Nicola Tosi

Italian citizen
Born February 12, 1979
Married, three children

Department of Planetary Physics
German Aerospace Center (DLR)
Rutherford Straße 2, 124789 Berlin (Germany)
Phone:+49 (0)30 67055365
Email: nicola.tosi@dlr.de
Web: https://nicola-tosi.github.io

Professional Appointments

2019– *Research Scientist*, Department of Planetary Physics, German Aerospace Center (DLR) Berlin.

2014–2019 *Helmholtz Young Investigator Group Leader*, Department of Astronomy and Astrophysics, Technische Universität (TU) Berlin and Department of Planetary Physics, German Aerospace Center (DLR) Berlin, Germany.

2011–2014 *Research Assistant*, Department of Planetary Geodesy, TU Berlin, Germany.

2010–2014 *Guest Scientist*, Department of Planetary Physics, DLR Berlin, Germany.

2008–2010 *Marie Curie PostDoc*, Department of Geophysics, Charles University in Prague, Czech Republic.

2004–2008 *Ph.D. student*, System-Earth Modeling Section, GeoForschungsZentrum Potsdam, Germany.

2005 *Visiting Student* (3 months), European project MAGMA (Mathematical Geophysics, Meteorology and their Applications), Department of Geophysics, Charles University in Prague, Czech Republic.

2003–2004 *Research Assistant* (6 months), Department of Geophysics, University of Milan, Italy.

Education

2004–2008 *Ph.D.* in Geophysics, GeoForschungsZentrum Potsdam and Charles University in Prague. Thesis: *Numerical modeling of present-day mantle convection.*

1997–2003 *M.Sc.* in Physics, University of Milan. Thesis: *Inversion of geodetic satellite data for the estimate of Earth's parameters.*

Grants

Research Grants

2021–2023 *German Research Foundation – Research Unit "Matter under planetary conditions"*. Structural and thermal models of solid exoplanets. Funding for 3 years for one PhD position. *Principal investigator.*

2018–2021 *Helmholtz Association – HEIBRIDS graduate school in data science.* Unravelling the evolution of terrestrial planets through machine learning. Funding for 3+1 years for one PhD position. *Co- principal investigator.*

2018–2020 *German Research Foundation – Priority Program SPP1992 "Exploring the diversity of extrasolar planets".* Interior-atmosphere feedbacks and the nature of detected sub-Neptunian planets. Funding for 3 years for two PhD positions. *Co-principal investigator.*

2017–2019 *German Research Foundation – Priority Program SPP1833 "Building a habitable Earth".* Crystallising the terrestrial magma ocean: Thermo- and Geodynamics. Funding for 3 years for two PhD position. *Co- principal investigator.*

2014–2019 *Helmholtz Association – Helmholtz Young Investigator Groups*. Funding for a research group (own position + two PhDs + 2 PostDocs) over 5+1 years. *Principal investigator.*

2011–2014 *German Research Foundation – Temporary position as principal investigator.* Structure and dynamics of Mercury's interior from a new generation of space-geodetic observations. Funding for own PostDoc position for 3 years. *Principal investigator.*

Grants for computational time

2018–2020 *North-German Supercomputing Alliance.* 3d convective mixing in planetary interiors with strongly variable rheological properties. *Principal investigator.*

2018–2020 *North-German Supercomputing Alliance.* Interior dynamics of Mercury, Mars, and the Moon through time. *Principal investigator.*

2013–2018 *North-German Supercomputing Alliance.* Partial melting and the thermo-chemical evolution of terrestrial planets. *Principal investigator.*

2012–2014 *High Performance Computing Center Stuttgart.* Magma ocean cumulate overturn simulations in the framework of thermo-chemical mantle convection. *Co-investigator.*

2012–2013 *Jülich Supercomputing Center.* The influence of partial melting on the thermo-chemical evolution of terrestrial bodies. *Principal investigator.*

Publications

59 refereed papers, H-index: 24, i10-index: 40, 1576 citations
(Source: Google Scholar, July 2021).
Underlined names indicate supervised PhD students and PostDocs.

