

BORIS J.P. KAUS

Geophysics and Geodynamics ·
Institute of Geosciences, VAMOS Research Center & Center for Computational Sciences
· Johannes-Gutenberg Universität Mainz ·
office 00-285 · J.J.-Becherweg 21 · 55128 Mainz · Germany
Phone: +49.6131.392.4527 · Fax: +49.6131.392.3070 · E-Mail: kaus@uni-mainz.de
CV Version: December 1, 2017

PERSONAL DATA

Date of Birth: December 4, 1976
Heerlen, Netherlands.
Citizenship: Netherlands.

PROFESSIONAL EXPERIENCE

2017- Institute of Geosciences,
Johannes Gutenberg University, Mainz, Germany
Director of the Institute of Geosciences

2014- Institute of Geosciences,
Center for Computational Sciences &
Center for Volcanoes, Atmospheres and Magmatic Open Systems
Johannes Gutenberg University, Mainz, Germany
Full Professor and Chair of Geophysics and Geodynamics (W3)

2011-2014 Institute of Geosciences,
Johannes Gutenberg University, Mainz, Germany
Professor of Geophysics (W2)

12/2010 - 8/2011 ETH Zürich, Zürich, Switzerland
Assistant Professor of Computational Geodynamics

2007-2015 University of Southern California, Los Angeles, USA
Research Assistant Adjunct Professor of Earth Sciences

1/2007 - 11/2010 ETH Zürich, Zürich, Switzerland
Oberassistent/Senior Research Scientist

2005-2006 University of Southern California, Los Angeles, USA
Postdoctoral Research Associate

2001-2004 ETH Zürich
Research and Teaching Assistant (Funded by the Swiss National Fonds).

1/2004, 9/2003 Physics of Geological Processes. Oslo, Norway
Visiting Researcher

10/2000–12/2000 Minnesota Supercomputer Institute
Visiting Researcher

1998-2000 ETH Zürich
Teaching Assistant

1995-1997 RWTH Aachen
Teaching Assistant

EDUCATION

- 2001-2004 ETH Zürich, Switzerland.
Ph.D. (summa cum laude) in Natural Sciences
- Project title: *Modelling approaches to geodynamic processes.*
 Advisors: Prof. Dr. Y. Podladchikov, Prof. Dr. J-P. Burg.
- 1997-2000 ETH Zürich, Switzerland.
Diplom (M.Sc.) in Natural Sciences
- Thesis: *Forward and reverse modelling of the three-dimensional Rayleigh-Taylor instability.*
 Advisor: Prof. Dr. Y. Podladchikov.
- 1995-1997 RWTH Aachen, Germany.
B.Sc. (Vordiplom) in Geology, July 1997.
- 1990-1995 Highschool (VWO) in Gulpen, The Netherlands.
-

PUBLICATIONS

My current (google scholar) *h*-index is 24 with 2398 citations, 64 publications, the average citation per publication is 37.5 and the *h*-index normalized over the years since I received my PhD is 2.

* student author † postdoc author

Submitted:

2. RUMMEL L.*, **KAUS B.J.P.**, WHITE R.W., MERTZ D., YANG J., BAUMANN T. (2017). Coupled petrological-geodynamical modeling of a compositionally heterogeneous mantle plume. *Tectonophysics*.
1. PÜSÖK A.*, **KAUS B.J.P.**, POPOV A. (2017). The effect of rheological approximations in 3-D numerical simulations of subduction and collision. *Tectonophysics*.

Peer-reviewed:

64. POURYAZDAN M., **KAUS B.J.P.**, RACK A., ERSHOV A., HAHN H. (2017). Mixing instabilities during shearing of metals. *Nature Communications*. Vol. 8 (1), 1611, doi:10.1038/s41467-017-01879-5.
63. DING L.*, BUHRE S., KUNISCH C., **KAUS B.J.P.** (2017). Pressure dependence of density and structural relaxation of glass near the glass transition region. *Journal of the American Ceramic Society*, doi:10.1111/jace.15276
62. REUBER G.*, **KAUS B.J.P.**, POPOV A. (2017). Deriving scaling laws in geodynamics using adjoint gradients. *Tectonophysics*. doi:10.1016/j.tecto.2017.07.017
61. MEYER S.*, **KAUS B.J.P.**, PASSCHIER C. (2017) Development of branching ductile and brittle shear zones: a numerical study. *Geochemistry Geophysics Geosystems*. doi: 10.1002/2016GC006793
60. YANG J.*, ZHAO L., **KAUS B.J.P.**, LU G., WANG K., ZHU R. (2017). Slab-triggered wet upwellings produce large volumes of melt: Insights into the destruction of the North China Craton. *Tectonophysics*. doi: 10.1016/j.tecto.2017.04.009

