Join us at the University of Exeter, Exeter, Devon, UK on the 22nd and 23rd of May 2024 for:

Artificial Intelligence for geological modelling and mapping

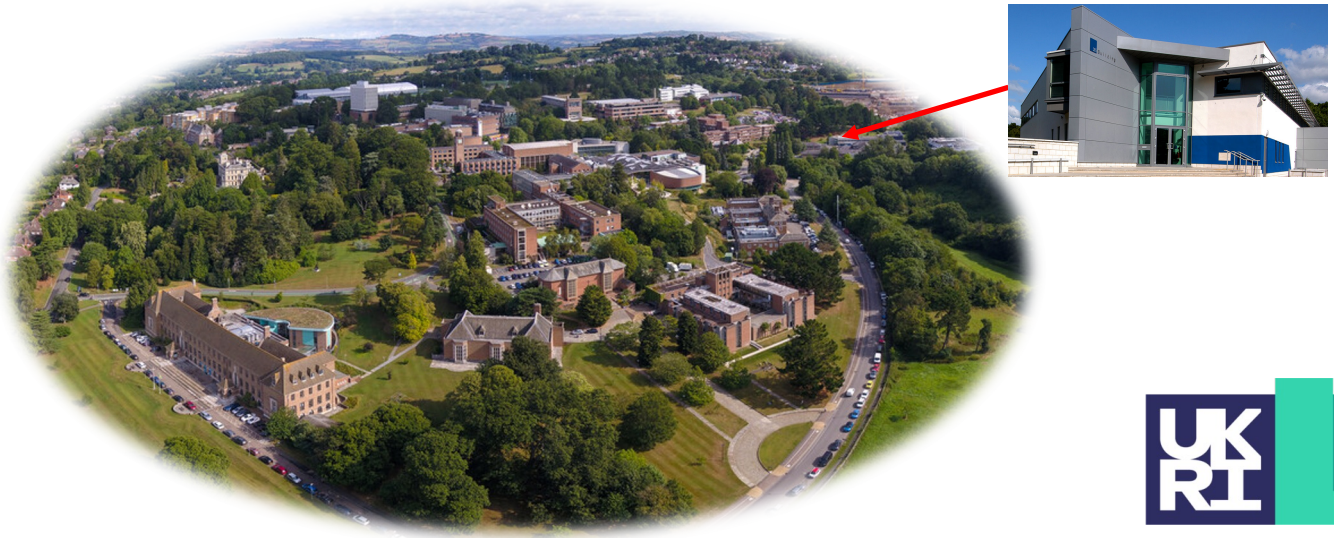
SCAN ME

Scan for details and location information

A timely conference to help shape the future of geological mapping technology.
Now fully booked with 170+ international attendees from all sectors. Waitlist available. **Key speakers:**

Prof Florian Wellmann - Chair of Computational Geoscience at RWTH Aachen University, **Germany**
Dr Mark Lindsay - Science Leader in 4D Minerals at CSIRO, **Australia**
Michael Hillier – 3D modeller at Geological Survey of **Canada**
Dr Kristine Asch - Head of Geological Information Systems and Maps, BGR, **Germany**
Prof Guillaume Caumon - Professor of geomodelling at Nancy School of Geology and GeoRessources, **France**

The conference will take place in the University of Exeter's XFi building in Exeter, Devon, UK



