University of Southampton

Advances in Geospatial Data Science 2024- Welcome

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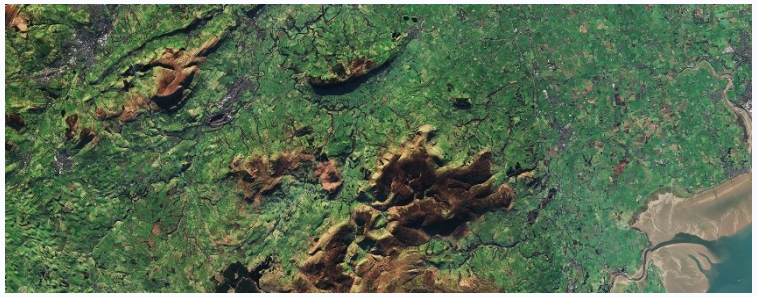
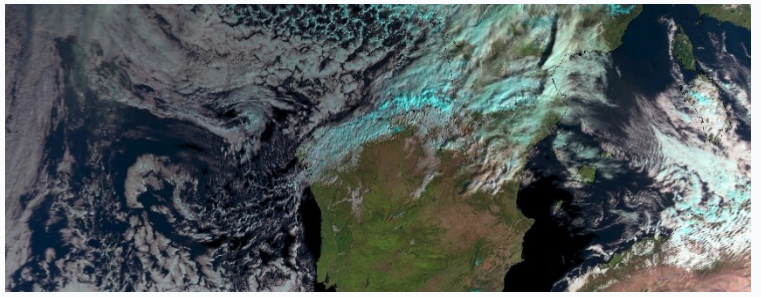
Key points

- Logistics/Fire exit
- Introduction
- Introduction to Southampton Geospatial
- Overview of the programme
- Computer access
- Any question





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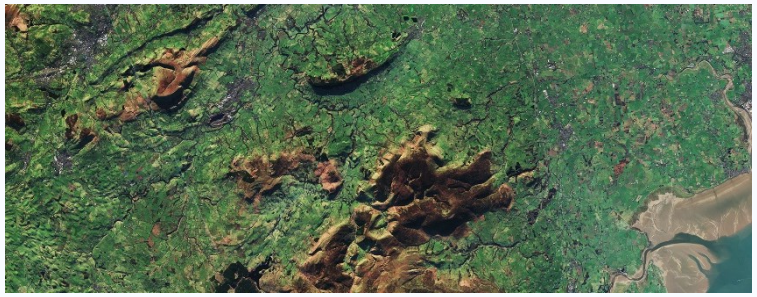
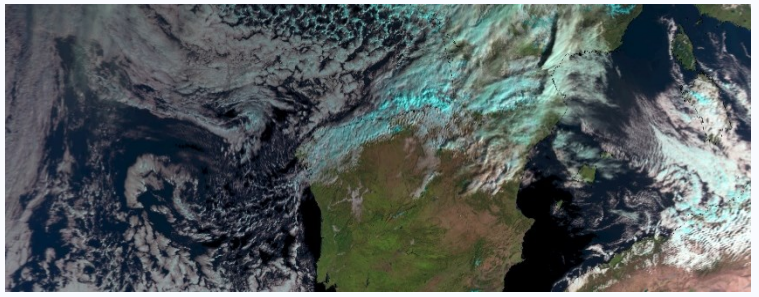
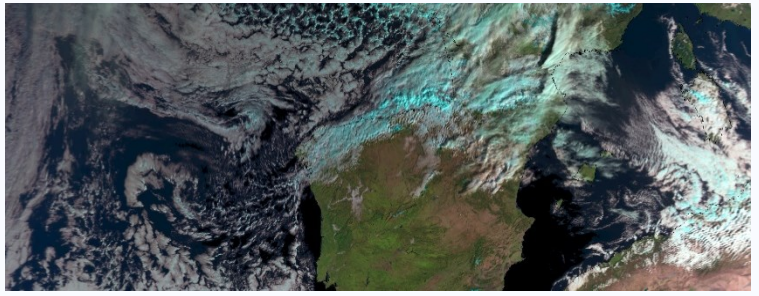




Vision: Southampton Geospatial

"Southampton Geospatial provides **a unique collaboration hub** for the University of Southampton's interdisciplinary expertise in geospatial data science, putting together teams and projects to address the most important societal and environmental challenges by harnessing the power of geospatial"