59. PALIN R.M., REUBER G.*, WHITE R.W., **KAUS B.J.P.**, WELLER O.M. (2017). Subduction metamorphism in the Himalayan ultrahigh-pressure Tso Moriri massif: an integrated geodynamic and petrological modelling approach. *Earth and Planetary Science Letters*. Vol. 467, p. 108-119, doi:10.1016/j.epsl.2017.03.029
58. PÜSÖK A.*, **KAUS B.J.P.**, POPOV A.A. (2016). On the quality of velocity interpolation schemes for marker-in-cell method and staggered grids. *Pure and Applied Geophysics*. doi:10.1007/s00024-016-1431-8
57. **KAUS B.J.P.** (2016) Constraining lithospheric flow. *Science*. Vol. 353, Issue 6307, Sept. 30, 2016, doi:10.1126/science.aai8442
56. CAO W.*, **KAUS B.J.P.**, PATERSON S. (2016) Intrusion of granitic magma into the continental crust facilitated by multiple pulses and diking: numerical simulations. *Tectonics*. 35, 1575-1594, doi:10.1002/2015TC004076
55. BUITER S.J.H., SCHREURS G., ALBERTZ M., GERYA T., **KAUS B.J.P.**, LANDRY W., LE POURHIET L., MISHIN Y., EGHOLM D.L., COOKE M., MAILLOT B., THIEULOT C., CROOK T., MAY D., SOULOUMIAC P., BEAUMONT C. (2016) Benchmarking numerical models of brittle thrust wedges. *Journal of Structural Geology*. doi:10.1016/j.jsg.2016.03.003
54. REUBER G.*, **KAUS B.J.P.**, SCHMALHOLZ S.M., WHITE R.W. (2016). Non-lithostatic pressure during subduction and collision and the formation of (ultra)-high pressure rocks. *Geology*. 44 (5), 343-346, doi: 10.1130/G37595.1
53. COLLIGNON M.*, YAMATO P., CASTELLTORT S., **KAUS B.J.P.** (2016) Modeling of wind gap formation and development of sedimentary basins during fold growth: application to the Zagros Fold Belt, Iran. *Earth Surface Processes and Landforms*. DOI: 10.1002/esp.3921
52. **KAUS B.J.P.**, POPOV A.A., BAUMANN T.S., PÜSÖK A.E., BAUVILLE A., FERNANDEZ N., COLLIGNON M. (2016) Forward and inverse modelling of lithospheric deformation on geological timescales. *NIC Symposium 2016 - Proceedings*. NIC Series Vol. 48. edited by K. Binder, M. Müller, M. Kremer, A. Schnurpfeil, p. 299-307.
51. MARQUES F., **KAUS B.J.P.** (2016) Speculations on the impact of catastrophic subduction initiation on the Earth system. *Journal of Geodynamics*. Vol. 93, 1-16. doi:10.1016/j.jog.2015.09.003
50. THIELMANN M.*, **KAUS B.J.P.**, POPOV A. (2015) Lithospheric stresses in Rayleigh-Bénard convection: Effects of a free surface and a viscoelastic Maxwell rheology *Geophysical Journal International*. Vol. 203 (3), p. 2200-2219
49. LEHMANN R.S.*, Lukáčová-Medvid'ová M., **KAUS B.J.P.**, POPOV, A.⁺ (2015) Comparison of continuous and discontinuous Galerkin approaches for variable-viscosity Stokes. *Zeitschrift für Angewandte Mathematik und Mechanik*. DOI: 10.1002/zamm.201400274
48. COLLIGNON M.*, FERNANDEZ N.*, **KAUS B.J.P.** (2015) Influence of surface processes and initial topography on lateral fold growth and fold linkage mode. *Tectonics*. Vol. 34 (8) DOI: 10.1002/2015TC003843
47. THIELMANN M.*, ROZEL A., **KAUS B.J.P.**, RICARD Y. (2015) Intermediate-depth earthquake generation and shear zone formation caused by grain size reduction and shear heating. *Geology*. Vol. 43 (9), p. 791-794.
46. BAUMANN T.*, **KAUS B.J.P.** (2015) Geodynamic inversion to constrain the non-linear rheology of the lithosphere. *Geophysical Journal International*. Vol. 202, No. 2, p. 1289-1316, DOI: 10.1093/gji/ggv201
45. FERNANDEZ N.*, **KAUS B.J.P.** (2015) Pattern formation in 3D numerical models of down-build diapirs initiated by a Rayleigh-Taylor instability. *Geophysical Journal International*. Vol. 202, No. 2, p. 1253-1270, DOI: 10.1093/gji/ggv219

