

PROPOSAL FOR AN EPSRC/UKRI CDT IN GEOSPATIAL ARTIFICIAL INTELLIGENCE

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OUR VISION

- **Existing sources of geospatial data** are used by many sectors (e.g., *Transport, Construction, Space, Agriculture and Maritime & Shipping*). Numerous opportunities exist for artificial intelligence and geospatial data experts in these sectors.
- We propose to **co-create** a national training centre that will graduate the **next generation of Geospatial Artificial Intelligence experts**. Our graduates will be:-
 - Experts in *AI and Machine Learning* and *Geospatial Science* with a breadth of knowledge around individual expertise and an understanding of motivations and constraints that apply to use cases beyond their own.
 - Future leaders who can adapt to challenges throughout their careers.
- We will:-
 - Recruit students from diverse backgrounds with wide-ranging skillsets whilst maintaining a strong focus on EDI.
 - Provide a formal training programme that addresses the technical skills requirements of each individual student.
 - Provide focussed training events that build generic skills (negotiation, communication, entrepreneurship) and industry-led group problem solving, across the entire cohort.

WHY GEOSPATIAL ARTIFICIAL INTELLIGENCE?

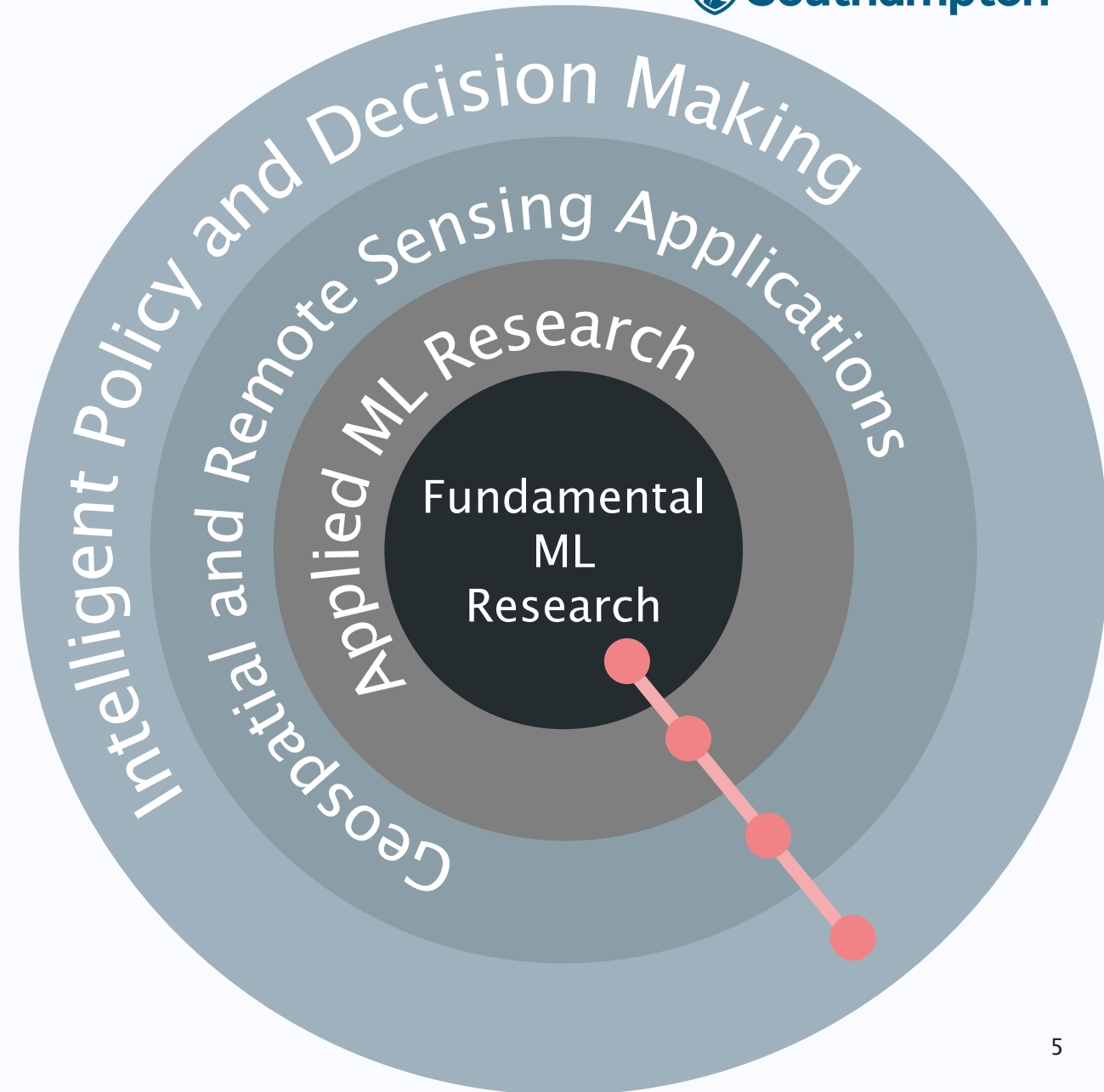
- **There is a clear national need to train experts in Geospatial AI.**
 - The National Geospatial Strategy identifies the Geospatial market as a clear growth area and there is a strong demand from employers.
 - At the same time, it is widely recognised nationally and internationally that **automation** and **artificial intelligence** are key to this.
 - Our vision addresses multiple EPSRC priorities: strategic priorities of “artificial intelligence, digitisation and data” and “the physical and mathematical sciences powerhouse”. Themes of “artificial intelligence and robotics” and “digital twins”.
 - There are clear application links to net zero, and security and resilience (both in terms of defence and of climate change).