University of Exeter

Institute for Data Science and Artificial Intelligence

Engineering and Physical Sciences Research Council

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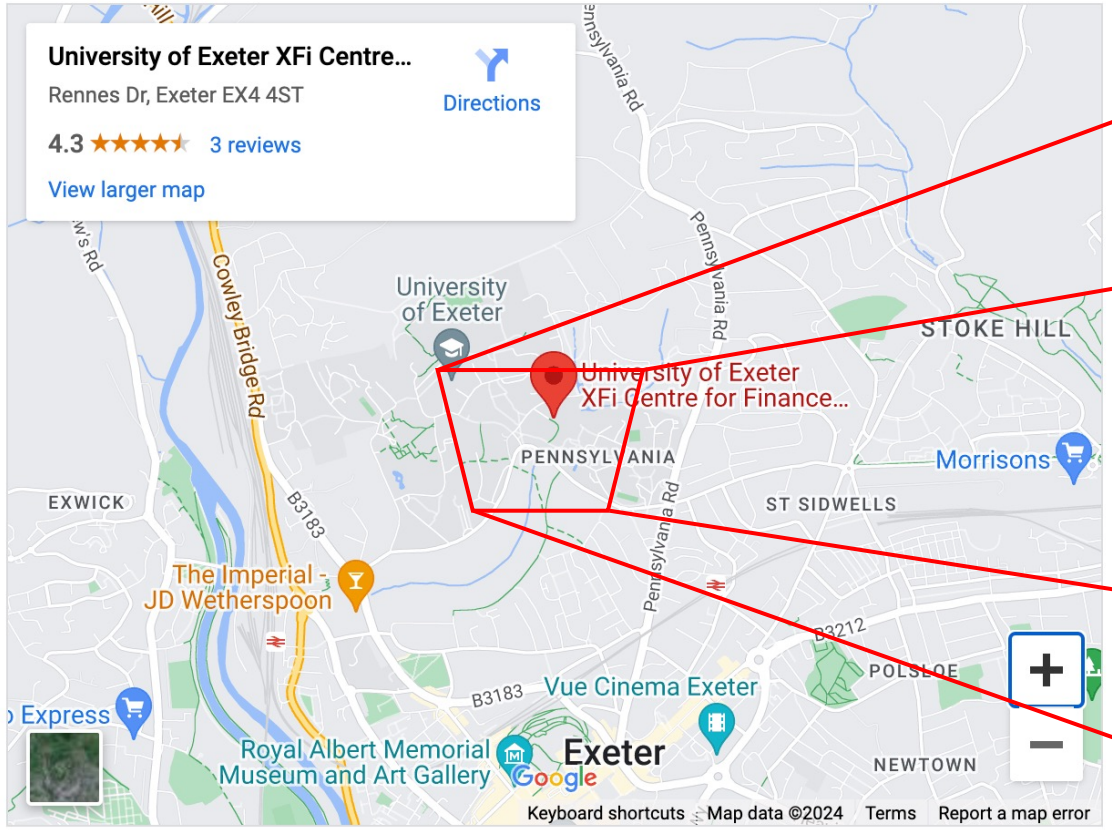

