

NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 16 (2022)

Paper with Philippe Helluy accepted

The paper [Hubert Baty, Florence Drui, Emmanuel Franck, Philippe Helluy, Christian Klingenberg, Lukas Thanhäuser: "A robust and efficient solver based on kinetic schemes for Magnetohydrodynamics \(MHD\) equations"](#), *Applied Mathematics and Computation*, vol. 440 (2023) has been accepted for publication.

We began to work on this in 2017 (with Lukas Thanhäuser). We had finished the Würzburg part of the work in 2018. Only in 2020 the the Strasbourg part of the work was finished and submitted. It took until now for it to be published.

Popular science paper with Kathrin accepted

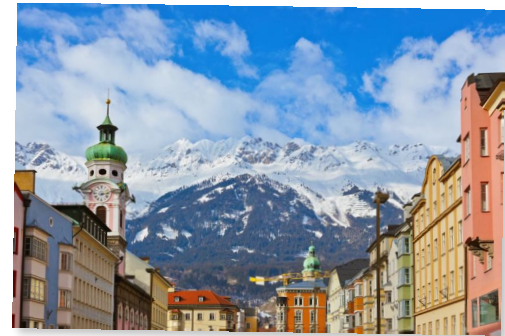
The paper [Kathrin Hellmuth, Christian Klingenberg, "Route planning for bacteria"](#), *Snapshots of modern mathematics from Oberwolfach*, No. 12 (2022) has been published.

The journal [Snapshots of modern mathematics from Oberwolfach](#) disseminates ideas of former participants at an Oberwolfach conference in an understandable way. Kathrin's lecture at an Oberwolfach workshop of Prof. Lukacova has now been turned into this paper.

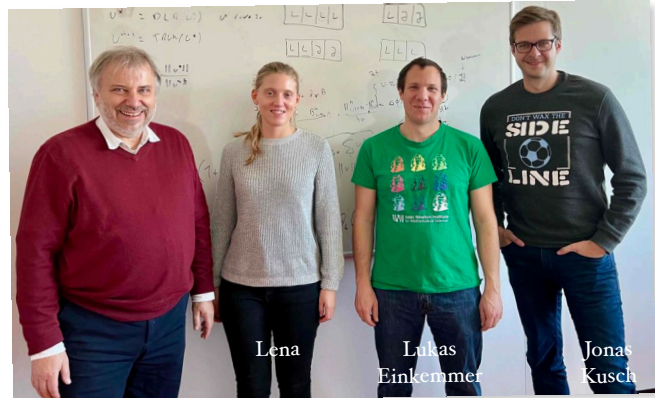
Visit to Innsbruck University

Last week Lena Baumann und myself visited the beautiful city of Innsbruck (Austria). This was a working visit with [Lukas Einkemmer](#) and his postdoc [Jonas Kusch](#) at Innsbruck University.

We worked on designing an efficient algorithm for kinetic equations (dynamical low rank), which we hope eventually will be useful in solving inverse problems for kinetic equations.



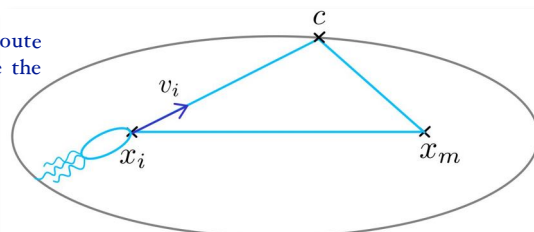
view from the market square in Innsbruck



My student seminar series

Bachelor and Master students have to take a seminar, where the professor assigns them a paper or a chapter in a research monograph, that they have to present in a lecture. This semester 18 students signed up for my seminars, [see here](#). The topics cover a broad range, like stochastic integration, numerics of conservation laws and neural networks.

Bacterium in the route planning setting (see the paper for details)



Paper with Marlies accepted

The paper [G. Bae, C. Klingenberg, M. Pirner, S. Yun: "BGK model for two-component gases near a global Maxwellian"](#), *SIAM Journal on Mathematical Analysis* (2023) has been accepted for publication.

This is an ongoing collaboration with [Seok-Bae Yun \(Korea\)](#), where existence results for non-linear kinetic equations are proven.

Finite Volumes for Complex applications

In October 2023 in Strasbourg the triennial conference [Finite Volumes for Complex applications](#) will be held. Here a paper has to be submitted **beforehand**, and if accepted, it can be presented at this conference.

Annual GAMM meeting 2023

The German applied math society [GAMM](#) will have its [2023 yearly meeting](#) in Dresden. Lena Baumann plans to participate.

Slides from NumKin 2022

Here are links to slides by [Lukas Einkemmer](#) and [Bruno Després](#) of Eric Sonnendrücker's workshop in November [NumKin 2022](#).

Humboldt fellowship application by Junming Duan

The Humboldt foundation gives prestigious fellowships to young scientists from abroad to visit a German university for up to two years.

[Junming Duan](#) has applied to visit us for two years. If accepted, he will arrive in fall of 2023. He presently is a postdoc with [Jan Hesthaven](#) on machine learning techniques for conservation laws.

Upcoming scientific conferences

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

- Dec. 12 - 16, 2022: [Kinetic and hyperbolic equations: modeling, analysis and numerics](#), in Toulouse (France), organized among others by Francis Filbet
- Feb. 26 - March 3, 2023: [SIAM Conference on Computational Sciences and Engineering or SIAM CSE23](#), held in Amsterdam, organized among others by Hans deSterck
- March 29 - 31, 2023: [4th European conference on Non-equilibrium gas flows](#), in Eindhoven, Netherlands
- May 22 - 26, 2023: [Sharing Higher-order Advanced Research Know-how on Finite Volume \(SHARK-FV\)](#) in Portugal, organized by Raphael Loubère and others
- May 30 - June 3, 2023: [Annual meeting of the Gesellschaft für angewandte Mathematik und Mechanik \(GAMM\)](#) in Dresden,
- June 26 - 30, 2023: [NumHyp 2023 \(Numerical methods for hyperbolic problems\)](#) in Bordeaux, France, organized by Raphael Loubère and others
- Sept. 4 - 8, 2023: [European Conference on Numerical Mathematics and Advanced Applications \(ENUMATH\)](#), in Lisbon, Portugal
- Oct. 30 - Nov. 3, 2023: [Finite Volumes for Complex Applications in Strasbourg](#) in Strasbourg, France, organized by Philippe Helluy and others
- summer of 2024: [International Conference on Hyperbolic Problems: Theory, Numerics and Applications \(HYP 2024\)](#) in Shanghai, China, organized by Shi Jin

New!

New!

Christmas party

Let me know if you will come to the year's end party next Sunday.

Year-end party of our work-group

You are cordially invited on
Sunday, Dec. 18, 2022 at 5 pm
 to my house at Unterer Neubergerweg 17B in Würzburg.

Please bring something to eat. I will provide *Glühwein* and a pumpkin pie.

Try to think of something that was *special for you* this year. Then prepare a short (~ 5 minute) presentation and some slides. Email me your slides beforehand for your presentation during the year-end party.

Do let me know by email whether you will come or not.

Christian Klingenberg

Emil Wiedemann moves to Erlangen

[Emil Wiedemann](#) (presently at Ulm university) will move to Friedrich-Alexander-Universität Erlangen-Nürnberg in March 2023. His work is related to [Simon Markfelder](#)'s work.