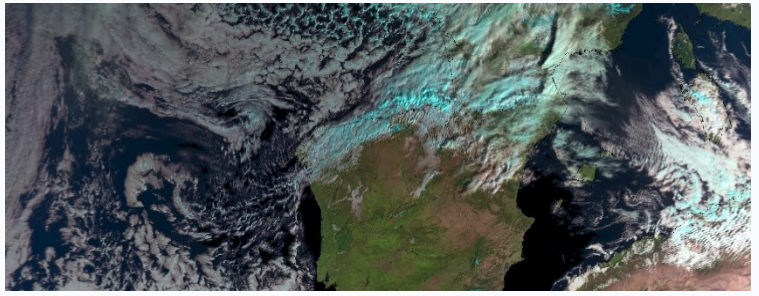




Objectives

- To invest in key activities that ***produce a step-change in the visibility and success*** of the University of Southampton's geospatial expertise
- To provide ***a single point of access*** to interdisciplinary geospatial expertise, tools and dataset at the university.
- To build a ***supportive and inclusive interdisciplinary community*** to work on the most challenging interdisciplinary geospatial research and enterprise projects
- To develop excellence in geospatial ***education, research, knowledge exchange and enterprise***
- To build a ***stronger network*** with public, private and third sector organisations to promote utilisation of geospatial data and tools.

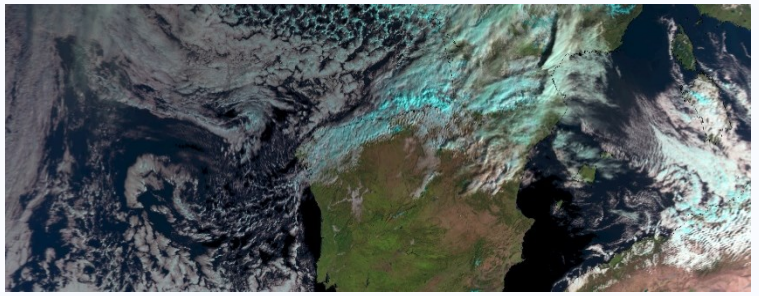




Southampton Geospatial: Research

- One of the largest groups of geospatial scientists in the UK (>200 ERE staffs across all faculties)
- Lunched October 2022
- Internal and external mapping exercise
- Funded 11 Demonstrator projects within the Geospatial sector of the university
- Trainning oppertunities in multi desciplianry areas e.g. Geospatial AI





Southampton Geospatial: Research

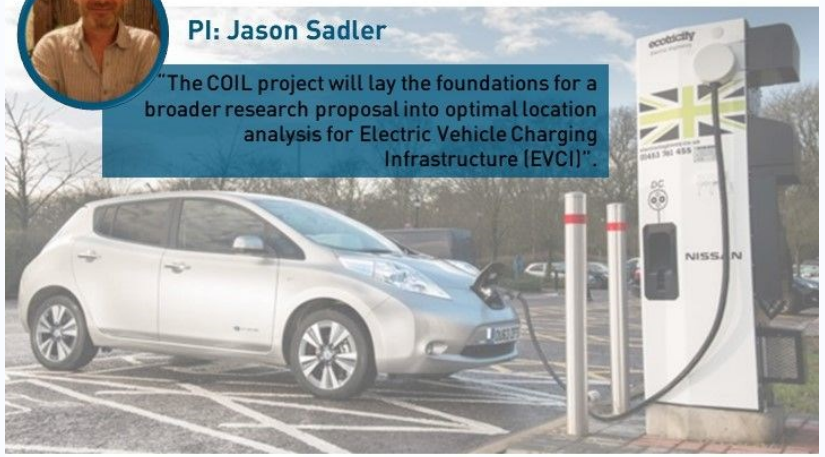
University of Southampton — Southampton Geospatial

Demonstrator Projects

COIL (Charging point locations)

PI: Jason Sadler

"The COIL project will lay the foundations for a broader research proposal into optimal location analysis for Electric Vehicle Charging Infrastructure (EVCI)".



A key project partner is Transport for the South East (TfSE) who are developing a strategy for ECVI rollout. This pump-priming exercise will lay the foundations for a broader research project to identify and address knowledge gaps relating to the optimisation of EVCI installation locations.

This is a complex geospatial resource allocation problem; there are many variables to consider. Given that 2030 is less than 7 years away, prioritisation must be given to areas where EVCI installation will be most beneficial, and uptake for Electric Vehicles will be greatest."

