Juliane Dannberg

⌘ Education

2007 – 2012	**Diplom** (B.Sc. & M.Sc.), Geophysics, Friedrich-Schiller-University Jena, Germany (Grade 1.0)
2012 – 2016	**Ph.D.** in Geophysics, GFZ German Research Centre for Geosciences/University of Potsdam, Germany, on "Dynamics of mantle plumes: Linking scales and coupling physics" Advisors: Stephan V. Sobolev and Volker John

⌘ Professional Appointments

2015 – 2016	**Research Assistant** at Texas A&M University, College Station, USA
2016 – 2017	**Postdoctoral Research Associate** at Texas A&M University, College Station, USA
2017 – 2018	**Postdoctoral Fellow** at Colorado State University, Fort Collins, USA
2018 – 2019	**Assistant Project Scientist** at University of California, Davis, USA
7/2018 – 9/2018	**Visiting Scholar** at Cambridge University, UK
since 8/2019	**Assistant Professor** at University of Florida, Gainesville, USA

⌘ Publications in Refereed Journals

2015	**Dannberg, J.**, Sobolev, S.V. Low-buoyancy thermochemical plumes resolve controversy of classical mantle plume concept. *Nature Communications* **6**.
2016	Gassmöller, R., **Dannberg, J.**, Bredow, E., Steinberger, B., Torsvik, T.H. Major influence of plume-ridge interaction, lithosphere thickness variations, and global mantle flow on hotspot volcanism—The example of Tristan. *Geochem. Geophys. Geosyst.,* **17,** 1454-1479.
2016	**Dannberg, J.**, Heister, T. Compressible magma/mantle dynamics: 3-D, adaptive simulations in ASPECT. *Geophys. J. Int.,* **207(3),** *1343-1366*.
2017	Heister, T., **Dannberg, J.**, Gassmöller, R., Bangerth, W., High Accuracy Mantle Convection Simulation through Modern Numerical Methods. II: Implications from Solving Realistic Problems. *Geophys. J. Int.,* **210(2),** *833-851*.
2017	**Dannberg, J.,** Eilon, Z., Faul, U., Gassmöller, R., Moulik, P., Myhill, R., The Importance of Grain Size to Mantle Dynamics and Seismological Observations (*Geochem. Geophys. Geosyst.,* **18,** *3034-3061*).
2017	Bredow, E., Steinberger, B., Gassmöller, R., **Dannberg, J.**, How plume-ridge interaction shapes the crustal thickness pattern of the Réunion hotspot track (*Geochem. Geophys. Geosyst.,* **18,** *2930–2948*).
2018	**Dannberg, J.,** Gassmöller, R., Chemical trends in ocean islands explained by plume– slab interaction *(Proceedings of the National Academy of Sciences,* ***115(17),*** *4351-4356)*.

2019 **Dannberg, J.,** Gassmöller, R., Grove, R., Heister, T. A new formulation for coupled magma/mantle dynamics *(Geophys. J. Int., **219(1),** 94-107)*.

2020 Gassmöller, R., **Dannberg, J.**, Bangerth, W., Heister, T., Myhill, R. On Formulations of Compressible Mantle Convection *(Geophys. J. Int., **221(2),** 1264–1280)*.

2020 Lesher, C., **Dannberg, J.,** et al. Iron isotope fractionation at the core-mantle boundary by thermodiffusion (*Nature Geoscience, **13**, 382–386*).

2021 Bredow, E., Steinberger, B., Gassmöller, R., **Dannberg, J.**, Mantle convection and possible mantle plumes beneath Antarctica – insights from geodynamic models and implications for topography (Geological Society, London, Memoirs, 56, https://doi.org/10.1144/M56-2020-2).

2021 **Dannberg, J.**, Myhill, R., Gassmöller, R., Cottaar, S. The morphology, evolution and seismic visibility of partial melt at the core-mantle boundary: Implications for ULVZs (*Geophys. J. Int., **227(2)**, 1028–1059*).

2022 van Zelst, I., Crameri, F., Pusok, A.E., Glerum, A., **Dannberg, J.** and Thieulot, C. 101 Geodynamic modelling: How to design, carry out, and interpret numerical studies (*Solid Earth, **13**, 583–637)*.