WHY SOUTHAMPTON?

- We have a strong track record and world leading expertise in the Geospatial Artificial Intelligence space.
 - This is not limited to a handful of people – it involves large numbers of academics right across the University with a wide range of complementary skills which is a necessity for running a national training centre.
 - We don't have to start from scratch; there are many existing internal and external collaborations and initiatives to build upon, including the Southampton Geospatial initiative, the Trustworthy Autonomous Systems (TAS) Hub and IRIS, the In situ and Remote Intelligent Sensing Centre of Excellence.
- We have close links and partnerships with numerous external organisations that collect, process, analyse and make decisions from *geospatial data*.
 - Many right on our doorstep, including Ordnance Survey, our National Mapping Agency.
 - We already have a broad and diverse array of facilities needed to support the training programme, such as the Iridis compute facility.

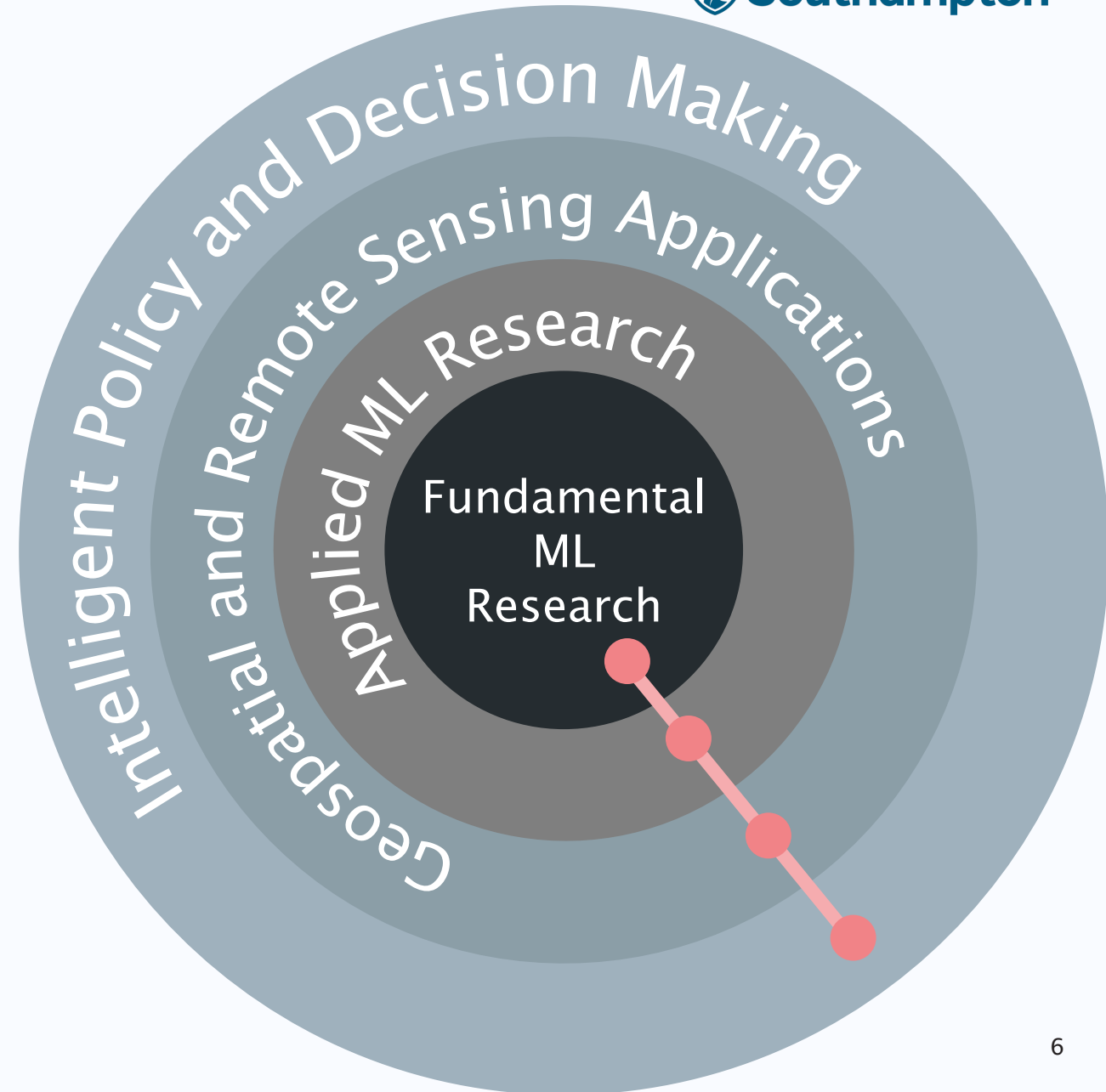
GEOSPATIAL ARTIFICIAL INTELLIGENCE

- Location-based information on objects, environments, events, and their trends is ubiquitous.
 - Working with this data requires automation and AI is essential.
 - Delivering graduates with the expertise to handle the challenges in this area is key to achieving UK aims.



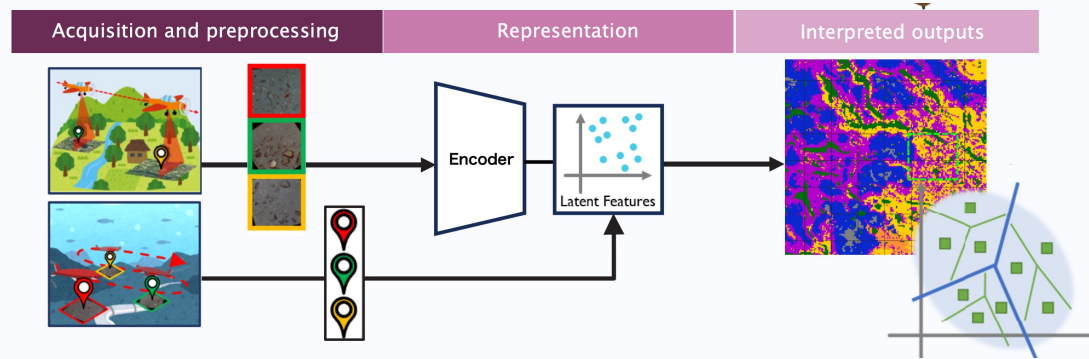
CHALLENGES

- Fundamental research questions:
 - model/algorithm/optimisation design through to domain-specific problems in utilising learning machines to solve tasks
- People challenges:
 - Finding a common ground (and language)
 - Knowledge transfer
 - Skills transfer
- Ethical challenges:
 - Potential for misuse or control, etc.
 - Accidental “personal” data leakage

