

Dr Rita Kounoudis

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RESEARCH INTERESTS

My research aims to improve our understanding of tectonic, magmatic and geodynamic processes by using a wide range of seismological techniques to construct models of crustal and mantle structure. At regional scales, my work spans a variety of active tectonic settings including terminal-stage subduction zones in the Eastern Mediterranean and continental rifting and plume-driven magmatism along the East African Rift. At more local scales, I apply earthquake detection and location methods to subduction-related volcanic systems (Soufrière Hills, Montserrat) and rift settings (southern Zambia) to characterise their magmatic/fluid plumbing systems and geothermal potential. I also investigate tectonically stable regions that preserve the imprints of tectonic processes which unfolded early in Earth's history and now host abundant critical mineral deposits (Central African Copper Belt).

Expertise: Seismological Imaging – Tectonics & Geodynamics – Magmatic & Geothermal Processes – Microseismic Detection

RESEARCH EXPERIENCE

2023 – Present | Postdoctoral Research Assistant (PDRA) in Seismology, University of Oxford

CuBES Project: Copper Basin Exploration Science (Zambia)

Seismically imaging the crustal and mantle structure of copper-rich Central Africa to constrain its tectonic evolution. Methods include shear-wave splitting, tomography, and receiver functions integrated with MT and gravity analysis.

- **Main collaborators:** Prof. Michael Daly; Prof. Mike Kendall; Prof. Stewart Fishwick; Chaanza Chifwepa (Zambian GSD).
- **Publications:** 2 lead-author papers and 2 in-preparation for submission in late 2025/early 2026.
- **Fieldwork:** Field leader for the maintenance and decommissioning of the CuBES seismograph network in Zambia (2023).

ReSET Project: Reframing Metal Mining for a Sustainable Energy Transition (Montserrat)

Applied earthquake detection and location techniques (e.g., QuakeMigrate, NonLinLoc) to broadband and nodal seismic networks to illuminate volcanic plumbing systems and assess the geothermal potential of Montserrat, Caribbean.

- **Main collaborators:** Prof. Mike Kendall; Dr Petros Bogiatzis; Montserrat Volcano Observatory.
- **Publications:** 1 in-preparation for submission in early 2026.
- **Fieldwork:** Nodal and broadband deployment and maintenance in Montserrat (2025).

Geothermal Energy Along the Southern East African Rift

Led the deployment of nodal seismometers in a region of significant geothermal potential (Bweenga hot springs) along the southern Zambian portion of the East African Rift, to collect data for microseismicity analysis (2023).

- **Main collaborators:** Prof. Michael Daly; Prof. Mike Kendall; Kalahari GeoEnergy.

Relevant technical skills developed: High Performance Computing; phase arrival picking; earthquake location; large nodal and broadband seismic datasets; tomography; receiver functions; joint inversion; Python for data analysis; multiprocessing tools.

2019 – 2023 | PhD in Geophysics, Imperial College London

TRAILS Project: Turkana Rift Arrays Investigating Lithospheric Structure (East Africa)

- **Funding:** Awarded the Imperial President's PhD Scholarship; NSF- and NERC-funded research project.
- **Thesis:** *"The Development of Rifting and Hotspot Tectonism in the Turkana Depression, East Africa"*. Seismological analysis included body-wave tomography, surface-wave tomography, receiver functions, and joint inversion.
- **Supervisors:** Prof. Ian Bastow (Imperial College); Prof. Cynthia Ebinger (Tulane University)
- **Publications:** 5 lead-author and 5 co-author papers (Nature, EPSL, GJI, and G-Cubed).
- **Fieldwork:** Maintenance of the TRAILS broadband seismograph network in Ethiopia (2019).

EDUCATION

2015 – 2019 | MSci in Geophysics at Imperial College London (1st Class Honours – top of the cohort)

MSci project: *"Seismic tomographic imaging of the Eastern Mediterranean mantle"* (achieved highest mark – 85%).

- Produced highest resolution P-wave and first S-wave model of Anatolia; published in Kounoudis et al. (2020, G-Cubed).

