NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 6 (2025)

Kathrin Helmuth successfully defended her PhD thesis

On April 15 Kathrin Helmuth defended her PhD thesis. Her opponents were *Leon Bungert*, *Qin Li* and myself. Her lecture and the 45 minutes of answers afterwards were excellent. There was quite a crowd attending in a celebratory mood: a number family members of hers, and also our extended workgroup including former PhD students.

Now Kathrin will be off to her post-doc position at Caltech in Pasadena, Calif., which begins May 1.

Kathrin's doctoral hat was built by members of our work group.

On the bottom part of the hat hat, one sees fotos from Kathrin's many academic travels (HYP 2022, left and Zürich, right). Above that a neural network is shown.

Rémi Abgrall has been awarded the Humboldt Prize

The most prestigious award of the Humboldt Foundation for visiting researches from abroad is the *Humboldt Research Award* (aka the Humboldt prize). In former times BMW even gave a car to the Humboldt prize recipients.

Rémi Abgrall has been awarded the Humboldt Prize. He will spend time in Germany in the second half of 2025.

The research mentioned in the application for the prize, planned for his visit to Germany, is the Active Flux method. Eric Sonnendrücker (MPI near Munich) will be the primary host of Rémi. The application for this prize mentions us in Würzburg as a secondary host, which means Rémi plans to visit us.

Kathrin, after she heard the good news that she passed her PhD defense with flying colors.

This is the top of Kathrin's doctoral hat. One looks into a convex surface, with the minimum being the blue bottom in the center.

The yellow plane represents her mathematical life (e.g. the kinetic chemotaxis equation in the foreground).

The green plane represents her teaching (like a machine learning figure in the front right).

The dark green plane represents hobbies of hers (like playing the violin).

The blue plane at the bottom is her private life (the rings for getting married and the airplane taking her from Würzburg University, blue house, to Caltech, white house).

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Travel grant submitted to BayFrance

The free state of Bavaria has funds for Bavarian university researchers that want to collaborate with those in France. The grant covers travel costs only. It is called *BayFrance*.

Wasilij Barsukow and myself submitted a grant proposal to BayFrance, so we could visit each other, in order to collaborate on the Active Flux method. If awarded, there would be money for our groups to visit each other from mid-2025 to mid-2026.

Junming Duan submitted a Chinese research proposal

this is the logo of the predecessor recruitment plan, the *Thousand Talents Plan*

China has a so-called *National High-end Foreign Expert Recruitment Plan*. The idea is to recruit back to China top Chinese scientific talent, that works abroad. This program is geared towards young researchers. An award carries high prestige in China and comes with funding for research. In that sense it is a bit like a European Research Council (ERC) grant in Europe.

Our post-doc *Junming Duan*, who will begin at the Chinese University of Hong Kong in Shenzhen next year, has submitted an application for this grant. Good luck, Junming!
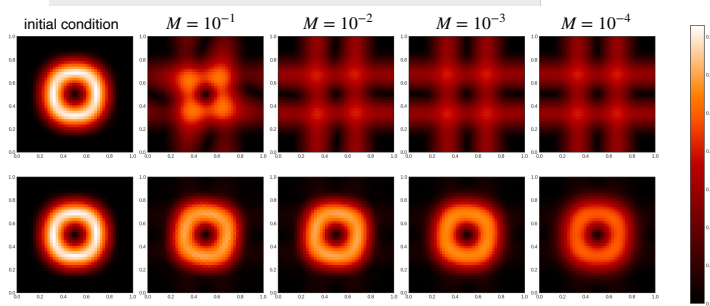
Upcoming scientific conferences
Click on the links and check where you might want to participate.

- June 9 - 13, 2025: *Numerical methods for hyperbolic problems 2025* (NumHyp25), in Darmstadt, organized by Jan Giesselmann and others

- June 25 - 27, 2025: *Mathematics of compressible fluids - analysis and numerics*, organized by Dominic Breit and Philipp Öffner in Clausthal, Germany

- June 24 - 27, 2025: *30th Biennial Conference in Numerical Analysis* in Glasgow, organized by persons from the University of Strathclyde, Glasgow

- July 13 - 18, 2025: *International Conference on Spectral and High-Order Methods* (ICOSAHOM), in Montreal, Canada

- July 28 - Aug. 1, 2025: *Applied Inverse Problems 2025* (AIP 2025), in Rio de Janeiro, Brazil

- Aug. 18 - December. 19, 2025: *Kinetic Theory: Novel Statistical, Stochastic and Analytical Methods*, at the Simons Laufer Mathematical Sciences Institute in Berkeley, California.

- Sept. 1 - 5, 2025: *European Conference on Numerical Mathematics and Advanced Applications* (ENUMATH 2025) in Heidelberg, organized by Barbara Wohlmuth among others

- Sept. 14 - 20, 2025: *Hirschegg Workshop*, in the Kleinwalsertal, Austria, organized by Ferdinand Thein and Gerald Warnecke

- Sept. 24 - 26, 2025: *Workshop on Hyperbolic Problems*, in Nürnberg, organized by Emil Wiedemann and Nicola De Nitti

- November 17 – 20, 2025: *SIAM Conference on Analysis of Partial Differential Equations* (PD25), Pittsburgh, Pennsylvania, USA

- December 6 - 8, 2025: Workshop on Active Flux, in Shenzhen, China, organized by Rémi Abgrall and Alexander Kurganov

- March 23 - 27, **2026**: *Hyperbolic problems – a comprehensive approach*, in Würzburg, Germany, organized by Wasilij Barsukow, Simon Markfelder, Marlies Pirner, Fritz Röpke, Emil Wiedemann

- 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

- sometime in 2026: Finite Volume and Complex Applications 11, in Münster, Germany

A simulation of the 2-d compressible Euler equations on a 40x40 grid. The norm of the velocity of the stationary Gresho vortex is shown after one rotation at consecutively lower Mach numbers M. The top row uses the so-called Suliciu approximate Riemann solver, that clearly gives wrong answers. The bottom row is the low Mach compliant modification (from Berthon, Klingenberg, Zenk, 2020).

News about a submitted thesis: Annika Gutzeit submitted her Master thesis

Annika Gutzeit submitted her Master thesis: *A low Mach relaxation method for the Euler equations*.

In her Master thesis, following the publication *Berthon, Klingenberg, Zenk 2020*, she describes this low Mach relaxation method and she also implemented the numerical method.