44. PÜSÖK A.*, **KAUS B.J.P.** (2015) Development of topography in 3D continental collision models. *Geochemistry Geophysics Geosystems*. Vol. 16 (5). DOI: 10.1002/2015GC005732.
43. LU G., **KAUS B.J.P.**, ZHAO L., ZHENG T. (2015) Self-consistent initiation of subduction from a stagnant lid induced by mantle flow. *Terra Nova*. Vol. 27, No. 2, p. 130-138, DOI: 10.1111/ter.12140
42. FERNANDEZ N.*, **KAUS B.J.P.** (2014) Influence of pre-existing salt diapirs on 3D folding patterns. *Tectonophysics*. Vol. 637, p.354-369. DOI:10.1016/j.tecto.2014.10.021.
41. COLLIGNON M.*, **KAUS B.J.P.**, MAY D.A., FERNANDEZ N.* (2014) Influences of surface processes on fold growth during 3D detachment folding. *Geochemistry Geophysics Geosystems*. DOI:10.1002/2014GC005450
40. FERNANDEZ N.*, **KAUS B.J.P.** (2014) Fold interaction and wavelength selection in 3D models of multilayer detachment folding. *Tectonophysics*. Vol. 632, p.199-217. DOI: 10.1016/j.tecto.2014.06.013
39. LU G., ZHAO L., ZHENG T., **KAUS B.J.P.**, (2014) Strong intra-continental lithospheric deformation in South China: implications from seismic observations and geodynamic modeling. *Journal of Asian Earth Sciences*. Vol. 86, p. 106-116. DOI: 10.1016/j.jseaes.2013.08.020
38. BAUMANN T.*, **KAUS B.J.P.**, POPOV A.+ (2014) Constraining effective rheology through parallel joint geodynamic inversion. *Tectonophysics*. DOI: 10.1016/j.tecto.2014.04.037
37. THIELMANN M.*, MAY D.A., **KAUS B.J.P.** (2014) Discretization errors in the hybrid finite element particle-in-cell method. *Pure and Applied Geophysics*. DOI: 10.1007/s00024-014-0808-9
36. LECHMANN S.M.*, SCHMALHOLZ S.M., HETENYI G., MAY D.A., **KAUS B.J.P.**, (2014) Quantifying the impact of mechanical layering and underthrusting on the dynamics of the modern India-Asia collisional system with 3-D numerical models. *Journal of Geophysical Research*. DOI: 10.1002/2012JB009748
35. JOHNSON T.E., BROWN M., **KAUS B.J.P.**, VAN TONGEREN J.A. (2014) Delamination and recycling of Archaean crust caused by gravitational instabilities. *Nature Geoscience*. Vol 7, p. 47-52, DOI: 10.1038/NGEO2019
34. KELLER T.*, MAY D.A., **KAUS B.J.P.**, (2013) Numerical modelling of magma dynamics coupled to tectonic deformation of lithosphere and crust. *Geophysical Journal International*. Vol. 195(3). pp. 1406-1442, doi:10.1093/gji/ggt306 [winner of the 2013 GJI Student Author Award]
33. **KAUS B.J.P.**, (2013) Solid Earth: Heating glaciers from below. (News & Views). *Nature Geoscience*. doi:10.1038/ngeo1919
32. THIELMANN M.*, **KAUS B.J.P.**, (2012) Shear heating induced lithospheric-scale localization: does it result in subduction? *Earth and Planetary Science Letters*. Vol. 359-360, p. 1-13, doi:10.1016/j.epsl.2012.10.002
31. DURETZ T.*, GERYA T.V., **KAUS B.J.P.**, ANDERSEN T. (2012) Thermomechanical modeling of slab eduction. *Journal of Geophysical Research - Solid Earth*. Vol. 117, B08411, doi:10.1029/2012JB009137.
30. RUH J.*, **KAUS B.J.P.**, BURG J.-P. (2012). Numerical investigation of deformation mechanics in fold-and-thrust belts: Influence of rheology of single and multiple decollements. *Tectonics*. Vol 13 (4), Q04001, doi:10.1029/2011GC003934.
29. GERAULT M.*, BECKER T.W., **KAUS B.J.P.**, FACCENNA C., MORESI L.N., HUSSON L. (2012) The role of slabs and oceanic plate geometry for the net rotation of the lithosphere, trench motions, and slab return flow. *Geochemistry Geophysics Geosystems*. Vol 13 (4), Q04001, doi:10.1029/2011GC003934.

28. CRAMERI F.* , SCHMELING H., GOLABEK G.J., DURETZ T., ORENDR R., BUITER S., MAY D.A., **KAUS B.J.P.**, GERYA T.V., TACKLEY P.J. (2012). A benchmark comparison of numerical surface topography calculations in geodynamic modelling. *Geophysical Journal International*. Vol. 181(1), p.38-54.
27. CRAMERI F.* , TACKLEY P.J., MEILICK I., GERYA T.V., **KAUS B.J.P.** (2012): A free plate surface and weak oceanic crust produce single-sided subduction on Earth. *Geophysical Research Letters*. Vol. 39(3), doi 10.1029/2011GL050046.
26. LECHMANN S.M.* , MAY D.A.+ , **KAUS B.J.P.**, SCHMALHOLZ S.M., (2011): Comparing thin-sheet models with 3D multilayer models for continental collision. *Geophysical Journal International*. 187, 10-33. doi: 10.1111/j.1365-246X.2011.05164.x
25. YAMATO P.+ , **KAUS B.J.P.**, MOUTHEREAU F., CASTELLTORT S. (2011): Dynamic constraints on crustal-scale rheology from the Zagros Fold Belt, Iran. *Geology*. Vol. 39 (9), p. 815-818, doi:10.1130/G32136.1
24. LU G.* , **KAUS B.J.P.**, ZHAO L. (2011): Thermal localization as a potential mechanism to rift cratons. *Physics of the Earth and Planetary Interiors*. Vol. 186, p. 125-137.
23. DEUBELBEISS Y.* , **KAUS B.J.P.**, CONNOLLY J.A.D., CARICCHI L. (2011): Potential causes for the non-Newtonian rheology of crystal-bearing melts. *Geochemistry Geophysics Geosystems*. Vol. 12, Q05007, 22p. doi:10.1029/2010GC003485.
22. DURETZ T.M.* , **KAUS B.J.P.**, SCHULMANN K., GAPAIS D., KERMARREC J.-J. (2011): Indentation as an extrusion mechanism of lower crustal rocks in the Eastern Bohemian Massif: Insight from analogue and numerical modelling. *Lithos*. Vol. 124 (1-2), 158-168.
21. CASTELLTORT S., NAGEL S., MOUTHEREAU F., LIN A.T.-S., WETZEL A., **KAUS B.J.P.**, WILLETT S., CHIANG S.-P., CHIU W.-Y. (2011): Sedimentology of Early Pliocene Sandstones in the south-western Taiwan foreland: implications for basin physiography in the early stages of collision. *Journal of Asian Earth Sciences*. Vol. 40, p. 52-71.
20. **KAUS B.J.P.**, MÜHLHAUS H., MAY D.A.+ (2010): A stabilization algorithm for geodynamic numerical simulations with a free surface. *Physics of the Earth and Planetary Interiors*. Vol. 181. p. 12-20.
19. CRAMERI F.* , **KAUS B.J.P.** (2010): Parameters that control lithospheric-scale thermal localization. *Geophysical Research Letters*. Vol. 37, L09308, doi:10.1029/2010GL042921
18. **KAUS B.J.P.** (2010): Factors that control the angle of shear bands in geodynamic numerical models of brittle deformation. *Tectonophysics*. Vol. 484 (1-4). p 36-47.
17. DEUBELBEISS Y.* , **KAUS B.J.P.**, CONNOLLY J.A.D. (2010): Direct numerical simulation of two-phase flow: Pattern formation and effective rheology of particle suspensions. *Earth and Planetary Science Letters*. Vol. 290 (1-2). p. 1-12.
16. GOLABEK G.* , GERYA T.V., **KAUS B.J.P.**, ZIETHE R., TACKLEY P.J. (2009): Rheological controls on the terrestrial core formation mechanism. *Geochem. Geophys. Geosyst.* Vol 10, Q11007, doi:10.1029/2009GC002552
15. SCHMALHOLZ S.M., **KAUS B.J.P.**, BURG J.-P. (2009): Stress-strength relationships in the lithosphere during continental collision. *Geology*. Vol 37 (9). p. 775-778.
14. **KAUS B.J.P.**, LIU Y., BECKER T.W., YUEN D.A., SHI Y. (2009): Lithospheric stress-states predicted from long-term tectonic models: influence of rheology and possible application to Taiwan. *Journal of Asian Earth Sciences*. Vol. 36 (1), p.119-134.
13. **KAUS B.J.P.**, GERYA T.V., SCHMID D.W. (2008): Recent advances in Computational Geodynamics: Theory, Numerics and Applications. *Physics of the Earth and Planetary Interiors*. Vol. 171(1-4), p. 2-6. (*Top downloaded PEPI paper in the beginning of 2009*).