BSc project: “Crustal deformation and strain rates in the Aegean tectonic system using seismic moment tensors” (achieved highest mark – 83%).

Select courses: Gravity, Magnetism and Orbital Dynamics (92%), Seismology (88%), Physics of Planet Earth (83%), Field Geophysics (74%), Structural Geology II (76%), Marine Geology and Geophysics (79%), Advanced Programming (84%).

2008 – 2015 | The Grammar School (Nicosia, Cyprus):

A-levels: A*A*AA

IGCSE: A*A*A*A*AAA

GRANTS, AWARDS AND RECOGNITION

Awards and recognition span research, teaching, community engagement, travel, and academic excellence:

2025	MPLS Researcher Award (£500) Awarded for contributions to the postdoctoral community at Oxford.
2025	Vice Chancellor’s Award Nomination For enabling a vibrant research community for research staff at Oxford.
2023	Janet Watson Memorial Prize (£1000) Awarded for excellence in research achievement and citizenship.
2023	BGA Gray-Milne Travel Grant (£500) Awarded to support attendance to an international conference.
2022	BGA Postgraduate Research in Progress (PGRiP) Prize Awarded for the best research talk.
2022	Best Graduate Teaching Assistant (Imperial College Union) Award Nominated by undergraduates; selected as the Best Graduate Teaching Assistant across Imperial in 2022.
2022	Outstanding Student Presentation Earth Science & Engineering PhD Conference, Imperial College.
2022	Departmental Networking Fund (£1000) Awarded to support a research workshop visit to the U.S.
2021	Departmental Teaching Assistant Award Awarded by academic staff for excellence in teaching support.
2021	British Geophysical Association PhD Paper of the Month Kounoudis et al. (2021, G-Cubed).
2019-2023	Imperial College President’s PhD Scholarship (£22,000 p.a. stipend +£2000 p.a. research budget) Prestigious award to top-tier PhD applicants university-wide (at most ~1 recipient per year in Earth Sciences).
2019	Ernest Edward Glorney Scholarship in Earth Resources Engineering Awarded for academic excellence to a final year undergraduate student.
2019	Earth Science and Engineering Student Centenary Prize Awarded for the best MSci research project.
2019	A.G. Charleton Institution of Mining and Metallurgy Prize Awarded for all-round academic excellence.
2018 & 2019	Faculty of Engineering Dean’s List at Imperial College London Marks in the top 10% of cohort.
2017 & 2018	EPSRC Award Awarded for two consecutive years to conduct summer research placements.
2017	British Geophysical Association Award Awarded to best performing student on a geophysics field course.
2016	Roycroft Prize Awarded for enthusiasm and high performance in first year undergraduate studies.
2013	Edexcel High Achievers Award Achieved highest mark internationally in IGCSE mathematics.

PUBLICATIONS

Highlighted publication:

2025 **KOUNOUDIS, R.,** I.D. Bastow, C.J. Ebinger, S. Goes, P. Zhou, M. Musila, C.S. Ogden and A. Ayele (2025). *The Importance of Past Rifting on Large Igneous Province Development*. **Nature**, 647, 115–120 [\[View Press Release\]](#)
[View Paper](#)

Peer-reviewed publications:

2025 Ogden, C.S., **R. KOUNOUDIS,** C. Chifwepa, J-M. Kendall, D. Holwell, S. Fishwick, S.E.J. Nippres, L. Finch, V. Lane and M.C. Daly (2025). *Crustal Structure of the Central African Plateau from Receiver Function Analysis*. **GJI**, 241(2), 1132-1144.
[View Paper](#)

2025 Musila, M., F. Civilini, C.J. Ebinger, I.D. Bastow, **R. KOUNOUDIS,** C.S. Ogden and N. Mariita (2025). *Ambient noise crustal imaging of a heterogeneous rift linkage zone: Turkana Depression, East Africa*. **GJI**, 243(1), ggaf282.
[View Paper](#)