Find out more:
Visit: www.southampton.ac.uk/research/institutes-centres/southampton-geospatial
Email: Geospatial@soton.ac.uk

University of Southampton — Southampton Geospatial

Demonstrator Projects

Pre-RAT
(Prelude to Rethinking Aeolian Transport)

PI: Dr Jo Nield

"The Pre-RAT project will help support a larger grant rethinking how we characterise aeolian transport in desert and coastal regions"

The current project funded by Southampton Geospatial aims to investigate the temporal frequency of protodune formation and destruction in collaboration with the Gobabeb Namib Research Institute.

We will install a timelapse camera and meteorological equipment in the Namib Desert where protodunes have been identified and track their dynamics during the Austral winter. Additionally, we will quantify the topography and surface roughness using a Terrestrial Laser Scanner in areas where protodunes are not present and compare these surface influences to areas where protodunes do form

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University of Southampton — Southampton Geospatial

Demonstrator Projects

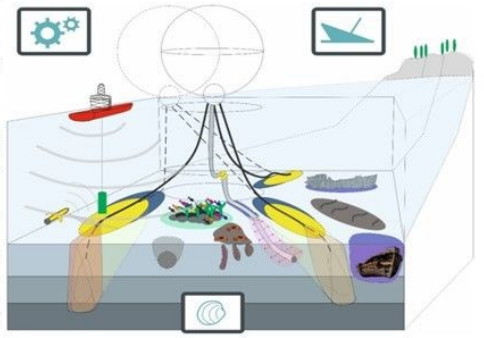
Geospatial mapping of impacts from offshore wind turbines on benthic community and heritage assets

PI: Dr Hugo Putuhena

"This geospatial database will be used to identify suitable locations for future offshore wind sites, and assess the potential impact on the environment"

To meet the net zero targets and accelerate the energy transition, the current capacity of offshore wind in UK waters needs to increase by a factor of five by 2030, Which will require installing of approximately 15,000 10 MW turbines.
In this study, we aim to address these challenges by utilizing public datasets and engaging with research stakeholders such as the Ministry of Defence (MoD), Historic England, and the Centre for Environment, Fisheries and Aquaculture Science (Cefas).

Our approach involves developing a geospatial database that integrates multi-variant data, including anthropogenic, geoscience, met-ocean, and ecological information. This geospatial database will be used to identify suitable locations for future offshore wind sites, and assess the potential impact on the environment, specifically the benthic community and heritage assets, for each net zero target envisioned for UK waters.



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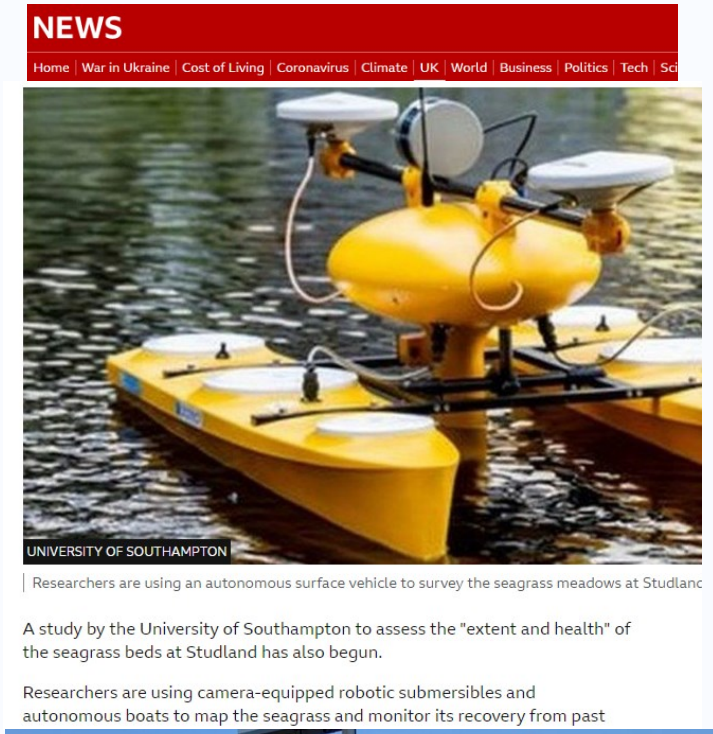
Southampton Geospatial: Engagement



Geospatial insight – The women transforming our world.