2022 **Dannberg, J.**, Gassmöller, R., Li, R., Lithgow-Bertelloni, C., Stixrude, L. An entropy method for geodynamic modelling of phase transitions: capturing sharp and broad transitions in a multiphase assemblage (*Geophys. J. Int., **231(3)**, 1833–1849*).

⌘ Other Publications

2012 **Dannberg, J.**, Goepel, A., Jahr, T., Ude, M. und Viereck, M. "Geomagnetic characterization of the Volcanic Complex Gompertshausen in the Heldburger Gangschar", *commemorative publication on occasion of the 25th anniversary of the German Volcanological Society.*

2016 Bangerth, W., **Dannberg, J.**, Gassmöller, R., & Heister, T. Computational Modeling of Convection in the Earth's Mantle, *SIAM News*, **49**, 2.

2017 **Dannberg, J.**, Shephard, G. "On the influence of grain size in numerical modelling", *blog of the Geodynamics Division of the European Geosciences Union.* (*https://blogs.egu.eu/divisions/gd/2017/11/29/on-the-influence-of-grain-size-in-numerical-modelling/*)

2018 Bangerth, W.; **Dannberg, J.**; Gassmoeller, R.; Heister, T., ASPECT v2.0.0 [software], doi:*10.5281/zenodo.1244587*.

2018 *As member of the CTSP Writing Committe. Whitepaper Reporting Outcomes from NSF-Sponsored Workshop:* 'CTSP: Coupling of Tectonic and Surface Processes'. (*https://csdms.colorado.edu/mediawiki/images/CTSP_WhitePaper_Final.pdf*)

2019 Bangerth, W., **Dannberg, J.**, Gassmöller, R., & Heister, T. ASPECT v2.1.0 [software]. *https://doi.org/10.5281/zenodo.2653531*.

2019 **Dannberg, J.** "Geodynamics 101: Magma dynamics", *blog of the Geodynamics Division of the European Geosciences Union.* (*https://blogs.egu.eu/divisions/gd/2019/09/25/magma-dynamics/*)

2020 Bangerth, W., **Dannberg, J.**, Gassmöller, R., & Heister, T. ASPECT v2.2.0. [software]. *https://doi.org/10.5281/zenodo.3924604*.

2021	Bangerth, W., **Dannberg, J.**, Gassmöller, R., & Heister, T. ASPECT v2.3.0. [software]. *https://doi.org/10.5281/zenodo.5131909*.
2021	**Dannberg, J.** "Thermodynamics and Geodynamics: The perfect couple? Part II", *blog of the Geodynamics Division of the European Geosciences Union (https://blogs.egu.eu/divisions/gd/2021/10/13/thermodynamics-and-geodynamics-the-perfect-couple-part-ii/).*

⌘ Funded Research

2014, 2015, 2016	Project "**Plume-Plate interaction in 3D mantle flow – Revealing the role of internal plume dynamics on global hot spot volcanism"** and two continuation proposals at the North-German Supercomputing Alliance Computing time in CPU hours: 4.8 million (103,000 Euro), 3.3 million (70,460 Euro), 3.7 million (79,300 Euro)
2014	Cooperative Institute for Dynamic Earth Research (NSF CIDER) for the project **"Investigating mantle dynamics using a composite rheology with grain size evolution, tested using seismology"**, $3700
2019	Principal Investigator of "**Collaborative Research: Development and Application of a Framework for Integrated Geodynamic Earth Models"** (NSF-FRES) Anticipated: $1,216,619
2021	Co-PI of "**CSEDI: Understanding the influence of mantle dynamics on the generation of Earth's magnetic field throughout the plate tectonics cycle**" Anticipated: $428,655
2022	Co-PI of Subaward "**Computational Infrastructure for Geodynamics Phase III**" (NSF Geoinformatics) $165,398
2023	Co-PI of Subaward "**Computational Infrastructure for Geodynamics Phase IV**" (NSF Geoinformatics) Anticipated: $705,150

