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March 30th - April 4th, Trento, Italy

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11<sup>th</sup> International Conference on

**High-Order Nonlinear Numerical Methods for  
Evolutionary PDEs: Theory and Applications**

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**CONFERENCE PROGRAM**

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**Organized by the University of Trento**



*The instrument that mediates between theory and practice, between thought and observation, is mathematics; it builds the connecting bridge and makes it stronger and stronger. Thus it happens that our entire present-day culture, insofar as it rests on intellectual insight into and harnessing of nature, is founded on mathematics. Already, Galileo said: Only he can understand nature who has learned the language and signs by which it speaks to us; but this language is mathematics and its signs are mathematical figures. Kant declared, "I maintain that in each particular natural science there is only as much true science as there is mathematics." In fact, we do not master a theory in natural science until we have extracted its mathematical kernel and laid it completely bare. Without mathematics today's astronomy and physics would be impossible; in their theoretical parts, these sciences unfold directly into mathematics. These, like numerous other applications, give mathematics whatever authority it enjoys with the general public.*

DAVID HILBERT

Radio address given in Königsberg on 8 September 1930, on the occasion of the yearly meeting of the Society of German Natural Scientists and Physicians (English translation by James T. Smith)



*This conference is dedicated to*

*the 80<sup>th</sup> birthday of Prof. Dr. Dr. h.c. Eleuterio F. Toro, OBE*

*the 70<sup>th</sup> birthday of Prof. Christian Klingenberg*

*the 65<sup>th</sup> birthday of Prof. Rémi Abgrall*

*the 60<sup>th</sup> birthday of Prof. Lorenzo Pareschi*

*the 60<sup>th</sup> birthday of Prof. Pep Mulet*

*the 60<sup>th</sup> birthday of Prof. Angelo Iollo*

*the 60<sup>th</sup> birthday of Prof. Elena Vázquez Cendón*

*the 50<sup>th</sup> birthday of Prof. Mario Ricchiuto*

*the 50<sup>th</sup> birthday of Prof. Vladimir Titarev*

*the 40<sup>th</sup> birthday of Prof. Walter Boscheri*

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**Scientific committee:**

Rémi Abgrall (*University of Zurich, Switzerland*)

Michael Dumbser (*University of Trento, Italy*)

Claus-Dieter Munz (*University of Stuttgart, Germany*)

Eleuterio F. Toro (*University of Trento, Italy*)

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**Organizing committee:**

Michael Dumbser (*University of Trento, Italy*)

Ilya Peshkov (*University of Trento, Italy*)

Olindo Zanotti (*University of Trento, Italy*)

Alessia Lucca (*University of Trento, Italy*)

Davide Ferrari (*INRIA, Strasbourg, France*)

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**Conference secretary:**

Francesco Lorenzi (*University of Trento, Italy*)

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**This conference has been supported by:**

University of Trento

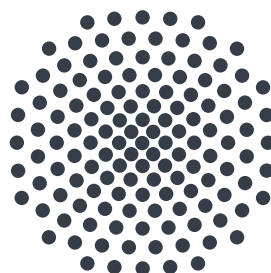
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## Welcome to HONOM 2026!

We are very pleased to welcome you to HONOM 2026, *the 11<sup>th</sup> International Conference on High Order Nonlinear Numerical Methods for Evolutionary PDE, held in Trento, Italy.*

HONOM 2026 is the eleventh in a series of biannual conferences that began with a meeting in Trento, Italy in 2005. Further editions of this conference were held in Trento, Italy in the years 2007, 2009, 2011, Bordeaux, France in 2013, Trento, Italy in 2015, Stuttgart, Germany in 2017, Madrid, Spain in 2019, Braga, Portugal in 2022 and Chania, Greece in 2024. These conferences focus on recent developments and new directions in the area of numerical methods for nonlinear hyperbolic partial differential equations (PDE).