Genova A., H. Hussmann , T. Van Hoolst, D. Heyner, L. Iess, F. Santoli, N. Thomas, P. Cappuccio, I. di Stefano, P. Kolhey, B. Langlais, J.Z.D. Mieth, J.S. Oliveira, A. Stark, G. Steinbrügge, **N. Tosi**, J. Wicht and J. Benkhoff (2021). Geodesy, geophysics and fundamental physics investigations of the BepiColombo mission. *Space Science Review*, 217:31, https://link.springer.com/article/10.1007/s11214-021-00808-9.

Plesa A.-C., E. Bozdag, A. Rivoldini, M. Knapmeyer, S. M. McLennan, S. Padovan, **N. Tosi**, D. Breuer, D. Peter, S. Stähler , M. A. Wieczorek, M. van Driel, A. Khan, T. Spohn (2021). Seismic velocity variations in a 3D Martian mantle:Implications for the InSight measurements, *Journal of Geophysical Research - Planets*, 126, e2020JE006755, doi:10.1029/2020JE006755.

Samuel E., M. Ballmer, S. Padovan, **N. Tosi**, A. Rivoldini and A.-C. Plesa (2021). The thermo-chemical evolution of Mars with a strongly stratified mantle. *Journal of Geophysical Research - Planets*, 126(4), doi:10.1029/2020JE006613.

Agarwal S., **N. Tosi**, P. Kessel, S. Padovan, D. Breuer and G. Montavon (2021). Towards constraining Mars' thermal evolution using machine learning. *Earth and Space Science*, 8(4), e2020EA001484, doi:10.1029/2020EA001484.

Tosi N. and S. Padovan (2021). Mercury, Moon, Mars: Surface expressions of mantle convection and interior evolution of stagnant-lid bodies. In *Mantle Convection and Surface Expressions*, H. Marquardt, M. Ballmer, S. Cottar and J. Konter (eds.), AGU Monograph Series. Ch. 17, doi:10.1002/9781119528609.ch17.

Foley B. J., C. Houser, L. Noack, and **N. Tosi** (2020). The heat budget of rocky planets. In Planetary Diversity: Rocky Planet Processes and Their Observational Signatures, E. J. Tasker, Y. Fujii, M. Laneuville, C. Unterborn, S. J. Desch, H. E. Hartnett (eds.), IOP Publishing, doi:10.1088/2514-3433/abb4d9ch4.

Patočka V., E. Calzavarini and **N. Tosi** (2020). Settling of inertial particles in turbulent Rayleigh-Bénard convection. *Physical Review Fluids*, 5, 114304, doi:10.1103/PhysRevFluids.5.114304.

Maurice M., **N. Tosi**, S. Schwinger, D. Breuer and T. Kleine (2020). A long-lived magma ocean on a young Moon. *Science Advances*, 6(28), doi:10.1126/sciadv.aba8949.

Agarwal S., **N. Tosi**, D. Breuer, S. Padovan, P. Kessel and G. Montavon (2020). A machine-learning-based surrogate model of Mars' thermal evolution. *Geophysical Journal International*, 222, 3, 1656-1670, doi:10.1093/gji/ggaa234.

Patočka V., O. Šramek and **N. Tosi** (2020). Minimum heat flow from the core and thermal evolution of the Earth. *Physics of the Earth and Planetary Interiors*, 305, 106457, doi:10.1016/j.pepi.2020.106457.

Stüeken E.E., S.M. Som, M. Claire, S. Rugheimer, M. Scherf, L. Sproß, **N. Tosi**, Y. Ueno and H.Lammer (2020). Mission to planet Earth: The first two billion years. *Space Science Review*, 216(31), doi:10.1007/s11214-020-00652-3.

Baumeister P., S. Padovan, **N. Tosi**, G. Montavon, N. Nettelmann, J. MacKenzie and M. Godolt (2020). Machine learning inference of the interior structure of low-mass exoplanets. *The Astrophysical Journal*, 889, 1, doi:10.3847/1538-4357/ab5d32.

Lammer H., M. Leitzinger, M. Scherf, P. Odert, C. Burger, D. Kubyshkina, C. Johnstone, T. Maindl, C.M. Schäfer, M. Güdel, **N. Tosi**, A. Nikolaou, E. Marcq, N.V. Erkaev, L. Noack, G. Kislyakova, L. Fossati, E.Pilat-Lohinger, F. Ragossnig and E.A. Dorfi (2020). Constraining the early evolution of Venus and Earth through atmospheric Ar, Ne isotope and bulk K/U ratios. *Icarus*, 339, 113551, doi:10.1016/j.icarus.2019.113551.

