

CV - Dr. Stefano Maffei

1. Personal information

Name	Stefano Maffei
Date/Place of birth	18.06.1987 in Milano (Italy)
Nationality	Italian & Swiss
Highest academic title	Dr. phil./PhD in Geophysics (2016)
Contact	Mobile: +41 79 345 7550; e-mail: stefano.maffei@erdw.ethz.ch
ORCID ID	0000-0002-1603-4040

2. Education

01/10/2012 - 03/03/2016	PhD in Geophysics at ETH Zurich, Switzerland Supervisor: Prof. Andrew Jackson
15/12/2009 - 20/07/2012	MSc in Physics at the Univ. of Bologna, Italy
25/09/2006 - 11/12/2009	BSc in Physics at the Univ. of Bologna, Italy

3. Employment history including current position

01/08/2021 - present	Scientific employee, Institute of Geophysics, ETH Zurich, Switzerland Advisor: Prof. Andrew Jackson
01/07/2019 - 31/07/2021	Research Associate (SWIGS project), School of Earth and Environment, Univ. of Leeds, UK Advisor: Dr. Philip W. Livermore
01/10/2016 - 31/05/2019	Research Assistant, Physics Department, Univ. of Colorado, USA Advisor: Prof. Michael A. Calkins
03/03/2016 - 28/09/2016	Postdoctoral researcher, Institute of Geophysics, ETH Zurich, Switzerland Advisor: Prof. Andrew Jackson
01/08/2012 - 30/09/2012	Project collaborator, Euro-Mediterranean Center for Climate Change, Bologna, Italy Supervisor: Prof. Nadia Pinardi

4. Institutional responsibilities

- 11/2021 - 06/2023: Early Career member of the Department Conference of the Earth Science Department of ETH Zurich (Switzerland).
- 03/2020 - 07/2021: Steering committee member of the Early Career Scientist Forum of the Leeds Institute for Fluid Dynamics (Leeds, UK).
- 12/2016 - 05/2019: Steering committee member of the Postdoctoral Association of Colorado (Boulder, CO, USA).

5. Awarded proposals

- 10/2023: (co-PI) "Dynamics of the Earth's core under the plesio-geostrophy paradigm". Joint USA-Swiss project, funded by SNSF (Switzerland) and SNF (USA) agencies.
- 10/2023: (PI) "Novel numerical methodologies to study the interior dynamics of Jupiter and Saturn". Numerical study proposal awarded with 200 thousands node-hours on the cluster LUMI-C (Finland).
- 12/2022: (PI) "Unravelling the Interior Dynamics of Jupiter and Saturn". ETH Grant for the full funding of a doctoral student.
- 09/2022: (PI) "Core dynamics & data assimilation - fundamentals". Awarded by ESA, under the program "Future EO-1: EO Science for Society".

5. 03/2018: (co-PI) “Synergistic Explorations of Hydromagnetic Core Turbulence”. Numerical study proposal awarded with 1.5 millions CPU-hours of resources on the cluster Summit (University of Colorado).
6. 06/2018: (co-PI) “Synergistic Explorations of Hydromagnetic Convective Turbulence”. Numerical study proposal awarded with computing and storage resources for a total value of 34,000 USD on the machines of the Texas Advanced Computing Center (TACC).

6. Supervision of junior researchers at graduate and postgraduate level

- 09/2023 - present PhD thesis (main supervisor): Ms. Sofya Dobrynina. ETH Zurich, Switzerland.
- 09/2017 - 04/2019 Undergraduate thesis (co-supervised): Mr. Mitchell J. Krouss, Univ, of Colorado, USA.
- 10/2017 - 04/2019 Undergraduate thesis (co-supervised): Mr. Talal Al Refae, Univ, of Colorado, USA.
- 10/2016 - 05/2019 PhD thesis (co-supervised): Dr. Ming Yan, Univ, of Colorado, USA.

7. Teaching activities

- 02/2023 - present “Earth’s core and the Geodynamo”. ETH Zurich, Switzerland.
- 02/2020 - 04/2020 “Data Analysis and Visualisation” (in Python). University of Leeds, UK.
- Spring 2014 Tutor of the exercise class “Geomagnetism”. ETH Zurich, Switzerland.
- Spring 2013-2016 “Geophysical Field Course (Geomagnetism)”. ETH Zurich, Switzerland.

8. Memberships in panels, boards, etc., and individual scientific reviewing activities

1. Reviewer for international scientific journals: Geophysical Journal International, Physics of the Earth and Planetary Interiors, Journal of Plasma Physics, Earth, Planets and Space.
2. Proposal reviewer for Humboldt Research Fellowship (Alexander von Humboldt Foundation, Germany)

9. Active memberships in scientific societies, fellowships in renowned academies

American Geophysical Union (AGU)
 European Geosciences Union (EGU)
 Royal Astronomical Society (RAS)

10. Other community services

1. Core-team member of the Diamond Open Access Journal “Geodynamica: Earth & Planets”.
2. Co-chair of scientific sessions at the European Geoscience Union (EGU) General Assembly in 04/2021 and 05/2022.
3. Main organiser of the second PhD retreat (05/2014), Earth Science Department, ETH Zurich. Total participants: 54 PhD students. Total budget: 13,090 CHF. Location: Parpan, Switzerland.