GEO BUSINESS 2023

Geospatial AI - a future pipeline of geospatial leaders

Southampton Geospatial: engagement

Technology & Innovation

Ordnance Survey and University of Southampton to lead pioneering geospatial research

Southampton Geospatial: Progress

Geospatial Commission

UK GEOSPATIAL STRATEGY 2030

Unlocking the power of location

Spotlight on universities and research centres

The UK has an active research and universities sector driving innovation through independent research and effective partnerships across academia, industry and the public sector. This is a remarkable asset in the form of a research base consistently ranked as world-leading in a wide range of areas.

The UK is home to four of the world's top 10 universities: Oxford, Cambridge, University College London and Imperial College London, and 14 others in the top 100[48]. With less than 1% of the world's population, the UK accounts for 4% of researchers, 7% of the world's academic publications and 14% of the world's most highly-cited academic publications[49].

Innovation in geospatial and linking technologies is being driven by UK universities. A strong university research base is essential to developing a geospatial skills and innovation pipeline to industry application. As new technology transforms the economy and society, skills are in increasingly high demand across all sectors, as well as opportunities for new innovation and research. Much of this research will be critical to supporting real-world innovations in the coming years.

Below are some examples of universities which are trailblazers in driving research using location data with emerging technologies to bring geospatial data into the forefront of innovation.

The UK also has strength in our research organisations which include independent and non-profit organisations as well as Research Council Institutes. These include a vibrant mix of innovation institutions; Catapults; National Academies; Public Sector Research Establishments, such as the National Physics Laboratory and the Defence, Science and Technology Laboratory; the Royce, Turing and Crick institutes.