Schulz F., **N. Tosi**, A.-C. Plesa and D. Breuer (2020). Stagnant-lid convection with diffusion and dislocation creep rheology: Influence of a non-evolving grain size. *Geophysical Journal International*, 220(1), 18-36, doi:10.1093/gji/ggz417.

Höning D., **N. Tosi** and T. Spohn (2019). Carbon cycling and interior evolution of water-covered plate tectonics and stagnant lid planets. *Astronomy & Astrophysics*, 627, A48, doi:10.1051/0004-6361/201935091.

Nikolaou A., N. Katyal, **N. Tosi**, M. Godolt, J. L. Grenfell, H. Rauer (2019). What factors affect the duration and outgassing of the terrestrial magma ocean? *The Astrophysical Journal*, 875, 11, doi:10.3847/1538-4357/ab08ed.

Katyal N., A. Nikolaou, M. Godolt, J. L. Grenfell, **N. Tosi**, F. Schreier, H. Rauer (2019). Evolution and spectral response of a steam atmosphere for early Earth with a coupled climate-interior model. *The Astrophysical Journal*, 875, 31, doi:10.3847/1538-4357/ab0d85.

Godolt M., **N. Tosi**, B. Stracke, J. L. Grenfell, T. Ruedas, T. Spohn, H. Rauer (2019). The habitability of stagnant-lid Earths around dwarf stars. *Astronomy & Astrophysics*, 625, A12, doi:10.1051/0004-6361/201834658.

Yu S., **N. Tosi**, S. Schwinger, M. Maurice, D. Breuer, L. Xiao (2019). Overturn of ilmenite-bearing cumulates in a rheologically weak lunar mantle. *Journal of Geophysical Research - Planets*, 124(2), 418-436, doi:10.1029/2018JE005739.

Höning D., **N. Tosi**, H. Hansen-Goos and T. Spohn (2019). Bifurcation in the growth of continental crust. *Physics of the Earth and Planetary Interiors*, 287, 37-50, doi:10.1016/j.pepi.2019.01.001.

Plesa A.-C., S. Padovan, **N. Tosi**, D. Breuer, M. Grott , M.A. Wieczorek, T. Spohn, S.E. Smrekar, W. B. Banerdt (2018). The thermal state and interior structure of Mars. *Geophysical Research Letters*, 45, doi:10.1029/2018GL080728.

Padovan S., T. Spohn T., P. Baumeister, **N. Tosi**, D. Breuer, Sz. Csizmadia, H. Hellard, F. Sohl (2018). Matrix-propagator approach to compute fluid Love numbers and applicability to extrasolar planets. *Astronomy & Astrophysics*, 620, A178, doi:10.1051/0004-6361/201834181.

Lammer H., A. L. Zerkle, S. Gebauer, **N. Tosi**, L. Noack, M. Scherf, E. Pilat-Lohinger, M. Güdel, J. L. Grenfell, M. Godolt and A. Nikolaou (2018). Origin and evolution of the atmospheres of early Venus, Earth and Mars. *The Astronomy and Astrophysics Review*, 26(2), doi:10.1007/s00159-018-0108-y.

Plesa A.-C., M. Knapmeyer, M. P. Golombek, D. Breuer, M. Grott, T. Kawamura, P. Longonné, **N. Tosi** and R. C. Weber (2018). Present-day Mars' seismicity predicted from 3-D thermal evolution models of interior dynamics. *Geophysical Research Letters*, 45(6), 2580–2589, doi:10.1002/2017GL076124.

Odert P., H. Lammer, N. V. Erkaev, A. Nikolaou, H. I. M. Lichtenegger, C. P. Johnstone, K. G. Kislyakova, M. Leitzinger and **N. Tosi** (2018). Escape and fractionation of volatiles and noble gases from Mars-sized planetary embryos and growing protoplanets. *Icarus*, 307, 327–346, doi:10.1016/j.icarus.2017.10.031.

