THE UNIVERSITY of EDINBURGH

MSc GeoEnergy

Professor Stuart Gilfillan, Programme Director

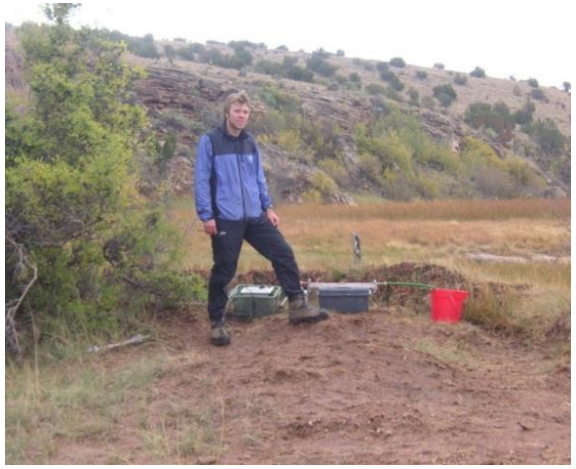
21st November 2025

EDINBURGH
Extraordinary futures await

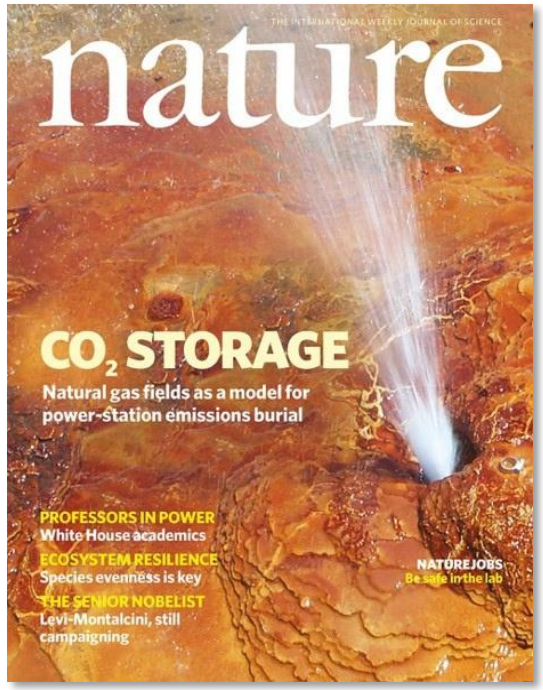

THE UNIVERSITY of EDINBURGH
WE TACKLE PROBLEMS THAT ARE HAPPENING TODAY

About me

- Professor in Geochemistry
- Programme Director for MSc GeoEnergy
- **Passionate about enabling the energy transition**
- BSc – University of Glasgow
- PhD – University of Manchester
- Postdoc, NERC Fellowship, Chancellors Fellowship at University of Edinburgh



What do I do?


nature
CO_2 STORAGE
Natural gas fields as a model for power-station emissions burial
PROFESSORS IN POWER
White House academics
ECOSYSTEM RESILIENCE
Species evenness is key
THE SENIOR NOBELIST
Levi-Montalcini, still campaigning
NATUREJOBS
Be safe in the lab


ELSEVIER
International Journal of Greenhouse Gas Control
Volume 63, August 2017, Pages 215–225
Using noble gas fingerprints at the Kerr Farm to assess CO_2 leakage allegations linked to the Weyburn-Midale CO_2 monitoring and storage project
Stuart M.V. Gilfillan[a], George William Sherk[b], Robert J. Poreda[c], R. Stuart Haszeldine[a]
Show more
https://doi.org/10.1016/j.ijggc.2017.05.015
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LIVE EDINBURGH
BBC NEWS
THE WORLD TODAY
Study says volcanic rocks could store captured CO2
HEADLINES
19:48

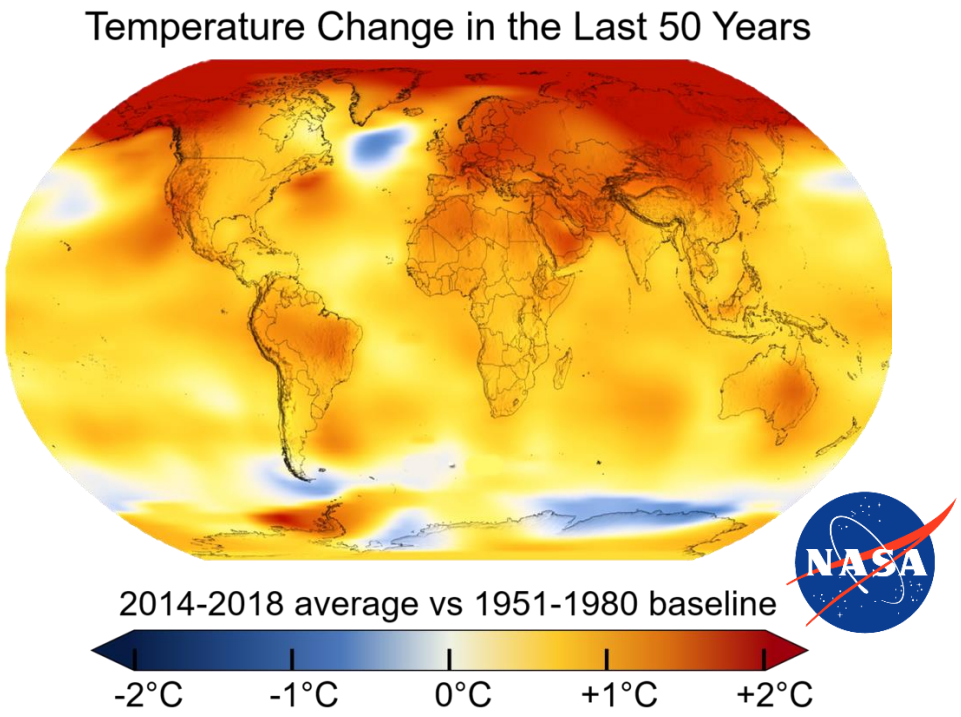

Old oil rigs could become CO2 storage sites
8 August 2019 | Comments
Climate change
BBC NEWS

