

# Adrian M. Ruf – Curriculum Vitae (July 22, 2021)

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## Education/Employment

- Since 2021    **Lecturer**, ETH Zürich, Switzerland
- Since 2019    **Postdoctoral researcher**, ETH Zürich, Switzerland  
Mentor: Prof. Siddhartha Mishra
- 2019         **PhD in Mathematics**, University of Oslo, Norway  
Marie Skłodowska-Curie research position  
Supervisors: Prof. Nils Henrik Risebro and Prof. Kenneth Karlsen
- 2016         **MSc in Mathematics**, Technical University of Berlin, Germany  
Supervisor: Prof. Etienne Emmrich
- 2013         **BSc in Mathematics**, Technical University of Berlin, Germany

## Publications

- [8] J. Badwaik, C. Klingenberg, N.H. Risebro, and A.M. Ruf. Multilevel Monte Carlo finite volume methods for random conservation laws with discontinuous flux. *M2AN Math. Model. Numer. Anal.*, 55: 1039–1065, (2021)  
[doi.org/10.1051/m2an/2021011](https://doi.org/10.1051/m2an/2021011)
- [7] U.S. Fjordholm and A.M. Ruf. Second-order accurate TVD numerical methods for nonlocal non-linear conservation laws. *SIAM J. Numer. Anal.*, 59(3): 1167–1194, (2021)  
[doi.org/10.1137/20M1360979](https://doi.org/10.1137/20M1360979)
- [6] A.M. Ruf. Flux-stability for conservation laws with discontinuous flux and convergence rates of the front tracking method. *IMA J. Numer. Anal.*, (2021)  
[doi.org/10.1093/imanum/draa101](https://doi.org/10.1093/imanum/draa101)
- [5] J. Badwaik and A.M. Ruf. Convergence rates of monotone schemes for conservation laws with discontinuous flux. *SIAM J. Numer. Anal.*, 58(1): 607–629, (2020)  
[doi:10.1137/19M1283276](https://doi.org/10.1137/19M1283276)
- [4] N.H. Risebro and A.M. Ruf. Numerical investigations into a model of partially incompressible two-phase flow in pipes. *SeMA*, 77: 143–159 (2019)  
[doi:10.1007/s40324-019-00207-9](https://doi.org/10.1007/s40324-019-00207-9)
- [3] A.M. Ruf, E. Sande, and S. Solem. The optimal convergence rate of monotone schemes for conservation laws in the Wasserstein distance. *J. Sci. Comput.*, 80: 1764–1776, (2019)  
[doi:10.1007/s10915-019-00996-1](https://doi.org/10.1007/s10915-019-00996-1)
- [2] J. Ridder and A.M. Ruf. A convergent finite difference scheme for the Ostrovsky–Hunter equation with Dirichlet boundary conditions. *Bit Numer. Math.*, 59: 775–796, (2019)  
[doi:10.1007/s10543-019-00746-7](https://doi.org/10.1007/s10543-019-00746-7)
- [1] A.M. Ruf. Convergence of a full discretization for a second-order nonlinear elastodynamic equation in isotropic and anisotropic Orlicz spaces. *Z. Angew. Math. Phys.*, 68: 118, (2017)  
[doi:10.1007/s00033-017-0863-z](https://doi.org/10.1007/s00033-017-0863-z)

## Preprints

- [9] S. Mishra, D. Ochsner, A. M. Ruf, and F. Weber. Well-posedness of Bayesian inverse problems for hyperbolic conservation laws. (2021)  
[arxiv.org/abs/2107.09701](https://arxiv.org/abs/2107.09701)

## Grants and Scholarships

- 2021 Robert Gnehm Grant, ETH Zürich, Switzerland
- 2020 Research-in-Pairs Grant, Oberwolfach Research Institute for Mathematics, Germany
- 2019 Scholarship for NUMHYP2019, University of Málaga, Spain
- 2018 Scholarship for an academic secondment (3 months), ETH Zürich, Switzerland
- Scholarship for HYP2018, Penn State University, USA

## Invited talks

- 2021 *Stability and error estimates for conservation laws with discontinuous flux and application to uncertainty quantification and inverse problems*  
Karlsruhe Institute of Technology, Germany
- Nonlocal conservation laws: improved regularity and higher-order numerical methods*  
Carnegie Mellon University, Pittsburgh, USA
- Convergence rates of numerical methods for conservation laws with discontinuous flux*  
TIFR Centre for Applicable Mathematics, Bangalore, India
- Numerical methods for conservation laws with nonlocal and discontinuous fluxes*  
University of Freiburg, Germany
- 2020 *Convergence rates of numerical methods for conservation laws with discontinuous flux*  
NTNU Trondheim, Norway
- Flux-stability for conservation laws with discontinuous flux and convergence rates of the front tracking method*  
University of Oslo, Norway
- 2019 *Convergence rates of monotone schemes in the Wasserstein distance*  
Julius Maximilian University of Würzburg, Germany
- Second-order numerical methods for nonlocal conservation laws*  
Polytechnic University of Bari, Italy
- Second-order numerical methods for nonlocal conservation laws*  
ETH Zürich, Switzerland