Breuer D. and **N. Tosi** (2018). Interiors and atmospheres. In *Planetary Geology*, A.-P. Rossi and S. van Gasselt (Eds.), Springer series in Astronomy and Planetary Sciences, Ch. 10, 221–242, doi:10.1007/978-3-319-65179-8

Padovan S., **N. Tosi**, A.-C. Plesa and T. Ruedas (2017). Impact-induced changes in the source depth and volume of magmatism on Mercury and their observational signature. *Nature Communications*, 8, 1945, doi:10.1038/s41467-017-01692-0

Tosi N., M. Godolt, B. Stracke, T. Ruedas, J. L. Grenfell, D. Höning, A. Nikolaou, A.-C. Plesa, D. Breuer and T. Spohn (2017). The habitability of a stagnant-lid Earth. *Astronomy & Astrophysics*, 605, A71, doi:10.1051/0004-6361/201730728.

Maurice M., **N. Tosi**, H. Samuel, A.-C. Plesa, C. Hüttig and D. Breuer (2017). Onset of solid-state convection and mixing during magma ocean solidification. *Journal of Geophysical Research - Planets*, 122(3), 577-598, doi:10.1002/2016JE005250. Editor's highlight. Journal's cover.

Plesa A.-C., M. Grott, **N. Tosi**, D. Breuer, T. Spohn and M. Wieczorek (2016). How large are present-day heat flux variations across the surface of Mars? *Journal of Geophysical Research - Planets*, 121(12), 2386–2403, doi:10.1002/2016JE005126. Commentary. Research spotlight in EOS.

Breuer D., A.-C. Plesa, **N. Tosi** and M. Grott (2016). Water in the Martian interior – The geodynamical perspective. *Meteoritics and Planetary Science*, 51(11), 1959–1992, doi:10.1111/maps.12727.

Dehant V. et al. (35 authors incl. **N. Tosi**) (2016). PLANET TOPERS: Planets, Tracing the Transfer, Origin, Preservation, and Evolution of their ReservoirS. *Origins of life and evolution of biospheres*, doi:10.1007/s11084-016-9488-z.

Huang H., **N. Tosi**, Chang S.-J., Xia S. and Qiu X. (2015). Receiver function imaging of the mantle transition zone beneath the South China Block. *Geochemistry, Geophysics, Geosystems*, 16(10), 3666–3678, doi:10.1002/2015GC005978.

Tosi N., O. Čadek, M. Běhounkova, M.Kaňova, A.-C. Plesa, M. Grott, D.Breuer, S. Padovan, and M.A. Wieczorek (2015). Mercury's low-degree geoid and topography controlled by insolation-driven elastic deformation. *Geophysical Research Letters*, 42, 7327–7335, doi:10.1002/2015GL065314.

Tosi N., P. Maierova and D. Yuen (2015). Influence of variable thermal expansivity and conductivity on deep subduction. In *Slab Dynamics: from mantle flow to mega disasters*, G. Morra, D. Yuen, S. King and S. Stein (Eds.), American Geophysical Union – Geophysical Monograph 211, Ch. 6, doi:10.1002/9781118888865.ch6.

Li J., **N. Tosi**, P. Maierova and D. Yuen (2015). Evidence from caustics waveform modelling for long slab thickening above the 660-km discontinuity under northeast Asia: Dynamical implications. In *Slab Dynamics: from mantle flow to mega disasters*, G. Morra, D. Yuen, S. King and S. Stein (Eds.), American Geophysical Union – Geophysical Monograph 211, Ch. 1, doi:10.1002/9781118888865.ch1 .

Tosi N., C. Stein, L. Noack, C. Hüttig, P. Maierová, H. Samuel, R. Davies, C. Wilson, S. Kramer, C. Thieulot, A. Glerum, M. Fraters, W. Spakman, A. Rozel and P. Tackley (2015). A community benchmark for viscoplastic thermal convection in a 2-D square box. *Geochemistry, Geophysics, Geosystems*, 16(7), 2175-2196, doi:10.1002/2015GC005807.

Plesa A.-C., **N. Tosi**, M. Grott and D. Breuer (2015). Thermal evolution and Urey ratio of Mars. *Journal of Geophysical Research - Planets*, 120, 995-1010, doi:10.1002/2014JE004748.