Many processes in science and engineering can be described by nonlinear time-dependent PDE systems. Accurate and robust numerical methods are required for their solution, since these PDE can exhibit smooth, small and large-scale features as well as discontinuities and singularities at the same time. This is evident in aeroacoustics, gas dynamics, magnetohydrodynamics (MHD), compressible turbulence and general relativity, when attempting to find solutions that may include shocks and singularities, and at the same time one needs to resolve small turbulent eddies and evolve weak signals of large characteristic wavelength over long distances and for large times on relatively coarse grids. In addition to the classical requirement of conservation, a high order of accuracy in both space and time is thus of fundamental importance to properly resolve all physical processes involved. However, since the times of Godunov, it is very well-known that high-order linear schemes generate spurious oscillations (the Gibbs phenomenon). The real challenge, therefore, still remains to construct high-order accurate and at the same time robust and stable nonlinear and non-oscillatory schemes. Significant advances have been made in this direction in the last decades, pioneered by TVD (Total Variation Diminishing) methods, ENO and WENO schemes, as well as nonlinear DG finite element methods with appropriate limiters.

We would like to thank the scientific committee, our sponsors and all the participants for their enriching contributions and we wish you a very pleasant stay in Trento and productive scientific and personal interactions during the conference!

*Michael Dumbser*

Chairman of the HONOM 2026 organization committee

*Ilya Peshkov, Olindo Zanotti, Alessia Lucca, Davide Ferrari*

HONOM 2026 local organizing committee

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# HONOM 2026, 30 March – 3 April 2026, Trento, Italy



## Program of the 11<sup>th</sup> Conference on High Order Nonlinear Numerical Methods for Evolutionary PDE

|               | Monday, 30.3.2026 |                        | Tuesday, 31.3.2026   |                   | Wednesday, 1.4.2026 |                    | Thursday, 2.4.2026 |                    | Friday, 3.4.2026         |                   |
|---------------|-------------------|------------------------|----------------------|-------------------|---------------------|--------------------|--------------------|--------------------|--------------------------|-------------------|
|               | Room<br>Madrizzo  | Room<br>Belvedere      | Room<br>Madrizzo     | Room<br>Belvedere | Room<br>Madrizzo    | Room<br>Belvedere  | Room<br>Madrizzo   | Room<br>Belvedere  | Room<br>Madrizzo         | Room<br>Belvedere |
| 08:45 – 09:15 |                   | Opening and Welcome    |                      |                   |                     |                    |                    |                    |                          |                   |
| 09:15 – 10:00 | <b>Droniou</b>    |                        | <b>May</b>           | <b>Maire</b>      | <b>Perrier</b>      | <b>Toro</b>        |                    |                    |                          |                   |
| 10:00 – 10:30 | <b>Abgrall</b>    |                        | <b>Klingenberg</b>   | <b>Mulet</b>      | <b>Titarev</b>      | <b>Boscheri</b>    |                    |                    |                          |                   |
| 10:30 – 11:30 | Coffee Break      |                        | Coffee Break         | Coffee Break      | Coffee Break        | Coffee Break       |                    |                    | Coffee Break             |                   |
| 11:30 – 12:00 | <b>Ricchiuto</b>  |                        | <b>Pareschi</b>      | <b>Lukačová</b>   | <b>Iollo</b>        | <b>Romenski</b>    |                    |                    |                          |                   |
| 12:00 – 12:30 | <b>Kurganov</b>   |                        | <b>Kummer</b>        | <b>Hoch</b>       | <b>Puppo</b>        | <b>Vilar</b>       |                    |                    |                          |                   |
| 12:30 – 13:00 | <b>Frolikovic</b> |                        | <b>Kozubskaya</b>    | <b>Gaburro</b>    | <b>Thomann</b>      | <b>Müller</b>      |                    |                    |                          |                   |
| 13:00 – 15:00 | Lunch             |                        | Lunch                | Lunch             | Lunch               | Lunch              |                    |                    | Lunch                    |                   |
| 15:00 – 15:30 | <b>Del Río</b>    | <b>Vedral</b>          | <b>Dhauadi</b>       | <b>Keim</b>       | <b>Lampert</b>      | <b>Chiocchetti</b> | <b>Willems</b>     | <b>Zeravy</b>      | <b>Tavelli</b>           | <b>Patela</b>     |
| 15:30 – 16:00 | <b>Lucca</b>      | <b>Döhning</b>         | <b>Sauerborn</b>     | <b>Schwarz</b>    | <b>Barthwal</b>     | <b>Klima</b>       | <b>Preda</b>       | <b>Zappa</b>       | <b>Peshkov</b>           | <b>Artiano</b>    |
| 16:00 – 16:30 | <b>Zampa</b>      | <b>Martínez-Donato</b> | <b>Birke</b>         | <b>Kopper</b>     | <b>Zanotti</b>      | <b>Regener</b>     | <b>Anguill</b>     | <b>Stuhlmacher</b> | <b>Dumbser</b>           |                   |
| 16:30 – 17:15 | Coffee Break      |                        | Coffee Break         |                   | Coffee Break        |                    | Coffee Break       |                    | Closure and Coffee Break |                   |
| 17:15 – 17:45 | <b>Dumett</b>     | <b>Liu</b>             | <b>Munoz Moncayo</b> | <b>Ferrari</b>    |                     |                    | <b>Yuan</b>        | <b>Caraga</b>      |                          |                   |
| 17:45 – 18:15 | <b>Castillo</b>   | <b>Samantaray</b>      | <b>Barrios</b>       | <b>Rinaldi</b>    |                     |                    | <b>Helie</b>       | <b>Yashina</b>     |                          |                   |
| 18:15 – 18:45 | <b>Dubois</b>     | <b>Redle</b>           |                      |                   |                     |                    | <b>Lazareva</b>    |                    |                          |                   |
| 20:00 – ...   | Welcome Reception |                        |                      |                   | Conference Dinner   |                    |                    |                    |                          |                   |