⌘ Awards

12/2013	**AGU Student Travel Grant Awardee** for students whose abstracts show scientific merit to application reviewers in applicable fields
4/2014	**Best poster** in the category "EGU Posters" at the PhD Day of the GFZ German Research Centre for Geosciences
10/2017	KlarText – **Prize for Science Communication** awarded by the German foundation Klaus Tschira Stiftung
6/2018	UC Davis Academic Federation **Travel Grant Awardee**
2021	**Jason Morgan Early Career Award** of AGU's Tectonophysics Section
2022/2023	**Distinguished Speaker** (Computational Infrastructure for Geodynamics Speaker Series)

⌘ Invited Talks

11/2012	"**Numerical modeling of thermo-chemical mantle plumes and their influence on dynamic topography"** at the certificate award ceremony of the faculty of Chemistry and Earth Sciences of the University of Jena, Germany, awarded for the best diploma thesis of the year
4/2014	"**Geodynamic modeling of eclogite-bearing mantle plumes using ASPECT"** in the CIG webinar as part of the presentation about "ASPECT: Science highlights"
6/2014	"**State of the art mantle convection modelling with ASPECT"** in the seminar series of the GeoComputing group of LMU München, Germany
5/2016	**"Magma dynamics and grain size evolution in mantle convection models: Numerical methods and applications"** in the GFD seminar series at ETH Zürich, Switzerland
6/2016	**"3D Numerical Modelling of Compressible Coupled Magma/Mantle Dynamics With Adaptive Mesh Refinement"** as part of the Melt in the Mantle programme at the Isaac Newton Institute for Mathematical Science in Cambridge, UK
1/2017	**"Coupling of computational thermodynamics and fluid dynamics – a magma/mantle dynamics perspective"** at the CIDER Workshop on interoperability of modeling tools in Honolulu, USA
4/2017	**„Methods and Applications of the Finite-Element Software ASPECT in Geodynamics"** in the Computer Science Colloquium at UC Boulder, Colorado (USA)
4/2017	**„Compressible Magma/Mantle Dynamics: 3d, Adaptive Simulations in ASPECT"** at the UC Davis Earth and Planetary Sciences Department Seminar Series in Davis, California, USA
5/2017	**„Geodynamic modeling with ASPECT: Applications for magma/mantle dynamics, grain size evolution and chemical zonation in mantle plumes"** and **ASPECT Hands-on Tutorial** at UT Austin, Texas, USA
9/2017	**"Geodynamic models of coupled magma/mantle dynamics: Towards integrating thermodynamic data"** in the Department of Geoscience Seminar at Aarhus University, Denmark
9/2017	**"Compressible magma/mantle dynamics: 3D adaptive simulations"** at the SIAM Conference on Mathematical and Computational Issues in the Geosciences in Erlangen, Germany
9/2017	**"Coupling mantle convection and melt migration: 3-D, adaptive simulations"** in the MathLab Seminar at SISSA (Scuola Internazionale Superiore di Studi Avanzati), Trieste, Italy
10/2017	**"Forward and inverse problems in geodynamic modelling: Part II -- Thermochemical Convection"** in the Inverse Problems seminar at Colorado State University, Fort Collins, USA
1/2018	**"Geodynamic modelling with ASPECT: Applications for magma/mantle dynamics, grain size evolution and chemical zonation in mantle plumes"** in the Global Geophysics seminar, University College London, UK
5/2018	CIG Webinar about "**ASPECT 2.0: Improved architecture, new features**" (with the ASPECT team)

