

Curriculum Vitae

Personal Information

Date / Place of Birth 14.01.1987, Hamm, Germany
Citizenship German

Academic Career

2006 - 2007 Study of Physics at Friedrich-Schiller-University Jena
2007 - 2011 Study of Geophysics at Friedrich-Schiller-University Jena,
Degree: Diploma in Geophysics "with distinction"
Thesis: "Stress- and strain distribution at curved subduction zones"
2011 - 2015 PhD at the GFZ German Research Centre for Geosciences,
Section 2.5 Geodynamic Modeling
Degree: Dr.rer.nat. (Ph.D.) in Geophysics
Thesis: "The interaction of subducted slabs and plume generation zones in geodynamic models"
2015 - 2016 Postdoctoral Research Associate at German Research Centre for Geosciences (GFZ)
2015 - 2017 Postdoctoral Research Associate at Dept. of Mathematics, Texas A&M University
2017 - 2018 Postdoctoral Fellow at Dept. of Mathematics, Colorado State University
2018 - Project Scientist at Dept. of Earth and Planetary Sciences (Computational Infrastructure for Geodynamics), University of California, Davis

Peer Reviewed Publications

2011 van Hinsbergen et al. (2011): Acceleration and deceleration of India-Asia convergence since the Cretaceous: Roles of mantle plumes and continental collision. *Journal of Geophysical Research*. Doi: 10.1029/2010JB008051
2014 Zeumann et al. (2014): New Finite-Element Modelling of Subduction Processes in the Andes Using Realistic Geometries. *Proceedings of the IAG General Assembly*. Doi: 10.1007/978-3-642-37222-3_13
2016 Gassmüller et al. (2016): Major influence of plume-ridge interaction, lithosphere thickness variations, and global mantle flow on hotspot volcanism – The example of Tristan. *Geochemistry, Geophysics, Geosystems*. Doi: 10.1002/2015GC006177

- 2017 Dannberg et al.: The importance of grain size to mantle dynamics and seismological observations. *Geochemistry, Geophysics, Geosystems*. Doi: 10.1002/2017GC006944
- Bredow et al.: How plume-ridge interaction shapes the crustal thickness pattern of the Réunion hotspot track. *Geochemistry, Geophysics, Geosystems*. Doi: 10.1002/2017GC006875
- Heister et al.: High Accuracy Mantle Convection Simulation through Modern Numerical Methods. II: Realistic Models and Problems. *Geophys. J. Int.*. Doi: 10.1093/gji/ggx195
- 2018 Alzetta et al.: The deal. II Library, Version 9.0. *Journal of Numerical Mathematics*. Doi: 10.1515/jnma-2018-0054
- Dannberg & Gassmüller: Chemical trends in ocean islands explained by plume–slab interaction. *Proceedings of the National Academy of Sciences*. Doi: 10.1073/pnas.1714125115
- Gassmüller et al.: Flexible and scalable particle in cell methods with adaptive mesh refinement for geodynamic computations. *Geochemistry, Geophysics, Geosystems*. Doi: 10.1029/2018GC007508
- 2019 Kellogg et al.: The role of scientific communities in creating reusable software: Lessons from geophysics. *Computing in Science & Engineering*, 21(2), 25-35.
- Dannberg et al.: A new formulation for coupled magma/mantle dynamics. *Geophys. J. Int.* *In press*.
- Gassmüller et al.: Evaluating the accuracy of hybrid finite element / Particle-In-Cell methods for modeling incompressible Stokes flow. *Geophys. J. Int.* *In review*.

Other Publications

- 2014 Steinberger et al.: Manteldynamik und das Aufbrechen von Gondwana, *System Erde* (4), 14-19.
- 2016 Bangerth et al.: Computational Modeling of Convection in the Earth's Mantle, *SIAM News*.
- 2018 Gassmüller: It's just coding ... - Scientific software development in geodynamics. *EGU Geodynamics Blog*.
<https://blogs.egu.eu/divisions/gd/2018/10/09/its-just-coding-scientific-software-development-in-geodynamics/>

Invited Presentations

- 2012 4th Colloquium of DFG priority programme SAMPLE. *Modelling the interaction between subducted slabs and thermo-chemical piles*
- 2013 Gordon Research Seminar: *Past plate motions and recent hotspot volcanism - Validating plate reconstructions by geodynamic modelling*
- 5th Colloquium of DFG priority programme SAMPLE. *Past plate motions and recent hotspot volcanism - Validating plate reconstructions by geodynamic modelling*
- AGU Fall Meeting: *Sensitivity of spatial distribution and dynamics of plume generation*