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## Daily program: Monday, 30 March 2026

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08:45 – 09:15 **OPENING AND WELCOME – ROOM MADRUZZO**

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09:15 – 10:00 **Jérôme Droniou** (University of Montpellier)  
*A polytopal exterior calculus framework with application to the Maxwell equations on manifolds*

10:00 – 10:30 **Rémi Abgrall** (University of Zürich)  
*Recent development on Active flux methodology*

10:30 – 11:30 **COFFEE BREAK**

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11:30 – 12:00 **Mario Ricchiuto** (INRIA, Bordeaux)  
*Genuinely multidimensional Riemann solvers, residual distribution and continuous finite elements: a unified view with some recent results*

12:30 – 13:00 **Alexander Kurganov** (Southern University of Science and Technology, Shenzhen)  
*Local Characteristic Decomposition-Based Central-Upwind Flux Splitting*

12:00 – 12:30 **Peter Frolkovic** (Slovak University of Technology, Bratislava)  
*Implicit methods for numerical solution of hyperbolic systems given by transport equations with nonlinear sorption*

13:00 – 15:00 **LUNCH**

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**ROOM MADRUZZO**

**ROOM BELVEDERE**

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15:00 – 15:30 **Laura Del Río** (INRIA, Bordeaux)  
*On the heat GLM system and its compatible discretization*

**Joshua Vedral** (TU Dortmund)  
*An Element-Based Convex Limiting Framework for Continuous Galerkin Methods with Nonlinear Stabilization*

15:30 – 16:00 **Alessia Lucca** (University of Trento)  
*Structure-preserving schemes for symmetric hyperbolic and thermodynamically compatible systems of PDEs*