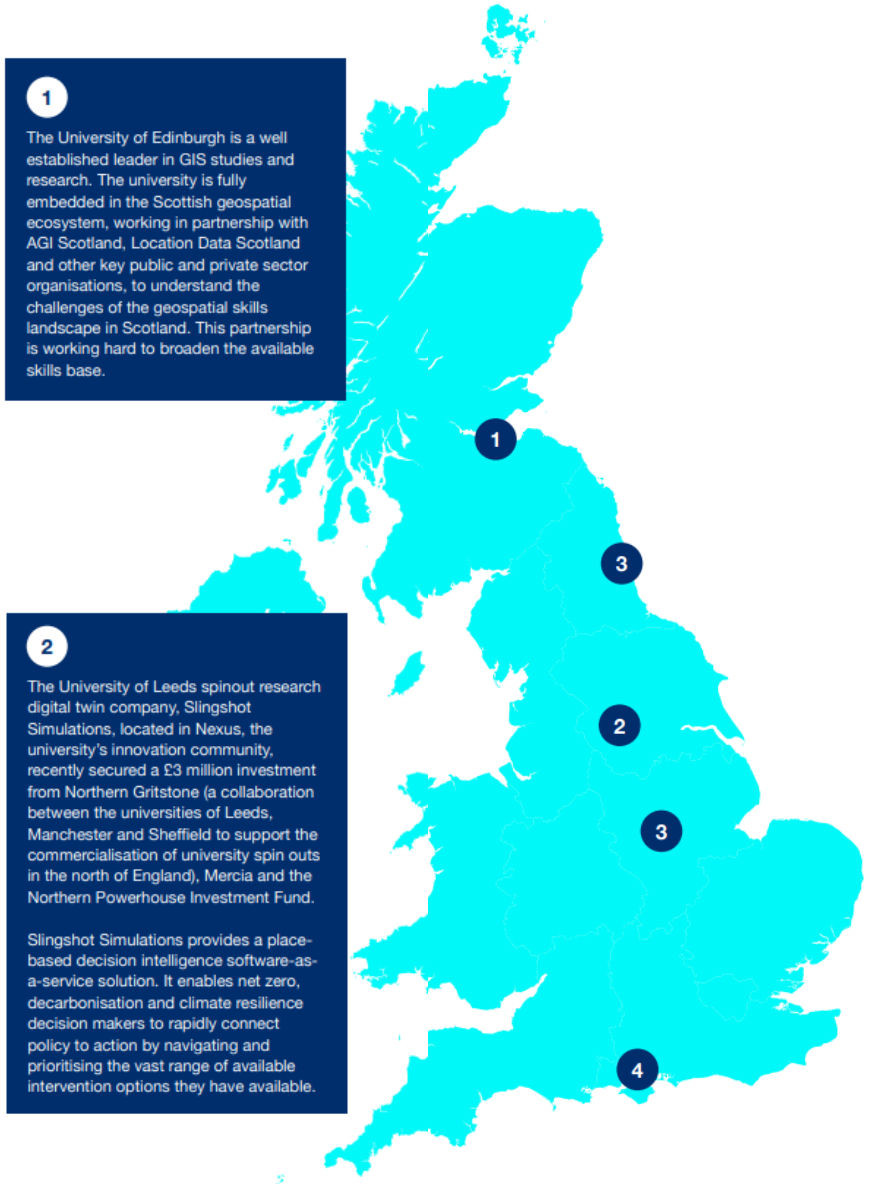
1

The University of Edinburgh is a well established leader in GIS studies and research. The university is fully embedded in the Scottish geospatial ecosystem, working in partnership with AGI Scotland, Location Data Scotland and other key public and private sector organisations, to understand the challenges of the geospatial skills landscape in Scotland. This partnership is working hard to broaden the available skills base.

2

The University of Leeds spinout research digital twin company, Slingshot Simulations, located in Nexus, the university's innovation community, recently secured a £3 million investment from Northern Gritstone (a collaboration between the universities of Leeds, Manchester and Sheffield to support the commercialisation of university spin outs in the north of England), Mercia and the Northern Powerhouse Investment Fund.

Slingshot Simulations provides a place-based decision intelligence software-as-a-service solution. It enables net zero, decarbonisation and climate resilience decision makers to rapidly connect policy to action by navigating and prioritising the vast range of available intervention options they have available.



3

Newcastle University and the University of Nottingham[50] are in the fifth year of their Centres for Doctoral Training programme in Geospatial Systems. Since receiving funding from UKRI in 2019, they are well on the way to training over 50 PhD students.

Collaborating with more than 50 UK and global partners, the universities have developed a programme, which focuses on the geospatial skills that leading industry experts have deemed a priority, based on emerging technologies and global trends. Technical research themes include big data analytics, Internet of Things and AI, with application in domains ranging from smart cities and mobility to social inclusion and healthy living.

4

The University of Southampton launched Southampton Geospatial in late 2022. It provides a unique collaboration hub for the University of Southampton's interdisciplinary expertise in geospatial data science, putting together teams and projects to address the most important societal and environmental challenges by harnessing the power of geospatial data in the UK and globally.

To meet the skills gap in the Geospatial AI sector, Southampton Geospatial is also developing a range of postgraduate training programmes in Geospatial AI, which spans computer science engineering, geography, mathematical sciences and ocean and earth sciences. Current projects include working in partnership with the Dorset Coastal Forum capturing data to develop nature-based solutions for coastal protection and habitat conservation in the Studland Bay Marine Conservation Zone.

Advances in Geospatial Data Science 2024:overview

Broad overview of recent advances in the following areas with an element of practical-based learning.

- Artificial intelligence
- Geospatial big data Analysis
- Remote Sensing
- Ethics and Privacy
- Applied Projects

https://southampton-geospatial.github.io/

Advances in Geospatial Data Science 2024:overview

09/09/2024				
Morning (09:00 - 12:30) - B44 (1057)	**Speaker**	**Lunch Break**	**Afternoon (13:30 - 16:30) B44 (1057/1061)**	**Evening (17:00 - 18:00)**
Sensing and Data collection		12:30 - 13:30	Campus (Soton UAV) tour, Environmental Sensing at Southampton (Julian Leyland, Chris Tomsett, Bob Entwistle)	B44 (1057)
Welcome and overview	Jadu Dash			Introduction to Challenges format (Jadu Dash)
Soton UAV	Bob Entwistle			
Mobile phones data	Shengjie Lai			
Earth Observation data	Booker Ogutu			

Advances in Geospatial Data Science 2024:overview

10/09/2024				
Morning (09:30 - 12:30) - B44 (1057)			**Afternoon (13:30-16:30) B44 (1061)**	**Evening (17:00 - 18:00)**
Geospatial AI			Research Showcase Daniela Rivera Marin (online)	B44 (1057)+ 2085, 2086
Introduction to AI	Jonathon Hare/Adam Prugel-Bennett	12:30 - 13:30		
Geospatial AI	Jonathon Hare/Adam Prugel-Bennett		Cal Pols	ideas for potential research projects (Blair Thornton)
Application of Geospatial AI	Jadu Dash		Hugo Putuhena Chris Emberson	

