Curriculum Vitae

Dr. Stefan A. Karpitschka

Research Group Leader, Physicist

Max Planck Institute for Dynamics and Self-Organization
Am Faßberg 17
37077 Göttingen
+49 551 5176 262
stefan.karpitschka@ds.mpg.de

Research Interests

- Fluid physics — micro and macro scale — wetting, complex fluids, evaporation, lubrication
- Soft matter physics — chemistry to mechanics — elastocapillarity, adhesion, rheology
- Biological physics — cell to culture level — cell motility, biomechanical pattern formation

Education

09/2008 – 12/2012	**Dr. rer. nat., Physics** (summa cum laude) Max Planck Institute of Colloids and Interfaces, Potsdam, Germany Advisors: Prof. Helmuth Möhwald and Dr. Hans Riegler Thesis: "Dynamics of Liquid Interfaces with Compositional Gradients"
10/2002 – 11/2007	**Diploma, Physics** (with distinction) University of Bayreuth, Germany Advisors: Prof. J. U. Küppers and Prof. S. Wehner Thesis: "Reaction Hysteresis of the CO Oxidation Reaction on Pd(111) Surfaces"

Research

since 05/2017	Research Group Leader **Max Planck Institute for Dynamics and Self-Organization**, Germany
03/2016 – 12/2016	Postdoctoral Researcher **Stanford University**, USA Advisor: Prof. Manu Prakash
01/2014 – 02/2016	Postdoctoral Researcher **University of Twente**, The Netherlands Advisors: Prof. Jacco H. Snoeijer and Prof. Detlef Lohse
01/2013 – 11/2013	Postdoctoral Researcher **Max Planck Institute of Colloids and Interfaces**, Germany Advisors: Prof. Helmuth Möhwald and Dr. Hans Riegler
11/2007 – 03/2008	Research Assistant **University of Bayreuth**, Germany Advisors: Prof. J. U. Küppers and Prof. S. Wehner

Professional Experience

since 2005	**Self employed** software development & technical consulting Real time imaging solutions, science & database tools
01/2003 – 10/2007	**Development of measurement software** Chair of Experimental Physics III, University of Bayreuth

Other Experience

04/2018 – 08/2018	**Parental leave** – Childcare for daughter Luisa Marie, born 03/2017
03/2017 – 04/2017	**Parental leave** – Childcare for daughter Luisa Marie, born 03/2017
04/2008 – 08/2008	**Educational travel** – North & West Africa

Honors & Funding

- **Journal Cover & Featured Article** "Printing wet-on-wet: attraction and repulsion of drops on a viscous film" in Applied Physics Letters (2018)
- **Invited publication** "The Value of a Fading Tracer" in the series "Focus on Fluids" by the Journal of Fluid Mechanics (2018)
- **Research group** "Interfaces of Complex Fluids" funded by the Max Planck - University of Twente Center for Complex Fluid Dynamics (since 2017)
- **Isaac Newton Institute**, Cambridge, UK (2013): Invited participant at the program "Mathematical Modeling and Analysis of Complex Fluids and Active Media in Evolving Domains"
- **LAM Research AG**, Austria (2012,2013): Industry funded project "Marangoni Drying"
- **Invited publication** with H.R. Brand (2010), special issue of *Physica D* in honor of S.C. Müller

Publications

Key publication metrics:

- Published articles: 24
- Publications in leading journals (Thomson Reuters):
  1 in Nature Communications (Impact factor: 11.47; Rank: 3/57 - Multidisciplinary Sciences)
  2 in Proc. Natl. Acad. Sci. USA (Impact factor: 9.67; Rank: 4/57 - Multidisciplinary Sciences)
  3 in Physical Review Letters (Impact factor: 7.51; Rank: 6/78 - Physics, Multidisciplinary)
- Total citations: 431 (Google Scholar)
- H-index: 11 (Google scholar)

Ten most important peer-reviewed journal publications:

[10] **Cusp-shaped elastic creases and furrows**
S. Karpitschka, J. Eggers, A. Pandey, and J.H. Snoeijer
Phys. Rev. Lett. 119, 198001 (2017) DOI: 10.1103/PhysRevLett.119.198001

[9] **Marangoni Contraction of Evaporating Sessile Droplets of Binary Mixtures**
S. Karpitschka, F. Liebig, and H. Riegler
Langmuir 33, 4682 – 4687 (2017) DOI: 10.1021/acs.langmuir.7b00740

[8] **Liquid Drops Attract or Repel by the Inverted Cheerios Effect**
S. Karpitschka, A. Pandey, L.A. Lubbers, J.H. Weijs, L. Botto, S. Das, B. Andreotti, and J.H. Snoeijer
Proc. Natl. Acad. Sci. USA, 113, 7403 – 7407 (2016) DOI: 10.1073/pnas.1601411113

[7] **Surface Tension Regularizes the Crack Singularity of Adhesion**
S. Karpitschka, L. van Wijngaarden, and J.H. Snoeijer
Soft Matter, 12, 4463 – 4471 (2016) DOI: 10.1039/C5SM03079J

[6] **Droplets Move over Viscoelastic Substrates by Surfing a Ridge**
S. Karpitschka, S. Das, M. van Gorcum, H. Perrin, B. Andreotti, and J.H. Snoeijer
Nature Commun., 6, 7891 (2015) DOI: 10.1038/ncomms8891

[5] **The Evaporation Behavior of Sessile Droplets from Aqueous Saline Solutions**
V. Soulié, S. Karpitschka, F. Lequien, P. Prené, T. Zemb, H. Möhwald, and H. Riegler
Phys. Chem. Chem. Phys., 17, 22296 – 22303 (2015) DOI: 10.1039/C5CP02444G

[4] **Sharp Transition between Coalescence and Non-Coalescence of Sessile Drops**
S. Karpitschka and H. Riegler
J. Fluid Mech. Rapids, 743, R1 (2014) DOI: 10.1017/jfm.2014.73

[3] **Noncoalescence of Sessile Drops from Different but Miscible Liquids: Hydrodynamic Analysis of the Twin Drop Contour as a Self-Stabilizing Traveling Wave**
S. Karpitschka and H. Riegler
Phys. Rev. Lett., 109, 066103 (2012) DOI: 10.1103/PhysRevLett.109.066103

[2] **Nonintrusive Optical Visualization of Surface Nanobubbles**
S. Karpitschka, E. Dietrich, J.R.T. Seddon, H.J.W. Zandfliet, D. Lohse, and H. Riegler
Phys. Rev. Lett., 109, 066102 (2012) DOI: 10.1103/PhysRevLett.109.066102

[1] **Quantitative Experimental Study on the Transition between Fast and Delayed Coalescence of Sessile Droplets with Different but Completely Miscible Liquids**
S. Karpitschka and H. Riegler
Langmuir, 26, 11823 – 11829 (2010) DOI: 10.1021/la1007457

Talks & Seminars

Selected invited seminars & talks:

- 2017 — Industry club workshop on droplet coalescence, Durham University, UK
- 2017 — IUSTI, Université Aix-Marseille, Marseille, France
- 2016 — SFB1194 Kickoff Meeting, Darmstadt, Germany
- 2015 — Lorentz Center Workshop "Capillarity of Soft Interfaces", Leiden, The Netherlands
- 2014 — University of Münster (AG Prof. U. Thiele), Zaferna Workshop
- 2013 — Isaac Newton Institute Workshop, "Complex Fluids in Evolving Domains", Leeds, UK
- 2013 — Universität der Bundeswehr, Munich, Germany
- 2012 — Nanobubbles and Micropancakes, l'École de Physique des Houches, Les Houches, France
- 2011 — Chemical Engingeering Department, Technion, Haifa, Israel

