

Prof. Dr. rer. nat.

## Thomas Richter

Numerische Mathematik in den Anwendungen

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### Personal data

Born June 24, 1976, Marl, German citizen

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### Scientific career

2016 - present	W3 Full Professor, Analysis and Numerics, Universität Magdeburg
2015 - 2021	Guest Professor, Interdisciplinary Center for Scientific Computing, Heidelberg
2015 - 2016	W2 Professor, Department Mathematik, Universität Erlangen-Nürnberg
2010 - 2015	Assistant Professor (W1), Universität Heidelberg
2008 - 2010	Lecturer, Institute for Applied Mathematics, Universität Heidelberg
2007 - 2008	Research Scholar, Aerospace Computational Design Laboratory, M.I.T., USA
2001 - 2006	Research assistant, Universität Heidelberg

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### Education

2014	Positive evaluation of Assistant-Professorship, Universität Heidelberg
2005	PhD in Mathematics, Universität Heidelberg
2001	Diploma in Mathematics, Universität Heidelberg

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### Research interests (substantiated by journal publications)

Adaptive finite elements, error estimation and optimization for complex multiphysics problems; Multiscale methods in space and time; PDE's and deep neural networks; Parallel Newton-multigrid methods; Fluid-structure interactions and complex flow problems; Software development.

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### Further academic activities

2020 - present	Director of the Institute for Analysis and Numerics, OVGU Magdeburg
2020 - present	Member of the Senate committee for IT
2019 - present	Head of examinations board and study board for the B.Sc. program Mathematikingenieur/In, OVGU Magdeburg
2017 - present	Member of the editorial board <i>Journal of Mathematical Fluid Mechanics</i> (Springer)
2014 - present	Organization of 7 international conferences and 9 international summerschools. In 2022 <a href="http://www.pec3.org/cusco2022">www.pec3.org/cusco2022</a> and <a href="http://www.pec3.org/school2022">www.pec3.org/school2022</a>

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### Supervised theses

2011 - 2022	6 finished / 6 ongoing PhD projects, 1 finished / 1 ongoing projects as 2nd advisor
2012 - 2021	Served in 10 international PhD committees
2011 - 2022	22 completed Master projects as first advisor
2011 - 2022	14 completed Bachelor projects as first advisor

## Projects with third-party funding (last 5 years)

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2021 - 2027	<i>Schmidt Futures</i> <b>SASIP: The Scale-Aware Sea Ice Project</b> , PI
2019 - 2022	<i>Joint Sino-German Programme DFG-NSFC</i> <b>Simulation and Analysis of temporal multiscale problems with partial differential equations</b> , PI
2019 - 2022	<i>Fachbezogene Partnerschaften mit Hochschulen in Entwicklungsländern</i> <b>PeCCC - Peruvian Competence Center for Scientific Computing</b> , PI and coordinator
2018 - 2019	<i>Industry project with Siemens</i> <b>Adaptivity and Multigrid</b> , PI
2018 - 2026	<i>DFG Research Training School</i> <b>Mathematical Complexity Reduction</b> , PI
2016 - 2020	<i>BMBF</i> <b>Simulation and Optimization of Blood Flows</b> , PI and coordinator
2014 - 2018	4 <i>DAAD Summerschools</i> in Peru, Brazil and Cuba Coordinator.
2013 - 2016	<i>BMBF</i> <b>Simulation and Optimization of Extreme Flows</b> , PI and coordinator

## Invited plenary talks (selected out of 22 invited plenary talks)

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06/2022	<i>ECCOMAS 2022 (Semi-Plenary)</i> , Oslo
08/2021	<i>X Congreso Internacional De Matemática Aplicada Y Computacional</i> , Universidad Nacional Agraria de la Selva, Perú
09/2019	<i>ENUMATH</i> , Egmond aan Zee, Netherlands
06/2018	<i>5th International Workshop on Modeling, Analysis, Simulations, and Applications of Inter-Facial Dynamics and FSI Problems (IMA-FSI)</i> , Sanya, China
11/2016	<i>Workshop on Multi-Phase Flow</i> , Waseda University, Tokyo (two main lectures)
12/2015	<i>Geometric Partial Differential Equations</i> , MFO Oberwolfach
06/2015	<i>International IFCAM Workshop on Control and Numerics for Fluid-Structure Interaction Problems</i> , TIFR-Centre for Applicable Mathematics, Bengaluru, Indien

## 10 Selected Publications

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(out of 3 books, 55 journal articles (+4 submitted), 7 software packages, 33 book chapters and proceedings)

- [1] N. Margenberg, D. Hartmann, C. Lessig, T. Richter: *A neural network multigrid solver for the Navier-Stokes equations*, Journal of Computational Physics 460, e-id 110983, 2022 <https://doi.org/10.1016/j.jcp.2022.110983>
- [2] S. Frei, T. Richter: *Efficient approximation of flow problems with multiple scales in time*, SIAM Multiscale Modeling and Simulation 18(2), pp. 942–969, 2020 <https://doi.org/10.1137/19M1258396>
- [3] F. Sonner, T. Richter: *Second order pressure estimates for the incompressible Navier-Stokes Equations*, SIAM J. Numer. Anal. 58, pp. 375-409, 2020 <https://doi.org/10.1137/18M1234813>
- [4] L. Failer, T. Richter: *A newton multigrid framework for optimal control of fluid-structure interactions*, Optimization and Engineering 22(4), 2021 <https://doi.org/10.1007/s11081-020-09498-8>
- [5] C. Mehlmann, T. Richter: *A modified global Newton solver for viscous-plastic sea ice models*, Ocean Modeling 116, pp. 96-107, 2017 <https://doi.org/10.1016/j.ocemod.2017.06.001>
- [6] T. Richter: *Fluid-structure Interactions*, LNCSE 118, Springer, 2017 <https://doi.org/10.1007/978-3-319-63970-3>
- [7] T. Richter and T. Wick: *Variational Localizations of the Dual Weighted Residual Method*, Journal of Comp. and Appl. Math., Vol. 279, p.192–208, 2015 <https://doi.org/10.1016/j.cam.2014.11.008>
- [8] S. Frei and T. Richter: *A locally modified parametric finite element method for interface problems*, SIAM J. Numer. Anal., Vol. 52, pp. 2315–2334, 2014 <https://doi.org/10.1137/130919489>
- [9] T. Richter: *A Fully Eulerian Formulation for Fluid-Structure-Interaction Problems*, J. of Comp. Physics 233, pp. 227-240, 2013 <https://doi.org/10.1016/j.jcp.2012.08.047>
- [10] T. Richter, T. Wick: *Finite Elements for Fluid-Structure Interaction in ALE and Fully Eulerian Coordinates*, CMAME 199, pp. 2633-2642, 2010 <https://doi.org/10.1016/j.cma.2010.04.016>