



# International Mini-Master



NADIA PROJECT - IP -026563-2

## Advanced casting design of automotive components

June 22nd-26th, 2009

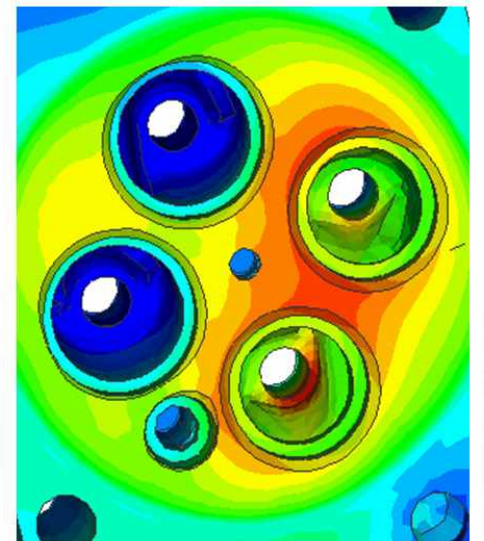
DTG

Dipartimento di Tecnica e Gestione dei Sistemi Industriali  
Università di Padova, sede di Vicenza  
Str. S. Nicola, 3 - 36100 Vicenza, Italy.



### Objectives

- This one-week course is intended for scientists and engineers working in Industry or Academia with design, manufacturing or R&D of automotive light metal castings.
- It is organized by the NADIA consortium with partners from Automotive-, manufacturing- and materials Industry in an integrated R&D program on development of automotive light metal castings.
- The course will be presented by leading experts from Industry and Academia.



### Topics Covered

- Fundamentals of solidification and casting technology
- Processing and properties of cast alloys
- Fundamentals of Numerical Modelling of Casting and Heat treatment Processes
- CAE Integrated tools for the development of automotive components
- Automotive components by Intelligent Processing

### Lecturers

**Lars Arnberg**, NTNU, Norway, **Franco Bonollo**, University of Padova, Italy, **Helmut Gese**, MATFEM, Germany, **Nicola Gramegna**, EnginSoft, Italy, **Fabio Grosselle**, University of Padova, Italy, **Eric Hepp**, MAGMA, Germany, **Amaia Igartua**, Tekniker, Spain, **Iñigo Loizaga**, CIE Automotive, Spain, **Roberto Molina**, TeksidAluminium, Italy, **Stefano Odorizzi**, Enginsoft, Italy, **Wolfgang Rehm**, Daimler, Germany, **Marc Schneider**, MAGMA, Germany, **Salem Seifeddine**, INGUS, Sweden, **Ingvar Svensson**, Univ. of Jönköping, Sweden, **Giulio Timelli**, University of Padova, Italy, **Ulrich Weiss**, Ford, Germany

For more information:

<http://www.nadiaproject.org/announces>

<http://www.enginsoft.it/calendario>



# Program Schedule

June 22<sup>nd</sup>, Monday

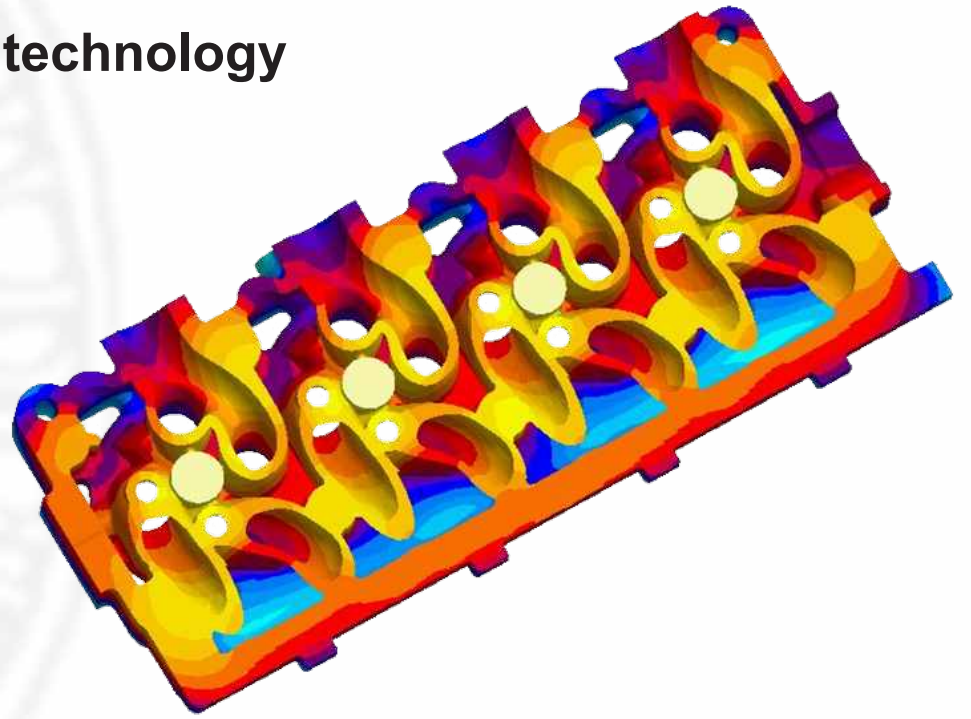
## **Fundamentals of solidification and casting technology**

- Microstructures and phase diagrams
- Nucleation and grain refinement
- Fundamentals of solidification and casting technology
  - Growth of dendrites and eutectics
  - Solute redistribution / microsegregation

June 23<sup>rd</sup>, Tuesday

## **Processing and properties of cast alloys**

- Casting processes for Al and Mg alloys
- Overview of casting defects
- Microstructural features of cast light alloys
- Predicting Microstructure of cast Aluminium alloys
- Fundamentals of heat treating of light alloys castings
- Experimental techniques for microstructure evaluation
- Process-microstructure-defects correlations for light alloys castings



June 24<sup>th</sup>, Wednesday

## **Fundamentals of Numerical Modelling of Casting and Heat treatment Processes**

- Introduction and Background to Casting Process Modelling
- Modelling of Fluid Flow and Mould Filling
- Modelling Heat Transfer and Solidification
- Models for Defect Formation
- Modelling of Stresses, Strains and Distortion
- Discretization and Numerical Solution Methodologies
- Current and Future Developments in Casting and Heat Treatment Process Simulation

June 25<sup>th</sup>, Thursday

## **CAE Integrated tools for the development of automotive components**

- Inputs for Simulation: Material Data and Process Conditions
- Output from Simulation: Interpretation of Results and use of defect criteria
- Output from Simulation: Local mechanical properties and Residual stress/strain
- Integrated optimisation of product development
- Advanced surface treatments of light alloys castings in view of wear resistance

June 25<sup>th</sup>, Thursday & June 26<sup>th</sup>, Friday

## **Automotive components by Intelligent Processing**

- Linking process simulation with FEM codes (Static, TMF ) and Intelligent Processing of Aluminium Cylinder Head by Gravity Casting
- Linking process simulation with FEM codes (Crash) and Intelligent Processing of Magnesium Structural Component by High Pressure Die Casting
- Intelligent Processing of Al Engine Block by Low-Pressure Die-Casting
- Intelligent Processing of Al Steering Component by High Pressure Die Casting

## Registration and Organization Issues

### **Mini-Master Secretariat**

DTG

Str. S. Nicola, 3 I - 36100 Vicenza, Italy.

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### **Mini-Master Venue**

The Mini-Master will be held at DTG, Università di Padova, Department of Vicenza, Stradella S. Nicola 3, Vicenza.

### **Language**

English will be the Mini-Master language.

### **Proceedings**

The Presentation will be published on the Cd-Rom proceedings and issued to participants on arrival at the Mini-Master.

### **Registration Fee**

Full Mini-master participation: EURO 1000 (Revenue Stamp included)

Day 1 + Day 2 : EURO 500 (Revenue Stamp included)

Day 3 + Day 4 + Day 5: EURO 700 (Revenue Stamp included)

NADIA Partners . Free of charge

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