

Joseph Asplet

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Research Experience

Postdoctoral Researcher. Dept. Earth Sciences, University of Oxford. 2023 – present

- Working on how local shear-wave splitting measurements can be used to help constrain the present-day stress field in the North Sea as part of the EU project “SHARP Storage - Stress history and reservoir pressure for improved quantification of CO₂ storage containment risks”.
- Consulting for a North Sea CO₂ storage operator through Oxford University Innovation.
- Researched the application of array seismology to detect and locate seismicity in the North Sea as part of the Oxford Martin School’s AGILE Initiative Sprint “What do we need to know to safely store CO₂ beneath our Shelf Seas”.
- Organised a stakeholder engagement workshop for AGILE project.
- Deployed and continue to maintain an array of 8 telemetered seismometers on the North York Moors. The array was deployed to test the potential of seismic arrays to detect and locate seismicity in the Southern North Sea.
- Written peer-reviewed research reports and contributed to CO₂ storage policy recommendations, which are being developed into multiple scientific publications.
- Joint administrator of research groups’ data processing cluster.
- Research member of the Oxford Net Zero research initiative.
- Presented research at 5 national and 2 international conferences.
- Given online webinar on research on seismic arrays, hosted by the Bristol and Oxford Microseismicity consortium.

Research Associate. School of Earth Sciences, University of Bristol. 2021 – 2023

- Developed new techniques to detect the presence and extent of melt with the Earth using instantaneous frequency to measure seismic attenuation anisotropy.
- Designed and implemented research software, written in Python, to forward model velocity and attenuation anisotropy in fractured, fluid-filled, mediums.
- Regularly attended and presented results at national and international conferences.
- Supervised masters projects of undergraduate students.

PhD Student. School of Earth Sciences, University of Bristol. 2017 – 2021

- Devised new approaches to observe seismic anisotropy in the lowermost mantle using shear-wave splitting of core-refracted phases.
- Researched techniques to relate lowermost mantle shear-wave splitting to geodynamic processes. Resulted in improved constraints on lowermost mantle flow patterns, and potential mineral compositions, beneath the Pacific.

- Secured postgraduate scholarship worth £15,000.
- Created a new data product, shipping lane maps aggregated from ship AIS data, during 3-month internship at geospatial intelligence firm Geolcollect. Included developing prototype data processing architecture in AWS to create a daily updating product and to serve shipping lane maps to Geolcollect's front-end website for a user-specified region.
- Presented results at national and international conferences and in scientific journals.
- Received training in research software engineering, scientific programming in Python and using HPC environments.

Education

Ph.D. Geology. University of Bristol

2017 – 2021

Thesis title: "New techniques for the robust identification and quantification of seismic anisotropy in the lowermost mantle"

Advisors: James Wookey and J-Michael Kendall.

MSci Geophysics. University of Southampton

2013 – 2017

First class honours.

Professional Service and Community Roles

- Secretary to the International Union of Geodesy and Geophysics (IUGG) UK National Committee (2023-2027).
- Incoming postdoc representative in Department of Earth Sciences.
- Organised University of Bristol geophysics research group's seminars (2020-2023)
- Solid Earth theme representative on the 2020 Wessex Doctoral Training Network (DTN) conference organising committee (a joint meeting between the GW4+, Spitfire and Oxford NERC doctoral training programmes).
- Convened the 2019 British Geophysical Association Postgraduate Research in Progress conference.
- Organised the 2019 University of Bristol School of Earth Sciences postgraduate seminar series.
- Reviewer for journals including: *Physics of the Earth and Planetary Interiors*, *Seismica*, *Geophysical Journal International*, *Journal of Volcanology and Geothermal Research*, *and Geochemistry*, *Geophysics*, *Geosystems*.
- Member of the American Geophysical Union (AGU) and European Association of Geoscientists and Engineers (EAGE).

Grants and Awards

- Government of Jersey postgraduate scholarship. Awarded £15,000 over 2017-2020.
- Runner-up – Best Talk award at the British Geophysical Association Postgraduate Research in Progress conference 2019.
- University of Southampton progression scholarship. Annual award of £500 for academic excellence from 2013-2017.

Journal Articles

- Asplet, J.**, Wookey, J., Kendall, J.M., Chapman, M., and Das, R. 2024
Shear-wave attenuation anisotropy: a fluid detection tool, *Seismica*. Doi:[10.31223/X5838Z](https://doi.org/10.31223/X5838Z)
- Hudson, T., **Asplet, J.**, and Walker, A., 2023.,
Automated shear-wave splitting analysis for single- and multi-layer anisotropic media.
Seismica. Doi:[10.31223/X5R67Z](https://doi.org/10.31223/X5R67Z)
- Asplet, J.**, Wookey, J. & Kendall, M., 2022.,
Inversion of shear-wave waveforms reveals deformation in the lowermost mantle.
Geophysical Journal International, **232**, 97–114. Doi:[10.1093/gji/ggac328](https://doi.org/10.1093/gji/ggac328)
- Asplet, J.**, Wookey, J. & Kendall, M., 2020.,
A potential post-perovskite province in D'' beneath the Eastern Pacific: evidence from new analysis of discrepant SKS–SKKS shear-wave splitting.
Geophysical Journal International, **221**, 2075–2090. Doi:[10.1093/gji/ggaa114](https://doi.org/10.1093/gji/ggaa114)

Other publications

- Asplet, J.**, Kettlety, T., Felgett, M. and Kendall, J. M., 2024, SHARP Storage Deliverable 2.3: Stress-induced anisotropy, reservoir properties and caprock integrity assessment.
- Sutton, M., Rufas, A., **Asplet, J.**, Moneron, J., Kallingal, M., Albini, D., Kettlety, T., Muslemani, H., Köppen, M., Cartwright, J., Bouman, H. A., Rickaby, R., Jackson, M., Smith, S. M., Allen, M., and Kendall, J. M., 2024., Filling in evidence gaps for the safe deployment of offshore Geological Carbon Storage. The Agile Initiative, University of Oxford, UK. doi: 10.5287/ora-e9o5oxve8
- Asplet, J.**, Kettlety, T., Felgett, M., Luckett, R., Kendall, J. and Kühn, D., 2024, June. Seismic Anisotropy as a Measure of in-Situ Stress for Safe CO₂ Storage. In *85th EAGE Annual Conference & Exhibition (including the Workshop Programme)*. European Association of Geoscientists & Engineers.
- Kettlety, T., **Asplet, J.**, Hudson, T. and Kendall, J.M., 2024, June. Using Array Methods for Cost-Effective Onshore Passive Seismic Monitoring for Offshore CO₂ Storage Projects. In *85th EAGE Annual Conference & Exhibition (including the Workshop Programme)*. European Association of Geoscientists & Engineers.
- Sutton, M., Rufas, A., **Asplet, J.**, Kallingal, M., Moneron, J., Cartwright, J., Kettlety, T., Kendall, M., Bouman, H., Rickaby, R., Allen, M., & Smith, S., 2024, What do we need to know to safely store CO₂ beneath our shelf seas? Stakeholder workshop report. The Agile Initiative.
- Asplet, J.**, 2021
New techniques for the robust identification and quantification of seismic anisotropy in the lowermost mantle. *University of Bristol*, url:<https://hdl.handle.net/1983/06dcb896-db47-4052-a40c-77b86fa5eaf7>