

DR. MARVIN FRITZ

PERSONAL DATA

PLACE, DATE OF BIRTH: Heilbronn, Germany | 28 July 1992
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WEBSITE: <https://fritz-io.github.io/>
PREPRINTS: http://arxiv.org/a/fritz_m_1

EDUCATION

2018 – 2022	DOCTORAL STUDIES (DR. RER. NAT.) IN MATHEMATICS University: Technical University of Munich Thesis: Well-posedness of nonlocal and mixed-dimensional phase-field models applied to tumor growth Supervisor: Prof. Dr. Barbara WOHLMUTH Grade: CUM LAUDE
2015 – 2017	MASTER OF SCIENCE (M.SC.) IN MATHEMATICS University: Technical University of Munich Thesis: The recent existence proofs of the Navier-Stokes equations Supervisor: Prof. Dr. Hans-Wilhelm ALT Grade: MAGNA CUM LAUDE (1.2)
2012 – 2015	BACHELOR OF SCIENCE (B.SC.) IN MATHEMATICS University: Technical University of Munich Thesis: On the stability of relative equilibrium solutions in vortex dynamics Supervisor: Prof. Dr. Jürgen SCHEURLE Grade: CUM LAUDE (2.2)

WORK EXPERIENCE

01/18 – 06/22	TECHNICAL UNIVERSITY OF MUNICH Job: Researcher at the Chair for Numerical Mathematics Task: Analysis and numerical treatment of nonlinear evolutionary PDEs
06/18 – 07/18	UNIVERSITY OF TEXAS AT AUSTIN Job: Guest researcher at the Institute of Computational Engineering and Sciences, invited by Prof. J. Tinsley Oden Task: Analysis and numerical treatment of tumor growth models
03/16 – 09/17	TECHNICAL UNIVERSITY OF MUNICH Job: Student assistant Task: Tutoring students and correcting assignments in Analysis and Linear Algebra for Computer Scientists
03/16 – 04/16	SERLO EDUCATION, Munich Job: Internship Task: Building a learning platform for students with Javascript
08/16 – 09/16	OCÉ PRINTING SYSTEMS, Poing Job: Internship Task: Numerical treatment of the Nernst-Planck-Poisson equation, describing the evolution of liquid toners in an electrical field

SCHOLARSHIPS AND AWARDS

Nov. 2020 Best Journal Article of 2019 in M3AS (World Scientific)
JUL. 2018 Best Study Award by HURWITZ-GESELLSCHAFT
2016–2017 DEUTSCHLANDSTIPENDIUM

PUBLICATIONS

- 2022 | EQUIVALENCE BETWEEN A TIME-FRACTIONAL AND AN INTEGER-ORDER GRADIENT FLOW: THE MEMORY EFFECT REFLECTED IN THE ENERGY
Co-Authors: Ustim Khristenko, Barbara Wohlmuth
Journal: submitted
Link: <https://arxiv.org/abs/2106.10985>
- 2021 | A 1D-0D-3D COUPLED MODEL FOR SIMULATING BLOOD FLOW AND TRANSPORT PROCESSES IN BREAST TISSUE
Co-Authors: Tobias Köppl, J. Tinsley Oden, Andreas Wagner, Barbara Wohlmuth, Chengyue Wu
Journal: International Journal for Numerical Methods in Biomedical Engineering
Link: <https://doi.org/10.1002/cnm.3612>
- 2022 | TIME-FRACTIONAL CAHN-HILLIARD EQUATION: WELL-POSEDNESS, DEGENERACY, AND NUMERICAL SOLUTIONS
Co-Authors: Mabel L. Rajendran, Barbara Wohlmuth
Journal: Computer & Mathematics with Applications
Link: <https://doi.org/10.1016/j.camwa.2022.01.002>
- 2021 | MODELING AND SIMULATION OF VASCULAR TUMORS EMBEDDED IN EVOLVING CAPILLARY NETWORKS
Co-Authors: Prashant K. Jha, Tobias Köppl, J. Tinsley Oden, Andreas Wagner, Barbara Wohlmuth
Journal: Computer Methods in Applied Mechanics and Engineering
Link: <https://doi.org/10.1016/j.cma.2021.113975>
- 2021 | ON A SUBDIFFUSIVE TUMOUR GROWTH MODEL WITH FRACTIONAL TIME DERIVATIVE
Co-Authors: Christina Kuttler, Mabel L. Rajendran, Laura Scarabosio, Barbara Wohlmuth
Journal: IMA Journal of Applied Mathematics
Link: <https://doi.org/10.1093/imamat/hxab009>
- 2020 | ANALYSIS OF A NEW MULTISPECIES TUMOR GROWTH MODEL COUPLING 3D PHASE-FIELDS WITH A 1D VASCULAR NETWORK
Co-Authors: Prashant K. Jha, Tobias Köppl, J. Tinsley Oden, Barbara Wohlmuth
Journal: Nonlinear Analysis: Real World Applications
Link: <https://doi.org/10.1016/j.nonrwa.2021.103331>
- 2019 | LOCAL AND NONLOCAL PHASE-FIELD MODELS OF TUMOR GROWTH AND INVASION DUE TO ECM DEGRADATION
Co-Authors: Ernesto Lima, Vanja Nikolic, J. Tinsley Oden, Barbara Wohlmuth
Journal: Mathematical Models and Methods in Applied Sciences
Link: <https://doi.org/10.1142/S0218202519500519>
- 2019 | ON THE UNSTEADY DARCY-FORCHHEIMER-BRINKMAN EQUATION IN LOCAL AND NONLOCAL TUMOR GROWTH MODELS
Co-Authors: Ernesto Lima, J. Tinsley Oden, Barbara Wohlmuth
Journal: Mathematical Models and Methods in Applied Sciences
Link: <https://doi.org/10.1142/S0218202519500325>
- 2018 | WELL-POSEDNESS AND NUMERICAL TREATMENT OF THE BLACKSTOCK EQUATION IN NONLINEAR ACOUSTICS
Co-Authors: Vanja Nikolić, Barbara Wohlmuth
Journal: Mathematical Models and Methods in Applied Sciences
Link: <https://doi.org/10.1142/S0218202518500550>