Padovan S., M. Wieczorek, J.-L. Margot, **N. Tosi** and S. Solomon (2015). Thickness of the crust of Mercury from geoid-to-topography ratios. *Geophysical Research Letters*, 42, 1029-1038, doi:10.1002/2014GL062487.

Plesa A.-C., **N. Tosi** and D. Breuer (2014). Can a fractionally crystallized magma ocean explain the thermo-chemical evolution of Mars? *Earth and Planetary Science Letters*, 403, 225-235, doi:10.1016/j.epsl.2014.06.034.

Tosi N., D. Breuer and T. Spohn (2014). Evolution of planetary interiors. In T. Spohn, D. Breuer, & T. V. Johnson (Eds.), *Encyclopedia of the Solar System*, Chapter 9, 185-208, Elsevier, doi:10.1016/B978-0-12-415845-0.00009-8.

Tosi N., M. Grott, A.-C. Plesa and D. Breuer (2013). Thermochemical evolution of Mercury's interior. *Journal of Geophysical Research - Planets*, 118, 2474-2487, doi:10.1002/jgre.20168.

Tosi N., A.-C. Plesa and D. Breuer (2013). Overturn and evolution of a crystallized magma ocean: a numerical parameter study for Mars. *Journal of Geophysical Research - Planets*, 118, 1512-1528, doi:10.1002/jgre.20109.

Laneuville M., M. Wieczorek, D. Breuer and **N. Tosi** (2013). Asymmetric thermal evolution of the Moon. *Journal of Geophysical Research - Planets*, 118, 1435-1452, doi:10.1002/jgre.20103.

Hüttig C., **N. Tosi** and W.B. Moore (2013). An improved formulation of the incompressible Navier-Stokes equations with variable viscosity. *Physics of the Earth and Planetary Interiors*, 220, 11-18, doi:10.1016/j.pepi.2013.04.002.

Tosi N., D.A. Yuen, N. de Koker and R. Wentzcovitch (2013). Mantle dynamics with pressure- and temperature-dependent thermal expansivity and conductivity. *Physics of the Earth and Planetary Interiors*, 217, 48-58, doi:10.1016/j.pepi.2013.02.004.

Noack L. and **N. Tosi** (2012). High-performance modelling in geodynamics. In *Integrated Information and Computing Systems for Natural, Spatial, and Social Sciences*, Claus-Peter Rueckemann (ed.), IGI Global, 324-352, doi:10.4018/978-1-4666-2190-9.ch016.

Plesa A.-C., **N. Tosi** and C. Hüttig (2012). Thermochemical convection in planetary mantles: advection methods and magma ocean overturn simulations. In *Integrated Information and Computing Systems for Natural, Spatial, and Social Sciences*, Claus-Peter Rueckemann (ed.), IGI Global, 302-323, doi:10.4018/978-1-4666-2190-9.ch015.

Wagner F.W., **N. Tosi**, F. Sohl, H. Rauer and T. Spohn (2012). Rocky super-Earth Interiors: Structure and Internal Dynamics of CoRoT-7b and Kepler-10b. *Astronomy and Astrophysics*, 541, A103, doi:10.1051/0004-6361/201118441.

Samuel H. and **N. Tosi** (2012). The influence of post-perovskite strength on the Earth's mantle thermal and chemical evolution. *Earth and Planetary Science Letters*, 323-324, 50-59, doi:10.1016/j.epsl.2012.01.024.

Tosi N. and D.A. Yuen (2011). Bent-shaped plumes and horizontal channel flow beneath the 660 km discontinuity. *Earth and Planetary Science Letters*, 312, 348-359, doi:10.1016/j.epsl.2011.10.015.

Yuen D.A. **N. Tosi** and O. Čadek (2011). Influences of lower mantle properties on the formation of asthenosphere in oceanic upper mantle. *Journal of Earth Science*, 22(2), 143-154, doi:10.1007/s12583-011-0166-9.

Tosi N., D.A. Yuen and O. Čadek (2010). Dynamical consequences in the lower mantle with the post-perovskite phase change and strongly depth-dependent thermodynamic and transport properties. *Earth and Planetary Science Letters*, 298, 229-243, doi:10.1016/j.epsl.2010.08.001.