12. **KAUS B.J.P.**, STEEDMAN C.*, BECKER T.W. (2008): From passive continental margin to mountain belt: insights from analytical and numerical models and application to Taiwan. *Physics of the Earth and Planetary Interiors*. Vol. 171(1-4), p. 235-251.
11. SCHMELING H., BABEYKO A., ENNS A., FACCENNA C., FUNICIELLO F., GERYA T., GOLABEK G., GRIGULL S., **KAUS B.J.P.**, MORRA G., SCHMALHOLZ S., VAN HUNEN J. (2008). A benchmark comparison of spontaneous subduction models: towards a free surface. *Physics of the Earth and Planetary Interiors*. Vol. 171(1-4), p. 198-223.
10. DEUBELBEISS Y. *, **KAUS B.J.P.** (2008): Comparison of Eulerian and Lagrangian numerical techniques for the Stokes equations in the presence of strongly varying viscosity. *Physics of the Earth and Planetary Interiors*. Vol. 171(1-4), p. 92-111.
9. PLATT J.P., **KAUS B.J.P.**, BECKER T.W. (2008): The San Andreas transform system and the tectonics of California: An alternative approach. *Earth and Planetary Science Letters*. Vol. 274. p380-391.
8. **KAUS B.J.P.**, BECKER T.W., (2007): Effects of elasticity on the Rayleigh-Taylor instability: implications for large-scale geodynamics. *Geophysical Journal International*, Vol. 168, p. 843-867. doi: 10.1111/j.1365-246X.2006.03201.x.
7. **KAUS B.J.P.**, SCHMALHOLZ S.M., (2006): 3D Finite amplitude folding: implications for stress evolution during crustal and lithospheric deformation. *Geophysical Research Letters*. Vol. 33, L14309, doi:10.1029/2006GL026341.
6. **KAUS B.J.P.**, PODLADCHIKOV Y.Y., (2006): Initiation of localized shear zones in viscoelastoplastic rocks. *Journal of Geophysical Research*. Vol. 111, doi:10.1029/2005JB003652.
5. BUITER S.H.H., BABEYKO A.Y., ELLIS S., GERYA T.V., **KAUS B.J.P.**, KELLNER A., SCHREURS G. and Y. YAMADA. (2006): The numerical sandbox: Comparison of model results for a shortening and an extension experiment. *Geol. Soc. Spec. Publ.* 253. 'Analogue and numerical modelling of crustal-scale processes'. p29-64.
4. **KAUS B.J.P.**, CONNOLLY J.A.D., PODLADCHIKOV Y.Y., SCHMALHOLZ, S.M. (2005): Influence of mineral phase transitions on basin subsidence and uplift. *Earth and Planetary Science Letters*. Vol. 233. p.213-228.
3. MILLER, S.A., COLLETTINI C., CHIARALUCE L., COCCO M., BARCHI M., **KAUS B.J.P.** (2004): Aftershocks driven by a high pressure CO_2 source at depth. *Nature*. Vol. 427. p724-727.
2. BURG J-P., **KAUS B.J.P.**, PODLADCHIKOV Y.Y. (2004): Dome structures in collision orogens. Mechanical investigation of the gravity/compression interplay. in Whitney, D.L., Teyssier, C., and Siddoway, C.S., *Gneiss domes in orogeny: Geological Society of America Special Paper* 380, p.47-66.
1. **KAUS B.J.P.**, PODLADCHIKOV Y.Y. (2001): Forward and reverse modeling of the three-dimensional viscous Rayleigh-Taylor instability. *Geophysical Research Letters*. Vol. 28. No. 6. p1095-1098.

Peer-reviewed extended abstracts:

5. BAUMANN T.S.⁺, **KAUS B.J.P.**, EICHHEIMER P. (2017). 3D Numerical Modelling of Salt Tectonics. *79th EAGE Conference and Exhibition 2017*, doi:10.3997/2214-4609.201701173.
4. FERNANDEZ N., **KAUS B.J.P.**, (2014): Analytical and numerical investigation of 3D multilayer detachment folding. *73rd IAMG Conference, Barcelona*.
3. **KAUS B.J.P.**, YAMATO P., MOUTHEREAU F., CASTELLTORT S., LECHMANN S.M. (2011): Using observed fold spacing and models to constrain the dynamics and rheology of the Zagros Mountains. *73rd EAGE Conference, Vienna*.

