Curriculum Vitae

Personal information

Surname / First name	**Thielmann, Marcel**
Address	Bayerisches Geoinstitut, Universitätsstraße 30, Universität Bayreuth, 95440 Bayreuth, Germany
Telephone	+49 (0)921 55 3721
Email	marcel.thielmann@uni-bayreuth.de
Nationality	German
Date of birth	04.11.1981
Civil Status	married, 2 children
ORCID	0000-0003-1185-3730
Google Scholar	https://scholar.google.de/citations?hl=en&user=yDs-MYAAAAAJ
Website	http://www.staff.uni-bayreuth.de/~bt303651/

Professional career

11/2021 – present
Emmy Noether Group Leader
Bayerisches Geoinstitut (BGI), University of Bayreuth, Germany
Head of the QuakeID research group investigating deep earthquake rupture processes

08/2020 – 09/2020
Guest professor
Department of Geology, University of Vienna
Lecture on Finite Difference Modelling, Numerical investigation of brittle-ductile deformation in eclogite

09/2015 – 10/2021
Postdoctoral researcher and lecturer
Bayerisches Geoinstitut (BGI), University of Bayreuth, Germany
Numerical modeling of deformation processes in the Earth, student supervision (2 PhD + 1 master), teaching

09/2013 – 04/2015
Postdoctoral researcher
Computational Physics of Engineering Materials, ETH Zurich, Switzerland
Design, construction and execution of laboratory experiments to investigate deformation of and flow in granular media, student supervision (1 PhD + 1 master), teaching

10/2009 – 08/2013
Scientific assistant (Marie Curie Fellow)
Geophysical Fluid Dynamics Group, ETH Zurich, Switzerland
Investigation of weakening mechanisms in the lithosphere with numerical modeling, scaling analyses, development of finite element codes

02/2008 – 09/2009
Student assistant, Bundesanstalt für Wasserbau, Karlsruhe, Germany
Numerical modeling of triaxial tests using ABAQUS

07/2006 – 12/2007
Student assistant, Geophysical Institute, University of Karlsruhe
Borehole stress analysis

10/2005 – 01/2006
Intern, Servicio Sismologicó, Chile
Aftershock location of the Ms 7.6 Tarapacá earthquake,

10/2005 – 01/2006
Student assistant, Geophysical Institute, University of Karlsruhe
Development of a raytracing program for reflection/refraction seismics

Education

07/2022	**Habilitation** Microstructural controls on localization processes in the Earth's mantle and lithosphere University of Bayreuth, Germany Advisors: Prof. H. Keppler, Prof. D.J. Frost, Prof. S.M. Schmalholz
10/2009 – 05/2014	**Dr. sc. ETH** Processes and properties controlling the formation of lithospheric-scale shear zones ETH Zurich, Switzerland Advisor: Prof. P. Tackley
10/2003 – 07/2009	**Diploma in Geophysics**, Grade: 1.2 (very good) Geodynamically consistent cross-sections through active mountain belts University of Karlsruhe, Germany Thesis supervisors: Prof. F. Wenzel, Prof. H. Wilhelm **Minor subjects: Physics, Hydrogeology, Rock Mechanics**
09/1992 – 07/2002	**Abitur** (diploma from German secondary school qualifying for university admission) Klettgau Gymnasium Tiengen, Germany

Community service

Scientific Conferences	Co-convener at the European Geoscience Union General Assembly(2013, 2017–2023), Co-convener at the GeoMod 2018 conference, Co-organizer of the German-Swiss Geodynamics Workshop 2016, Poster Judge at EGU general assembly 2014-2020
Reviewing	Reviewer for Physics of the Earth and Planetary Interiors, Journal of Structural Geology, Tectonophysics, Journal of Geophysical Research, Geophysical Journal International, PLOS ONE, Granular Matter, Icarus, Solid Earth, Science Advances, Nature Communications

Institutional responsibilities

2023	PhD evaluation committee of L. Czekay, University of Bayreuth, Germany
2021	PhD advisory committee of R. Fildes, UC Davis, USA
2020	PhD evaluation committee of R. Huang, University of Bayreuth, Germany
2019	PhD evaluation committee of J. Schierjott, ETH Zurich, Switzerland
2017	PhD advisory committee of E. Marzotto, University of Bayreuth, Germany
2017	PhD advisory committee of J. Schierjott, ETH Zurich, Switzerland
2016	PhD advisory committee of P. Eichheimer, University of Bayreuth, Germany
2013– 2015	Internal Seminar Organizer, Institute of Building Materials, ETH Zurich, Switzerland

