Sebastian Aland

Curriculum Vitae

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Personal

Birth	March 1, 1983. Lübben, Germany
Nationality	German
Family status	married, 2 kids (5 and 8 years)

History

since 03/2017	**Professor for Modeling/Simulation (permanent, full time)**. Faculty of Informatics/Mathematics, HTW Dresden - University of Applied Sciences
07/2015 - 11/2015	**Fellow**, *at Sir Isaac Newton Institute, Cambridge, UK*.
07/2014 - 12/2016	**Research Group Leader**, *Institute of Scientific Computing, TU Dresden*.
11/2013 - 07/2014	**PostDoc**, *Department of Mathematics, University of California, Irvine, USA*. Assistant specialist in the group of Prof. John Lowengrub
01/2009 - 07/2012	**PhD in mathematics (Dr. rer. nat.)**, *TU Dresden*, summa cum laude. Supervisors: Prof. Axel Voigt, Prof. John Lowengrub Title: Modeling of two-phase flow with surface-active particles
01/2009 - 10/2013	**Scientific Staff**, *Institute of Scientific Computing, TU Dresden*.
10/2003 - 11/2008	**Diploma in mathematics**, *TU Dresden*. with honors (grade 1.1)
06/2002	**High school diploma**, with honors (grade 1.0).

Longer Research Visits

02/2010 - 05/2010	**Research Visit**, *University of California, Irvine, USA*. in the group of Prof. John Lowengrub
10/2006 - 03/2007	**Research semester**, *University of New South Wales*, Sydney, Australia.
08/2006 - 10/2006	**Research internship**, *National Cheng Kung University, Tainan, Taiwan*.

Languages

German	mother tongue	
English	fluent	*1.5 years in english-speaking countries*
French	fluent	*6 months studies in Paris*

Funding

01/2018 - 12/2020 **130,000 Euro**, *Saxon Ministry for Science and Arts for 'Two-phase flow simulations to determine the viscosity of biological cells'*, (SMWK MatEnUm-2).

04/2017 - 09/2020 **189,480 Euro**, *DFG research grant for 'Phase field models for biological cells in flow'*, (AL 1705/3).

11/2013 - 12/2016 **263,550 Euro**, *DFG priority program SPP-1506 for 'A diffuse interface model for multiphase flow with surface-active particles'*, (AL 1705/1).

Stipends and Awards

2016 Outstanding Reviewer Award, Journal of Computational Physics

2013 Excellent PhD thesis awarded with board membership in the junior board of the Society for Applied Mathematics and Mechanics (GAMM)

2013 Winner of the GAMM Young Researcher Minisymposia Competition

09/2007 - 03/2008 European Erasmus fellow

08/2006 - 10/2006 DAAD stipend for the Taiwan Summer Institute Program

Dresden, 22. August 2018

Ten most important publications

peer-reviewed journal articles

[1] D. Mokbel, H. Abels, and S. Aland. A phase-field model for fluid–structure interaction. *Journal of Computational Physics*, 372:823 – 840, 2018.

[2] M. Mokbel, D. Mokbel, A. Mietke, N. Träber, G. Salvatore, O. Otto, J. Guck, and S. Aland. Numerical Simulation of Real-Time Deformability Cytometry To Extract Cell Mechanical Properties. *ACS Biomaterials Science & Engineering*, 2017.

[3] S. Aland, S. Egerer, J. Lowengrub, and A. Voigt. Diffuse interface models of locally inextensible vesicles in a viscous fluid. *Journal of Computational Physics*, 277:32–47, 2014.

[4] S. Aland and F. Chen. An efficient and energy stable scheme for a phase-field model for the moving contact line problem. *International Journal for Numerical Methods in Fluids*, 81:657–671, 2015.

[5] K. Schwarzenberger, S. Aland, H. Domnick, S. Odenbach, and K. Eckert. Relaxation oscillations of solutal Marangoni convection at curved interfaces. *Colloids and Surfaces A*, 481:633–643, 2015.

[6] S. Aland. Time integration for diffuse interface models for two-phase flow. *Journal of Computational Physics*, 262:58–71, 2014.

[7] R. Hensel, R. Helbig, S. Aland, H.G. Braun, A. Voigt, C. Neinhuis, and C. Werner. Wetting resistance at its topographical limit: the benefit of mushroom and serif T structures. *Langmuir*, 29:1100–1112, 2013.

[8] S. Aland, J. Lowengrub, and A. Voigt. A continuum model of colloid-stabilized interfaces. *Physics of Fluids*, 23(6):062103, 2011.