2. **KAUS B.J.P.**, BECKER T.W. (2008): A numerical study on the effects of surface boundary conditions and rheology on slab dynamics. *Extended abstracts of the GeoMod2008 conference, Bolletino di Geofisica*. Vol 49 (2 Supplement), p177-182.
1. **KAUS B.J.P.**, PODLADCHIKOV Y.Y., SCHMID D.W. (2004): Eulerian spectral/finite difference method for large deformation modelling of visco-elasto-plastic geomaterials. *Extended abstracts of the GeoMod2004 conference. Bolletino di Geofisica*. Vol. 45. p346-349.

Others:

4. **KAUS B.J.P.** (2014): Response to: "Boris Kaus receives 2012 Paul Niggli Medal". *Swiss Journal of Geosciences*. Vol 107, p. 129-131.
3. BECKER T.W., **KAUS B.J.P.** (2010): Numerical Geodynamics. An introduction to computational methods with focus on solid Earth applications of continuum mechanics. Lecture notes. University of Southern California, Los Angeles. 155 pages.
2. **KAUS B.J.P.** (2004): Modelling approaches to geodynamic processes. PhD. Thesis. ETH Zürich.
1. **KAUS B.J.P.** (2000): Forward and reverse modeling of the three-dimensional viscous Rayleigh-Taylor instability. M.Sc. Thesis. ETH Zürich.

Edited volumes:

- **KAUS B.J.P.**, GERYA T.V., SCHMID D.W. (editors): Recent advances in Computational Geodynamics: Theory, Numerics and Applications. *Special Issue in Physics of the Earth and Planetary Interiors*. (Vol 171 (1-4), December 2008).

SEMINARS

I have given quite a few seminars during since my first appearance around 2000. Below they are broken down in chronological order, and only invited lectures are counted.

Invited lectures at geoscience departments:

- 2017 [1] Chinese Academy of Science, Beijing.
- 2016 [2] Cambridge University, University of Vienna.
- 2015 [6] University of Tübingen, JGU Mainz (young physical society), ETH Zürich, Bayerische Geoinstitut (BGI), Chinese Academy of Science, Beijing (×2).
- 2014 [3] Curtin University, Institute Physique du Globe Paris, FU Berlin.
- 2013 [5] Uni Kiel, Uni Münster. Uni-Lyon/ENS (European Seminar Series), USC (x2).
- 2012 [2] ETH Zürich, U. Buenos Aires.
- 2011 [6] U. Lyon, U. Lausanne. Mathematics U. Mainz, Seismology ETH, U. Bonn, Department seminar ETH.
- 2010 [1] U. Rennes.
- 2009 [3] U. Mainz, U. Bochum, U. Bern.
- 2008 [3] U. Bonn, U. Frankfurt, U. Karlsruhe.
- 2007 [2] U. Paris 6, U. Jena.
- 2006 [5] Johns Hopkins University, Durham University, U. Oslo, Caltech, U. Maryland.

2005 [2] ETH Zürich, UCLA.

2004 [2] U. Potsdam, USC.

Lectures at conferences or workshops:

2017 [4] EGU, AGU.

2016 [4] EGU, Melt in the Mantle 3rd Workshop (Cambridge), CREEP kickoff workshop, German-Swiss Geodynamics workshop.

2015 [3] SIAM Computational Science and Engineering, EGU, European Geodynamics Meeting Olerons (France)

2014 [5] Von Neumann Institute of Computing workshop, Gauss Lecture EGU (×2), PASC workshop, YuPo workshop Lausanne.

2013 [5] AlpArray planning meeting, EGU, ALERT workshop on geomechanics (×2), AGU.

2012 [1] FKPE Meeting.

2011 [2] European Geodynamics Meeting Potsdam, Arne Richter Medal Lecture EGU.

2010 [1] GeoMod.

2009 [2] Crystal2Plate kickoff meeting, Geodynamics Workshop Suzdal Russia.

2008 [5] DIAS meeting Dublin, GeoMod Florence, CIG Workshop on Mantle Convection and Lithosphere Dynamics UC Davis (2 talks), EGU.

2007 [1] AGU.

2005 [1] CIG Mantle Convection Workshop Boulder.

2000 [1] AGU.

AWARDS

- European Research Council Consolidator Grant. 2017.
- IGGCAS International Fellowship for Distinguished Scientists by the Chinese Academy of Sciences. 2017.
- European Research Council Proof of Concept Grant. 2015.
- Youth Award of International Cooperation, Chinese Academy of Sciences, 2015 (jointly with Prof. Liang Zhao).
- John von Neumann Excellence Project (by the John von Neumann institute for high-performance computing). 2014.
- C.F. Gauss Lecturer, German Geophysical Society (DGG). 2014
- Paul Niggli Medal. Paul Niggli Foundation. (Switzerland's most prestigious "young scientist award" in the Earth Sciences). 2012
- Arne Richter Award for Outstanding Young Scientists. European Geosciences Union. (Highest union award for young Earth Scientists by the EGU). 2011.
- European Research Council Starting Grant. 2010.
- Editors' citation for "Excellence in Refereeing" for *G-Cubed*. April 2007.
- "Exceptional reviewer" award by *GSA Today*. December 2006.

- ETH Medal for best PhD thesis (awarded to <8% of ETH graduate students). June 2005.
- Swiss National Science Foundation, research grant (2001-2004).
- Minnesota Supercomputer Institute visiting researcher fellowship (Autumn 2000).

