DR PAULA KOELEMEIJER – CURRICULUM VITAE

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Research Interests

I am interested in diverse aspects of seismology ranging from global tomography and long period data for constraining deep Earth structure to seismic noise for studying human and animal behaviour. I often work across disciplines, linking seismology with geodynamics and mineral physics, as well as combining insights with biologists. Much of my research is hypothesis driven, often combining data, forward and inverse modelling, with a particular emphasis on data uncertainties and resolution.

Academic employment

2022 – Present: **Tutorial Fellow in Earth Sciences**, Exeter College Oxford, UK
2022 – Present: **Associate Professor & Royal Society University Research Fellow**, University of Oxford, UK[1]
2019 – 2022: **Royal Society University Research Fellow & Proleptic lecturer**, Royal Holloway, UK[2]
2018 – 2019: **Royal Society University Research Fellow**, University College London, UK
2015 – 2018: **Junior Research Fellow**, University College, University of Oxford, UK
2014 – 2015: **Postdoctoral Fellow**, ETH Zurich, Switzerland

Education & further training

2019 – 2020: **Researchers Academy**, National Co-ordinating Centre for Public Engagement (NCCPE), UK
One-year programme aimed at developing public engagement skills.
2017 – 2018: **Enhancing Teaching Programme**, University of Oxford, UK
National teaching qualification to develop skills for higher education teaching.
2010 – 2014: **PhD in Seismology**, University of Cambridge, UK. Thesis: "Normal mode studies of long wavelength structures in Earth's lowermost mantle". Awarded 19th July 2014.
2008 – 2010: **Master in Geophysics**, Utrecht University, NL. Grade: 92/100, GPA 4.0/4.0 *(cum laude)*
2005 – 2008: **Bachelor in Earth Sciences**, Utrecht University, NL. Grade: 90/100, GPA 4.0/4.0 *(cum laude)*

Awards

2021: **Philip Leverhulme Prize** by the Leverhulme Trust, awarded to early career researchers whose work has had international impact and whose future research career is exceptionally promising
2021: **Outstanding Reviewer** for Geophysical Research Letters
2018: **Doornbos Memorial Prize** by the Committee for the Study of Earth's Deep Interior (SEDI / IUGG) for outstanding work on the Earth's deep interior by an early career scientist

Selection of acquired funding (All as PI unless indicated otherwise)

2025: **Co-I on Cost Action:** Testing fundamental physics with seismology (PI: Aneta Wojnar). £480k
2024: **Co-I on MPLS PCER Award**: Shake, rattle and roll, outreach funding (PI: Charlie Rex). £4k
2024: **Co-I on NERC Capital Grant:** Seismic node equipment (PI: Prof. Nick Rawlinson) £646k
2024: **Royal Society URF renewal:** Mid mantle mysteries, 3 years salary + PhD funding. £636k
2023: **Royal Society ERE award:** Upper mantle anisotropy with full uncertainties, PDRA funding. £157k
2023: **Co-I on DFG Priority Programme DeepDyn Award:** Constraining absolute plate motions with normal modes and geodynamic modelling, PhD funding (PI: Dr Bernhard Schuberth). £131k
2021: **Royal Society ERE Award:** CMB topography using normal modes, PhD funding. £169k
2021: **Philip Leverhulme Prize:** Seismicity and background noise in London, PhD funding. £100k
2020: **Co-I on NERC Large Grant:** Constraining mantle circulation in 4D, PDRA + PhD funding (PI: Prof. Huw

[1] *Maternity leave taken from Dec 2022 to Sep 2023.*
[2] *Maternity leave taken from Jul 2020 to Apr 2021 with employment at 80 % FEC from Apr 2021 to May 2022.*

Davies). Total award £3.3m, with my component £164k

2018: **Royal Society Enhancement Award**: Lower mantle structure from normal modes, PhD funding. £71k

2018: **Royal Society URF (fellowship)**: The landscape of the core-mantle boundary, 5 years salary. £564k

2015: **University College JRF (fellowship):** Multi-scale topography of the CMB, 3 years salary. £76k

2014: **ETH Zurich Postdoctoral Fellowship**: Imaging of the Earth across the scales, 2 years salary. £146k

Service to scientific community

Societies:	Secretary for the British Geophysical Association (since 2024)
Editing:	Editor for *Geophys. J. Int.* (since 2024) and community-led journal *Seismica* (since 2022), guest editor for special issues in *EGU Solid Earth* and *Frontiers in Earth Science* (2020-2021)
Reviewing:	Journal reviewer for *JGR, TSR*, *EPSL*, *GJI*, *GRL*, *G-cubed*, *Nature Comm*. (since 2016) Proposal reviewer for NERC, German DFG, French ANR, Leverhulme Trust (since 2018)
Organising:	MODES 2025 (sole organiser, Oxford), UK-SEDI 2019 (organising committee, UCL), BGA PGRiP 2013 (organising committee, Cambridge). SEDI session organiser (2018 and 2022).
Convening:	Organised and convened > 10 sessions at AGU (2013 – 2021) and EGU (2016 – 2020)