2025 Zhou, P., I.D. Bastow, **R. KOUNOUDIS,** C.S. Ogden and Y. Wang (2025). *Crustal Seismic Structure of the Anatolian Plate and its Implications for Plateau Uplift: Evidence from Joint Inversion of Receiver Functions and Surface Waves*. **G-Cubed**, 26, e2025GC012393.
[View Paper](#)

2024 View Paper	KOUNOUDIS, R. , J-M. Kendall, S. Fishwick, C.S. Ogden, C. Chifwepa and M.C. Daly (2024). <i>The Tectonic Development of the Central African Plateau: Evidence from Shear-Wave Splitting</i> . GJI , 239(3), 1694-1708.
2023 View Paper	Musila, M., C.J. Ebinger, I.D. Bastow, G. Sullivan, S.J. Oliva, E. Knappe, M. Perry, R. KOUNOUDIS , C.S. Ogden, R. Bendick, S. Mwangi, N. Mariita, G. Kianji, E. Kraus and F. Illsley-Kemp (2023). <i>Active Deformation Constraints on the Nubia-Somalia Plate Boundary Through Heterogeneous Lithosphere of the Turkana Depression</i> . G-Cubed , 24(9), e2023GC010982.
2023 View Paper	KOUNOUDIS, R. , I.D. Bastow, C.J. Ebinger, F. Darbyshire, M. Musila, C.S. Ogden, A. Ayele, G. Sullivan, F. Ugo, R. Bendick, N. Mariita and G. Kianji (2023). <i>The Development of Rifting and Magmatism in the Multiply-Rifted Turkana Depression, East Africa: Evidence from Surface-Wave Analysis of Crustal and Mantle Structure</i> . EPSL , 621, 118386.
2023 View Paper	Boyce, A., R. KOUNOUDIS , I.D. Bastow, C.J. Ebinger, S. Cottaar and C.S. Ogden (2023). <i>Mantle Wavespeed and Discontinuity Structure Below East Africa: Implications for Cenozoic Hotspot Tectonism and the Development of the Turkana Depression</i> . G-Cubed , 24(8), e2022GC010775.
2023 View paper	Ogden, C.S., I.D. Bastow, C.J. Ebinger, A. Ayele, R. KOUNOUDIS , M. Musila, R. Bendick, N. Mariita, G. Kianji, R. Rooney, G. Sullivan and B. Kibret (2022). <i>The Development of Multiple Phases of Superposed Rifting in the Turkana Depression, East Africa: Evidence from Receiver Functions</i> . EPSL , 609, 118088.
2021 View paper	Merry, T.A.J., I.D. Bastow, R. KOUNOUDIS , C.S. Ogden, R.E. Bell and L. Jones (2021). <i>The Influence of the North Anatolian Fault and a Fragmenting Slab Architecture on Upper Mantle Seismic Anisotropy in the Eastern Mediterranean</i> . G-Cubed , 22(9), e2021GC009896.
2021 View paper	KOUNOUDIS, R. , I.D. Bastow, C.J. Ebinger, C.S. Ogden, A. Ayele, R. Bendick, N. Mariita, G. Kianji, G. Wigham, M. Musila and B. Kibret (2021). <i>Body-Wave Tomographic Imaging of the Turkana Depression: Implications for Rift Development and Plume-Lithosphere Interactions</i> . G-Cubed , 22(8), e2021GC009782.
2021 View paper	Boyce, A., I.D. Bastow, S. Cottaar, R. KOUNOUDIS , J. Guilloud De Courbeville, E. Caunt and S. Desai (2021). <i>AFRP20: New P-wavespeed Model for the African Mantle Reveals Two Whole-Mantle Plumes below East Africa and Neoproterozoic Modification of the Tanzania Craton</i> . G-Cubed , 22(3), e2020GC009302.
2020 View paper	KOUNOUDIS, R. , I.D. Bastow, C.S. Ogden, S. Goes, J. Jenkins, B. Grant and C. Braham (2020). <i>Seismic Tomographic Imaging of the Eastern Mediterranean Mantle: Implications for Terminal-Stage Subduction, the Uplift of Anatolia, and the Development of the North Anatolian Fault</i> . G-Cubed , 21(7), e2020GC009009.
2019 View paper	Venereau, C.M.A., R. Martin-Short, I.D. Bastow, R.M. Allen and R. KOUNOUDIS (2019). <i>The Role of Variable Slab Dip in Driving Mantle Flow at the Eastern Edge of the Alaskan Subduction Margin: Insights from Shear-Wave Splitting</i> . G-Cubed , 20(5), 2433-2448.