11. Prizes, awards, fellowships

1. 09/2020: Seal of Excellence for a Horizon 2020, Marie Skłodowska-Curie Actions, awarded for proposals scored 85% or higher. Final score: 92.8%.
2. 09/2019: Seal of Excellence for a Horizon 2020, Marie Skłodowska-Curie Actions, awarded for proposals scored 85% or higher. Final score: 88.8%.
3. 09/2006: Scholarship awarded by the Italian Ministry of Education for promising students enrolled in Physics, Mathematics or Chemistry Bachelor courses.

12. Publications in peer-reviewed journals

1. Calkins, Michael A., Talal AlRefae, Angel Hernandez, Ming Yan, and [Stefano Maffei](#). “A numerical investigation of quasi-static magnetoconvection with an imposed horizontal magnetic field” *Submitted to Physical Review Fluids*, preprint: arXiv:2310.06683 (2023).

2. * Maffei, Stefano, Joseph W.B. Eggington, Philip W. Livermore, Jonathan E. Mound, Sabrina Sanchez, Jonathan P. Eastwood, and Mervyn P. Freeman. “Climatological predictions of the auroral zone locations driven by moderate and severe space weather events” *Scientific Reports* 13, no. 1 (2023): 779.
3. Maffei, Stefano, Philip W. Livermore, Jon E. Mound, Sam Greenwood, and Christopher J. Davies. “Fast directional changes during geomagnetic transitions: global reversals or local fluctuations?” *Geosciences* 11, no. 8 (2021): 318.
4. He, Fei, Yong Wei, Stefano Maffei, Philip W. Livermore, Christopher J. Davies, Jon Mound, Kaihua Xu, Shuhui Cai, and Rixiang Zhu. “Equatorial auroral records reveal dynamics of the paleo-West Pacific geomagnetic anomaly.” *Proceedings of the National Academy of Sciences* 118, no. 20 (2021).
5. * Maffei, Stefano, Mithcell J. Krouss, K. Julien, and M. A. Calkins. “On the inverse cascade and flow speed scaling behaviour in rapidly rotating Rayleigh-Bénard convection.” *Journal of Fluid Mechanics* 913 (2021).
6. * Jackson, Andrew, and Stefano Maffei. “Plesio-geostrophy for Earth’s core: I. Basic equations, inertial modes and induction.” *Proceedings of the Royal Society A* 476, no. 2243 (2020): 20200513.
7. Holdenried-Chernoff, Daria, Stefano Maffei, and Andrew Jackson. “The surface expression of deep columnar flows.” *Geochemistry, Geophysics, Geosystems* 21, no. 6 (2020): e2020GC009039.
8. Yan, Ming, Michael A. Calkins, Stefano Maffei, Keith Julien, Steven M. Tobias, and Philippe Marti. “Heat transfer and flow regimes in quasi-static magnetoconvection with a vertical magnetic field.” *Journal of Fluid Mechanics* 877 (2019): 1186-1206.
9. * Maffei, Stefano, Michael A. Calkins, Keith Julien, and Philippe Marti. “Magnetic quenching of the inverse cascade in rapidly rotating convective turbulence.” *Physical Review Fluids* 4, no. 4 (2019): 041801.
10. Maffei, Stefano, and Andrew Jackson. “Kinematic validation of a quasi-geostrophic model for the fast dynamics in the Earth’s outer core.” *Geophysical Journal International* 210, no. 3 (2017): 1772-1786.
11. * Maffei, Stefano, Andrew Jackson, and Philip W. Livermore. “Characterization of columnar inertial modes in rapidly rotating spheres and spheroids.” *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences* 473, no. 2204 (2017): 20170181.
12. Maffei, S. and A. Jackson. Propagation and reflection of diffusionless torsional waves in a sphere. *Geophys. J. Int.*, 204.3 (2016): 1477-1489.
13. Maffei, S., A. Jackson, and P. W. Livermore. “Plesio-geostrophy for Earth’s core II: onset of thermal convection”. *In prep.*
14. Maffei, S. and A. Jackson. “Plesio-geostrophy for Earth’s core III: Effect of Viscosity on Columnar Inertial Modes”. *In prep.*
15. Maffei, Stefano, Joseph W.B. Eggington, Philip W. Livermore, Jonathan E. Mound, Sabrina Sanchez, Jonathan P. Eastwood, and Mervyn P. Freeman. “Equatorial geomagnetic field control of auroral zones” *In prep.*