7/2018	**"Chemical trends in ocean islands explained by plume–slab interaction"**, research talk at the 16th Symposium of SEDI, Study of the Earth's Deep Interior, Edmonton, Canada
8/2018	**"Advances in the geodynamic modelling code ASPECT"**, keynote talk at the German-Swiss Geodynamics Workshop 2018 in Noer, Germany
11/2018	Guest lecture on **"The importance of subduction history and mineral grain size evolution to mantle dynamics"** at CEED – University of Oslo, Norway
12/2018	**"Convection Simulations Explain the Compositional Heterogeneity of Oceanic Island Chains"** and **"Modeling Melt Generation and Transport by Integrating Thermodynamic Models in Geodynamic Simulations Using the Community Code ASPECT"** at the AGU Fall Meeting, Washington D.C., USA
1/2019	**"Mantle plumes and their interaction with tectonic plates: Insights from geodynamic modeling"** at University of Florida, Gainesville, Florida, USA
3/2019	**"Mantle plumes and their interaction with tectonic plates: Insights from geodynamic modeling"** at University of Delaware, Newark, Delaware, USA
4/2019	**"Linking chemical trends in ocean islands to the complex interaction between starting plumes and the core-mantle boundary"** at the EGU General Assembly, Vienna, Austria
5/2019	**"Mantle plumes and their interaction with tectonic plates: Insights from geodynamic modeling"** at Goethe University Frankfurt, Germany
8/2019	**"Modelling mantle convection with chemical and rheological heterogeneities"**, keynote talk at the Ada Lovelace Workshop on Modeling of Mantle and Lithosphere Dynamics, Siena, Italy
11/2019	**"Numerical Modeling of Coupled Magma/Mantle Dynamics Using the Community Code ASPECT"** in the Applied and Numerical Analysis seminar at University of Florida, Gainesville, USA
12/2019	**"Plume formation across scales: The influence of subducted slabs, chemical heterogeneities and a partially molten boundary layer"** at the AGU Fall Meeting, San Francisco, USA
12/2019	**"Mantle plumes and their interaction with tectonic plates: Insights from geodynamic modeling"** in the weekly seminar of the Institute of Geosciences, Friedrich-Schiller-University Jena, Germany
3/2020	**"Plumes and their interaction with a heterogeneous mantle: Insights from geodynamic modeling"** in the Tectonics and Seismology Seminar at UCLA, Los Angeles, USA
7/2020	**"Dynamics, evolution and seismic visibility of melting zones in the lowermost mantle"** in the University of Kentucky Geophysics and Tectonics seminar (virtual)
9/2020	**"Dynamics, evolution and seismic visibility of melting zones in the lowermost mantle"** at the Mini-Workshop on Feedbacks Between Mantle Composition, Structure, and Evolution (virtual)

10/2020	**"Mantle plumes and their interaction with tectonic plates: Insights from geodynamic modeling"** in the University of Miami's Rosenstiel School of Marine and Atmospheric Science Geotopics Seminar (virtual)
12/2020	**"Quantifying the influence of an evolving mineral grain size on the characteristics of mantle flow"** at the AGU Fall Meeting (virtual)
02/2020	**"The morphology, evolution and seismic visibility of partial melt at the core-mantle boundary: Implications for ULVZs"** at the Berkeley Seismo Lab (virtual)
10/2021	"**Coupling of computational thermodynamics and fluid dynamics: Implications for partial melt at the core-mantle boundary and layering of convection**" in the GFD seminar series at ETH Zürich (virtual)
10/2021	"**Modeling phase transitions by coupling geodynamics and thermodynamics: Implications for partial melt at the core-mantle boundary and layering of convection**" in the Geodynamics Seminar at Columbia University/Lamont-Doherty Earth Observatory (virtual)
11/2021	**"Modeling phase transitions in the Earth's mantle: Implications for partial melt at the core-mantle boundary and layering of convection"** in the Geophysics Colloquium at the University of Münster/Germany (virtual)
03/2022	**"Mantle plumes and their interaction with tectonic plates: Insights from geodynamic modeling"** in the Department of Geology Colloquium at University of Georgia
06/2022	**"Dynamics and composition of mantle plumes: Insights from connecting geodynamic models to seismic observations"** at the SAGE/GAGE workshop in Pittsburgh
08/2022	**"Mantle plumes and their chemical composition: Insights from geodynamic modeling"** at GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany
09/2022	**"Interactions between Mantle Convection, Plate Tectonics, and Material Recycling in the Earth's Interior"** in the Institute for Geophysics at UT Austin
10/2022	**"Dynamics of Tectonic Plates, Subducted Slabs, and Mantle Plumes"** in the Department of Earth, Environmental & Planetary Sciences at Brown University
11/2022	**"Subducted Slabs, Mantle Plumes, and the Plate Tectonic Cycle"** at Envisioning the Future of Geophysics: A Celebration of the Centennial of the Seismological Laboratory at the California Institute of Technology, Pasadena
11/2022	**"How subduction history and lowermost mantle viscosity control the evolution of thermochemical structures at the core-mantle boundary"** at the Earth`s History, Dynamics, and Planetary Habitability worskhop in Sundvollen, Norway
11/2022	**"The Plate Tectonic Cycle and Material Recycling in the Earth's Interior: Insights from connecting geodynamic models to seismic observations"** in the Department of Earth Sciences at ETH Zürich