Manuscripts in preparation:

2026	KOUNOUDIS, R. , J-M. Kendall, P. Bogiatzis, G. Ryan and S. Shams (2026). <i>Building an Earthquake Catalogue for Montserrat: Can Nodal Seismometers Improve Detection Capabilities?</i>
2026	KOUNOUDIS, R. , J-M. Kendall, J. Jenkins, T. Mackay-Champion, C. Chifwepa and M.C. Daly. (2026). <i>Seismic Imaging of a Metasomatized Lithospheric Mantle Beneath Central Africa's Precambrian Terranes: Evidence for Ancient Subduction</i> .
2026	Scrivens, B.*, R. KOUNOUDIS , J-M. Kendall and M.C. Daly (2026). <i>Upper-Mantle Seismic Structure of Zambia: Insights from P- and S-wave travel-time tomography. [*primary supervisor of MSc student]</i>

FIELDWORK EXPERIENCE

2025	Montserrat (ReSET seismic network) Broadband and nodal seismograph service team. Also conducted a resistivity survey across Montserrat’s main geothermal field.
2024	North York Moors (NYMAR array) Servicing seismograph stations, data extraction, instrument calibration.
2023	Zambia (CuBES seismic network) Led a team to service and decommission a broadband seismograph network spanning from north to southern Zambia. Simultaneously collected rock samples for density/gravity analysis.
2023	Zambia (Bweenga geothermal project) Deployed a nodal seismometer array to monitor microseismicity around active hot springs and geothermal fields in southern Zambia.
2019-2023	Troodos Ophiolite in Cyprus (gravity survey) Collected gravity data for future publication alongside teaching and supervising undergraduate students on conducting geophysical surveys.

2019	Ethiopia (TRAILS seismic network) Servicing seismograph stations, data extraction, instrument calibration.
2017-2018	Cyprus (TROODOS seismic network) Servicing seismograph stations, data extraction, instrument calibration.

SCIENTIFIC COLLABORATORS

Europe: University of Oxford; Durham; Imperial College; Leicester; Cambridge; Cyprus Geological Survey Department, Technische Universität Berlin | **North America:** University of Montana; Tulane; Montreal; Montserrat Volcano Observatory | **Africa:** University of Addis Ababa; Nairobi; Dedan Kimathi Institute of Technology; Lusaka; Zambian Ministry of Mines | **Industry:** BHP; First Quantum Minerals (FQM); Kalahari GeoEnergy | **Research Facilities:** SEIS-UK; AWE.

TEACHING EXPERIENCE AND SUPERVISION

- Worcester College, University of Oxford – Stipendiary Lecturer and College Tutor (2024-2025).**
- Delivered weekly tutorials in geology and geophysics to 1st, 2nd and 3rd year undergraduate students (15 students).
 - Provided pastoral support and participated in Tutorial Fellow and Senior Common Room Committee meetings.
- Independent Project Supervision (BSc and MSc thesis):**
- Principal supervisor for 4th year MSc seismology students at Oxford (2024-2025) and Imperial (2021-2022).
 - Co-supervisor for two 4th year MSci seismology projects (2019-2020; 2020-2021).
 - Graduate Teaching Assistant for 3rd year Geophysics Independent Research projects (2018-2022).
- Undergraduate Teaching:**
- Tutorial lecturer at Oxford for Plate Tectonics (3rd year) and Geophysical Methods (2nd year).
 - Teaching Assistant at Imperial across all years of the MSci Geophysics and Geology programmes (2018-2023): *Seismology, Numerical Methods, Maths, Paleo-magnetism, Geodesy and Orbital Dynamics, Continental Tectonics, Planetary Physics, Applied Geophysics, Geohazards.*
 - Academic and pastoral mentor for ten 1st year undergraduates at Imperial (2019).
 - Developed teaching material on using Generic Mapping Tools (GMT) for publication-quality figures and UNIX.
- Fieldtrip Teaching and Demonstrating:**
- Demonstrator on 3rd year Oxford Earth Sciences tectonics fieldtrip, Gulf of Corinth (2024, 2025).
 - Demonstrator and group leader on 2nd year Imperial Geophysics fieldtrip to Cyprus (2022, 2023).
 - 1st Year Imperial Geology fieldtrip to Charnwood and geological field skills training modules (2022-2023).
 - “Rocks and Structures in the Field” of South Wales and “Geology of Mars” virtual fieldtrips (2021).