King S., C. Lee, P. van Keken, W. Leng, S. Zhong, E. Tan, **N. Tosi** and M. Kameyama (2010). A community benchmark for 2D Cartesian compressible convection in the Earth's mantle. *Geophysical Journal International*, 180, 73-87, doi:10.1111/j.1365-246X.2009.04413.x.

Tosi N., O. Čadek and Z. Martinec (2009). Subducted slabs and lateral viscosity variations: Effects on the long-wavelength geoid. *Geophysical Journal International*, 179, 813-826, doi:10.1111/j.1365-246X.2009.04335.x.

Tosi N., O. Čadek, Z. Martinec, D.A. Yuen and G. Kaufmann (2009). Is the long-wavelength geoid sensitive to the presence of post-perovskite above the core-mantle boundary? *Geophysical Research Letters*, 36, L05303, doi:10.1029/2008GL036902.

Tosi N., Z. Martinec (2007). Semi-analytical solution for viscous Stokes flow in two eccentrically nested spheres, *Geophysical Journal International*, 170, 1015-1030, doi:10.111/j.1365-246X.2007.03482.x.

Tosi N., R. Sabadini, A.M. Marotta and L.L.A. Vermeersen (2005). Simultaneous inversion for the Earth's mantle viscosity and mass imbalance in Antarctica and Greenland, *Journal of Geophysical Research*, 110, B07402, doi:10.1029/2004JB003236.

Invited Talks and Seminars

Early dynamics of planetary mantles: From magma oceans to solid-state convection (2019). Institut de Physique du Globe de Paris, Paris, France. *Seminar.*

Isotopic heterogeneities on Earth-like planets without plate tectonics (2018). ISSI Workshop "Reading Terrestrial Planet Evolution in isotopes and element measurements". International Space Science Institute, Bern, Switzerland. *Talk.*

Physics of magma oceans (2018). CNRS Training workshop "Forsterite", Bonascre, France. *Lecture.*

Solid-state convection during magma ocean solidification on Mars and the Moon (2018). University of Münster, Germany. *Seminar.*

Solid-state convection during magma ocean solidification on Mars and the Moon (2018). University of Bern, Switzerland. *Seminar.*

Early thermo-chemical dynamics of terrestrial mantles (2017). ACCRETE Meeting: Accretion and early differentiation of the Earth and the terrestrial planets, Nice, France. *Talk.*

Some dynamical effects on the geoid and topography of Mercury and Mars (2017). Royal Observatory of Belgium, Bruxelles, Belgium. *Seminar.*

Thermal evolution, crust and lithosphere structure of Mercury (2016). IRAP (Research Institute in Astrophysics and Planetology), Toulouse, France. *Seminar.*

Thickness of Mercury's crust and lithosphere from geoid and topography observations (2016). 15th SEDI Symposium, Nantes, France *Talk.*

Consequences of magma ocean solidifcation for mantle dynamics and evolution (2016). 76th Meeting of the German Geophysical Society, Münster (Germany). *Talk.*

Magma ocean solidification: consequences for mantle dynamics and evolution (2015). AGU Fall Meeting, San Francisco (USA). *Talk.*

Interior dynamics and evolution of the terrestrial planets (2015). 5th Potsdam-Berlin Astrophysics Colloquium, Berlin (Germany). *Talk.*

Structure and evolution of Mercury's interior from MESSENGER observations (2015). AGU-CGU Joint Assembly, Montreal (Canada). *Talk.*

Structure and evolution of Mercury's interior from MESSENGER observations (2015). EGU Meeting, Vienna (Austria). *Talk.*

Magma ocean cumulate overturn: consequences for mantle dynamics and evolution (2014). Laboratoire de Planétologie et Géodynamique. Université de Nantes (France). *Seminar.*

Thermochemical evolution of Mercury's interior (2014). Laboratoire de Planétologie et Géodynamique. Université de Nantes (France). *Seminar.*

Influence of variable thermodynamic parameters on mantle dynamics. Joint Workshop on High-Pressure, Planetary, and Plasma Physics (2013). DLR Berlin (Germany). *Talk.*

Thermochemical evolution of Mercury's interior (2013). Department of Geophysical Fluid Dynamics. ETH Zürich (Switzerland). *Seminar.*

Modeling solid-state convection in the Earth and terrestrial planets (2012). Geo.X Planetary Sciences Summer School. GFZ Potsdam (Germany). *Keynote lecture.*

