at small strains; 2. Nonlinear mechanics of structures and multibody systems; 3. Solution methods and software for coupled and interaction problems; 4. Probability aspects and uncertainty quantification; 5. Nonlinear fluid mechanics and multi-phase flows; 6. Fluid-structure interaction and immersed boundary method.

COURSE MATERIAL

The course material will consist of the graduate textbook written by A. Ibrahimbegovic *Nonlinear Solid Mechanics: Theoretical Formulation and Finite Element Solution Methods*, Springer 2009, a copy of textbook *Computational Methods for Solids and Fluids: Multiscale Analysis, Probability Aspects and Model Reduction*, a copy of chapter on stochastic FEM written by H.G. Matthies for Encylopedia and CD-ROM with copies of transparencies from the lectures, survey papers by the lecturers and recent manuscripts. The copy of computer code CO-*FEAP* providing multi-scale parallel-computer implementation of well-known code FEAP, written by Prof. Robert L. Taylor at UC Berkeley, and the Component Template Library (*CTL)* for code-coupling and parallel-computing platform, developed at TU Braunschweig, and the complete manual is available only to course attendees. This course was also organized at ECCOMAS MSF 2015, which was held in Sarajevo, with more than 30 participants (photo below)

COURSE PROFESSORS

Adnan Ibrahimbegovic is Professor Classe Exceptionnelle, Member Senior IUF-Institut Universitaire France and Chair for Computational Mechanics at University of Technology Compiègne, an elite engineering school and a founding member of Sorbonne Universités (along with Paris-Sorbonne, Université Pierre Marie Curie, INSEAD …). He has obtained his engineering education in Sarajevo, PhD at the University of California Berkeley, USA and Habilitation at University Pierre Marie Curie in Paris, France. He has held professorships and research positions at four different universities (including UC Berkeley, USA; EPFL, Switzerland; ENS-Cachan, France and currently UTC, France). He is the past Chairman of ENS-Cachan Teaching and LMT-Cachan Research Departments and Head of Master Program MaiSE. He has received a number of international distinctions, including IACM Fellow Award, Humboldt Research Award for Germany, Research Award for Slovenia, International Fellow NSERC Award for Canada, 'Claude Levy-Strauss' Chair for Univ. Sao Paulo, Brazil, 'Asgard' Chair for NTNU, Norway, KAIST Invited Professor, South Korea, 'Hôte Académique' Award for EPFL, Switzerland. He has produced more than 450 publications, including 150 papers in scientific journals and 7 textbooks and monographs**.**

Hermann G. Matthies has obtained his initial degree from the TU Berlin, Germany; and his doctoral degree in mathematics at MIT, Cambridge, USA in 1978, working on FEM and plasticity. Subsequently he has worked in Research Division of Germanischer Lloyd, Hamburg, Germany, dealing with industrial research and engineering in diverse fields such as wind, offshore, and ice engineering. Since 1995 he joined academia as the Head of the Institute of Scientific Computing at the TU Braunschweig, Germany; and from 1996 to 2006 he was additionally the director of the University Computing Centre. His current research is oriented towards the uncertainty quantification, Bayesian identification and updating, coupled and interaction problems, plasticity and scientific computing. He has received several international distinctions, among them the Fellowship Award of the IACM. Since 2013, he has been appointed Full Member of the "Braunschweigische Wissenschafliche Gesellschaft" (BWG). He has published over 100 papers in scientific journals, as well as over 220 conference publications and topical special issues.

Nikolaos Limnios, is Professor Classe Exceptionnelle at University of Technology Compiègne (UTC) and Director of the Laboratoty of Applied Mathematics. He has obtained his diploma in 1979 at AUTh Greece, PhD in 1983 and Doctorat d'Etat in 1991 at UTC France. In 1988, he was appointed Maitre de Conférences and in 1993 a Professor at UTC in Laboratory of Applied Mathematics. His research interests include stochastic processes and statistics to different applications domains, such as: reliability, statistical seismology, biology, etc. He has published more than 150 journal papers and several books on theory and applications of stochastic processes.

Florian De Vuyst is Professor at Ecole Normale Supérieure de Cachan, France. He has obtained his initial degree and his doctoral degree in mathematics at University Pierre Marie Curie, Paris in 1994. He was Professor in Applied Mechanics at Ecole Centrale Paris, before joining ENS-Cachan. He is currently the Director of Institute Farman, an interdisciplinary platform regrouping 5 laboratories at ENS-Cachan, and vice-Director of CMLA-Centre of Mathematics and Its Applications and vice-Director of joint research group with CEA/DAM dealing with hydrodynamics and plasma applications. His current research is oriented towards high performance computing, multi-phase and free-surface fluid flow and model reduction methods. He has published over 100 papers in scientific journals in fluid mechanics and applied mathematics.

Abdellatif Ouahsine is a Professor and member of administrative board at University of Technology Compiègne (UTC). He has obtained his doctoral degree and Habilitation in Fluid Mechanics from University of Science and Technology Lille. Since 1994, he serves as Head of Laboratory of Computational Hydraulics (LHN), a joint team UTC and CETMEF (French national technical institute of the Ministry of Ecology, Sustainable development and Energy). His current research interest pertain to environmental and computational fluid dynamics (CFD), with special emphasis on fluid-structure interaction. He has published close to 100 papers, and organized several conferences on hydrodynamic modeling, currents and waves in coastal area and river management.