COMMUNITY SERVICE AND PROFESSIONAL AFFILIATIONS

- Director of the Institute of Geosciences, Johannes Gutenberg University of Mainz [2017-].
- Member of the Science Steering Committee, Computational Infrastructure in Geodynamics (CIG, a NSF funded center) [2015-2018].
- Chair of the study & teaching committee, Institute of Geosciences, JGU [2015-].
- Main organizer of the 2014 German-Swiss Geodynamics Workshop, Bad Stein am Ebernburg, [2014].
- Associate Editor for *Geochemistry, Geophysics, Geosystems* [2013-].
- Planning committee member of the AlpArray Schwerpunktprogram by the DFG [2013-].
- Member of the steering committee of the Max Planck Graduate Center [2013-].
- Member of the steering committee of the research focus area "Volcanoes, Atmospheres and Magmatic Open Systems (VAMOS)" at JGU Mainz [2013-]
- Member of the steering committee of the Geocycles Research Center [2012-2013].
- Member of the Max Planck Graduate Center advisory panel [2012-].
- Member of the Forschungskollegium Physik des Erdkörpers (FKPE) [2012-].
- Member of the steering committee of the research focus area "Computational Methods in the Natural Sciences" at JGU Mainz [2011-]
- Member of the senate advising committee for information technology at JGU Mainz [2011-]
- Member of the EGU Young Scientists award committee of the geodynamics division [2011-2012]
- Reviewer for proposals of the US Science foundation (NSF), the German Research Foundation (DFG), the Dutch Research Foundation (NWO), the German exchange office (DAAD), and the Volkswagen Stiftung.
- Reviewer for *GSA Today, Geophysical Journal International, Tectonophysics, G-cubed, Physics of the Earth and Planetary Interiors, Geology, Science, Journal of Geophysical Research, Earth and Planetary Science Letters, Journal of Asian Earth Sciences, Pure and Applied Geophysics, Nature Geoscience, Scientific reports*.
- Organized sessions on Computational Geodynamics at the Fall AGU in 2006, 2007 and 2014, as well as at the EGU meeting in 2010-2015 (either as convener or co-convener).
- Managing guest editor of a special volume on Computational Geodynamics that appeared in december 2008 in *Physics of the Earth and Planetary Interiors*.
- Member of the American Geophysical Union, the European Geosciences Union, and the German Geophysics Union (DGG).

GRANTS

As main or as co-PI:

- MAGMA: Melting And Geodynamic Models of Ascent. *European Research Council Consolidator Grant*. PI. 5 yrs (2018-2023), 1.994 Million Euro].
- StagBL: A Scalable, Portable, High-Performance Discretization and Solver Layer for Geodynamic Simulation. Platform of Advanced Scientific Computing (PASC) research grant. Switzerland. Funds one postdoc at ETH Zurich for 3 years (Patrick Sanan). co-PI with Taras Gerya (ETH), Dave May (Oxford), and Paul Tackley (ETH, main PI). CHF 350'000,-
- Constraining the dynamics of the present-day Alps with 3D geodynamic inverse models. *German Research Foundation* PI. 3 years PhD project (2017-2020) as part of the 4DMB Special Focus Research program, ~149 kEuro.
- PERMEA: Determining permeability of fractured rocks. *BMBF* main PI. 3 years. (2017-2020), Euro 1.5 million in total, together with RWTH Aachen, University of Erlangen, IGEM. Mainz part 1 PhD student fellowship for 3 years. (around ~ 250 kEuro).
- SECURE. *BMBF*. PI representing Mainz. 1 PhD student fellowship, each for 3 years. (4/2015-3/2019, ~ 540 kEuro for Mainz).
- SALTED: Salt Tectonics and Dynamics. *European Research Council Proof of Concept Grant*. PI. 18 Months (2016-2017), EUR 150'000,-
- Numerical modelling of lithospheric and crustal-scale deformation on geological timescales. *Forschungszentrum Jülich (German Supercomputer Center) production proposal for JUQUEEN* PI. 1 year (11/2015-10/2016), 11.8 million CPU hours.
- Geodynamic modeling of the initiation of plate tectonics in a differentiating early Earth *German Research Foundation* PI. 3 years PhD project (2015-2018), ~149 kEuro.
- Numerical modelling of lithospheric and crustal-scale deformation on geological timescales. *Forschungszentrum Jülich (German Supercomputer Center) production proposal for JUQUEEN* PI. 1 year (11/2014-10/2015), 15.4 million CPU hours.
- Making melt and moving it. *VAMOS Research Center Project, University of Mainz* co-PI together with prof. Richard White (Mainz). 2 years PhD project (1/2015-12/2016), ~80 kEuro.
- Reverse modelling of lithospheric deformation *Computational Sciences Collaborative Center, JGU Mainz* PI. 1 year student stipendium, 10 kEuro.
- Complex Rheologies in Earth dynamics and industrial Processes (CREEP). *EU Horizon 2020 International Training Network*. PI representing Mainz (main PI: Andrea Tommasi, University of Montpellier). 2 PhD student fellowships, each for 3 years. (4/2015-3/2019, ~ 540 kEuro for Mainz).
- Next generation high-performance computer in Mainz (MOGON II). *Wissenschaftsrat and German Research foundation* co-PI (main PI: Brinkmann, Computing Center JGU). Replacement of the high-performance computer at JGU Mainz in two phases (2015-2021, Euro 8.7 million).
- Numerical modelling of lithospheric and crustal-scale deformation on geological timescales. *Forschungszentrum Jülich (German Supercomputer Center) production proposal for JUQUEEN* PI. 1 year (11/2013-10/2014), 15 million CPU hours.
- Reverse modelling in geosciences. *Computational Sciences Collaborative Center, JGU Mainz* PI. 1 year PhD student stipendium, 30 kEuro. (1/2014-12/2014).

