Dr. Samuel Jennings

Software developer · AI-assisted and agentic engineering · PhD in geophysics

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PROFILE

Software developer with a PhD in geophysics. I build open-source Django frameworks and data infrastructure. In my own time I build software with a team of AI agents: specification-driven, test-first, with human-gated review. Comfortable across the whole stack, from data models to deployment. Good at explaining technical work to people who aren't specialists. Open to opportunities inside and outside academia.

EXPERIENCE

Jun 2022 – now

Postdoctoral researcher, software and data infrastructure · GFZ Helmholtz Centre for Geosciences, Potsdam

Lead database and portal developer, World Heat Flow Database Project (heatflow.world): back end, database, data models and API.

- Designed a layered, MIT-licensed framework stack: Django MVP (Django application shell) → FairDM (FAIR research data portals) → the Global Heat Flow Database portal
- Turn spreadsheet-based workflows into validated data models with SKOS controlled vocabularies and persistent identifiers (DOI, ORCID, IGSN)
- Work with the project's data assessment team and partners to keep the data models true to how the science is done

2019 – 2021

Project lead, Newer Volcanics Province magnetotelluric survey · University of Adelaide

Planned and led a four-person field campaign across 51 sites in South Australia and western Victoria: logistics, budget, safety and land-access negotiations with government agencies and private landholders.

2018 – 2021

Field technician · Zonge Engineering and the University of Adelaide

Paid contract field work: several magnetotelluric surveys for Zonge's clients in remote Queensland and Western Australia and several University of Adelaide research trips to remote South Australia.

PERSONAL PROJECTS

2025 – now

Forge AEO · my automated agentic engineering team

A self-hosted team of AI agents that designs, builds and reviews software on my own projects: prototype first, specification, tests first, independent review and a merge I approve myself. Built this website and its Sphinx theme, and maintains the Django MVP package family.

EDUCATION

2018 – 2021

PhD, Geophysics · University of Adelaide

Nature of the Lower Crust. Combining thermal and electrical methods: a geochemistry-based thermal conductivity model, high-temperature laboratory conductivity experiments (control software written in Python), a 51-site magnetotelluric survey and ThermoGlobe, a Django portal for global heat flow data.

2017

BSc Honours (First Class), Geophysics · University of Adelaide

A new compositionally-based thermal conductivity model for plutonic rocks. Top of the cohort.

2013 – 2016

BSc, Mineral Geoscience · University of Adelaide

2010 – 2011

Advanced Diploma, Aviation · TAFE SA · private pilot licence

SKILLS

Software	Python, Django, django-cotton, Tailwind CSS and daisyUI, JavaScript, SQL, Sphinx, Git and GitHub Actions, Docker
AI	Agentic software development, multi-agent workflows, specification-driven and test-first development with AI, self-hosted language models
Data	FAIR data principles, data modelling, SKOS controlled vocabularies, persistent identifiers
Other	Project and field-campaign leadership, stakeholder negotiation, scientific writing
Languages	English (native), German (learning)

OPEN SOURCE

Django MVP and its family of about 18 packages · FairDM and its plugins · sphinx-daisyui · django-controlled-vocabularies · django-content-license

SERVICE

2017 – 2021	Australian Society of Exploration Geophysicists, SA/NT branch: committee member, Treasurer 2020–2021
2018 – 2021	Health and Safety Representative, Department of Earth Sciences, University of Adelaide

SELECTED PUBLICATIONS

Neumann, F., Norden, B., …, Fuchs, S., **Jennings, S.**, et al. (2026). The 2024 release of the Global Heat Flow Database: quality assessment, metadata standards, and a century of geothermal data. *Earth System Science Data*, 18(7), 4639–4668.

Jennings, S., Elger, K., Fuchs, S., et al. (2024). Geoluminate: a community-centric framework for decentralized geoscience data portals. *EGU General Assembly 2024*.

Fuchs, S., Norden, B., Neumann, F., …, **Jennings, S.**, et al. (2023). Quality-assurance of heat-flow data: the new structure and evaluation scheme of the IHFC Global Heat Flow Database. *Tectonophysics*, 863, 229976.

Jennings, S., Heinson, G., Hasterok, D., Kay, B. (2023). Magnetotelluric support for edge-driven convection and shear-driven upwelling in the Newer Volcanics Province. *Scientific Reports*, 13, 5543.

Jennings, S., Hasterok, D., Payne, J. (2019). A new compositionally based thermal conductivity model for plutonic rocks. *Geophysical Journal International*, 219(2), 1377–1394.

Full list: scholar.google.com/citations?user=RJgvDP0AAAAJ