Supervising and mentoring

Postdocs:	Advisor to Dr Franck Latallerie (PDRA 2023 – 2025, Oxford)
PhD students:	Primary supervisor of 5 PhD students (4 ongoing in Oxford, 1 completed at RHUL) Co-supervisor of 7 PhD students (6 ongoing, 1 completed) at Oxford, LMU and Strasbourg
MSc students:	Supervisor of 5 undergraduate research project students (all completed) at Oxford and UCL
ECR support:	Sharing experiences with funding and fellowship applications in annual events (since 2018)

Teaching

Qualification:	SEDA PDF Descriptor 2 Award: National qualification for Higher Education in the UK (2018)
Lecturing:	3rd Global seismology (since 2022), 4th year Mantle structure & dynamics (since 2022), 1st year Mathematics, 1st year Seismology (since 2023)
Tutoring:	Personal tutor for Earth Sciences students at Exeter College (since 2022) Tutor (small-group) for quantitative undergraduate courses (2015 – 2018, 2022 – Present)
Field teaching:	1st year field trips to Pembrokeshire (2016, 2022) and Arran (2010, 2011, 2014)
Examining:	Dr Fred Dubois (Strasbourg, 2020), annual internal review of PhD students (since 2020)

Invited research seminars and conference presentations

Keynote:	Inge Lehmann Symposium (2025), ANU 50 year Symposium (*unable to travel due to leave*, 2023), Ada Lovelace workshop (*unable to attend due to leave*, 2022), BGA PGRiP (2018)
Conferences:	BSM (2022), UKSEDI (2021), SSA (2020), EGU (2020, 2018), AGU (2019, 2018, 2016, 2014)
Universities:	Leeds, Yale, ETH Zurich (2022); Imperial, Cambridge (2020); Birmingham, LMU Munich, (2019); Oxford, Bristol (2018); Leeds, Princeton, Maryland (2017); Strasbourg, Lyon (2016); Oslo (2015); UCL, Imperial, Michigan (2014); Scripps, LMU Munich, Utrecht, Geoazur (2013)

Selected media and outreach activities

Training:	NCCPE Researchers Academy (2019/2020), Royal Society Media Skills training (2020)
Schools:	Participating in "I'm a Scientist StayatHome" (2020), Online lectures (since 2020), preparing teaching materials for GeoBus (UCL, 2020), school career visits for STEM (since 2020)
Events:	Earth day Oxford (2024), Royal Society Lates (2020), Royal Society Discovery Hub (2019)
Media:	Youtube videos on Greenland paper (2024) and Covid lockdown paper (2020), animation "Journey to the centre of the Earth" with BBC Ideas (2023), Futurum Careers resources (2022), articles for *The Conversation* (2017 – 2020), PintOfScience podcast (2020)
Interviews:	Regular commentaries and interviews with international radio and newspapers (e.g. BBC, NY Times, El Pais, Sunday Times, Temblor, BBC Radio 4, Wired)
3D printing:	Developed open-source methodology to 3D print globes for explaining geophysical concepts, detailed in an invited conference poster (2019) and article in *Frontiers in Earth Science* (2021)

PAULA KOELEMEIJER – LIST OF PUBLICATIONS

** = PhD student, * = MSc research student, under my (co-)supervision

In progress

- Trautner, V.E.**, **P. Koelemeijer**, J. Ritsema & H. Marquardt. Seismic signal of the iron spin crossover in travel-time data. *Draft in preparation for submission to Geophys. Res. Lett.*
- Ramadan, F.**, B. Fry, **P. Koelemeijer** & T. Nissen-Meyer. PGVnet: a machine-learning framework for the generation of rapid, physics-consistent PGV maps. *Draft about to be submitted to J. Geophys. Res.*
- Boudinot, L.A.**, **P. Koelemeijer**, R.A. Montgomery & B. Mortimer. Behavioral responses of terrestrial animals to seismic waves and anthropogenic seismic disturbances. *Draft about to be submitted to Nature Reviews Biodiversity*
- Serra, E.**, C. Zaroli, S. Lambotte & **P. Koelemeijer**. Inference of the S- to P-wave velocity ratio and its uncertainty with an application to South-East Asia. *In review for Geophys. J. Int.,* available via EarthArXiv, doi:10.31233/X56X5G
- Leung, J.**, A.M. Walker, **P. Koelemeijer**, F. Restelli** & D.R. Davies. Quantitative assessment of tomographic proxies for lowermost mantle composition and mineralogy. *In revision for PEPI (SEDI special issue)*, available via EarthArXiv, doi:10.31223/X5F42K
- Latallerie, F.‡, C. Zaroli, S. Lambotte, A. Maggi, A. Walker & **P. Koelemeijer**. Finite-frequency 3D surface-wave SOLA tomography: a synthetic study. *In revision for Seismica*, available via EarthArXiv, doi:10.31223/X5FM79

