

Julian Fischer

Born: February 1989

Scientific Positions

- starting January 2017 **Assistant Professor (tenure-track)**, *IST Austria*,
Research group leader.
- September 2014 – December 2016 **Research Assistant (Postdoc)**, *Max Planck Institute for Mathematics in the Sciences, Leipzig*,
Research group of Prof. Felix Otto.
- September 2013 – August 2014 **Research Assistant (Postdoc)**, *University of Zürich*,
Research group of Prof. Michel Chipot.
- April 2011 – August 2013 **Research Assistant (PhD Student)**, *University of Erlangen-Nürnberg*,
Research group of Prof. Günther Grün.

Education

- April 2011 – June 2013 **PhD in Mathematics**, *University of Erlangen-Nürnberg*,
Grade: summa cum laude (with distinction).
- November 2010 – December 2011 **Master in Mathematics**, *University of Erlangen-Nürnberg*,
Grade: 1.0.
- October 2008 – November 2010 **Bachelor in Mathematics**, *University of Erlangen-Nürnberg*,
Grade: 1.1.
- June 2008 **Abitur**, *Gymnasium Alexandrinum, Coburg*, Grade: 1.1.

Awards

Scientific Awards

- 2015 **Dr. Körper Prize**, *GAMM (Gesellschaft für Angewandte Mathematik und Mechanik)*.
Award for the four best PhD theses of the past year in the fields of applied mathematics and mechanics
- 2012 **Fritz and Maria Hofmann Award**, *Faculty of Sciences, University of Erlangen-Nürnberg*.
Award for an outstanding Master thesis

Awards and Competitions for School or University Students

- 2008 – 2011 **Scholarship of the German National Academic Foundation**.
(Studienstiftung des Deutschen Volkes)
- 2010/11 **ACM International Collegiate Programming Contest**, *together with Thomas Fersch and Alexander Rass (Team of the University of Erlangen-Nürnberg)*.
1. Place at the 2010 Northwestern Europe Regional Contest (NWERC)
7. Place and Silver Medal at the 2011 ICPC World Finals in Orlando

- 2008 **International Olympiad in Informatics (IOI).**
Gold Medal and 11. Place, best relative performance of a German participant since 2001
- 2008 **German National Competition in Mathematics.**
Bundessieger of the 2007 German National Competition in Mathematics (“Bundeswettbewerb Mathematik”)
- 2006 **German National Competition in Informatics.**
Bundessieger of the 24. German National Competition in Informatics (“Bundeswettbewerb Informatik”)

Invited Conference Talks

- June 2016 **Workshop on Entropy Methods, Dissipative Systems, and Applications,** *Erwin Schrödinger Institute, Vienna.*
- February 2016 **ERC Workshop “Modeling materials and fluids using variational methods”,** *WIAS Berlin.*
- August 2015 **Workshop on New Trends in Nonlinear Elliptic Equations,** *Banff International Research Station.*
- February 2015 **Workshop on Gradient Flows and Entropy Methods,** *HIM Bonn.*
- December 2014 **Variational Methods for Evolution,** *Oberwolfach.*
- September 2014 **Workshop of the GAMM Activity Group on Analysis of PDEs,** *University of Stuttgart.*
- June 2014 **INdAM Meeting “Singular and Degenerate Evolution Problems”,** *Cortona, Italy.*
- December 2012 **Workshop on Nonlocal Problems,** *University of Zürich.*

Contributed Conference Talks

- May 2016 **SIAM Conference on Mathematical Aspects of Materials Science,** *Philadelphia, Pennsylvania.*
- April 2016 **Berlin-Leipzig Workshop in Analysis and Stochastics,** *MPI Leipzig.*
- March 2016 **Minisymposium on Multiscale Evolutionary Problems,** *Joint Annual Meeting of DMV and GAMM 2016, TU Braunschweig.*
- December 2015 **PDE 2015,** *WIAS Berlin.*
- October 2015 **Workshop of the GAMM Activity Group on Analysis of PDEs,** *University of Kassel.*
- July 2015 **Equadiff 2015,** *Université Claude Bernard - Lyon 1.*
- June 2015 **Reliable Methods of Mathematical Modeling 2015,** *University of Zurich.*
- June 2015 **13th European Finite Element Fair 2015,** *Charles University Prague.*
- September 2014 **ISIMM STAMM 2014,** *Poitiers, France.*
- June 2014 **International Symposium on Applied Analysis,** *University of Zurich.*
- May 2014 **8th European Conference on Elliptic and Parabolic Problems,** *Gaeta, Italy.*
- April 2014 **Swiss Numerics Day,** *University of Zurich.*
- March 2014 **85th Annual Meeting of GAMM,** *University of Erlangen-Nürnberg.*