Awards

04/2011, Union Outstanding Student Poster (OSP) Award for the poster "Shear heating and subduction initiation" at the EGU General Assembly, Vienna,Austria

External funding

2018	WiN-UBT Travel Grant, € 1500.-
	DFG grant 321722160, Chemistry dependence of the grain boundary character distribution (GBCD) of olivine, € 250 000.- (Co-PI)
2020	DFG grant, QDis: Quantifying Detachment Induced Surface Uplift in the Alps, $\sim$ € 320 000.- (PI)
2021	DFG Emmy Noether grant , QuakeID: Identifying nucleation mechanisms of intermediate-depth and deep focus earthquakes $\sim$ € 1 600 000.- (PI)

Memberships

Deutsche Geophysikalische Gesellschaft (DGG), European Geoscience Union (EGU), American Geophysical Union (AGU)

Research Network “YoungCEED – Subduction zone initiation (SZI) database”

Member DFG Priority Programme “Mountain Building Processes in Four-Dimensions (4D-MB)”

Journal publications

Publication statistics

Since 2012, I have published 25 articles in international peer-reviewed scientific journals (7 as first author, 9 as co-author of a PhD student supervised by me). The continuously growing number of citations since 2012 (Google Scholar: 631 as of 26.03.2023) and an h-index of 14 reflects the scientific relevance of these publications and the quality of my research.

Rogowitz, A., **Thielmann, M.**, Kraus, K., Grasemann, B., and Renner, J. (2023). The Effect of the Garnet Content on Deformation Mechanisms and Weakening of Eclogite: Insights From Deformation Experiments and Numerical Simulations. Geochemistry, Geophysics, Geosystems, 24(3), e2022GC010743. doi:10.1029/2022gc010743

Eberhard, L., **Thielmann, M.**, Eichheimer, P., Néri, A., Suzuki, A., Ohl, M., Fujita, W., Uesugi, K., Nakamura, M., Golabek, G. J. and Frost, D. J. (2022). A New Method for Determining Fluid Flux at High Pressures Applied to the Dehydration of Serpentinites. Geochemistry, Geophysics, Geosystems, 23(9). doi:10.1029/2021gc010062

Gülcher, A. J. P., Golabek, G. J., **Thielmann, M.**, Ballmer, M. D., and Tackley, P. J. (2022). Narrow, Fast, and “Cool” Mantle Plumes Caused by Strain-Weakening Rheology in Earth’s Lower Mantle. Geochemistry, Geophysics, Geosystems, 23(10). doi:10.1029/2021gc010314

Koemets, E., Fedotenko, T., Khandarkhaeva, S., Bykov, M., Bykova, E., **Thielmann, M.**, Chariton, S., Aprilis, G., Koemets, I.,Glazyrin, K., Liermann, H.-P., Hanfland, M., Ohtani, E., Dubrovinskaia, N., McCammon, C. and Dubrovinsky, L. (2021). Chemical Stability of FeOOH at High Pressure and Temperature, and Oxygen Recycling in Early Earth History. European Journal of Inorganic Chemistry, 2021(30), 3048–3053. doi:10.1002/ejic.202100274

Rebaza, A. M., Posner, E. S., **Thielmann, M.** and Rubie, D. C. and Steinle-Neumann, G. (2021) Experimental determination of carbon diffusion in liquid iron at high pressure. Am Mineral 106, 1950–1956, doi: 10.2138/am-2021-7644

Crameri, F., Magni, V., Domeier, M., Shephard, G.E., Chotalia, K., Cooper, G., Eakin, C.M.,Grima, A.G., Gürer, D., Király, Á., Mulyukova, E., Peters, K., Robert, B. and **Thielmann, M.** (2020), A transdisciplinary and community-driven database to unravel subduction zone initiation. Nature Communication 11, 1–14 (2020), doi:10.1038/s41467-020-17522-9

Thielmann, M. and Schmalholz, S. M. Contributions of Grain Damage, Thermal Weakening, and Necking to Slab Detachment. (2020), Front. Earth Sci. 8, 254, doi:10.3389/feart.2020.00254