Peer-reviewed book chapters

B1. **Koelemeijer, P.** (2021). "Towards consistent seismological models of the core-mantle boundary landscape". In: *"Mantle upwellings and surface expressions", AGU Monograph edited by Marquardt, Ballmer, Cottaar & Konter*, Chapter 9, pp. 229-255, doi:10.1002/9781119528609.ch9

Peer-reviewed extended abstracts

A1. Scivier, S.**, T. Nissen-Meyer, **P. Koelemeijer** & A.G. Baydin (2024). Gaussian processes for probabilistic estimates of earthquake ground shaking: a 1-D proof-of-concept. *Peer-reviewed conference paper for ML4PS workshop at NeurIPS 2024*, available via arXiv, doi:10.48550/arXiv.2412.03299

Peer-reviewed articles

23. Davies, J.H., J. Panton, (...), **P. Koelemeijer**, F. Latallerie‡, et al. (2025). How to assess similarities and differences between mantle circulation models and Earth using disparate independent observations. *In press, Proc. Roy. Soc. A.,* doi:10.1098/rspa.2024.0827
22. Mag, A.M.**, C. Zaroli & **P.Koelemeijer** (2025). Bridging the gap between SOLA and Deterministic Linear Inferences in the context of seismic tomography. *Geophys. J. Int.*, vol. 242(1), ggaf131, doi:10.1093/gji/ggaf131
21. Panton, J., J.H. Davies, **P. Koelemeijer**, J. Ritsema & R. Myhill (2025). Unique composition and evolutionairy histories of large low velocity provinces. *Scientific Reports*, vol. 15, 4466, doi:10.1038/s41598-025-88931-3
20. Svennevig, K., S.P. Hicks, (…), **P. Koelemeijer**, C. Ebeling, A. Cannata, W.D. Harcourt et al. (2024). A rockslide-generated tsunami in a Greenland fjord rang Earth for 9 days. *Science*, vol. 385, is. 6714, pp. 1196-1205, doi:10.1126/science.adm9247
19. Restelli, F.**, C. Zaroli & **P. Koelemeijer** (2023). Robust estimates of the ratio between S- and P-wave velocity anomalies in the Earth's mantle using normal modes. *Phys. Earth. Planet. Int.,* vol. 347, 107135, doi:10.1016/j.pepi.2023.107135
18. Trautner**, V.E., S. Stackhouse, A. Turner*, **P. Koelemeijer**, D.R. Davies, A.S.J. Mendez, N. Satta, A. Kurnosov, H.-P. Liermann & H. Marquardt (2023). Compressibility of ferropericlase at high-temperature: evidence for the iron spin crossover in seismic tomography. *Earth Planet. Sci. Lett.*, vol. 618, 119296, doi:10.1016/j.epsl.2023.118296
17. Richards, F.D., M.J. Hoggard, S. Ghelichkhan, **P. Koelemeijer** and H.C.P. Lau (2023). "Geodynamic, geodetic and seismic constraints favour deflated and dense-cored LLVPs". *Earth Planet. Sci. Lett.*, vol. 602, 117964, doi: 10.1016/j.epsl/2022/117964