ACADEMIC SERVICE, POSITIONS OF RESPONSIBILITY, AND EEDI

2024-Present	Researcher Representative, University of Oxford Lead advocacy for early career researchers by participating in faculty committees, shaping policies, and promoting an inclusive, supportive research environment.
2024	Postdoctoral Representative on the Athena Swann Action Group, University of Oxford Contributed to shaping and delivering Athena Swan initiatives, helping to advance gender equity in research.
Dec 2024	Lead convener for an AGU Fall Meeting 2024 Tectonophysics session Tectonic, Magmatic and Geodynamic Studies of Rifts, Rifted Margins and Ridges.
2022-2023	Interim Communications and Social Media Manager, Imperial College Invited to cover communications support for the Earth Sciences department for 10 months alongside my PhD.
2020-2023	Organiser of the PMaC (Plates, Mantle and Core) research group, Imperial College Organise and host weekly meetings and seminars with internal and external speakers.
2022	Member of Student Panel for Lectureship Interviews, Imperial College
2020-2023	Committee Member of the Graduate Society, Imperial College PhD student representative. Involved organising social and academic events (e.g., annual departmental Earth Science PhD Student Conference).
2021-Present	Reviewer for Academic Journals Geology, Nature Communications, GRL, GJI, EGU Sphere, PEPI, Gondwana Research, GSL, Scientific Reports, Journal Geophysical Research: Solid Earth, G-Cubed, Tectonophysics.
2015-2019	Undergraduate Academic Representative Elected each academic year to represent students in my cohort.

INVITED TALKS

2026 [upcoming]	EGU General Assembly 2026 in the Tectonics and Structural Geology Section Solicited speaker for the <i>"Continental Rift Evolution: from Inception to Break-up"</i> session.
2025	Research Culture Initiatives Showcase, University of Oxford Presented the <i>"Fellowship Day"</i> initiative, which I co-led to support postdoctoral Earth Science researchers in preparing independent funding applications.
2024	AGU Fall Meeting 2024 in the Volcanology, Geochemistry and Petrology Section Invited speaker for the <i>"Rift to Ridge: Bridging the Extensional Gap"</i> session.
2024 [view talk]	COMET Seminar (Centre for Observation and Modelling of Earthquakes, Volcanoes, and Tectonics) <i>"Variable Thermal and Magmatic Modification of East African Lithosphere"</i>
2024	Dublin Institute of Advanced Studies (DIAS) Geo-Seminar Series <i>"The Development of Rifting and Magmatism in the Multiply Rifted Turkana Depression"</i>
2024	Royal Astronomical Society – Astronomy and Geophysics Highlights Meeting <i>"Continental Break-up Along the East African Rift"</i> (non-specialist audience).
2023 [view talk]	Rifts and Rifted Margins Online Webinar <i>"Development of Rifting and Magmatism in the Turkana Depression, East Africa"</i>
2022	Inaugural Earth Science and Engineering Departmental Research Seminar Presented PhD research.
2022	University of Oxford Geophysics Seminar <i>"Rifting and Hotspot Tectonism: Imaging the Crust and Mantle in the Unusually Broad Turkana Depression, East Africa"</i>
2021	National Observatory of Athens <i>"Terminal-Stage Subduction: Implications for Anatolian Uplift and Magmatism"</i>
2021 & 2022	Geophysics Society, Imperial College Presented research and information on pursuing PhD studies.