2014	<p>Ludwig-Maximilians-University Munich, <i>Geoscience seminar: Sensitivity of spatial distribution and dynamics of plume generation</i></p> <p>6th Colloquium of DFG priority programme SAMPLE. <i>Geodynamic models and seismic observations of the South Atlantic lower mantle</i></p> <p>GeoFrankfurt: <i>Geodynamic models and seismic observations of the South Atlantic lower mantle</i></p>
2016	<p>8th Colloquium of the DFG priority programme SAMPLE. <i>Major influence of lithosphere thickness variations and global mantle flow on Tristan hotspot volcanism</i></p>
2017	<p>CU Boulder, <i>Computational Science seminar: Methods and Applications of the Finite-Element Software ASPECT in Geodynamics</i></p> <p>UT Austin, <i>Seminar: The Geodynamic Modeling Code ASPECT: Structure, Methods and Plume-Ridge Interaction</i></p> <p>Colorado State University, <i>Inverse problems seminar: Forward and inverse problems in geodynamic modeling: Part I Evolution of island chains in the South Atlantic and Indian Ocean</i></p>
2018	<p>Earth-Life Science Institute (ELSI), Tokyo, <i>ASPECT tutorial</i></p> <p>Christian-Albrechts-University Kiel, <i>Geoscience Seminar</i></p> <p>University College London, <i>Global Geophysics Seminar: Geodynamic modeling with ASPECT: Applications for magma/mantle dynamics, grain size evolution and chemical zonation in mantle plumes</i></p> <p>SIAM Parallel Processing, Tokyo, <i>Advances in Mantle Convection Modeling: Nonlinear Solvers, Multiphysics, Linking scales</i></p> <p>CIDER Summer School, UC Santa Barbara: <i>Scientific Software Development 101: Fundamentals</i></p> <p>AGU panel discussion member: <i>Community Forum: The Role of an Open-Source Software Initiative Within AGU.</i></p>
2019	<p>SIAM Geosciences, Houston: <i>Accurately utilizing particle-in-cell methods for adaptively refined finite-element models</i></p>

Third-party Funding

2014	<p>North-German Supercomputing Alliance: <i>Plume-Plate interaction in 3D mantle flow – Revealing the role of internal plume dynamics on global hot spot volcanism (4.8 million CPU hours)</i></p> <p>NSF Cider: <i>Investigating mantle dynamics using a composite rheology with grain-size evolution, tested using seismology (3,000 \$)</i></p>
2015	<p>North-German Supercomputing Alliance: <i>Follow-up on Plume-Plate interaction in 3D mantle flow (3.2 million CPU hours)</i></p>
2016	<p>North-German Supercomputing Alliance: <i>Follow-up on Plume-Plate interaction in 3D mantle flow (3.7 million CPU hours)</i></p>
2019 - 2020	<p>Better Scientific Software (BSSW) fellow of the DoE IDEAS-ECP project. PI. (\$34,750)</p>

Teaching

2008 - 2011	Teaching assistant in geodynamics courses at Friedrich-Schiller-University Jena
2011	Student tutorials in „Mathematics for Geoscientists“, University Potsdam
2012 - 2014	ASPECT student courses in module „Computational Geodynamics“
2014	ASPECT tutorial at GeoMod 2014 conference
2016	ASPECT tutorial at CIG Allhands Meeting, UC Davis
2018	ASPECT tutorial at ELSI EON Winter School Tokyo ASPECT tutorial at CGU/CIG annual meeting, Niagara Falls ASPECT tutorial at CIDER summer school, UC Santa Barbara Software Carpentry “ <i>Version Control with Git</i> ” tutorial at CIDER summer school, UC Santa Barbara Organization and teaching at the Rayleigh developer meeting (5 day developer meeting including teaching in scientific software development and open-source community management)
2015 - 2018	Organization and teaching at the ASPECT hackathon (10 day summer school in scientific software development and development workshop)
pending (2019)	Certification as an official Software Carpentry Instructor

Service

2008 - 2009	Spokesperson of the student council at the Institute for Geosciences
2009 - 2010	Member of the student council and institute council at the Institute for Geosciences
2011	Member of the organizing team of the 12 th International Workshop on Modeling of Mantle Convection and Lithosphere Dynamics.
Since 2014	Maintainer of the ASPECT geodynamic modeling software
2017	AGU Session Chair, Session: DI14A: Deep Mantle Dynamics and Its Surface Expressions III
Reviews for	Geochemistry, Geophysics, Geosystems, ACM - Transactions on Mathematical Software, Chilean National Commission for Scientific and Technological Research (CONICYT)

Other Experiences

Project maintainer	ASPECT
Software contributions	CitcomS, ASPECT, deal.II, Rayleigh, FDPS_SPH, see https://github.com/gassmoeller