**Daniel Döhning** (RWTH Aachen University)  
*Volume Term Adaptivity for Discontinuous Galerkin Schemes*

16:00 – 16:30 **Enrico Zampa** (University of Vienna)  
*A structure preserving finite element scheme for the incompressible GPR model*

**Izarne Martínez-Donato** (University of Valencia)  
*High-order Minimally Implicit Runge-Kutta (MIRK) methods and application to the 1D shallow water equations with topography and Manning friction*

16:30 – 17:15 **COFFEE BREAK**

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17:15 – 17:45 **Miguel Dumett** (San Diego State University)  
*High Order Mimetic Differences Curl Vector Calculus Identities*

**Yongle Liu** (University of Zürich)  
*Positivity-preserving Well-balanced PAMPA Scheme with Global Flux Quadrature for One-dimensional Shallow Water Equations*

17:45 – 18:15 **Jose Castillo** (San Diego State University)  
*Data-Driven Mimetic Framework for Turbulence Modeling*

**Saurav Samantaryay** (Johannes Gutenberg University Mainz)  
*Asymptotic Preserving and Well Balanced Linearly Implicit Additive IMEX Schemes for the Isentropic Euler Equations with Gravity*

18:15 – 18:45 **Juliette Dubois** (TU Berlin)  
*Uncertainty quantification of conservation laws with several random parameters*

**Michael Redle** (TU Clausthal)  
*High-Order Positivity-Preserving Well-Balanced Schemes: Combining Flux Globalization with Modified Patankar Methods*

20:00 – ... **WELCOME RECEPTION**

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## Daily program: Tuesday, 31 March 2026

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09:15      **OPENING – ROOM MADRUZZO**

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09:15 – 10:00    **Sandra May** (TU Berlin)  
*About the DoD Stabilization to Solve the Small Cell Problem*

10:00 – 10:30    **Christian Klingenberg** (Würzburg University)  
*A structure-preserving compact high-order method for multi-dimensional hyperbolic conservation laws*

10:30 – 11:30    **COFFEE BREAK**

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11:30 – 12:00    **Lorenzo Pareschi** (Heriot Watt University, Edinburgh)  
*Boltzmann Across Regimes: Dynamic Domain Decomposition and Uniformly Accurate IMEX Solvers*

12:30 – 13:00    **Florian Kummer** (TU Darmstadt)  
*Implicit high-order shock tracking for the compressible Euler equations using an extended discontinuous Galerkin method*

11:30 – 12:00    **Tatiana Kozubskaya** (Keldysh Institute of Applied Mathematics RAS, Moscow)  
*EBR Schemes: Recent Developments*

13:00 – 15:00    **LUNCH**

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**ROOM MADRUZZO**

**ROOM BELVEDERE**

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15:00 – 15:30    **Firas Dhaouadi** (University of Bordeaux)  
*On hyperbolic approximations for a class of dispersive and diffusive-dispersive equations*

**Jens Keim** (University of Stuttgart)  
*An Entropy Stable Discontinuous Galerkin Spectral Element Method on Heterogeneous Grids*

15:30 – 16:00    **Robert Sauerborn** (TU Darmstadt)  
*A Structure Preserving Finite Volume Scheme for the Navier-Stokes-Korteweg Equations*

**Anna Schwarz** (University of Stuttgart)  
*High-Order Shock Capturing on Heterogeneous Grids using Discontinuous Galerkin Spectral Element Methods*

16:00 – 16:30    **Gunnar Birke** (University of Münster)  
*Energy preservation properties of the Domain of Dependence stabilization method on cut cell meshes*

**Patrick Kopper** (University of Stuttgart)  
*A  $p$ -adaptive discontinuous Galerkin spectral element method on heterogeneous, curvilinear meshes*

16:30 – 17:15    **COFFEE BREAK**

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17:15 – 17:45    **Carlos Muñoz-Moncayo** (KAUST, Saudi Arabia)  
*A Hyperbolic Approximation of the Nonlinear Schrödinger Equation*