Papa, S., Pennacchioni, G., Menegon, L. and **Thielmann, M.** (2020), High-stress creep preceding coseismic rupturing in amphibolite-facies ultramylonites. Earth Plan. Sc. Lett. 541, 116260, doi:10.1016/j.epsl.2020.116260

Marzotto, E., Hsieh, W.-P., Takayuki, I., Chao, K.-H., Golabek, G., **Thielmann, M.** and Ohtani, E. (2020), Effect of water on lattice thermal conductivity of ringwoodite and its implications for the thermal evolution of descending slabs. Geophysical Research Letters 47, e2020GL087607, doi: 10.1029/2020gl087607

Schierjott, J. C., **Thielmann**, M., Rozel, A. B., Golabek, G. J. and Gerya, T. V. (2020) Can Grain Size Reduction Initiate Transform Faults?–Insights From a 3-D Numerical Study. Tectonics, 39, e2019TC005793, doi:10.1029/2019tc005793

Eichheimer, P., **Thielmann, M.**, Fujita, W. Golabek, G.J., and Nakamura, M. (2020), Combined numerical and experimental study of microstructure and permeability in porous granular media. Solid Earth, 11, 1079–1095, doi: 10.5194/se-11-1079-2020

Thielmann M. , Golabek .G., and Marquardt, H. (2020), Ferropericlase Control of Lower Mantle Rheology: Impact of Phase Morphology,Geochemistry Geophysics Geosystems, 21(2), e2019GC008688, doi:10.1029/2019GC008688.

Eichheimer, P., **Thielmann, M.** , Popov A., Golabek G. J. , Fujita W. , Kottwitz M. O., and Kaus B. J. P. (2019), Pore-scale permeability prediction for Newtonian and non-Newtonian fluids, Solid Earth, 10(5), 1717-1731, doi:10.5194/se-10-1717-2019.

Thielmann, M. (2018), Grain size assisted thermal runaway as a nucleation mechanism for continental mantle earthquakes: Impact of complex rheologies, Tectonophysics, 746, 611–623, doi:10.1016/j.tecto.2017.08.038

Bianchi, F., Wittel, F. K. ,**Thielmann, M.**, Trtik, P., and Herrmann, H. J. (2018), Tomographic Study of Internal Erosion of Particle Flows in Porous Media, Transport in Porous Media, 16(13), 1-16, doi:10.1007/s11242-017-0996-8

Bianchi, F., **Thielmann, M.**, de Arcangelis, L. and Herrmann, H. J. (2018), Critical Bursts in Filtration, Physical Review Letters, 120(3), 034503, doi:10.1103/PhysRevLett.120.034503

Liao J., Gerya T., **Thielmann M.**, Webb A.A.G., Kufner S. and Yin, A. (2017), 3D geodynamic models of continental subduction with opposite polarities in the Hindu Kush-Pamir orogenic system, northwestern Tibetan Plateau, Earth and Planetary Science Letters, doi:10.1016/j.epsl.2017.10.005

Bianchi, F., **Thielmann M.**, Mani R., Or D. and Herrmann H. J. (2016), Tensile Stress Relaxation in Unsaturated Granular Materials, Granular Matter, 18(75), doi:10.1007/s10035-016-0673-6

Schrenk, K. J., Hilário M. R., Sidoravicius V., Araújo N. A. M., Herrmann H. J., **Thielmann M.**, and Teixeira A. (2016), Critical Fragmentation Properties of Random Drilling: How Many Holes Need to Be Drilled to Collapse a Wooden Cube? Physical Review Letters, 116(5), 055701, doi:10.1103/PhysRevLett.116.055701,

Thielmann, M., Kaus, B. J. P., and Popov, A. A. (2015). Lithospheric stresses in Rayleigh–Bénard convection: effects of a free surface and a viscoelastic Maxwell rheology. Geophysical Journal International, 203(3), 2200–2219,

Thielmann, M., Rozel, A., Kaus, B. J. P., and Ricard, Y. (2015). Intermediate-depth earthquake generation and shear zone formation caused by grain size reduction and shear heating. Geology, 43(9), 791–794,