Advances in Geospatial Data Science 2024:overview

11/09/2024				
Morning (09:30 - 12:30) - B44 (1057) ***Open source data and Ethics*** Open source intelligence Geospatail Data Ethics	Sarah Morris Alexandra Karamitrou	12:30 - 13:30	**Afternoon (13:30-16:30) B44 (1061)** Demonstration of open-source GIS tools , GeoData (AH)	**Evening** Dinner

Advances in Geospatial Data Science 2024:overview

12/09/2024				
Morning (09:30 - 12:30) - B44 (1057)			**Afternoon (13:30-16:30)**	**Evening**
Tools and Models			B44 (1057)+ 2085, 2086	B44 (1057)+ 2085, 2086
Geospatial data and tools for environmental sensing	Blair Thornton	12:30 - 13:30	Guided work on solution to Challenges (experts in the room)	Finalise pitch (group work)
Geospatial and machine learning to map displaced people	Sarchil Qader			
Towards a national collection: AI enhancement of national geospatial records	Fraser Sturt			

Advances in Geospatial Data Science 2024:overview

13/09/2024				
	Morning (09:30 - 12:00) - B44 (1061)			**Afternoon (13:00-15:00) B44 (1057)**
	Open source tools			
09:30 - 12:00	Google Earth Engine training	Daniela Rivera Marin/Finn James	12:00 - 13:00	Solution pitching Closing