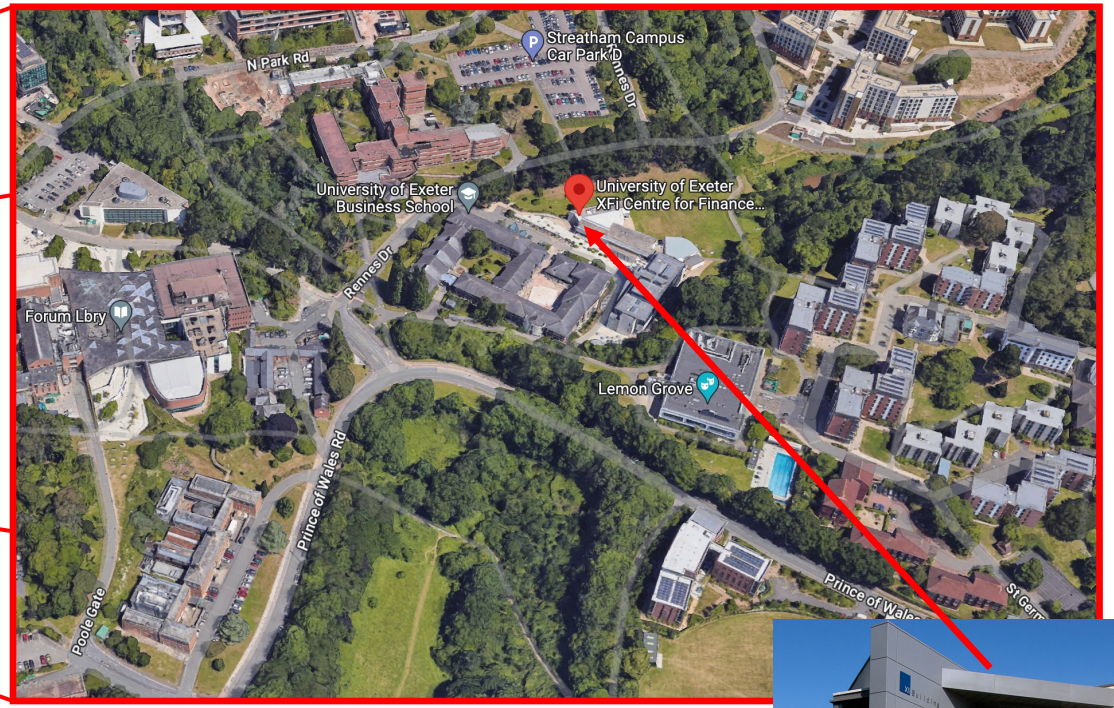

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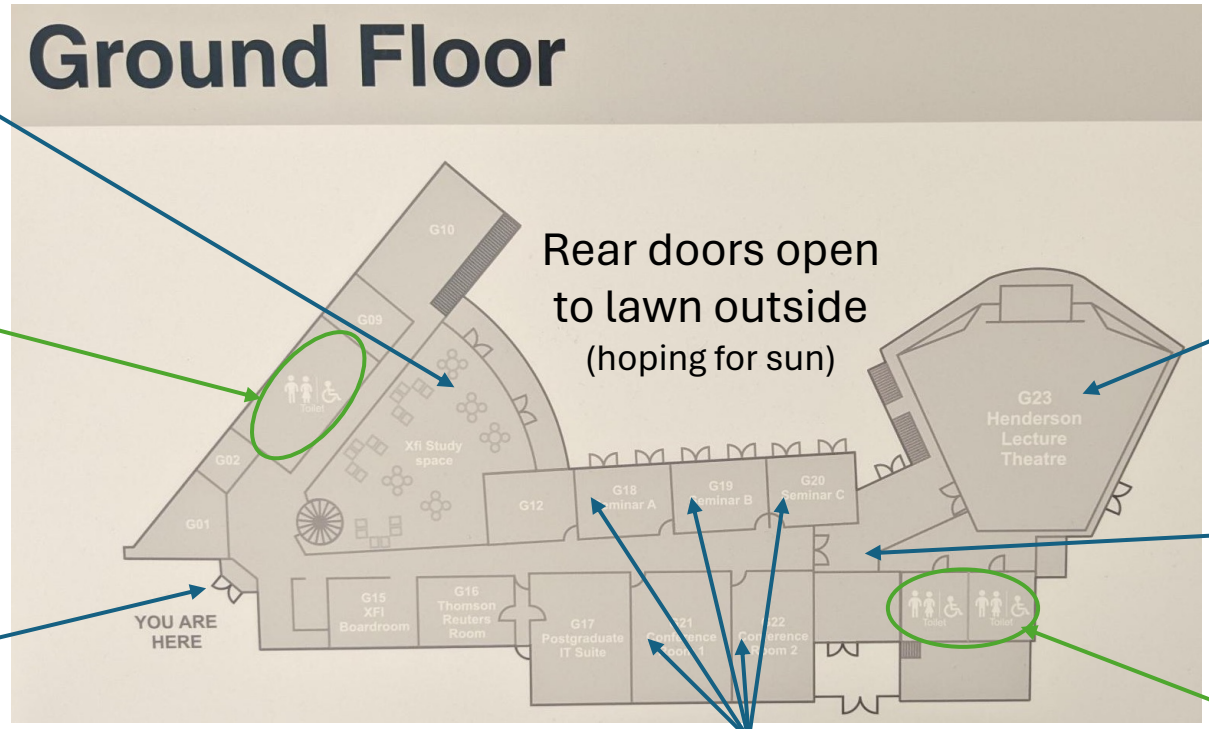
All talks and addresses will take place in the Henderson Lecture Theatre within the University of Exeter's XFi building:

Refreshments area 1 (the atrium)

Bathrooms A

Main entrance (enter here to pickup your name badge)



Rear doors open to lawn outside (hoping for sun)