Melnikov, K., Mani, R., Wittel, F. K., **Thielmann, M.**, and Herrmann, H. J. (2015). Grain-scale modeling of arbitrary fluid saturation in random packings. Phys. Rev. E, 92, 022206. http://doi.org/10.1103/PhysRevE.92.022206,

Thielmann, M., May, D.A. and Kaus, B.J.P. (2014). Discretization Errors in the Hybrid Finite Element Particle-in-cell Method, Pure and Applied Geophysics, 171(9), 2165–2184 ,

Hidas, K., Garrido, C., Tommasi, A., Padrón-Navarra, J.A., **Thielmann, M.**, Konc, Z., Frets, E. and Marchesi, C. (2013). Strain localization in pyroxenite by reaction-enhanced softening in the shallow subcontinental lithospheric mantle, Journal of Petrology, 54(10), 1997–2031,

Thielmann, M. and Kaus, B.J.P. (2012). Shear-heating induced lithospheric localization: Does it result in subduction?, Earth and Planetary Science Letters, 359-360, 1–13,

Theses

Geodynamically consistent cross-sections through active mountain belts, Diploma thesis, University of Karlsruhe

Processes and properties governing the formation of lithospheric-scale shear zones, PhD thesis, ETH Zürich

Invited Talks

2012 Breaking the lid: from shear zones to subduction, Seminar Geosciences Montpellier, Montpellier, France

2016 Forming plate boundaries: The search for effective strain localization mechanisms, Centre for Earth Evolution and Dynamics seminar, Oslo, Norway

Shear localization due to grain size evolution and shear heating: an energy perspective, Geophysical Fluid Dynamics seminar, Zürich, Switzerland

	Grain size assisted thermal runaway: A mechanism for plate boundary creation and intermediate-depth earthquake generation?, Structural Geology Seminar, Tübingen, Germany
2017	Grain size assisted thermal runaway: a mechanism to generate intermediate-depth earthquakes and ductile shear zones, EGU General assembly, Vienna, Austria
	Latest developments in Earth dynamics models and their impact on surface processes, 4th Central European Geomorphology Conference, Bayreuth, Germany
	Mineral scale modelling of two-phase deformation, BAdW Workshop “Mantle Dynamics and Deep Earth Material Cycles”, München, Germany
	Earthquakes Below the Brittle-Ductile Transition: The Role of Grain Size Assisted Thermal Runaway, AGU Fall Meeting, New Orleans, USA
2018	Ductile strain localization: the key for plate tectonics on a convective planet, Seminar FAST, Orsay, France
	Earthquakes, shear zones and plate tectonics: the importance of ductile weakening mechanisms, Erdwissenschaftliches Kolloquium, Vienna, Austria
	Intermediate depth earthquakes due to grain size assisted thermal runaway: What are the odds?, Japan Geoscience Union Meeting, Chiba, Japan
	From ductile shear zones to earthquakes, Earth, Sea and Sky III: International Joint Graduate Program Workshop in Earth and Environmental Sciences, Sendai, Japan
2019	Deforming two-phase media: From Topology to Rheology, CREEP Final Workshop, Les Houches, France
	Earthquakes and plate tectonics - the importance of ductile weakening mechanisms, Structural Geology and Tectonics Seminar, ETH Zürich, Switzerland
2021	The 2013 Wind River earthquake: an example of a ductile seismic rupture?, DGG Jahrestagung, Kiel, Germany
2022	Ductile Deep Earthquakes - a numerical perspective, Njord seminar series, Oslo/online, Norway
	Ductile Deep Earthquakes - a numerical perspective, ENS Laboratoire de Géologie Seminar, Paris, France

Conference proceedings (oral, selected)

