

TARGET Project Proposal Form – 2025 entry

First page not sent out in adverts

Project Title	Mining for Sustainable and Inclusive Development (MISID)
University (where student will register)	UCL
Which institution will the student be based at?	Choose an item. UCL
Theme (Max. 2 selections)	Sustainability
Key words	Sustainable development, inclusive development, indigenous people; biodiversity; modelling; critical mineral extraction; global South
Please explain how the project fits within the NERC remit	This project addresses the important challenge of a need for critical mineral exploration to address the sustainable energy transition in need of critical minerals, while balancing biodiversity protection and social environmental justice for indigenous people and local communities living in areas with substantial potential for critical mineral exploration. This proposed PhD fits within the NERC remit as it addresses environmental sustainability and integrates considerations of sustainable development goals for critical mineral extraction.
Supervisory team (including institution & email address)	<p>PI: Dr. Teresa Domenech Aparisi, UCL Institute for Sustainable Resources, University College London (t.domenech@ucl.ac.uk)</p> <p>Co-I: Prof. Paul Ekins, UCL Institute for Sustainable Resources, University College London (p.ekins@ucl.ac.uk)</p> <p>Co-I at second TARGET institution: Dr. Flurina Wartmann, Senior Lecturer in Human Geography, Department of Geography & Environment, School of Geosciences, University of Aberdeen (flurina.wartmann@abdn.ac.uk)</p>
Is the PhD suitable for part time study?	Yes

Project Title: Mining for Sustainable and Inclusive Development (MISID)

Lead supervisor:

Dr Teresa Domenech, UCL Institute for Sustainable Resources, University College London

Co-supervisors:

Professor Paul Ekins, UCL Institute for Sustainable Resources, University College London

Dr Flurina Wartmann, Geography & Environment, School of Geosciences, University of Aberdeen

Project Highlights:

1. The MISID project will map biodiversity rich areas, indigenous peoples' territories, and significant deposits of key energy transition minerals (ETMs), identifying areas that should be preserved from mining given their importance for indigenous peoples, biodiversity or other environmental characteristics.
2. MISID will quantify through modelling how to match demand for ETMs with restricted access to deposits in protected areas and those of particular significance to indigenous peoples, and define necessary strategies to address potential bottlenecks building on circularity, material and technology innovation (minerals' substitutability).
3. MISID will generate policy pathways to transition towards 'nature-positive' and socially just minerals supply chains.



Overview:

This PhD proposal seeks to explore issues at the nexus between the need for an increase in the mining of critical minerals for renewable energy and other technologies that are important for the low-carbon energy transition¹, and the facts that many important deposits of these minerals are both in areas of high biodiversity and on the lands of indigenous peoples (Figure 1).

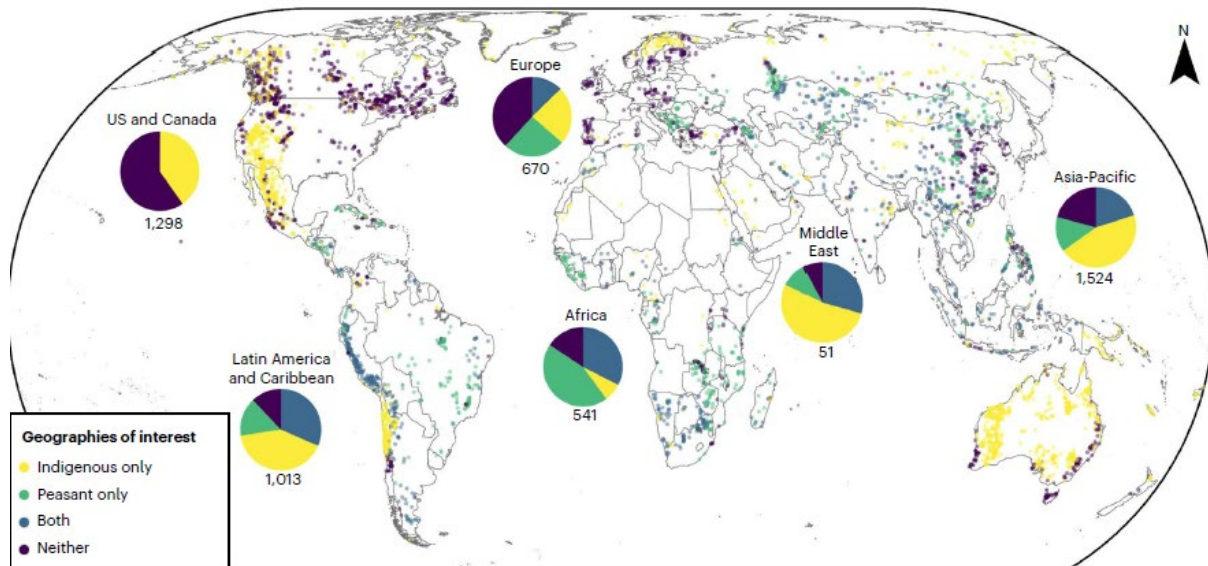


Figure 1: Distribution of mining projects for energy transition minerals (ETMs) on indigenous and peasant people’s lands.