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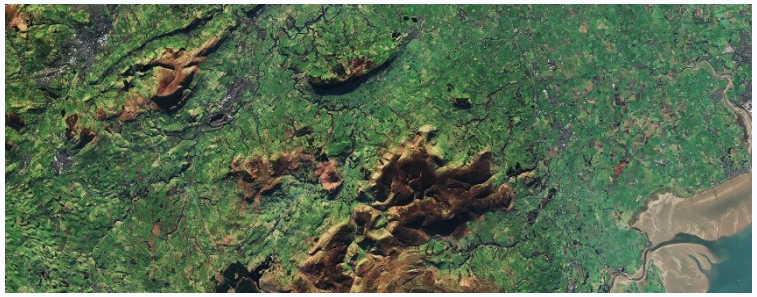
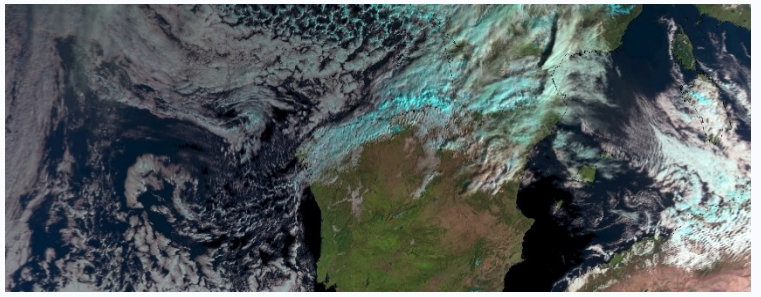
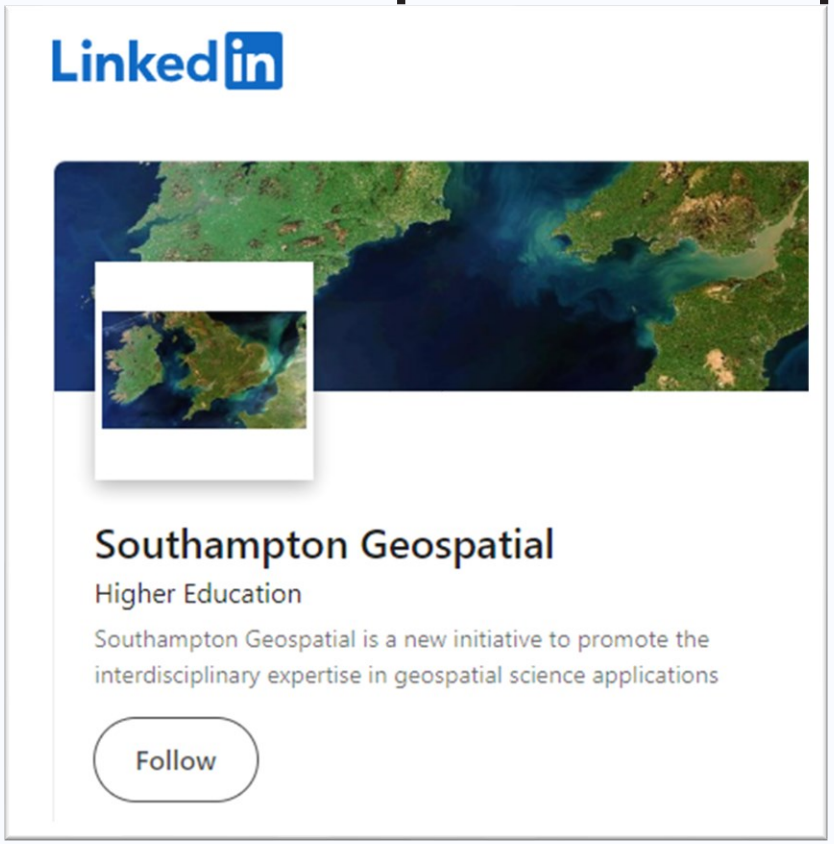
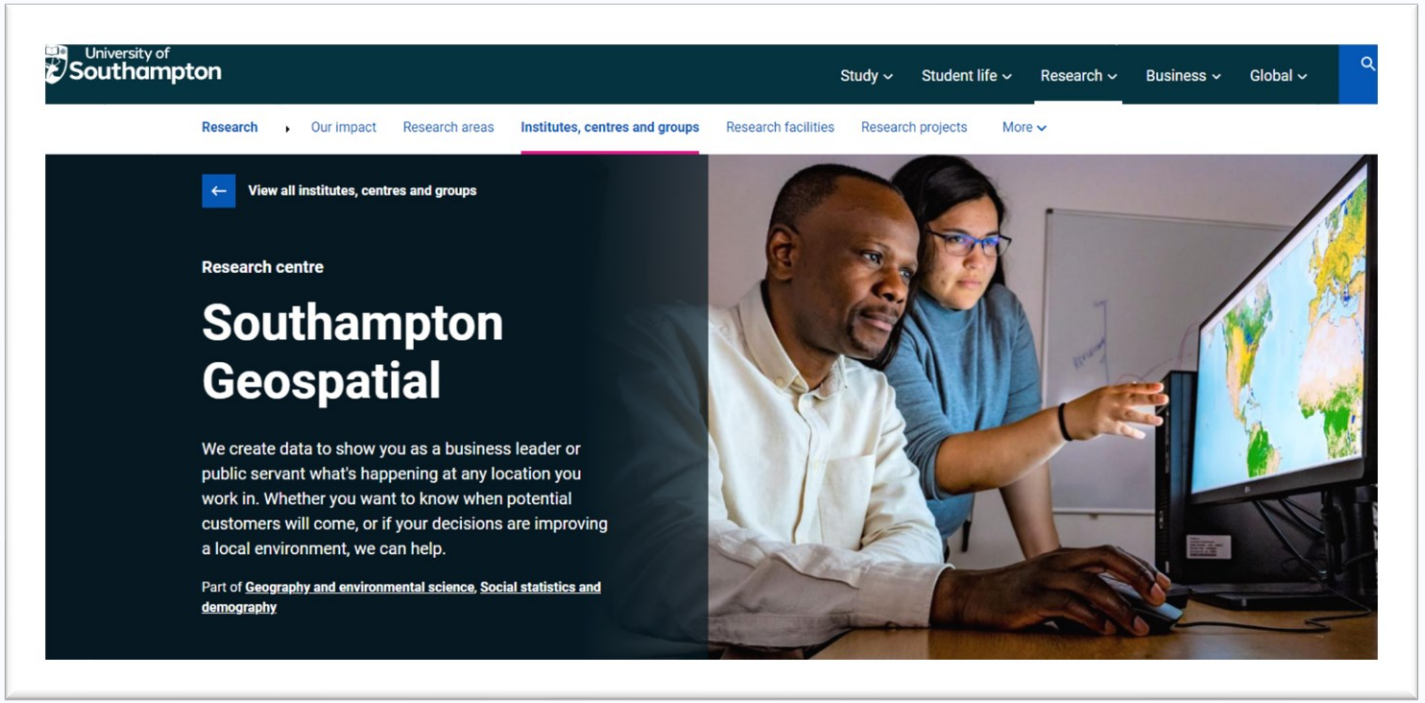




Southampton Geospatial





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