12/2022	**"How subduction history and lowermost mantle viscosity control the thermal and chemical structure of Earth's deep interior"** at the AGU Fall Meeting, Chicago
01/2023	IRIS webinar on the **"Dynamics and composition of mantle plumes: Insights from connecting geodynamic models to seismic observations"** (virtual)
03/2023	"**Subducted Slabs, Mantle Plumes, and the Plate Tectonic Cycle**" as part of the CIG Distinguished Speaker Series (presented in the Hewett Club Seminar at UC Riverside Earth and Planetary Sciences, the Earth Sciences Hybrid Seminar at SOEST/University of Hawai'i at Manoa, and the Department of Earth & Environmental Sciences at University of Ottawa)

⌘ Teaching

3/2013, 2014, 2015	**Instructor** for the course *"Computational Geodynamics"*, University of Potsdam, Germany
9/2014	**Organizer and Instructor** for the hands-on tutorial on *"ASPECT: a next-generation geodynamic modelling software"* at the Geomod conference in Potsdam, Germany
1/2016 – 5/2016	**Co-Instructor** (with W. Bangerth) for the class *Mathematical Modeling (MATH 442)* at Texas A&M University, USA
6/2016	**Instructor** for the *ASPECT tutorial* at the CIG All Hands Meeting, Davis, USA
10/2017	**Instructor** for the Deep Earth Systems PhD Course *"Forging links between petrology and geophysics"*, October 2-13, 2017 Aarhus University, Aarhus, Denmark
1/2018	**Guest Lecture** on *"Applications of the geodynamics code ASPECT"* in the Geophysics Seminar of the University of Kiel, Germany
1/2018	**Instructor** for the *2018 EON-ELSI Winter School* in Earth-Life Sciences, January 22 - February 2, 2018, Earth-Life Science Institute, Tokyo Institute of Technology Tokyo, Japan
5/2018	**Instructor** for the *ASPECT tutorial* at UC Davis, USA
6/2018	**Instructor** for the *ASPECT tutorial* at the CIG/CGU Meeting, Niagara Falls, Canada
11/2018	**Instructor** for the *ASPECT tutorial* at CEED – University of Oslo, Norway
8/2019	**Co-Organizer** of the *Computational Methods for PDEs Summer School* at Colorado State University, Fort Collins, CO, USA
Spring 2020, 2021	**Instructor** for the class *Introduction to Geophysics* (GLY 4450/GLY 5255) at University of Florida, USA
7/2020	**Co-Organizer and Instructor** for the *CIG Tectonics Modeling Tutorial* (virtual, ~50 participants)
Fall 2021, 2022	**Instructor** for the class *Introduction to Simulations and Computational Techniques for Earth Sciences* (GLY 4930/GLY 6932) at University of Florida, USA

⌘ Mentorship/Student & Postdoc Supervision

PhD Students:	Martina Monaco (since 2021) Ranpeng Li (since 2021)

Member of the Ph.D. Supervisory Committee for:

Han Byul "Aiden" Woo (since 2020)
Brian Kelly (since 2020)
Carson Beattie (since 2021)
Gabriel Johnston (since 2021)
Liz Pesar (since 2021)
Danilo Cruz (since 2021)
Daniel Astudillo (since 2022)
Laura Mulrooney (since 2022)

Postdoctoral Associates:

Kiran Chotalia (since 2020)
Arushi Saxena (since 2020)
Daniele Thallner (since 2022, co-supervised)