2009	Shear heating and subduction initiation, Swiss Geoscience Meeting, Fribourg/Switzerland
2010	Processes and properties controlling the formation of lithosphere-scale shear zones, Crystal2Plate Assessment Session, Orsay/France
2012	How to break a plate?, 3rd Crystal2Plate workshop, Bristol/UK
	Intra-oceanic subduction initiation induced by shear heating: What are the odds?, 14th Symposium on Tectonics, Structural Geology and Geology of Crystalline Rocks, Kiel/Germany
	Shear-heating induced lithospheric localization: Can it result in subduction?, EGU General assembly, Vienna/Austria
2013	Breaking the lid: how to self-consistently create shear zones in the lithosphere, 4th Crystal2Plate workshop, Fréjus/France
2014	Grain size assisted formation of pseudotachylites: A numerical study, EGU General assembly, Vienna/Austria
2017	Grain size assisted thermal runaway: a mechanism to generate intermediate-depth earthquakes and ductile shear zones, DGG Jahrestagung, Potsdam/Germany
2019	Earthquakes below the brittle-ductile transition: The role of grain size assisted thermal runaway, Specialist discussion meeting of the Royal Astronomical Society, London, UK
	Deep intraslab earthquake rupture due to grain size assisted thermal runaway, Japanese Geoscience Union Meeting, Chiba, Japan
	Ferropericlase control of lower mantle rheology - Impact of phase morphology, International Workshop on Deep Volatile Cycling in the Earth, Tokyo, Japan
	Ferropericlase control of lower mantle rheology - Impact of phase morphology, 2nd Deep Earth Symposium, Münster, Germany

2021 | Impact of ferropericlase elongation on lower mantle rheology, EGU General Assembly, online

Contributions of grain size reduction and shear heating to slab detachment, German-Swiss Geodynamics Workshop, Bad Belzig, Germany

Public outreach

2011 | Le Cervin est-il africain?, SPS meeting, Lausanne/Switzerland, Joint presentation with M. Marthaler, results from numerical experiments were presented by me

2019 | Enigmas at depth, EGU Geodynamics Blog, `https://blogs.egu.eu/divisions/gd/2019/11/13/enigmas-at-depth/`

Teaching

Introductory lectures

2013 – 2015 | Introduction to Computational Physics - exercises, ETH Zürich

2018 – 2020 | Allgemeine Geologie, Universität Bayreuth

2018 – 2021 | Introduction to Geophysics, Unviversität Bayreuth

Advanced lectures

2010 – 2013 | Finite Element Block Course - exercises, ETH Zürich

2010 – 2013 | Mantle and Lithosphere dynamics - exercises, ETH Zürich

2013 – 2015 | Computational Statistical Physics - exercises, ETH Zürich

2015 – present | Finite difference method , Universität Bayreuth

2015 – present | Geodynamical modeling , Universität Bayreuth

Field courses

2006 – 2007 | Geophysical field course (geoelectrics), Universität Karlsruhe (TH)

2010 – 2013 | Geophysical field course (gravimetry), ETH Zürich

Other lectures

08/2020 | Block course on numerical modelling in Geoscience, University of Vienna

03/2022 | Tectonic Modelling Short Course, University of Halle

Supervision

PhD theses | Filippo Bianchi (2014 – 2017), Experimental investigation of clogging of porous media, ETH Zürich (main supervisor: H.J. Herrmann)

Philipp Eicheimer (2016–2020), Impact of volatiles on subduction dynamics, University of Bayreuth (main supervisor: G. Golabek)

Jana Schierjott (2016–2019), Transform fault formation due to grain size evolution, ETH Zürich (main supervisor: P. Tackley)

Enrico Marzotto (2017–2021), Impact of water transport on lower mantle dynamics, University of Bayreuth (main supervisor: G. Golabek)

Filippe Ferreira (2017–2021), Grain boundary character distribution of olivine, University of Bayreuth (main supervisor: K. Marquardt)

Master theses | Amir Omeradzic (2014/2015), Numerical Simulations of Directed Particle Assembly, ETH Zürich (main supervisor: H.J. Herrmann)

Andrea Adams (2016/2017), Viability of Archean Subduction Initiation by Continental Spreading and Plume-Continent Interactions, master thesis, University of Bayreuth (main supervisor: G. Golabek)

Other | Matteo Berchier (2014/2015), Clogging of porous media, semester project, ETH Zürich (main supervisor: H.J. Herrmann)

Sebastian Honegger (2014/2015), Diffusion Limited Aggregation, Proseminar Theoretical Physics, ETH Zürich (main supervisor: H.J. Herrmann)

Yang Li (2015/2016), A Numerical Parameter Study for the Mixing of the Martian Mantle, semester project, University of Bayreuth (main supervisor: G. Golabek)

Sourav Misra (2016), Impact of inclusions on fold growth rates, semester project, University of Bayreuth (main supervisor: G. Golabek)

Daria Andreieva (2022), Effects of surface tension on inclusion elongation, University of Bayreuth (main supervisor: G. Golabek)