Selected conference contributions:

- 2018 — *DPG Spring Meeting*, Berlin, Germany
- 2016 — *APS March Meeting*, Baltimore, USA
- 2015 — *Fluid & Elasticity*, Biarritz, France
- 2014 — *APS DFD Meeting*, San Francisco, USA
- 2014 — *Flow14*, Enschede, The Netherlands
- 2013 — *Droplets 2013*, Marseille, France
- 2012 — *6th Conference of the International Marangoni Association*, Haifa, Israel
- 2011 — *FluidDTU Summerschool*, Krogerup, Denmark
- 2010 — *Lorentz Center Workshop "Capillary Shaping of Solutes"*, Leiden, The Netherlands
- 2010 — *5th Conference of the International Marangoni Association*, Florence, Italy
- 2010 — *24th Conference of the European Colloid and Interface Society*, Prag, Czech Republic
- 2008 — *DPG Spring Meeting*, Berlin, Germany

Teaching

- since **2017**, main advisor for 2 bachelor thesis projects and 2 PhD students
- **2011-2016**, mentoring & (co-)advising of $\sim$10 PhD, master, and bachelor students
- **2015**, University of Twente — teaching assistant & several lectures, master course *Fluid & Elasticity*, main instructor: Prof. Jacco Snoeijer
- **2014**, University of Twente — teaching assistant, bachelor course *Experimental Techniques in Physics of Fluids*, main instructor: Prof. Michel Versluis
- **2009 & 2010**, University of Potsdam — teaching assistant, *Physical Chemistry III (Spectroscopy & Crystallography)*, main instructor: Prof. Helmuth Möhwald

Service

- Coordination — Member of the coordination board, DFG Priority Program 2171, "Dynamic Wetting of Flexible, Adaptive and Switchable Surfaces" (since 2018)
- Outreach — Girls & Boys Day 2018, "Dancing Droplets", experiments for high school students
- Organization — Member of the organizing committee, Droplets 2015 conference, University of Twente, Enschede, The Netherlands
- Organization — Summerschool of the Interfaces Department, Max Planck Institute of Colloids and Interfaces, 2009, Albufeira, Protugal
- Outreach — Max Planck Institute of Colloids and Interfaces, 2009, experiments for children
- Outreach — Numerous lab demonstrations for a wide variety of audiences
- Peer-review — Refereeing for *Physical Review Letters, Proceedings of the Royal Society A, Journal of Fluid Mechanics, Physics of Fluids, Langmuir, Soft Matter, Journal of Physical Chemistry, Journal of Polymer Science B*

Media coverage

- **Sep 2016** — Physics World, *Physics at the breakfast table*, Karpitschka et al., *Proc. Natl. Acad. Sci. USA* 113, 7403 (2016)
- **Jul 2016** — New York Times, *'Inverted Cheerios Effect' Returns Physics to the Breakfast Table*, Karpitschka et al., *Proc. Natl. Acad. Sci. USA* 113, 7403 (2016)
- **Jun 2016** — The Australian, Karpitschka et al., *Proc. Natl. Acad. Sci. USA* 113, 7403 (2016)
- **Jun 2016** — Phys.org and about 30 other news outlets, *How scientists inverted the cheerios effect*, Karpitschka et al., *Proc. Natl. Acad. Sci. USA* 113, 7403 (2016)
- **Aug 2015** — Science Daily and several other news outlets, *Surfing droplets: Movement of droplets on soft surfaces*, Karpitschka et al., *Nature Commun.* 6, 7891 (2015)
- **Aug 2015** — Independence News, *Surfing droplets in Nature Communications*, Karpitschka et al., *Nature Commun.* 6, 7891 (2015)
- **Sep 2012** — Nature Nanotechnology, News & Views, *Nanobubbles: Imaged with a light touch*, Karpitschka et al., *Phys. Rev. Lett.* 109, 066102 (2012)