- April 2013 **Interfaces and Free Boundaries: Analysis, Control and Simulation, Oberwolfach.**
- December 2011 **FIRST Midterm Conference, University of Bath.**

Seminar Talks

- May 2016 **Academy of Sciences of the Czech Republic, Prague.**
by invitation of Prof. Eduard Feireisl
- May 2016 **Carnegie Mellon University, Pittsburgh, Center for Nonlinear Analysis Seminar.**
by invitation of Prof. David Kinderlehrer
- November 2015 **University of Heidelberg.**
by invitation of Prof. Hans Knüpfer
- June 2015 **TU München.**
by invitation of Prof. Daniel Matthes
- November 2014 **University of Erlangen-Nürnberg, Kolloquium Angewandte Mathematik.**
by invitation of Prof. Günther Grün
- November 2014 **WIAS Berlin, Langenbach-Seminar.**
by invitation of Prof. Alexander Mielke
- October 2014 **University of Zürich, Arbeitsgemeinschaft Analysis.**
by invitation of Prof. Michel Chipot
- June 2014 **University of Würzburg, Oberseminar Analysis.**
by invitation of Prof. Anja Schlömerkemper
- December 2013 **University of Zürich, Symposium about Mathematics.**
- November 2013 **ETH Zürich, Talks in Theoretical Sciences.**
- November 2013 **Max Planck Institute for Mathematics in the Sciences, Leipzig, Arbeitsgemeinschaft Angewandte Analysis.**
by invitation of Prof. Felix Otto
- October 2013 **University of Regensburg, Oberseminar Analysis.**
by invitation of Prof. Harald Garcke

Teaching

Lectures

- Winter 2015/16 **Mathematics for Physicists 3 – Vector Calculus and PDEs**
4+2 hours/week
- Summer 2015 **A Posteriori Modeling Error Estimates in Continuum Mechanics**
2 hours/week

Seminars

- Fall 2013 **Seminar on Numerical Linear Algebra**
Topic: Eigenvalue Problems
- Summer 2013 **Introductory Seminar for First-Year Students**
Topic: Mathematics and Technology

Organization of Exercise Classes

- Spring 2014 **Numerical Analysis 1**
- Winter 2012/13 **Analysis 3**
- Summer 2012 **Analysis 2**
- Winter 2011/12 **Analysis 1**

Tutor for Exercise Classes

- Spring 2014 **Numerical Analysis 1**
- Summer 2012 **Analysis 2**
- Winter 2011/12 **Analysis 1**
- Summer 2011 **Measure Theory**
- Winter 2010/11 **Partial Differential Equations**
Topics: in particular Sobolev spaces, linear elliptic PDEs

Volunteer Work at Competitions for School Students

- 2014 **Member of the Scientific Committee**, *Central European Olympiad in Informatics (CEOI)*, Jena, Germany.
- 2013 **Member of the Scientific Committee**, *Baltic Olympiad in Informatics (BOI)*, Rostock, Germany.
- 2012 **Deputy Team Leader of the German Team**, *International Olympiad in Informatics (IOI)*, Sirmione, Italy.
- 2011 **Member of the Technical Committee**, *Baltic Olympiad in Informatics (BOI)*, Copenhagen, Denmark.
- 2010 **Deputy Team Leader of the German Team**, *Baltic Olympiad in Informatics (BOI)*, Tartu, Estonia.
- 2009 **Deputy Team Leader of the German Team**, *Baltic Olympiad in Informatics (BOI)*, Stockholm, Sweden.
- 2009–2011 **Coach at the German National Selection Camps for the International Olympiad in Informatics.**
Duties: coach for the participants, preparation and judging of the exams

Publications

Preprints

- [18] **Stochastic homogenization of linear elliptic equations: Higher-order error estimates in weak norms via second-order correctors**, together with Peter Bella, Benjamin Fehrman, and Felix Otto, *Preprint*, 2016.
- [17] **Weak-strong uniqueness of solutions to entropy-dissipating reaction-diffusion equations**, *submitted*, 2016.
- [16] **Bi-Sobolev solutions to the prescribed Jacobian inequality in the plane with L^p data**, together with Olivier Kneuss, *submitted*, 2016.
- [15] **Liouville principles and a large-scale regularity theory for random elliptic operators on the half-space**, together with Claudia Raithel, *submitted*, 2016.
- [14] **Sublinear growth of the corrector in stochastic homogenization: Optimal stochastic estimates for slowly decaying correlations**, together with Felix Otto, *in (minor) revision*, 2016.
- [13] **Approximation of slightly compressible fluids by the incompressible Navier-Stokes equation and linearized acoustics: a posteriori estimates**, *Preprint*, 2015.