16. Restelli, F.**, **P. Koelemeijer** & A. Ferreira (2022). “Normal mode observability of radial anisotropy in the Earth's mantle”. *Geophys. J. Int.*, vol. 233, is. 1, 663-679, doi:10.1093/gji/ggac474
15. Ringler, A.T., R E. Anthony, (…), **P. Koelemeijer**, H.C P. Lau, V. Lekic, et al. (2022). Achievements and Prospects of Global Broadband Seismographic Networks after 30 Years of Continuous Geophysical Observations. *Reviews of Geophysics*, doi:10.1029/2021RG000749
14. Robson, A.J.S., H.C.P. Lau, **P. Koelemeijer** & B. Romanowicz (2022). An analysis of core-mantle boundary Stoneley mode sensitivity and sources of uncertainty. *Geophys. J. Int.*, Vol. 228(3), 1962-1974, doi:10.1093/gji/ggab448
13. **Koelemeijer, P**. and J. Winterbourne (2021). “3D printing the world: developing geophysical teaching materials and outreach packages”. *Front. Earth Sci.*, Vol. 9, p 297, doi:10.3389/feart.2021.669095
12. Chaves, C.A.M., **P. Koelemeijer** and J. Ritsema (2021). “Comparing ray-theoretical and finite-frequency teleseismic traveltimes: implications for constraining the ratio of S-wave to P-wave velocity variations in the lower mantle”. *Geophys. J. Int.*, Vol. 224(3), 1540-1552, doi:10.1093/gji/ggaa534
11. Lecocq, T., S.P. Hicks, K. Van Noten, K. van Wijk, **P. Koelemeijer**, R.S.M De Plaen, F. Massin, G. Hillers et al. (2020). “Global quieting of high-frequency seismic noise due to COVID-19 pandemic lockdown measures”. *Science*, Vol. 369(6509), 1338-1343, doi:10.1126/science.abd2438
10. Jones, T., R. Maguire, P. van Keken, J. Ritsema and **P. Koelemeijer** (2020). “Subducted oceanic crust as the origin of seismically slow lower mantle structures”. *Progress in Earth and Planetary Science,* **7**(17), doi:10.1186/s40645-020-00327-1
9. **Koelemeijer, P.**, B.S.A. Schuberth, D.R. Davies, A. Deuss and J. Ritsema (2018). “Constraints on the presence of post-perovskite in Earth’s lowermost mantle from tomographic-geodynamic model comparisons”, *Earth Planet. Sci. Lett.,* **494**, 226-238, doi:10.1016/j.epsl.2018.04.056
8. Mortimer, B., W.L. Rees *, **P. Koelemeijer** and T. Nissen-Meyer (2018). “Classifying elephant behaviour through seismic vibrations”, *Current Biology,* **28**, R547-R548, doi:10.1016/j.cub.2018 .03.062
7. Zaroli, C., **P. Koelemeijer** and S. Lambotte (2017). “Toward seeing the Earth’s interior through unbiased tomographic glasses”, *Geophys. Res. Lett.,* **44**, doi:10.1002/2017GL074996
6. **Koelemeijer, P.**, A. Deuss, and J. Ritsema (2017). “Density structure of Earth’s lowermost mantle from Stoneley mode splitting observations”, *Nature Comm*., **8**, 15241, doi:10.1038/ncomms15241
5. **Koelemeijer, P.,** J. Ritsema, A. Deuss and H.-J. van Heijst (2016). “SP12RTS: a degree-12 model of shear- and compressional-wave velocity for the Earth’s mantle”, *Geophys. J. Int.*, **204** (2)**,** 1024–1039, doi:10.1093/gji/ggv481
4. **Koelemeijer, P**., A. Deuss, and J. Ritsema (2013). “Observations of core-mantle boundary Stoneley modes”, *Geophys. Res. Lett*., **40** (11), 2557–2561, doi:10.1002/grl.50514
3. Soldati, G., **P. Koelemeijer**, L. Boschi and A. Deuss (2013). “Constraints on core-mantle boundary topography from normal mode splitting”, *G-cubed*, **14**(5), 1333–1342, doi:10.1002/ggge.20115
2. **Koelemeijer, P.J.**, A. Deuss and J. Trampert (2012). “Normal mode sensitivity to Earth’s D’’ layer and topography on the core-mantle boundary: What we can and cannot see”, *Geophys. J. Int.*, **190** (1), 553–568, doi:10.1111/j.1365-246X.2012.05499.x
1. **Koelemeijer, P.J**., C.J. Peach and C.J. Spiers (2012). “Surface diffusivity of cleaved NaCl crystals as a function of humidity: Impedance spectroscopy measurements and implications for crack healing in rocksalt”, *J. Geophys. Res.*, **117**, B01205, 15 pp. doi:10.1029/2011JB008627

Selection of non-peer reviewed publications

- Cottaar, S. and **P. Koelemeijer** (2021). “The interior of Mars revealed” (Perspective), *Science*, Vol. 373(6553), 388-389, doi:10.1126/science.abj8914
- Kyriakopoulos, C., N. Barth, **P. Koelemeijer**, J. Winterbourne and R. Toussaint (2021). “3D Printing in Geology and Geophysics: Overview and Thoughts on Current Applications”, *Front. Earth. Sci.*, Vol. 9, p 610, editorial article, doi:10.3389/feart.2021.734291
- **Koelemeijer, P.** and S.P. Hicks (2020). “Coronavirus lockdown reduced seismic activity around the world”, *The Conversation.* https://bit.ly/3rjxAT4
- **Koelemeijer, P.** (2017). “A giant lava lamp inside the Earth might be flipping the planet’s magnetic field”, *The Conversation,* https://bit.ly/3v1Xq0a