[9] S. Aland and A. Voigt. Benchmark computations of diffuse interface models for two-dimensional bubble dynamics. *International Journal for Numerical Methods in Fluids*, 69(3):747–761, 2011.

[10] S. Aland, J. Lowengrub, and A. Voigt. Two-phase flow in complex geometries: A diffuse domain approach. *Computer Modeling in Engineering and Sciences*, 57(1):77–106, 2010.

Conference contributions

Invited talks

05/2018 'Modeling of Fluid-Structure Interaction and Elastic Membranes'. at Graduate Academy for 'Interfaces, Complex Structures, and Singular Limits', Universität Regensburg

11/2017 'Simulation of Elastic Cells and Shells in Flow'. Research Center LiPhy, University Grenoble, France

01/2017 Oberwolfach Workshop on Emerging Developments in Interfaces and Free Boundaries, Oberwolfach, Germany

11/2016 'Phase-field Modeling of Fluid-Structure Interaction', TU Munich

10/2016 'Phase-field Modeling of Multi-Phase Microfluidics', TU Chemnitz

02/2016 'A Phase-field model for Fluid-Structure Interaction', ETH Zurich, Switzerland

01/2016 'Modeling and Simulation of elastic cells in flow', Workshop on Modelling, Analysis and Numerics of Biological Membranes, Imperial College London, UK

11/2015 'Simulation of biological cells in flow', Centre for Scientific Computing, University of Warwick, UK

07/2015 'Diffuse interface models for cell motility', Workshop on Modelling, Numerical Analysis and Applications, Isaac Newton Institute, Cambridge, UK

05/2015 'Phase field models for coupled elastic/fluid materials', Colloquium of the Institute of New Materials, Saarbrücken, Germany

11/2014 'Public Relations for Simulations', European Project Center, Dresden, Germany

11/2014 National Workshop on Communication of Science, Klaus-Tschira Stiftung, Heidelberg, Germany

11/2013 'A mechanistic collective cell model for epithelial colony growth', Seminar on Applied and Computational Mathematics, University of California Irvine, USA

07/2013 Invited lecture on phase field modeling, Summer School on Transport Processes at Fluidic Interfaces, RWTH Aachen, Germany

06/2012 'A continuum model of colloid-stabilized systems', 12^{th} International Conference on Free Boundary Problems, Chiemsee, Germany

03/2012 'Continuum modelling of colloid-stabilized systems', Seminar on Multiscale Statistical Physics, Aalto University, Helsinki, Finnland

05/2010 'Two-phase flows in complex geometries', Seminar on Applied and Computational Mathematics, University of California Irvine, USA

Contributed and Minisymposia talks

08/2018 'A Phase-field Model for Fluid-Structure Interaction', SIAM Conference on the Life Sciences, Minneapolis, USA

07/2018 'Modeling, simulations and experiments of cell bulk and cortex mechanics', World Congress of Computational Mechanics, New York, USA

06/2016 'Pulsing droplets: Simulation of oscillatory Marangoni convection at fluid-fluid interfaces', Minisymposium on Complex Fluid Flows in Engineering, European Congress on Computational Methods in Applied Sciences and Engineering, Crete, Greece

06/2015 'Phase field models for coupled elastic/fluid materials', Workshop on Scientific Computing, Decin, Czech Republic

03/2015 'Pulsing droplets: Simulation of oscillatory Marangoni convection at fluid-fluid interfaces', Annual Meeting of the Society for Applied Mathematics and Mechanics, Lecce, Italien

10/2014 'Numerical simulation of endocytosis', Annual Meeting of the DFG priority program 1506, Dresden, Germany

04/2014 'Diffuse-interface models for locally inextensible vesicles', Southern California Flow Symposium, University of California Los Angeles, USA

10/2013 '2D and axisymmetric Taylor-Flow simulations', Taylor-Flow workshop, TU Hamburg-Harburg, Germany

07/2013 'A diffuse interface model for coupled bulk/surface systems', Kick-off meeting of DFG SPP1506, Aachen, Germany

03/2013 'Benchmark computations of diffuse-interface models for two-phase flow', Annual Meeting of the Society for Applied Mathematics and Mechanics, Novi Sad, Serbia

03/2013 'Modelling and numerical simulation of bubbles in liquid metal', DFG SFB 609 Symposium, Dresden, Germany

11/2012 'Time integration for diffuse-interface models for two-phase flows', Workshop: Numerical Methods for Two-phase Flow, Universität Stuttgart, Germany