TALKS AND CONFERENCES

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| 04/22 | <p>INTCOMSIN (INTERFACES, COMPLEX STRUCTURES, AND SINGULAR LIMITS)</p> <p>Place: Universität Regensburg</p> <p>Talk: Well-posedness of mixed-dimensional and nonlocal phase-field models of Cahn-Hilliard type applied to tumor growth</p> |
| 09/21 | <p>DMV-ÖMG ANNUAL CONFERENCE</p> <p>Place: Universität Passau</p> <p>Talk: On the time-fractional Cahn-Hilliard equation applied to tumor growth</p> |
| 07/21 | <p>16TH U.S. NATIONAL CONGRESS ON COMPUTATIONAL MECHANICS</p> <p>Place: University of Illinois at Urbana-Champaign</p> <p>Talk: Phase field models of the growth of tumors embedded in an evolving vascular network: Dynamic 1D-3D models of angiogenesis</p> |
| 07/21 | <p>YIC (VI ECCOMAS YOUNG INVESTIGATORS CONFERENCE) 2021</p> <p>Place: Universitat Politecnica de Valencia</p> <p>Talk: Analysis of a mixed-dimensional tumor growth model</p> |
| 03/21 | <p>SIAM CONFERENCE ON COMPUTATIONAL SCIENCE AND ENGINEERING</p> <p>Place: Fort Worth</p> <p>Talk: Analysis of the time-fractional Cahn-Hilliard equation</p> |
| 08/20 | <p>SMB (SOCIETY FOR MATHEMATICAL BIOLOGY) 2020 ANNUAL MEETING</p> <p>Place: Universität Heidelberg</p> <p>Talk: Analysis of a multispecies tumor growth models coupling 3D phase-fields with a 1D vascular network</p> |
| 03/20 | <p>INTERNATIONAL WORKSHOP ON RECENT DEVELOPMENTS IN MODELLING,
ANALYSIS AND SIMULATION OF PROCESSES IN POROUS MEDIA</p> <p>Place: Friedrich-Alexander-Universität Erlangen-Nürnberg</p> <p>Talk: On the unsteady Darcy-Förchheimer-Brinkman equation in tumor growth models</p> |
| 11/17 | <p>OBERSEMINAR ANGEWANDTE ANALYSIS</p> <p>Place: Technische Universität Dortmund</p> <p>Talk: On the solvability of the 3D Navier-Stokes equations</p> |
| 08/17 | <p>OBERSEMINAR SIMULATION AND UNCERTAINTY QUANTIFICATION</p> <p>Place: Technical University of Munich</p> <p>Talk: On the solvability of the 3D Navier-Stokes equations</p> |
| 10/15 | <p>OBERSEMINAR DYNAMISCHE SYSTEME</p> <p>Place: Technical University of Munich</p> <p>Talk: On the stability of relative equilibria in vorticity dynamics</p> |

WORKSHOPS

OCT. 2021	NONLOCALITY IN ANALYSIS, NUMERICS AND APPLICATIONS Place: Lorentz Center
JUN. 2021	HAUSDORFF SCHOOL ON: TRENDING TOOLS FOR THE SOLVABILITY OF NON-LOCAL ELLIPTIC AND PARABOLIC EQUATIONS Place: Hausdorff Center for Mathematics
APR. 2021	HAUSDORFF SCHOOL ON DIFFUSIVE SYSTEMS: PATTERN FORMATION, BIFURCATIONS, AND BIOLOGICAL APPLICATION Place: Hausdorff Center for Mathematics
FEB. 2021	WORKSHOP: MATHEMATICAL AND COMPUTATIONAL MATERIALS SCIENCE Place: IMSI Institute for Mathematical and Statistical Innovation
FEB. 2021	WINTERSCHOOL ON ANALYSIS AND APPLIED MATHEMATICS Place: Universität Münster
MAR. 2019	OCIP 2019: WORKSHOP ON NUMERICAL METHODS FOR OPTIMAL CONTROL AND INVERSE PROBLEMS Place: Technical University of Munich
SEP. 2018	WORKSHOP ON ADVANCED COMPUTATIONAL MODELING FOR TUMOR GROWTH PREDICTION Place: Technical University of Munich

SUPERVISED STUDENT PROJECTS

2021	R. Koch (Bachelor's thesis) Topic: On the numerical discretization of the time-fractional Lotka–Volterra equation
2021	N. Nebulishvili (Master's thesis) Topic: On the Lattice–Boltzmann method applied to the time-fractional Cahn–Hilliard equation
2020	C. Feistner (Bachelor's thesis) Topic: Time integration methods for the Cahn–Hilliard equation
2019	L.-M. Kauck (Seminar project) Topic: Complex Newton method
2019	P. A. Wolfmeier (Seminar project) Topic: Continuous but nowhere differentiable functions

COMPUTER SKILLS

C/C++, R, PYTHON, MATLAB, L^AT_EX, FENICS, libMesh

LANGUAGES

GERMAN (C2), ENGLISH (B2+/C1), SPANISH (A2), LATIN (Latinum)

Dr. Marvin Frey
(typeset in L^AT_EX)