Source: Owen et al., 2023², Figure 1a.

The proposal is put forward in the context of two statements released earlier in 2024 by the International Council on Mining and Metals (ICMM), one on the protection of biodiversity³ and one on the future relation of ICMM’s mining company members with indigenous peoples when there are proposals to mine in indigenous peoples’ territories⁴. The statement on indigenous peoples drew a very critical response from some indigenous peoples’ organisations⁵.

The ICMM biodiversity statement committed ICMM member companies to contribute to “a nature-positive future”, and references the definition of this from the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) as “halting and reversing biodiversity loss by 2030 from a 2020 baseline, through measurable gains in the health, abundance, diversity and resilience of species, ecosystems, and natural processes”. It also commits ICMM member companies to “respect legally designated protected areas” and “not explore or mine in UNESCO World Heritage sites”. The ‘nature’ element of this PhD research will explore the practical implications of these commitments for the accessibility for mining of energy transition minerals.

¹ <https://www.iea.org/reports/global-critical-minerals-outlook-2024>.

² Owen, J.R., Kemp, D., Lechner, A.M. *et al.* Energy transition minerals and their intersection with land-connected peoples. *Nat Sustain* 6, 203–211 (2023). <https://doi.org/10.1038/s41893-022-00994-6>.

³ <https://www.icmm.com/en-gb/our-principles/position-statements/nature>.

⁴ <https://www.icmm.com/en-gb/our-principles/position-statements/indigenous-peoples>.

⁵ <https://rightenergypartnership.org/public-statement-on-adoption-of-the-indigenous-peoples-mining-position-statement-of-the-international-council-on-mining-and-metals-icmm/>.

In respect of mining on the territories of indigenous peoples, the PhD research will explore whether, at what level and on what terms mining for energy transition minerals would be likely to win the Free Prior and Informed Consent of the indigenous people who would be affected.

Methodology:

To address the objectives above there is a need for enhanced intelligence around the geographical distribution of mineral resources, especially those which are concentrated and scarce and critical for enabling the low-carbon energy transition maps onto areas of rich biodiversity and the territories of indigenous peoples.

We propose a methodological design which combines a) geographical mapping using satellite data and advance imaging AI, b) dynamic Material Flow Analysis and Life Cycle Assessment to assess impacts of mining from a whole life cycle approach and considering a wider set of impacts on water, toxicity and land, beyond carbon c) biodiversity assessment and developing of metrics with relevance for mining activities and d) interviews with both mining companies and indigenous peoples' organisations.

This will be complemented with policy analysis and environmental, social and governance (ESG) requirements to propose feasible transition pathways towards nature-positive and socially just solutions.

Possible Timeline

Year 1: Carry out the mapping of the overlap between significant deposits to ETMs, biodiversity richness and indigenous peoples' territories.

Year 2: Engage in environmental assessment of the impacts of mining activities in these areas, especially in respect of biodiversity, and how these might be mitigated.

Year 3: Carry out interviews with mining companies and key stakeholders from indigenous organisations.

Training and skills:

TARGET researchers will participate in a minimum of 40 days training over the 3.5 years of study composed of:

- an annual one-week workshop dedicated to their year group, and tailored to that cohort's needs in terms of skills development – *for the first three years of their study*;
- an annual all-TARGET workshop with cross-year interactions, advanced training and opportunities to specialise in particular areas – *all years of study*;
- a number of one-day workshops;
- additional online events and in-person workshops attached to relevant conferences.

Partners and collaboration (including CASE):

This PhD project will bring together researchers from two TARGET universities, UCL and the University of Aberdeen. The UCL team will lead on the mapping activity in Year 1 and the environmental assessment in Year 2, with the Aberdeen researcher providing input on the identity, nature and locations of indigenous peoples, and biodiversity hotspots, in potential mining areas, in collaboration with others from the newly created NETGAIN Doctoral Focal Award. The Aberdeen researcher will be the main supervisor of the interviews with mining companies (with whom the UCL team has excellent contacts) and indigenous peoples, using culturally appropriate means of engaging with different groups in inter-cultural and cross-linguistic contexts.

Further reading:

Newbold, T., Hudson, L., Arnell, A., and Contu, S. (2016): Has land use pushed terrestrial biodiversity beyond the planetary boundary? A global assessment. *Science*, July 15.
<https://www.science.org/doi/10.1126/science.aaf2201>.

Owen, J.R., Kemp, D., Lechner, A.M.*et al.* (2023): Energy transition minerals and their intersection with land-connected peoples. *Nat Sustain* **6**, 203–211. <https://doi.org/10.1038/s41893-022-00994-6>.

Torres, A., zu Ermgassen, S., Navarro, L., Ferri-Yanez, F., Teixeira, F., Wittkopp, C., Rosa, I., and Liu, J. (2024). Mining threats in high-level biodiversity conservation policies. *Conservation Biology*, **38**, e14261. <https://doi.org/10.1111/cobi.14261>.

And see websites in footnotes.

Further details:

Please visit <https://target.le.ac.uk/> for additional details on how to apply.

For queries about this project contact primary supervisor: Dr. Teresa Domenech Aparisi
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