Publications in Peer-Reviewed Journals

- [12] **A higher-order large-scale regularity theory for random elliptic operators**, together with Felix Otto, *Comm. Partial Differential Equations*, 41(7):1108-1148, 2016.
<http://dx.doi.org/10.1080/03605302.2016.1179318>
- [11] **Behaviour of free boundaries in thin-film flow: the regime of strong slippage and the regime of very weak slippage**, *Ann. Inst. H. Poincaré Anal. Non Linéaire*, 33(5):1301-1327, 2016.
<http://dx.doi.org/10.1016/j.anihpc.2015.05.001>
- [10] **Analysis of a modified second-order mixed hybrid BDM_1 finite element method for transport problems in divergence form**, together with Fabian Brunner and Peter Knabner, *SIAM J. Numer. Anal.*, 54(4):2359-2378, 2016.
<http://dx.doi.org/10.1137/15M1035379>
- [9] **A posteriori modeling error estimates for the assumption of perfect incompressibility in the Navier-Stokes equation**, *SIAM J. Numer. Anal.*, 53(5):2178-2205, 2015.
<http://dx.doi.org/10.1137/140966654>
- [8] **Global existence of renormalized solutions to entropy-dissipating reaction-diffusion systems**, *Arch. Ration. Mech. Anal.*, 218(1):553-587, 2015.
<http://dx.doi.org/10.1007/s00205-015-0866-x>
- [7] **Finite speed of propagation and waiting times for the stochastic porous medium equation – a unifying approach**, together with Günther Grün, *SIAM J. Math. Anal.*, 47(1):825-854, 2015.
<http://dx.doi.org/10.1137/140960578>

- [6] **Estimates on front propagation for nonlinear higher-order parabolic equations: an algorithmic approach**, *Interfaces Free Bound.*, 17(1):1-20, 2015.
<http://dx.doi.org/10.4171/IFB/331>
- [5] **Upper bounds on waiting times for the thin-film equation: the case of weak slippage**, *Arch. Ration. Mech. Anal.*, 211(3):771-818, 2014.
<http://dx.doi.org/10.1007/s00205-013-0690-0>
- [4] **Uniqueness of solutions of the Derrida-Lebowitz-Speer-Spohn equation and quantum drift-diffusion models**, *Comm. Partial Differential Equations*, 38(11):2004-2047, 2013.
<http://dx.doi.org/10.1080/03605302.2013.823548>
- [3] **Optimal lower bounds on asymptotic support propagation rates for the thin-film equation**, *J. Differential Equations*, 255(10):3127-3149, 2013.
<http://dx.doi.org/10.1016/j.jde.2013.07.028>
- [2] **Infinite speed of support propagation for the Derrida-Lebowitz-Speer-Spohn equation and quantum drift-diffusion models**, *NoDEA Nonlinear Differential Equations Appl.*, 21(1):27-50, 2014.
<http://dx.doi.org/10.1007/s00030-013-0235-0>
- [1] **Advection-driven support shrinking in a chemotaxis model with degenerate mobility**, *SIAM J. Math. Anal.* 45(3):1585-1615, 2013.
<http://dx.doi.org/10.1137/120874291>

[Reports and Proceedings](#)

- [P2] **Global existence of renormalized solutions to entropy-dissipating reaction-diffusion systems**, *Oberwolfach Report 51/2014*.
- [P1] **Optimal estimates on interface propagation in thin-film flow**, *Oberwolfach Report 15/2013*.

[Theses](#)

- PhD Thesis **Optimal estimates on front propagation for the thin-film equation and other fourth-order parabolic equations**, *University of Erlangen-Nürnberg*, June 2013
Advisor: Prof. Günther Grün
Referees: Prof. Günther Grün, Prof. Frank Duzaar, Prof. Michel Chipot
- Master Thesis **Estimates on interface propagation rates for a degenerate chemotaxis model**, *University of Erlangen-Nürnberg*, December 2011