

Harry Matchette-Downes, PhD

Freelance geospatial data scientist

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Education

2015–2021	PhD in geophysics, Massachusetts Institute of Technology, USA. Thesis topic: Seismic imaging of Earth’s deep interior.
2011–2015	BA, MSc (first class) in physics (minor geology), University of Cambridge, UK.

Selected projects

2026, Jan.	SalGo Team (Uni. of Oxford ecology)	Developed an interactive web map as an interface to the COM(P)ADRE matrix population model databases.
2025, June.–July	WildCRU (Oxford Uni. conservation)	Built an interactive catalog map of Species Distribution Models (SDMs) and data pipeline—in just one month.
2024, Jan.–Sept.	Okko Healthcare	Created an algorithm to detect vision loss in app users.
Jan.–May	Anglo American	Reviewed a geological risk assessment of a mining project, including additional remote-sensing analysis.
2023, Oct.–Nov.	<i>Conservation NGO (anonymised)</i>	Cartography, based on satellite data, for a conservation property in the Peruvian Amazon.
2022 Sep.–2023 Apr.	<i>Exploration company (anonymised)</i>	Managed survey logistics, GIS, and data analysis for hydrogen exploration in Spain.

Voluntary roles

2025, Feb.–present	TCT Hikers’ Board (a steering committee)	I support the Transcaucasian Trail, a hiking route and sustainable development project in the Caucasus region, through GIS work and fundraising.
2024, Mar.–present	MapAction	Selected to be a deployable geospatial volunteer (see ‘MapAction contributions’ below).

Selected MapAction contributions

MapAction is a UK-based charity with around 40 geospatial professionals who volunteer to provide field mapping for humanitarian disasters, often as part of the United Nations team (UNDAC). We also deliver training to build disaster resilience in developing nations.

2026, February	Mozambique floods	11 days	MapAction Team Leader for second rotation. Deployed with UNDAC. Mapping tasks, especially helicopter logistics, hard-to-reach areas, and camp maps with drone and survey-form data.
2025, April	Myanmar earthquake	14 days	Deployed with UNDAC. Mapping tasks, especially for the Rapid Needs Assessment.
February	ASEAN-ERAT Induction course	8 days	Delivered classroom sessions and facilitated the 'SimEx' for the Level 1 course in Cambodia.

I've also helped remotely with Hurricanes Helene, Milton, and Melissa, wildfires in Belize, an oil spill in Ecuador, and a training for refugees in Uganda. I've received over nine weeks of training from MapAction, SAFA (situation awareness and first aid), humanitarian topics and systems, teaching, and GIS.

Research and internships

2022, Feb.–August	MIT	Post-doc: Computed large-scale vibrations of planet Earth on a supercomputer.
2019, June–August	Hochschild Mining	Summer internship: Supported exploration geophysics for a gold-mining company based in Lima, Peru.
2014, June–August	British Antarctic Survey	Research internship: Modelled synchrotron radiation from Jupiter's radiation belts using Fortran.

Skills

Teaching	Teaching assistant at MIT, for mixed undergraduate–postgraduate classes in Planetary Science and Structural Geology. I have prepared and delivered training for MapAction trips to Uganda and Cambodia, including a multi-day 'simulation exercise'.
Web maps	I'm an expert in building and maintaining web maps, using various map libraries (e.g. MapLibre GL JS, Leaflet, and Folium). I build fast, cost-effective sites using the latest web tile technologies (e.g. tippecanoe and Protomaps) stored in the cloud (e.g. Amazon S3). For an example, see the WildMAPS site .
Web design	Experienced user of Javascript, HTML, CSS, PHP and MySQL to build websites. I built a blog about hiking and cartography, from scratch.
Programming	Scientific programming using Python, Matlab, Fortran and C++. Version control using git, and deployment with Docker.

Data science	Signal processing, GUI creation, data exploration and visualisation, parameter-fitting, numerical modelling, parallel processing, design and training of machine-learning algorithms (AI). I can work independently to design data pipelines.
Geospatial data and databases	Using QGIS, ArcGIS, Google Earth Engine and Python (e.g. scipy and geopandas) for mapping and GIS. Familiar with various remote-sensing products including DEMs, NVDI, Copernicus, and others. Experienced with MySQL and TypeDB databases.
Speaking	I've given talks at the Royal Geographical Society (2026) and the American Geophysical Union (2020).
Data presentation	I am an expert in data visualisation, e.g. with matplotlib (Python). I can present results clearly and concisely in reports, papers, and presentations.
Fieldwork	I've carried out more than 21 weeks of geological and geophysical fieldwork in Europe, the Americas, and India, including six weeks of solo mapping in Jamaica, leading a gravity survey in Saint Lucia, and running soil-gas surveys for hydrogen exploration.
Languages	I speak fluent Spanish and basic Russian.
Adventure travel and travel writing	I have had many successful adventure-travel expeditions. Most recently, in the summer of 2025, I became the first person to solo-hike the 1,400-km Pamir Trail in Tajikistan. I've written an account for Sidetracked Magazine, the UK's largest outdoors magazine in terms of online following.

Journal articles

2025	C. Martin et al. "The geology of the Shyok suture zone: evidence for Cretaceous extension of the southern Eurasian margin and Eocene India–Eurasia collision". In: <i>Journal of the Geological Society</i> 182.2. DOI: 10.1144/jgs2024-082
2025	T. Cranshaw, H. Matchette-Downes, and K. Reid. "Reporting of oral chemical restraint in the Mental Health Services Monthly Statistics for England". In: <i>BJPsych Bulletin</i> , pp. 1–5. DOI: 10.1192/bjb.2025.10
2019	H. Matchette-Downes, R. D. van der Hilst, A. Gilligan, and K. Priestley. "Seismological constraints on the density, thickness and temperature of the lithospheric mantle in southwestern Tibet". In: <i>Earth and Planetary Science Letters</i> 524, p. 115719. DOI: 10.1016/j.epsl.2019.115719

References

Available on request.