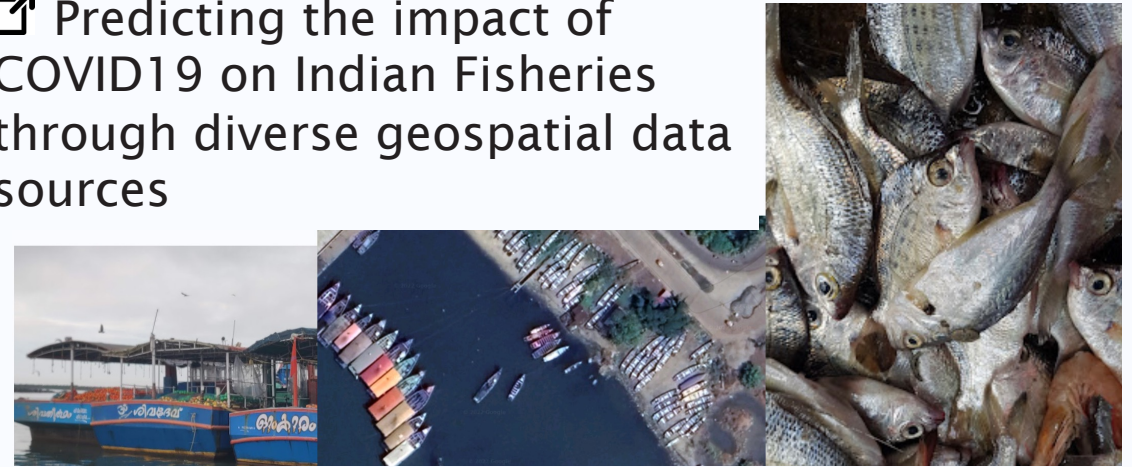


EXAMPLES OF CURRENT RESEARCH PROJECTS

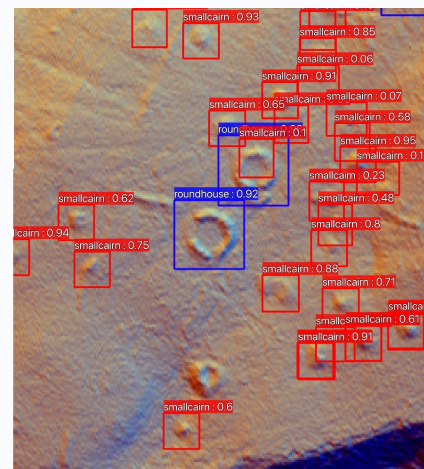
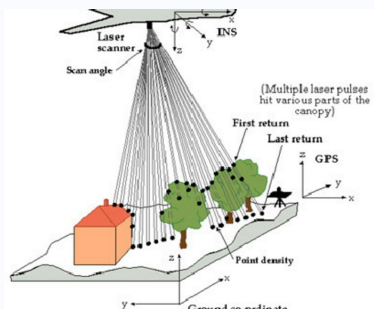
📌 Developing methods for self-supervision that reduce human labelling effort



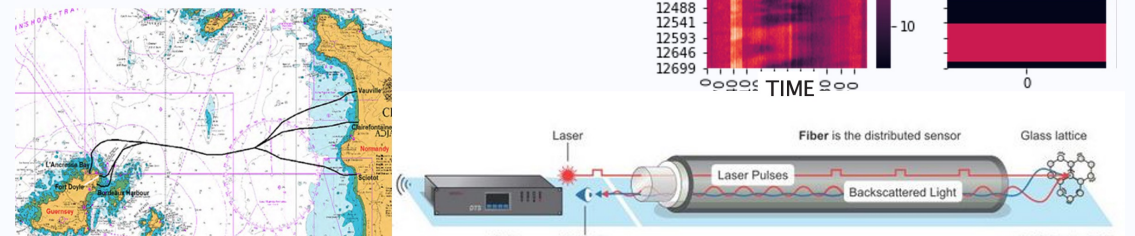
📌 Predicting the impact of COVID19 on Indian Fisheries through diverse geospatial data sources



📌 Finding archaeological sites to help with planning and construction



📌 Predicting failures of underwater cables and monitoring ocean-bottom temperature



Interested in being involved?

- Complete the questionnaire: <https://tinyurl.com/geo-AI>
- Contact us: geo-ai@soton.ac.uk
- Find out more: <http://geospatial-ai-cdt.github.io>