- Numerical modelling of lithospheric and crustal-scale deformation on geological timescales. *Forschungszentrum Jülich (German Supercomputer Center) production proposal for Juqueen* PI. 1 year (5/2012-4/2013), 14 million CPU hours.
- Modelling branching fault zones in the Earth's crust. *Computational Sciences Collaborative Center, JGU Mainz* co-PI (main PI: C. Passchier, Tectonophysics). 1 year PhD student stipendium. 30 kEuro (1/2013-12/2013).
- Efficient treatment of nonlinearities in large-scale 3D numerical simulations of geodynamic processes. *Computational Sciences Collaborative Center, JGU Mainz* PI (together with M. Lukacova, Mathematics). 1 year PhD student stipendium. 30 kEuro (6/2012-5/2013).
- Numerical modelling of lithospheric deformation on geological timescales. *CSCS (Swiss supercomputing center) production proposal* PI. 1 year (2010), 1.5 million CPU hours.
- TopoMod: Sculpting the Earth's topography: insights from modelling deep-surface processes. Marie Curie Initial Training network *European Science Foundation*. Co-PI and co-supervisor of 1 PhD student based at ETH Zurich (main European PI: Claudio Faccenna, Rome. main PI Zurich: Jean-Pierre Burg). 3 yr (2011-2014),
- MODEL: Mechanics Of Deformation of the Earth's Lithosphere. *European Research Council Starting Grant*. PI. 5 yrs (2010-2015), EUR 1'420'920,-
- EAR-1019636 Collaborative Research: Crustal Overturn in Continental Margin Arcs During Magmatic Surges. *National Science Foundation*. Co-PI (main PI: Scott Paterson) (2011-).
- Three-dimensional numerical simulations of deformation and erosion during continental collision and indentation: Application to the Himalayan syntaxes. *ETH Science Foundation*. Co-PI (main PI: Stefan Schmalholz). 3 yrs (2009-2012), CHF 149'000,-
- Dynamics of Arc-Continent collision and foreland basin evolution in Taiwan: a field and numerical modelling approach. *Swiss National Fonds*. Co-PI (main PI: Sébastien Castelltort). 2 yrs (2009-2011), CHF 120'775,- .
- High resolution thermo-mechanical modeling of batholith emplacement, with applications to Adamello. *Swiss National Fonds*. Co-PI with Taras Gerya (ETH Zurich) and main supervisor of 1 PhD student. 3 yrs (2009-2012), CHF 307'150,- 2009-2012
- Crystal2Plate: How does plate tectonics work: From crystal-scale processes to mantle convection with self-consistent plates *European Science Foundation*. Co-PI and main supervisor of 1 PhD student (main European PI: Andrea Tommasi, Montpellier. main PI Zurich: Paul Tackley). 3 yrs (2009-2012), EUR 645'021,-

As international collaborator:

- Dynamics of continental deformation: Insights from seismic structure and anisotropy. *Irish Science Foundation*. Collaborator. (main PI: Sergei Lebedev, Dublin Institute of Advanced Studies).

SUPERVISION

- JGU, current
- David Muessle (PhD, 2017-)*. Induced seismicity in geothermal reservoirs.
 - Oskar Kottwitz (PhD, 2017-)*. Effective permeability of fractured rocks.
 - Georg Reuber (PhD, 2016-)*. Geodynamic inverse modelling.
 - Andrea Piccolo (PhD, 2015-)*. Modelling geodynamics of the early Earth.
 - Lingfeng Ding (PhD, 2015-)*. Rheology of glass under elevated pressures.
 - Beatriz Martinez Montesinos (PhD, 2015-)*. Development of new 3D parallel codes to model hydrofracturing in complex geological environments.
 - Lisa Rummel (PhD, 2/2015-)*. Coupling petrological melting and crystallization models with geodynamic simulations. (jointly with R. White, Metamorphic

Geology)

Xinxin Wang (visiting PhD-student, 2016-). Numerical modelling of Taiwan.

JGU, previous

Jianfeng Yang (visiting PhD-student, 2014-2016, now postdoc in Padua). Effect of fluid in the mantle on craton destruction.

Anton Popov (Postdoc, 2011-2015, now permanent staff in Mainz). Development of new viscoelastoplastic lithospheric deformation code that run on massively parallel computers.

Adina Püsök (PhD-student, 2012-2016, now Scripps Postdoc fellow. San Diego CA, USA). Dynamics of the India-Asia collision.

Ragnar Lehmann (PhD-student, 2012-2016, now working for a consulting company in Frankfurt). Numerical modeling of melt migration. (jointly with M. Lukacova, Mathematics)

Tobias Baumann (PhD-student, 2011-2016, now postdoc and lecturer, Mainz). Quasi-instantaneous geodynamic inversion of lithospheric rheology.

Arthur Bauville (Postdoc, 12/2014-12/2015, now postdoc at JAMSTEC Japan). Inverse geodynamic modelling and 3D modelling of Alpine collision.

Sven Meyer (PhD-student, 2012-2015, now postdoc Mainz). Anastomosing shear zones (jointly with C. Passchier)

Richard Spitz (MSc-student, 2014-2015, now PhD student in Lausanne, CH). Emplacement mechanisms of granitic intrusions in southern Patagonia.

Georg Reuber (BSc-student, 2014, now PhD-student Mainz). Tectonic overpressure in subduction regimes.

Philipp Eichheimer (BSc/MSc-student, 2014/2016, now PhD student Bayreuth). Numerical modelling of internal deformation in salt structures.

Lorenzo Candiotti (BSc/MSc-student, 2014/2016, now PhD-student Lausanne). Numerical modeling of sagduction.

Naiara Fernandez (PhD-student, 2011-2014, now permanent research scientist at the University of Texas, Austin). 2D/3D modelling of fold and thrust belts and salt tectonics.

Emmanuelle Boutonnet (Postdoc, 2012-2014, now Gymnasium teacher in France). Lithosphere Dynamics.

Oliver Hartkorn (Diplom-student, 2012-2013, now PhD student in Space Weather, Uni Koeln). Effects of solar storms on quality of magnetotelluric data.

Florian Malm (PhD-student, 2013). New techniques for determination of thermal conductivities in geothermal fields.