12/2012 'A diffuse interface model for coupled bulk/surface systems', Annual Meeting of the DFG priority program 1506, Augsburg, Germany

07/2012 Lecture: 'How to solve PDEs in complex geometries', National PhD Students Workshop on Transport Processes at Fluidic Interfaces, Dresden, Germany

12/2011 'A continuum model if colloid-stabilized interfaces', International Workshop on Transport Processes at Fluidic Interfaces. RWTH Aachen, Germany

07/2011 'Diffuse interface models for Taylor flow', Taylor-Flow Workshop. Universität Erlangen, Germany

06/2011 'Numerical simulation of Bijels', Workshop on Scientific Computing. Decin, Czech Republic

05/2010 'Stabilizing Fluid-fluid interfaces by nanoparticles', SIAM Conference on Mathematical Aspects of Materials Science . Philadelphia, USA

Organization of scientific events

03/2016 Poster Coordinator at the Annual Meeting of the Society for Mathematics and Mechanics (GAMM), Braunschweig, Germany.

09/2015 Annual Meeting of the Junior Board of the Society for Mathematics and Mechanics (GAMM), Dresden, single organizer.

07/2015 Minisymposium: *Simulation of Two-Phase Flow*, ECCOMAS Young Investigator Conference, Aachen, Germany.

07/2015 ECCOMAS Young Investigator Conference, Aachen, Member of the Scientific Committee.

10/2014 Annual Meeting of DFG priority program 1506: *Transport processes on fluidic interfaces*, Dresden, main organizer, together with A. Voigt.

03/2013 Young Researcher Minisymposium: *Benchmarking of two-phase flow simulations*, Annual Meeting of the Society for Applied Mathematics and Mechanics, Novi Sad, Serbia.

07/2012 National Workshop: *Simulation of transport processes on fluidic interfaces*, Dresden, single organizer.

Reviews

Journal of Computational Physics

Computers and Fluids

New Biotechnology

International Journal for Numerical Methods in Fluids

International Journal of Heat and Mass Transfer

Journal of Multiphase Flows

Chemical Engineering Science

Physica A

Communications in Mathematical Sciences

Communications in Nonlinear Science and Numerical Simulation

Teaching and supervision

Lectures and courses

at HTW Dresden (recurring yearly since SS 2017)

WS **Numerical Simulation**.
lecture in master degree course Applied Computer Science
HTW Dresden, 4 SWS

WS+SS **Parallel Algorithms**.
lecture in master degree course Data Science
HTW Dresden, 4 SWS

WS+SS **Basics of Computer Science (algorithms and data structures)**.
lecture in bachelor degree courses
HTW Dresden, 8 SWS

WS+SS **Research Seminar: Numerical Simulation of Two-phase Flow**.
in master degree course Applied Computer Science
HTW Dresden, 4 SWS

at TU Dresden, for Boston University (USA)

SS 2015 **Differential Equations**.
lecture, 6 SWS, in english

SS 2013 **Differential Equations**.
tutorial, 6 SWS, in english

at TU Dresden

SS 2015 **Diffuse Interface Models for Two-Phase Flow**.
graduate lecture
3 lectures, in english

SS 2013 **Seminar Scientific Computing**.
2 SWS

2009–2012 **Modeling Seminar**.
Modeling and implementation of numerical methods
6 semesters, each 2 SWS

SS - summer semester ... WS - winter semester ... SWS - hours per week

Thesis supervision

PhD theses

(2021) Lucas Wittwer: Influence of microscopic flow on solute cells and capillary growth

(2020) Dominic Mokbel: Numerical methods for biological cell mechanics

(2020) Marcel Mokbel: Diffuse interface models for Marangoni convection

2016 Wieland Marth: Hydrodynamic Diffuse Interface Models for Cell Morphology and Motility. TU Dresden

Master's theses

2017 Julian Karwowski: Numerical simulation of elastic cells in flow by immersed boundary methods, TU Dresden

2016 Dominic Mokbel: Modeling and Simulation of biological cells in flow, TU Dresden

2015 Marcel Mokbel: Marangoni convection in the Hele-Shaw cell, TU Dresden

2013 Sabine Egerer: Dynamics of cells under shear flow - Numerical studies for global and local surface area conservation, TU Dresden

2012 Sebastian Reuther: Modellierung und Simulation von Oberflächenzirkulationen in Ozeanen, TU Dresden

2012 Wieland Marth: Mathematische Modellierung und Simulation von Biomembranen mit Phasenfeldfunktionen, TU Dresden