## Contributed talks

- 2021 *Flux-stability for conservation laws with discontinuous flux and convergence rates of the front tracking method*  
Sayas Numerics Seminar, USA
- 2020 *Recent advances in numerical analysis of conservation laws with discontinuous flux*  
Graduate Colloquium in Applied Mathematics  
ETH Zürich, Switzerland

- 2019 *Convergence rates of monotone schemes for conservation laws with discontinuous flux*  
 UiO PDE Seminar  
 University of Oslo, Norway
- Second-order numerical methods for nonlocal conservation laws*  
 NumHyp2019  
 University of Málaga, Spain
- 2018 *A second-order method for nonlocal conservation laws*  
 BIT Circus  
 Aalto University, Finland
- The Ostrovsky–Hunter equation with Dirichlet boundary conditions*  
 HYP2018  
 Penn State University, USA
- Multiphase flow in pipelines*  
 Modcompshock Midterm Review Meeting  
 ETH Zürich, Switzerland

## Invited research visits

- 2019 Julius Maximilian University of Würzburg, Germany,  
 with Jayesh Badwaik (1 week)
- Polytechnic University of Bari, Italy,  
 with Prof. Giuseppe Coclite (1 week)
- 2018 ETH Zürich, Switzerland,  
 with Prof. Siddhartha Mishra (3 months)

## Academic activities

- 2020 **ETH Zürich, Switzerland**  
*Instructor*  
 Instructed newly hired teaching assistants at the TA Training Day (spring and fall)
- 2019 **Simula Research Laboratory, Fornebu, Norway**  
*Teaching assistant*  
 Taught the course ‘Communication Scientific Research’ for PhD students and postdocs
- 2010 - **Technical University Berlin, Germany**  
 2016 *Teaching assistant*  
 Taught courses in Functional Analysis, Calculus and Calculus for Engineers
- 2015 - **Matheon Research Center, Berlin, Germany**  
 2016 *Student assistant*  
 Organized the Matheon advent calendar for students, coordinated and revised the calendar puzzles and solutions
- 2015 **TUBS, Berlin, Germany**  
*Coordinating assistant*  
 Coordinated the 79th annual meeting of the DPG

- 2011 - **Unitus project Technical University of Berlin, Germany**  
 2013 *Student assistant*
- Created and improved activity oriented learning materials used in mathematical courses for engineers, e.g. supporting teaching material, online platform Mumie, guidelines for teaching assistants, exam difficulty analyses
- 2009 - **Uniseminar Education AG, Switzerland**  
 2011 *Freelancer*
- Created various mathematical teaching materials for the courses Mathematics I & II and Mathematical economics

## Refereeing activity

Referee for: SIAM Journal of Numerical Analysis  
 IMA Journal of Numerical Analysis  
 ESAIM: Mathematical Modelling and Numerical Analysis  
 Zeitschrift für angewandte Mathematik und Physik  
 Calcolo  
 Journal of Elliptic and Parabolic Equations  
 International Journal of Computational Methods

## Supervision

Supervised the semester thesis of D. Ochsner, 2020, ETH Zürich  
 Supervised two students on their semester projects, 2018, University of Oslo

## Teaching experience

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|------|---------|--|
| 2021 | Fall:   | Lectures for ‘Statistical and Numerical Methods for Chemical Engineers’ (ETH Zürich–scheduled) |
|      | Spring: | Lectures for ‘Numerical Methods for Hyperbolic PDEs’ (ETH Zürich)                              |
| 2020 | Spring: | Organization of ‘Numerical Methods for Physicists’ (ETH Zürich)                                |
| 2019 | Spring: | Exercise sessions for ‘Communicating Scientific Research’ (Simula)                             |
| 2015 | Fall:   | Tutorials for ‘Calculus I for Mathematicians’ (TU Berlin)                                      |
|      | Spring: | Tutorials for ‘Functional Analysis I’ (TU Berlin)  |
| 2014 | Fall:   | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
|      | Spring: | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
| 2013 | Fall:   | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
|      | Spring: | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
| 2012 | Fall:   | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
|      | Spring: | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
| 2011 | Fall:   | Tutorials for ‘Calculus I for Engineers’ (TU Berlin)   |
|      | Spring: | Tutorials for ‘Calculus II for Mathematicians’ (TU Berlin)                                     |
| 2010 | Fall:   | Tutorials for ‘Calculus I for Mathematicians’ (TU Berlin)                                      |

## Languages

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| German    | First language  |
| English   | Proficient      |
| Finnish   | Basic knowledge |
| Norwegian | Basic knowledge |

## References

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Prof. Ulrik Skre Fjordholm  
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Prof. Nils Henrik Risebro  
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