NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 2 (2022)

Postponed: end-of-semester party

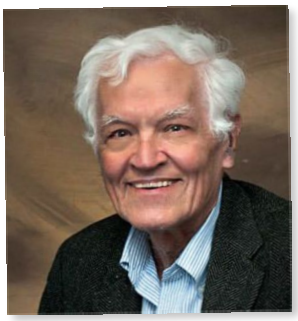
Usually, on the last day of teaching we meet for an end-of-semester party. This semester this would have been on February 11, 2022.

Unfortunately the Corona rules only allow for a meeting of up to 10 persons. Hence we shall postpone this party until this rule disappears. Let us hope this will be soon.

Our seminar series on hyperbolic equations continues

Our online seminar series on hyperbolic equations will continue:

- Feb. 18: tba
- Feb. 25: *Alina Chertock* (Raleigh, NC, USA)
- Mar. 4: tba
- Mar. 11: *Eitan Tadmor* (College Park, MD, USA)
- Mar. 18: *Li Wang* (Minneapolis, USA), "Some new perspectives on developing asymptotic preserving schemes for kinetic equations"
- Mar. 25: *Jingwei Hu* (Seattle, USA), "High order strong stability preserving and asymptotic preserving multi-derivative IMEX Runge-Kutta methods"
- Apr. 1: *Barbara Re* (Torino, Italy), "On computing weakly compressible multi-phase flows"
- Apr. 8: *Giacomo Dimarco* (Ferrara, Italy), "High order numerical methods for the Boltzmann equation and related problems"
- Apr. 15: no seminar, Easter break
- Apr. 22: *Jim Glimm* (Stony Brook, NY, USA), "Admissibility condition for the fluid Navier–Stokes and Euler equations"
- Apr. 29 tba
- May 6: *Randy LeVeque* (Seattle, USA)
- May 13: *Martin Frank* (Karlsruhe, Germany), "Structure-preserving artificial neural networks for moment closures"



Jim Glimm

Randy LeVeque

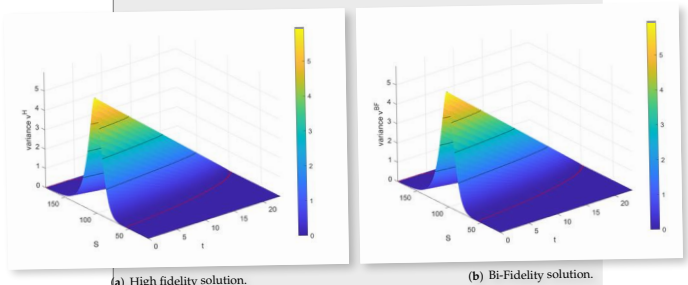
God's tech support

Have a look at this hilariously funny spoof on Corona, *click here*.

Paper by Kathrin Hellmuth accepted

The paper *Hellmuth, K, Klingenberg, C.: "Computing Black Scholes with uncertain volatility - a machine learning approach, Mathematics, vol. 10 (3), 489, special issue "Numerical Analysis with Applications in Machine Learning", ed. P. Tsompanopoulou (2022)* has been accepted for publication.

This work comes out of her Master thesis. It uses a bi-fidelity approach to determine the volatility of the Black-Scholes equations.



(a) High fidelity solution. (b) Bi-Fidelity solution.

The two numerical solutions are quite similar. The one on the left was computationally more expensive than the one on the right (found by a bi-fidelity approach).

Upcoming scientific conferences

Go ahead and click the links to check where you might want to participate.

- Jan. 10 - June 24, 2022: *Frontiers in kinetic theory: connecting microscopic to macroscopic scales - KineCon 2022* , a one semester program organized at the Newton Institute at Cambridge University with 5 one week workshops in this time

- Feb. 14 - 18: *Rigorous analysis of incompressible fluid models and turbulence* organized at the Newton Institute by Edriss Titi et. al.

- Mar. 7 - 9, 2022: *Workshop on inverse problems in biology*, at the Poincaré Institute in Paris, co-organized by Marie Doumic

- March 7 - 11, 2022: *Perspectives on Multiphase Fluid Dynamics, Continuum Mechanics and Hyperbolic Balance Laws* in Luminy near Marseille, France, organized among others by Dumbser and Warnecke

- March 14 - 18, 2022: *SIAM Conference on Analysis of Partial Differential Equations* ***online***, organized by Sid Mishra and Emil Wiedemann

- May 16 - 20, 2022: *The Boltzmann Equations: in the trail of Torsten Carlemann*, near Stockholm, Sweden

- April 4 - 8, 2022: *HIGH ORDER NONLINEAR NUMERICAL METHODS FOR EVOLUTIONARY PDEs: THEORY AND APPLICATIONS (HONOM)* in Braga, Portugal, organized by Raphael Loubère und Stephane Clain

- April 10 - 15, 2022: *Structure preserving discretizations*, in Oberwolfach, organized by Bruno Després, Michael Dumbser, myself

- May 23 - 29, 2022: *Sharing Higher-order Advanced Research Know-how on Finite Volume (SHARK-FV)* in Portugal, organized by Raphael Loubère und Stephane Clain

- June 12 - 18, 2022: *Summer School on "Methods and models of kinetic theory"* organized by Marzia Bisi (Parma) among others

- June 20 - 25: HYP2022: *18th International Conference on Hyperbolic Problems, Theory, Numerics, Applications* - Part 2 (formerly HYP 2020), in Malaga, Spain, organized by Carlos Pares

- June 19 - 24, 2022 *"Numerical methods for kinetic equations"* a summer school by *Eric Sonnendrücker* and *Lukas Einkemmer* in the alps in Italy

- June 27 - July 1, 2022: *Hyperbolic balance laws & beyond*, in Magdeburg, organized by Helzel and Lukacova

- July 18 - 22, 2022: *When Kinetic Theory meets Fluid Mechanics*, in Zürich, organized among others by Alexis Vasseur

- Aug. 22 - 26, 2022: *10th International Conference on Numerical Methods for Multi-Material Fluid Flow (MULTIMAT 2021)* in Zürich, organized by Remi Abgrall and others

- Sept. 12 - 14, 2022: *Nils Henrik Risebro birthday conference* in Oslo, organized among others by Fjordholm, Holden, Mishra

- Oct. 9 - 14, 2022: *Computation of hyperbolic and related PDEs: A conference in honor of Remi Abgrall*, organized by Sid Mishra at ETH Zurich on Monte Verità (Ascona, Switzerland)