Eric Schaeffer (Diplom-student, 2012-2013, now PhD student in Physics, JGU). Inverse modelling of combined geological and magnetotelluric data.

Meike Hintze (BSc-student, 2013, now studying in Kiel). Three-dimensional numerical modelling of salt domes formed by down building.

ETH, previous

Marine Collignon (PhD-student, 2011-2015). Interactions between surface processes and fold growth in fold-and-thrust belts: application to the Zagros Fold Belt.

Marcel Thielmann (PhD-student, 2009-2013, now Oberassistent in Computational Physics, ETH). Processes and properties controlling the formation of lithospheric-scale shear zones.

Tobias Keller (PhD-student, 2009-2013, now Postdoc at Stanford). 3D thermo-mechanical numerical modelling of batholith emplacement, with application to the Adamello Batholith.

Sarah Lechmann (PhD-student, 2008-2012, now research scientist at the Swiss Federal Department of Sport and Defence). 3D numerical modelling of deformation at indenter corners (co-supervisor; main supervisor: Schmalholz).

Jonas Ruh (PhD-student, 2009-2011, now postdoc in Paris). Modelling of deformation in accretionary wedges (co-supervisor; main supervisor: Burg).

Thibault Duretz (PhD-student, 2008-2011, now senior researcher Uni Lausanne). Numerical modelling of deformation in the Bohemian Massiv (co-supervisor; main supervisor: Gerya).

Guizhi Zhu (Postdoc, 2008-2011). Physics of 3D plume formation above subducting slabs. (supervised together with Gerya).

Patricia Eugster (MSc-student, 2011). Basin subsidence in Taiwan.

Dave May (Postdoc, 2011, now Oberassistent ETH Zürich). Robust and fast 3D numerical techniques for geodynamic applications.

Tobias Baumann (PhD-student, 2011, moved to Mainz). Quasi-instantaneous geodynamic inversion of lithospheric rheology.

Naiara Fernandez (PhD-student, 2011, moved to Mainz). 2D/3D modelling of fold and thrust belts and salt tectonics.

Hein van Heck (PhD-student, 2007-2010, now PostDoc at Cardiff University). Scaling of plate tectonics on terrestrial planets. (member of PhD-thesis committee).

Marina von Tscharnner (MSc-student, 2010; later obtained a PhD at the University of Lausanne and now works in industry). Modelling of subduction with overriding plate.

Gregor Golabek (PhD-student, 2007-2010, now Professor of Geodynamics at the University of Bayreuth). Numerical modelling of core formation processes and Venus coronae (co-supervisor; main supervisor: Tackley).

Yolanda Deubelbeiss (PhD-student, 2007-2010, now at the PR department of the NAGRA, which is the Swiss nuclear waste deposit research institute). Numerical modeling of particle suspensions with application to crystal-melt systems.

Gang Lu (visiting PhD-student, 2009-2010, now associate professor at the Chinese Academy of Sciences, Beijing). Numerical modelling of craton destruction.

Christiane Heinicke (MSc-student, 2009-2010, later PhD-student in Ilmenau followed by a career in space and, maybe one day, Mars exploration). Lithospheric stress states and shear localization.

Philippe Yamato (Postdoc, 2008-2009, now Professor of Tectonics, Rennes University). 2D and 3D numerical models of crustal-scale deformation in fold and thrust belts.

Marcel Thielmann (MSc-student, 2009, later PhD student, now postdoc in Bayreuth). Approaches to compute geodynamically-consistent cross-sections through active orogens.

Fabio Crameri (MSc-student, 2009, now postdoc in Oslo). Numerical modelling of lithospheric-scale shear localization.

Fabio Crameri (BSc-student, 2007). Numerical models of Io, including melt migration (with Tackley as main supervisor).

Surrendra Schoch (MSc-student, 2008, now working for UBS). Free Surface effects on Rayleigh-Benard convection.

USC, previous

Wenrong Cao (PhD student, 2009-2015, now assistant professor at the University of Reno). Numerical modelling magmatic systems in the Sierra Nevada (co-supervisor; main supervisor: Paterson).

Melanie Gerault (PhD student, 2009-2014, now postdoc in Lyon). Numerical modelling of mantle flow (co-supervisor; main supervisor: Becker).

Clare Steedman (MSc, 2007, now working in geological consulting). 2D numerical modelling of the geodynamic evolution of Taiwan (with Becker and Okaya).

Others

Marina von Tscharnner (PhD-student 2014, University Lausanne). Three-dimensional hydrodynamic numerical modeling of fold nappe formation, basement-cover deformation and slab detachment with applications to the Helvetic Nappe system (W. Switzerland). (external member of PhD-thesis committee).

Niklaus Hürlihan (PhD 2013), University Lausanne Post-plutonic Magmatism: from the Source to the Emplacement of the Upper Crustal Dyke Swarm, Adamello Massif, Italy (external member of PhD committee).

CLASSES TAUGHT

- 2011- JGU Mainz (as Professor of Geophysics)
Geophysikalische Modellierung
Geophysikalisches Kolloquium
Introduction to Geophysics
Dynamics of the Earth II
Geodynamics
Geostatistics II
Numerical Modelling and Analysis of Surface Processes
Introduction to computational geosciences
Introduction to Finite Element Modelling in Geosciences.
Advanced Computational Geodynamics and High-Performance Computing
- 2007-2011 ETH Zürich (as Oberassistent and Assistant Professor)
Dynamics of the Mantle and Lithosphere.
Geophysical Field Experiments.
Geophysical Fluid Dynamics Seminar.
Introduction to Finite Element Modelling in Geosciences. (initially with Schmalholz, later with May)
Computational Geodynamics using finite differences.
- 2005-2006 USC - Los Angeles (as Research Associate)
Geodynamics. (with Becker)