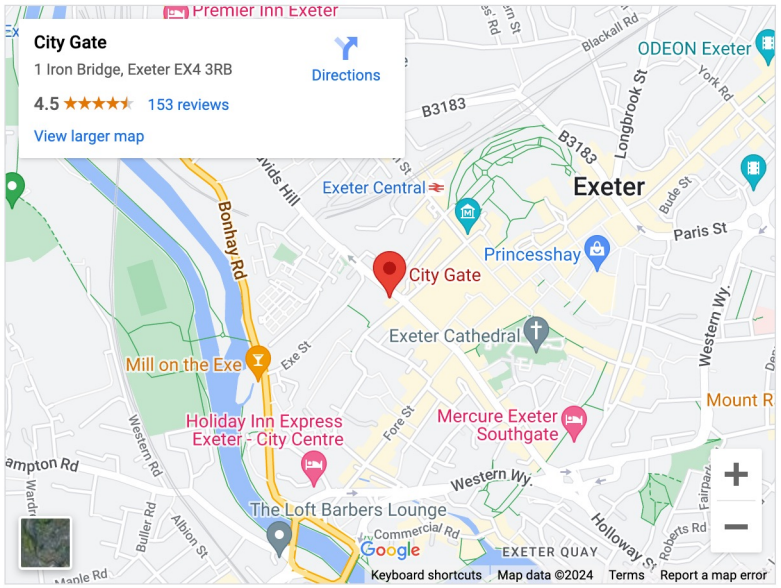
XFi Henderson Lecture Theatre: all talks take place in here

Refreshments area 2 (outside Henderson)

Rooms for breakout discussions (Seminar rooms A, B, C and Conference rooms 1 & 2) - accessible throughout the conference

Bathrooms B

The only thing scheduled on Tuesday 21st is the informal evening social from 18:00 in the City Gate Hotel / Pub in Exeter:

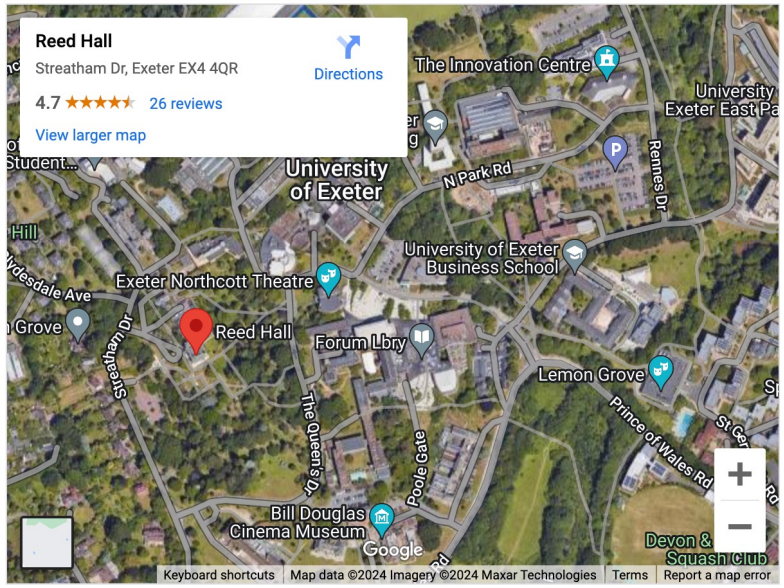


So, if you're in Exeter the evening before the conference and want to grab a drink or dinner in the company of other AI-GMM conference delegates, please feel free to drop in

We have the 'gallery' room reserved (towards the back of the ground floor), which opens to the garden

