NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 1 (2026)

Mengni Li will begin her Humboldt Fellowship on Feb. 1

Mengni Li

Mengni Li's topic is inverse scattering theory in magneto-hydrodynamics. She is a lecturer at Southeast University in Nanjing, China and has received a Humboldt Fellow with us from Feb. 2026 until Jan. 2028. Only recently she finally received her visa and has arrived in Germany on Feb. 1, 2026.

Sophie Lauer submitted her Master thesis

Sophia Lauer submitted her Master thesis *"Convex Integration applied to the two-dimensional compressible Euler equations"*.

Understanding solutions for the compressible Euler equations is notoriously difficult. Milestones in this ongoing quest are: 1965 Glimm proved existence for initial data with small total variation, albeit only in one space dimension. In 1985 Diperna proved existence for large initial data, using compensated compactness, but only for isentropic Euler in one space dimension. Using an entropy condition these solutions are unique. Around 2012 it was shown that entropy solutions in two space dim. are not unique, using the convex integration technique. Sophie explained this last difficult result in her Master thesis.

Giovanni Leidi will join our work group

Giovanni Leidi

From 2019 - 2023 Fritz Röpke (Heidelberg) and myself had a joint DFG project on numerics for astrophysical applications. The two PhD students supported by this grant were Claudius Birke in Würzburg and Giovanni Leidi in Heidelberg. Since then Giovanni has become a post-doc in Heidelberg, where he continues the work along the lines of our DFG project. His post-doc contract will expire this summer, and after that he will join us as a post-doc for one year beginning in Sept. 2026.

One of the scientific outcomes of the DFG project was that we were inspired to work on a new numerical method, the Active Flux method. Giovanni plans to apply this to astrophysical applications. Going by the experience in our former project, we expect this collaboration to help us refine the Active Flux method.

Application submitted for the second period of the DFG hyperbolic priority program

The DFG (German Science Foundation) has a priority program for hyperbolic equations, see here, where 21 groups from German universities are funded to do research in hyperbolic conservation laws. Jointly with Wasilij Barsukow we run one of these groups.

This DFG program lasts for 6 years, grants are given for 3 years each. Now we are approaching the half way point of this program, so that Wasilij and myself have applied for another 3 year PhD position to continue our research.

In the first period of this program we identified situations, where the so-called Active Flux finite volume numerical method has very useful properties, such as preserving stationary solutions, asymptotic preserving, maintaining solenoidal flow etc., all without a change of the method. This was proven for linear systems of hyperbolic equations. In the second period we plan to extend these good properties to non-linear systems of conservation laws, whenever this is possible.

news about conferences

SIAM Conference on Computational Science and Engineering (CSE27)

Every two years the American applied math society (SIAM) organizes the *SIAM Conference on Computational Science and Engineering*. The next one, *CSE27*, will be held in Pittsburgh, U.S.A. the week February 22 – 26 , 2027.

This is a huge conference with mainly contributed talks via mini-symposia. One always finds interesting talks there.

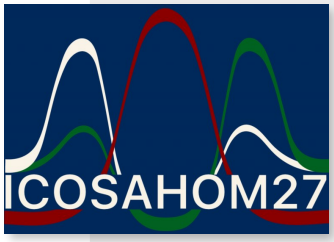
A coding week in Crete: SunHype

June 21 - 26, 2026 there will be a a coding and modeling week on hyperbolic equations held in Chania, Crete, called *SunHyp 2026*. It is organized by Elena Gaburro.

This is not a conference, but a coding week. Participant will gather around various pre-decided topics. One topic is by Giovanni Leidi. He plans to apply the Active Flux method to astrophysical applications. Another topic is by Wasilij Barsukow. He will devise evolution operators for 2-dim. nonlinear conservation laws to be used in the fully discrete Active Flux method.

From Würzburg *Nikhil Manoj*, Simon Krotsch and myself plan to attend.

ICOSAHOM 2027 in Milan



The International Conference on Spectral and High-Order Methods (ICOSAHOM) on numerics of differential equations takes place every two years. A few hundred people attend this conference, consisting mainly of contributed talks in the form of mini-symposia.

The next one, (*ICOSAHOM27*) will take place 5 - 9 July 2027 in Milan, organized by Paola F. Antonietti and others.

Upcoming scientific conferences

Click on the links and check where you might want to participate.

- March 23 - 27, **2026**: *Hyperbolic problems – a comprehensive approach*, in Würzburg, Germany, organized by Wasilij Barsukow, Simon Markfelder, Marlies Pirner, Fritz Röpke, Emil Wiedemann
- March 25 - 27, 2026: *5th European Conference on Non-Equilibrium Gas Flows* (NEGF26), in Toulouse, France, organized by Stéphane Colin among others
- March 30 - April 4, 2026: *International Conference on high-order nonlinear numerical methods for evolutionary PDE* (HONOM) in Trento, Italy, organized by Michael Dumbser
- May 4 - 8, 2026: *Sharing Higher order Advanced Research Know-how on Finite Volume* (SHARK-FV 2026) in Minho, Portugal, organized by Raphael Loubère and others
- May 25 - 29, 2026: *20th International Conference on Hyperbolic Problems (HYP2026)*: Theory, Numerics and Applications, in Stuttgart, Germany organized by Maja Lukacova und Christian Rhode
- June 1 - 5, 2026: *Perspectives on Multiphase Fluid Dynamics, Continuum Mechanics and Hyperbolic Balance Laws* (ProHyp2026), in Strasbourg, organized by Philippe Helluy and others
- June 7 - 13, 2026: Summer School *"Methods & Models of Kinetic Theory"*, in Pesaro (Italy), organized by Maria Groppi and others
- June 21 - 26, 2026: *Solving ultimate challenges and network building: a coding and modelling week on and beyond hyperbolic equations* (SunHyp 2026) in Chania, Crete, organized by Elena Gaburro
- July 19 - 24, 2026: *17th World Congress on Computational Mechanics & 10th European Congress on Computational Methods in Applied Sciences and Engineering*, in Munich, Germany
- Sept. 7 - 11, 2026: *12th International Conference on Numerical Methods for Multi-Material Fluid Flow* (MultiMat 2026) at Biarritz, France, organized by Raphael Loubère and others
- Feb. 22 – 26 , **2027**: *SIAM Conference on Computational Science and Engineering (SCE27)*, in Pittsburgh, Penn., USA.
- mid June 2027: Numerical Methods for Hyperbolic Problems (NumHyp 2027), in Verona 2027 organized by Elena Gaburro
- 5 - 9 July 2027: *International Conference on Spectral and High-Order Methods* (ICOSAHOM 2027), in Milan organized by Marco Verani, Paola Antonietti and others

Rémi Abgrall plans to visit us in June

Rémi Abgrall is a Humboldt Prize recipient for the academic year 2025/26. As part of his stay in Germany he plans to visit us in Würzburg sometime in June of 2026.