Some dynamical consequences of variable thermal conductivity in the deep mantle (2011). AGU Fall Meeting, San Francisco (USA). *Talk.*

The role of variable thermodynamic and transport properties on mantle dynamics (2011). Department of Earth Sciences, University of Milan (Italy). *Seminar.*

Mantle dynamics, post-perovskite and the role of pressure-dependent thermodynamic and transport properties (2010). C2C Geodynamics Meeting, Marianske Lazne (Czech Republic). *Keynote lecture.*

Mantle dynamics with the post-perovskite phase change and pressure-dependent thermodynamic and transport properties (2010). Department of Geophysics, Frankfurt University (Germany). *Seminar.*

Subduction into the deep mantle: geoid sensitivity and lateral variations of viscosity (2009). Bayerisches Geoinstitut, University of Bayreuth (Germany). *Seminar.*

Numerical simulation of subducting lithosphere: snapshot and time-dependent models (2008). Laboratory for Modeling and Scientific Computing, Politecnico di Milano (Italy). *Seminar.*

Students and PostDocs Advising

Post-docs:

- Dr. Vojtěch Patočka (2018–2021, DLR Berlin)
- Dr. Dennis Höning (2015–2017, DLR Berlin)
- Dr. Sebastiano Padovan (2015–2017, DLR Berlin)

PhD Students:

- Siddhant Agarwal (2018–, DLR Berlin)
- Philipp Baumeister (2018–, TU Berlin)
- Falko Schulz (2016–, TU Berlin)
- Shuoran Yu (2016–2020, Macau University, China), *co-advising*
- Athanasia Nikolaou (2015–2019, DLR Berlin)
- Maxime Maurice (2015–2020, DLR Berlin)

Master Students:

- Alexandre Gallot (2019, SUPAERO, Toulouse, France, Aerospace Engineering)
- Philipp Baumeister (2017, TU Berlin, Physics)
- Falko Schulz (2016, Universität Potsdam, Physics)
- Shuoran Yu (2015, Macau University, China, Computer Science)
- Sebastian Prinz (2014, Technische Universität Bergakademie Freiberg, Geophysics)
- Maxime Maurice (2014, SUPAERO, Toulouse (France), Aerospace Engineering)

Bachelor Students:

- Oliver Henke-Seeman (2019, TU Berlin, Physics)
- Magdalena Haselsteiner (2014, Technische Universität Wien, Physics)
- Annika Stuke (2013, TU Berlin, Physics)

Teaching

Physics of Planetary Interiors (32-hours lecture course), TU Berlin, Winter semester 2015–2016, 2016–2017, 2017–2018, 2018–2019.

Service and Training

Interdisciplinary Scientist of the Mercury ESA mission BepiColombo.

Science team member of the Mars NASA Mission InSight.

Convener/organizer for:

- *Lorentz Center Virtual Workshop: Diversity of Rocky Planets*, 2020
- *European Planetary Science Conference*, Berlin, 2018
- *Goldschmidt Conference*, Boston, USA, 2018
- *Lunar and Planetary Science Conference*, The Woodlands, USA, 2017
- *American Geophysical Union Fall Meeting*, San Francisco, USA, 2015, 2017
- *GeoBerlin Conference*, Berlin, 2015

Reviewer of project proposals submitted to the *European Research Council* (ERC), *German Science Foundation* (DFG), *Natural Sciences and Engineering Research Council* (NSERC) of Canada, *Dutch Research Council* (NWO).

Referee for *Science Advances, Nature Geoscience, Nature Astronomy, Space Science Reviews, Earth and Planetary Science Letters, Geophysical Research Letters, Journal of Geophysical Research (Solid Earth), Journal of Geophysical Research (Planets), Icarus, G-cubed, Physics of the Earth and Planetary Interiors, Geophysical Journal International, Elements Magazine, Meteoritics and Planetary Science, Planetary and Space Science, Journal of Geodynamics, Pure and Applied Geophysics, AGU Monograph Series.*

Certificate for Outstanding Contribution in Reviewing, *Earth and Planetary Science Letters*.

Participation to the *Helmholtz management academy*. Attended courses: *Leading your group* (three workshops of two to three days in 2015–2016) and *Agile project management* (2-days workshop in 2016).