Internship: Supervision of Martina Monaco for a project on subduction modeling with ASPECT (~150 hours, virtual) as part of her Master's thesis

⌘ Outreach

2017 **Dannberg, J.** (2017). **"**Auf und Ab im Erdmantel" (Up and Down in the Earth's Mantle), *special supplement to the weekly journal "Die Zeit".* (*https://www.klartext-preis.de/meldungen/auf-und-ab-im-erdmantel/*)

6/2018 **Invited talk** "Ein Blick ins Innere der Erde – Wie Gesteins-bewegungen unseren Planeten formen" (Looking into the Earth's Interior – How Moving Rocks Shape Our Planet) at Schule mit Wissenschaft Thüringen (School MIT Science), a **workshop for high-school teachers** organized by the MIT Club of Germany, Erfurt, Germany (*https://youtu.be/Rh2ym5sxMeM*)

12/2018 "Why Are the Pieces of Land in the Wide Water that Breathe out Fire and Smoke Made of Different Types of Rocks?", talk in the **Education session** "The Up-Goer Five Challenge" at the AGU Fall Meeting (*https://youtu.be/SAxO2nzhvZ0*)

10/2020 **Virtual visit** to Herbert Ammons Middle School in Miami-Dade County as part of the "Scientist in Every Florida School" program

⌘ Professional Service

2013-2014 **Elected Student Representative** of the graduate school GeoSim involving communicating the student's interests to the executive board

since 2014 **Reviewer** for SIAM Journal of Scientific Computing; Geochemistry, Geophysics, Geosystems; Gondwana Research; Geophysical Journal International; Physics of the Earth and Planetary Interiors; Journal of Geophysical Research: Solid Earth; Tectonophysics; Frontiers in Earth Science; Nature; Nature Geoscience; Nature Communications; Geophysical Research Letters; NSF EAR and NASA

since 2014 **Committee Member** of the Mantle Convection working group of the Computational Infrastructure for Geodynamics (CIG)

2016 **Session Convener** at EGU General Assembly & AGU Fall Meeting

4/2016 **Judge** for the Outstanding Student Poster and PICO Award at the EGU General Assembly

since 2016	**Principal Developer and Official Maintainer** of the Open Source mantle convection code ASPECT
2017 – 2021	**Session Convener and OSPA Liaison** at the AGU Fall Meeting
2018 – 2022	**Member of the Expert Panel** for the KlarText – Prize for Science Communication awarded by the German foundation Klaus Tschira Stiftung
2019 – 2022	Elected **member of the Science Steering Commitee** of the Computational Infrastructure for Geodynamics (CIG), **Vice Chair** in 2021, **Chair** in 2022
2020	**Member of the CIG Search/Special Committee** for a new vision and leadership for CIG-IV
since 2020	**Topical Editor** of Solid Earth
2022	**Session Convener** at the AGU Fall Meeting
2023	Member of the **CIG Speakers Committee**
since 2023	Memer of the **Early Career/OSPA committee** of AGU's Tectonophysics Section

⌘ Organization of Workshops and Seminars

8/2011	**Management team** of the *12th International Workshop on Modeling of Mantle Convection and Lithospheric Dynamics,* Potsdam, Germany
11/2012	**Organization committee member** of the *Annual workshop of the graduate school GeoSim*
2013	**Organization committee member** of the *GeoSim seminar series,* Potsdam, Germany
10/2014	**Organizer** of the *GeoSim Fall school "Software development"*
2016	**Co-Organizer** of the third *ASPECT Hackathon*, Lake Tahoe, USA
2017	**Co-Organizer** of the fourth *ASPECT Hackathon*, Blue Ridge, USA
2018	**Co-Organizer** of the fifth *ASPECT Hackathon* near Petaluma, USA
2019	**Co-Organizer** of the sixth *ASPECT Hackathon* near Heber City, USA
2020	**Co-Organizer** of the seventh *ASPECT Hackathon* (virtual)
2020	**Organization committee member** of the CIG Community Workshop (virtual)
2021	**Co-Organizer** of the 8th *ASPECT Hackathon* (virtual)
2022	**Co-Organizer** of the 9th *ASPECT Hackathon* in Cody, USA