Artificial Intelligence for Geological Modelling and Mapping @ University of Exeter	DAY ONE – Wednesday 22nd of May 2024
09:00 – 09:30	Registration and refreshments (+ put up posters if you have them)
09:30 – 09:40	**Welcome address by Stuart Brocklehurst, University of Exeter Deputy Vice-Chancellor and Aline Villavicencio, Director of our Institute for Data Science and AI**
09:40 – 10:35	**Introductory session – where we stand, scene setter (chair and additional welcome by Charlie Kirkwood, University of Exeter)**
09:45 – 10:15	• **Kristine Asch**, BGR, Germany – Geology without frontiers: The pioneer project of the first digital International Geological Map of Europe (IGME 5000)
10:15 – 10:35	• Charlie Kirkwood, University of Exeter, UK – AI for geological mapping: incremental progress or revolutionary shift?
10:35 – 11:00	Refreshments break
11:00 – 12:30	**Session 1 – from observations to geological knowledge (chair: Kristine Asch, BGR, Germany)**
11:00 – 11:30	• **Mark Lindsay**, CSIRO, Australia – The map is not the territory: Geosciences in the AI-era
11:30 – 11:50	• Paul Cleverley, Robert Gordon University, UK – How can Natural Language Processing (NLP) support Geological Modelling and Mapping?
11:50 – 12:10	• Tom Buckle, University of Exeter, UK – Improving Lithology Classification from pXRF using Multiscale Interval Features
12:10 – 12:30	• Emma Mailey, AtkinsRéalis, UK – Engineering geology in machine learning applications for geohazard identification
12:30 – 13:30	Lunch break
13:30 – 14:40	**Session 2 – addressing uncertainty in geological modelling (chair: Mark Lindsay, CSIRO, Australia)**
13:30 – 14:00	• **Guillaume Caumon**, Université de Lorraine, France – On automation and uncertainty management in 3D geological interpretation and modelling: from geometry to graphs
14:00 – 14:20	• Vasily Demyanov, Herriot-Watt University, UK – Uncertainty in AI based reservoir modelling workflows
14:20 – 14:40	• Thomas Jerome, GMDK Inc, Canada – AI in geomodelling requires a strong, active human supervision. Learning from geostatistically-driven geomodelling from well data
14:40 – 15:00	**Poster lightning talks – poster presenters introduce themselves and their research to the conference audience**
15:00 – 15:30	Refreshments break
15:30 – 17:00	**Poster session & networking** (with a drink at 4).
17:00	Break for evening (suggest going to either the Ram Bar on campus, or to the nearby Imperial [with Isambard Kingdom Brunel designed orangery])
18:30 +	Conference dinner at Reed Hall *only if you have booked your place*. **With after-dinner talk from Rachel McInnes, Met Office Co-Director of UoE-Met Office JCEEI**

The conference dinner will be held in the picturesque Reed Hall on campus from 18:30 on the 22nd of May (arrival and welcome drinks from 18:30, with dinner served at 19:00).



In order to attend the dinner you must have booked your place already; the deadline was the 8th of May!

For those who are not coming – and not everyone will be – there are many nice places to eat in the city of Exeter, and potentially many other delegates to eat with.

Artificial Intelligence for Geological Modelling and Mapping @ University of Exeter	DAY TWO – Thursday 23rd of May 2024
09:00 – 09:30	Morning refreshments
09:30 – 11:00	**Session 3 – probabilistic geomodelling and machine learning (chair: Guillaume Caumon, Université de Lorraine, France)**
09:30 – 10:00	• **Florian Wellmann**, RWTH Aachen University, Germany – Probabilistic learning with geological models
10:00 – 10:20	• Charlie Garayt, École des Mines de Paris + Geovariances, France – Simulating horizontally infinite 2D geomodels with GANs
10:20 – 10:40	• Mahsa Paknezhad, Datarock, Australia – Enhancing geological mapping through latent diffusion inpainting of surface infrastructure artifacts in remote sensing imagery
10:40 – 11:00	• Fabian Leal, University of Western Australia, Australia – Interpreting Deepkriging for Spatial Interpolation in Geostatistics
11:00 - 11:30	Refreshments break
11:30 – 12:30	**Session 4.1 – AI in geological survey organisations, part 1 (chair: Florian Wellmann, RWTH Achen University, Germany)**
11:30 – 12:00	• **Michael Hillier**, Geological Survey of Canada, Canada – GeoINR: Advancing 3D Implicit geological modelling with implicit neural networks
12:00 – 12:20	• Suzanne Atkins, TNO, Netherlands – AI methods for offshore windfarm geotechnical analysis: translating seismic lines into geotechnical cross sections
12:30 – 13:30	Lunch break
13:30 – 14:30	**Session 4.2 – AI in geological survey organisations, part 2 (chair: Michael Hillier, Geological Survey of Canada, Canada)**
13:30 – 13:50	• Matthew Paice, British Geological Survey, UK – Updating the UK superficial deposits thickness model using machine learning and AI
13:50 – 14:10	• Daniel Coutts, Geological Survey of Canada, Canada – Mapping of geologic outcrop descriptions with deep learning architectures
14:10 – 14:30	• Willem Dabekaussen, TNO, Netherlands – Probabilistic spatial modelling of seabed-sediment composition in the Dutch North Sea using the Random Forest algorithm
14:30 – 15:00	Refreshments break
15:00 – 16:00	**Group discussion session – breakout into discussion groups to discuss key topics**
16:00 – 16:30	Group discussion feedback – each group to report back on findings / thoughts (**chair: Charlie Kirkwood, University of Exeter, UK)**
16:30 – 16:40	Closing address
16:40	End / finish / celebrate / relax! Until next time…