CONFERENCES AND WORKSHOPS

2025	IASPEI Seismology Conference
2024	Coordinated research group talks for Rio Tinto, BHP and FQM representatives, University of Oxford
2023	European Geosciences Union (EGU) General Assembly
2024	Royal Astronomical Society Specialist Meeting <i>"Tectonics, Geodynamics, and Geo-resources of the East African Rift: Perspectives on Past and Future Research"</i>
2022	Earth Science and Engineering PhD Student Conference, Imperial College
2022 & 2024	British Seismology Meeting (BSM)
2021 & 2022	The BGA Postgraduate Research in Progress (PGRiP) Conference [award for best talk]
2021	President's Scholars Research Symposium, Imperial College
2019-2025	American Geophysical Union (AGU) Fall Meetings

SOCIETAL ENGAGEMENT AND OUTREACH

2025	UNIQ Course University of Oxford Helps students from diverse backgrounds apply to Oxford.
2024	Oxplore Festival Outreach programme for Year 11-13 students in Cornwall.
2023	Great Exhibition Road Festival Co-leader of seismology workshop aimed at age groups 4-8 yrs old.
2021-2023	Imperial College Earth Science Open Days Delivered talks to prospective students and their families.
2019-2023	Imperial College Outreach STEM leader Frequently delivered "Meet the Researcher" Webinars and in-person talks aimed at age groups 10-18 yrs old.
2018-2023	Earth Science Departmental Outreach Leader Promote Earth Science at school visits (e.g., Sutton Trust Summer School, Earth Science Taster Day, Nonsuch School for Girls, Bridge Academy).
2019 & 2022	Great Exhibition Road Festival Supported seismology and planetary science public workshops (8+ yrs old).

RELEVANT WORK EXPERIENCE

June-Aug 2017, 2018 – Undergraduate Research Opportunities Programme (UROP) in Seismology

- EPSRC-funded placements over two consecutive years.
- Conducted seismological data analysis contributing to two publications: *Venereau et al. 2019 (G³)*; *Boyce et al. 2021, (G³)*.

June-Sept 2016 – The Cyprus Institute

- Research project: “*Water management and supply in Nicosia during the British colonial period (1878-1960)*”.
- Supervised by the Director of Science and Technology in Archaeology at the Cyprus Institute and University of Cyprus.
- Final report is archived at the Cyprus Water Development Department library.

ATTENDED COURSES AND WORKSHOPS

AGU Courses: ROSES 2020 (Remote Online Sessions for Emerging Seismologists).

Graduate School Courses: Introduction to Machine Learning; Professional Development; Graduate Teaching Assistant Training.

EDI Workshops: Active Bystander; Unconscious Bias; Equality & Diversity; Bullying & Harassment; Racism Awareness.

Geomatrix Training: Hands-on experience with active and passive geophysical equipment for undergraduate field teaching.

ADDITIONAL SKILLS AND QUALIFICATIONS

Outdoor Fieldwork First Aid: Renewed June 2025.

Mental Health First Aid (MHFA England): Certified March 2023.

Driver’s License: Held since 2014.

Languages: English (Native/bilingual); Greek (Native/bilingual).

IT Skills: Python; Obspy; SAC; Bash/Shell Scripting; GMT; UNIX/Linux; C++; Fortran (basic); HTML; Illustrator; LaTeX; ArcGIS; HPC cluster environments.

PROFESSIONAL MEMBERSHIPS

Fellow, Royal Astronomical Society (RAS).

Full member, European Geosciences Union (EGU).

Full member, American Geophysical Union (AGU).

REFEREES

Prof. Mike Kendall – Postdoctoral Research PI/supervisor

Email: mike.kendall@earth.ox.ac.uk

Prof. Ian Bastow – PhD supervisor

Email: i.bastow@imperial.ox.ac.uk