**Davide Ferrari** (INRIA, Strasbourg)  
*A discrete equivalence in HTC schemes for multiphase flows*

17:45 – 18:15    **Gabriel Barrios** (KAUST, Saudi Arabia)  
*Design of High-Order Fractional-Step Runge-Kutta Methods with Low-Order Subintegrators*

**Sara Rinaldi** (University of Trento)  
*Arbitrary-Lagrangian-Eulerian solver for relativistic detonation waves*

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## Daily program: Wednesday, 1 April 2026

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09:15      **OPENING – ROOM MADRUZZO**

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09:15 – 10:00    **Pierre-Henri Maire** (CEA, Bordeaux)  
*Revisiting Genuinely Multidimensional Fluxes for Cell-Centered Lagrangian Gas Dynamics*

10:00 – 10:30    **Pep Mulet** (University of València)  
*All Mach number second-order implicit-explicit schemes for isentropic compressible Cahn-Hilliard-Navier-Stokes equations*

10:30 – 11:30    **COFFEE BREAK**

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11:30 – 12:00    **Maria Lukáčová-Medvid'ová** (Johannes Gutenberg University Mainz)  
*High-Order Methods for Euler Equations: Truly Multidimensional Operators and Selection Criteria*

12:00 – 12:30    **Philippe Hoch** (CEA, ArpaJon)  
*Novelties on arbitrary high-order two-dimensional composite finite volume schemes*

12:30 – 13:00    **Elena Gaburro** (University of Verona)  
*High order accurate ADER Finite Volume schemes based on novel genuinely multidimensional Riemann solvers*

13:00 – 15:00    **LUNCH**

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### ROOM MADRUZZO

15:00 – 15:30    **Joshua Lampert** (University of Hamburg)  
*Advances in the Construction of Summation-By-Parts Operators on Arbitrary Grids and General Function Spaces*

15:30 – 16:00    **Rahul Barthwal** (University of Stuttgart)  
*A second order accurate generalized Riemann solver for a hyperbolic model of two-layer thin film flow*

16:00 – 16:30    **Olindo Zanotti** (University of Trento)  
*High order numerical schemes within a new first-order BSS-NOK formulation of the Einstein equations*

16:30 – 17:15    **COFFEE BREAK**

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### ROOM BELVEDERE

**Simone Chiocchetti** (University of Cologne)  
*ADER schemes go faster and faster*

**Matej Klíma** (University of Verona)  
*3D direct Arbitrary-Lagrangian-Eulerian ADER-DG schemes on moving meshes with connectivity changes*

**Daniel Regener Roig** (University of Bergamo)  
*Robust discontinuous Galerkin solution of the multicomponent Euler model for multiphase flows*

20:00 – ...    **CONFERENCE DINNER**

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## Daily program: Thursday, 2 April 2026

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09:15      **OPENING – ROOM MADRUZZO**

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09:15 – 10:00    **Vincent Perrier** (University of Pau)

*Discrete Hodge-Helmholtz decomposition and application to the accuracy problem in the computation of low Mach number compressible flows*

10:00 – 10:30    **Vladimir Titarev** (Computing Center of RAS, Moscow)

*Numerical study of some problems of rarefied gas mechanics*

10:30 – 11:30    **COFFEE BREAK**

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11:30 – 12:00    **Angelo Iollo** (University of Bordeaux)

*Collocated Reduced-Order Models for High-Order Schemes*

12:00 – 12:30    **Gabriella Puppo** (Sapienza University of Rome)

*From kinetic equations to macroscopic models for two phase flow*

12:30 – 13:00    **Andrea Thomann** (INRIA, Strasbourg)

*Numerical methods for hyperbolic multi-scale systems*

13:00 – 15:00    **LUNCH**

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**ROOM MADRUZZO**

**ROOM BELVEDERE**

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15:00 – 15:30    **Klaas Willems** (KU Leuven)