POSTERS	
Antoine Heude, Justine Elias – Envisol.fr, France	Variography and geostatistical tools for the QAQC of AI generated quantification of pollutants in contaminated lands
Charlie Moon – Moon Geology, Robin Shail – University of Exeter, UK	Detailed lithological mapping from geochemistry: an example from SW England using automated catchment generation and integration of different geochemical media
Trais Kliphuis, Velimir Vesselinov – Envitrace, USA	AI/ML for characterization, mapping, and prediction of groundwater contamination plumes
Peter Webb – Getech Group, UK	Modelling surface heat flow for resource exploration in the energy transition
Angelica Capozzoli – Università degli Studi di Napoli Federico II, Italy	Automatic identification of areas of archaeological interest using Unsupervised Machine Learning algorithms applied to electromagnetic data
Pichaya Zerne – Geological Survey of Sweden, Sweden	SeaMoreEco – Seamless monitoring, restoration, and conservation in the northern Gulf of Bothnia
Maurizio Ambrosino – University of Sannio, Italy	Using compositional indicators and machine learning for mapping geochemical domains
Sebastián Garzón – Utrecht University, Netherlands	Machine-learning based automation of borehole lithostratigraphic interpretation
Amandine Fratani – RING, GeoRessources / ENSG, Universite ́de Lorraine / CNRS, Nancy, France	Using Random Forest to learn pairwise associations of fault traces
Charlie Kirkwood – University of Exeter, UK	Geological knowledge acquisition as a computational optimisation problem
Velimir Vesselinov, Trais Kliphuis – Envitrace, USA	Mapping geothermal resources using AI/ML

DISCUSSION TOPICS FOR BREAKOUT GROUPS (open to other suggestions, please get in touch with idsai@exeter.ac.uk)	
Are AI/ML/statistical methods really the sensible way forward?	Arguments for and against the development of AI/ML/statistical methods for geological modelling and mapping, versus traditional methods. Could it be that we're in a hype bubble with no utility?
Developing the technology	What are the routes to progressing the technical aspects of geological modelling and mapping in the age of artificial intelligence? E.g. algorithms, models, inference methods, data acquisition and ingestion
Identifying specific applications	Where can AI approaches to geological modelling and mapping have greatest impact, and at what timescales? Are there low-hanging fruit along the way? E.g. for consideration; **critical minerals**, geothermal, carbon storage
Shifting culture	The roots of geological modelling and mapping are not in AI methods. How can the geological community best move forward to (if appropriate) embrace AI methodologies for the benefit of the science?
Equality, diversity, and inclusion	How can we ensure that the community around artificial intelligence for geological modelling and mapping is as egalitarian, diverse, and inclusive as possible? (and help to avoid 'AI geology' being a splinter group).
Skills for the future	What skills do the geologists of the future need to have? How can we make sure that we're training the next generation to have the skills that they'll need?
Funding sources & collaboration opportunities	What funding opportunities are out there to support development of AI for geological modelling and mapping? Can we work together to access these, or work together to make more funding opportunities available?

We look forward to welcoming you to Exeter for the AI-GMM conference!

Key contacts:

Scan for details and location information

- While in the UK, for genuine emergencies call 999 and state your required service (police, fire, ambulance, etc) to receive help from our emergency services.

- While in Exeter and particularly on campus, if you have any issues including personal safety, first aid, and general welfare please call University of Exeter Estate Patrol on:

  Emergencies: +44 (0) 1392 722222
  Routine: +44 (0) 1392 723999

- For conference specific assistance, please email one of the following and we'll do our best to assist:
  h.l.chapman2@exeter.ac.uk
  e.paremain@exeter.ac.uk
  c.kirkwood@exeter.ac.uk

If you are lost, Estate Patrol (above) will also be able to help!