*A semi-Lagrangian method for the polyatomic ESBGK model*

**Michal Žeravý** (Slovak University of Technology, Bratislava)

*A priori time limiting for the Quinpi scheme*

15:30 – 16:00    **Silvia Preda** (University of Insubria, Como)

*SCOUT: Semi-Lagrangian COnservative and Unconditionally Stable schemes for nonlinear advection-diffusion problems*

**Alessandra Zappa** (University of Insubria, Como)

*Extending Quinpi in 2D: an implicit scheme for nonlinear conservation laws*

16:00 – 16:30    **Pierre Anguill** (CEA, Arpajon)

*An asymptotic preserving method for the linear transport equation on general meshes*

**Roman Stuhlmacher** (KTH Royal Institute of Technology)

*Superconvergence through SIAC filtering on non-uniform, structured meshes*

16:30 – 17:15    **COFFEE BREAK**

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17:15 – 17:45    **Dean Yuan** (INRIA, Bordeaux)

*Anisotropic mesh adaptation for the non-linear shallow water equations*

**Julio Careaga** (University of Groningen)

*Entropy preserving discontinuous Galerkin schemes for shallow water moment models*

17:45 – 18:15    **Romane Helie** (CEA, Arpajon)

*Lagrange-Remap scheme for 3D ideal magnetohydrodynamic equations in a Cartesian AMR hydrocode*

**Marina Yashina** (MADI University, Moscow)

*Evolutionary PDEs for Macroscopic Modeling of Road Traffic Flow in Urban Areas*

17:45 – 18:15    **Galina Lazareva** (RUDN University, Moscow)

*Mathematical model of current distribution in a tungsten plate during pulsed heating*

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## Daily program: Friday, 3 April 2026

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09:15      **OPENING – ROOM MADRUZZO**

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09:15 – 10:00    **Eleuterio Francisco Toro** (University of Trento)

*Time-reconstruction solvers for the GRPm. Application to ADER methods for hyperbolic systems.*

10:00 – 10:30    **Walter Boscheri** (CNRS, Chambéry)

*Structure preserving finite volume schemes on Voronoi grids: involutions, asymptotic limits, algebraic constraints and thermodynamics*

10:30 – 11:30    **COFFEE BREAK**

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11:30 – 12:00    **Evgeniy Romenski** (Sobolev Institute of Mathematics, Novosibirsk)

*Numerical Evaluation of Effective Elastic Moduli of a Heterogeneous Deformed Fluid Saturated Porous Medium*

12:00 – 12:30    **Francois Vilar** (Université de Montpellier)

*Subcell monolithic ADER-AFE-DG/FV convex property preserving scheme*

12:30 – 13:00    **Lucas Müller** (University of Trento)

*A generalized Riemann problem-based compact reconstruction method for finite volume schemes*

13:00 – 15:00    **LUNCH**

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**ROOM MADRUZZO**

**ROOM BELVEDERE**

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15:00 – 15:30    **Maurizio Tavelli** (University of Verona)

*A structure-preserving semi-implicit four-split scheme for continuum mechanics*

**Julie Patela** (CEA, Arpajon)

*An APITALI approach for Lagrangian schemes enforcing the discrete entropy growth for Euler equations*

15:30 – 16:00    **Ilya Peshkov** (University of Trento)

*On various structures of continuum mechanics models and the need for structure preserving integrators*

**Marco Artiano** (Johannes Gutenberg University Mainz)

*On Affordable Entropy-Conservative and Entropy-Stable Methods for Nonconservative Hyperbolic Systems*

16:00 – 16:30    **Michael Dumbser** (University of Trento)

*A simple and general framework for the construction of exactly div-curl-grad compatible discontinuous Galerkin finite element schemes on unstructured simplex meshes*

16:30 – 17:15    **CLOSURE AND COFFEE BREAK**

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