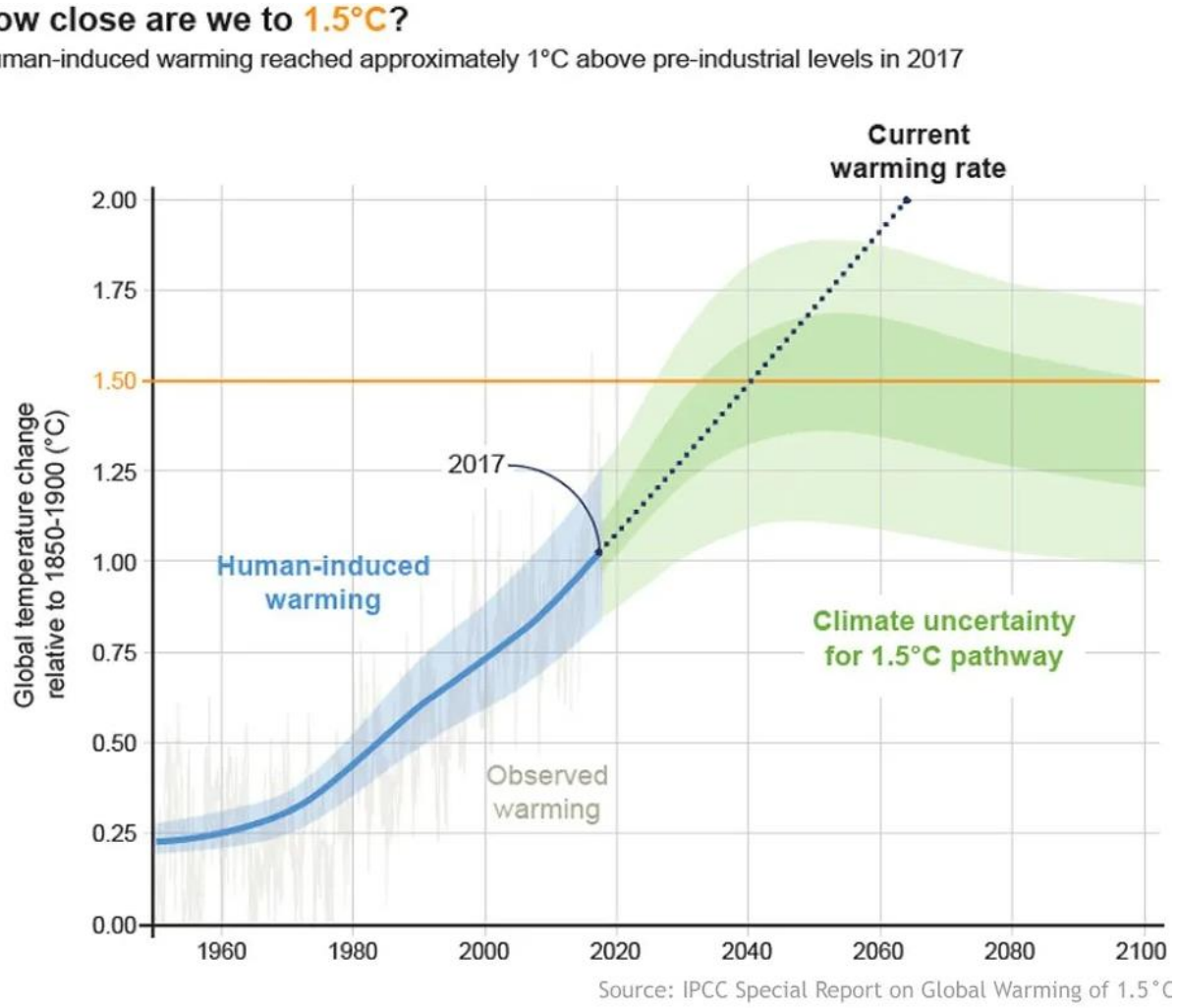
Cohort lead: Prof. Mark Wilkinson

- Mark undertakes research on geological energy storage and waste disposal, including:
- Hydrogen storage and compressed air energy storage in porous rocks
- Natural analogues for what will happen to CO_2 when it is injected for Carbon Storage
- Disposal of water produced during CO_2 storage
- Diagenesis, or what happens to sediments as they are buried and turn into rocks

Why study GeoEnergy?

~ 1°C of warming relative to 1850 - 1900





Extreme heat and wildfires

US wildfires: Firefighters battle raging blazes across western states amid heatwave

WORLD | ENVIRONMENT | CALIFORNIA | UNITED STATES | Monday 12 July 2021, 7:19pm

Climate > News

Wildfires spread across more than 1 million acres of US and Canada as California urged to cut energy for fifth time

The fires are fueled by the drought-dried brush and high temperatures

Graig Graziosi | 2 days ago | 1 comments

Heavy rainfall and flooding

Germany and Belgium floods: At least 44 dead and more than 70 missing after heavy rain

Houses have been washed away with many others in danger of collapsing, dozens of people are missing or stranded and 200,000 properties are without power after two days of heavy rain causes rivers to burst their banks across western Germany and neighbouring Belgium.

Sunita Patel-Carstairs
News reporter @SunnyNadal

Thursday 15 July 2021 17:44, UK

Germany

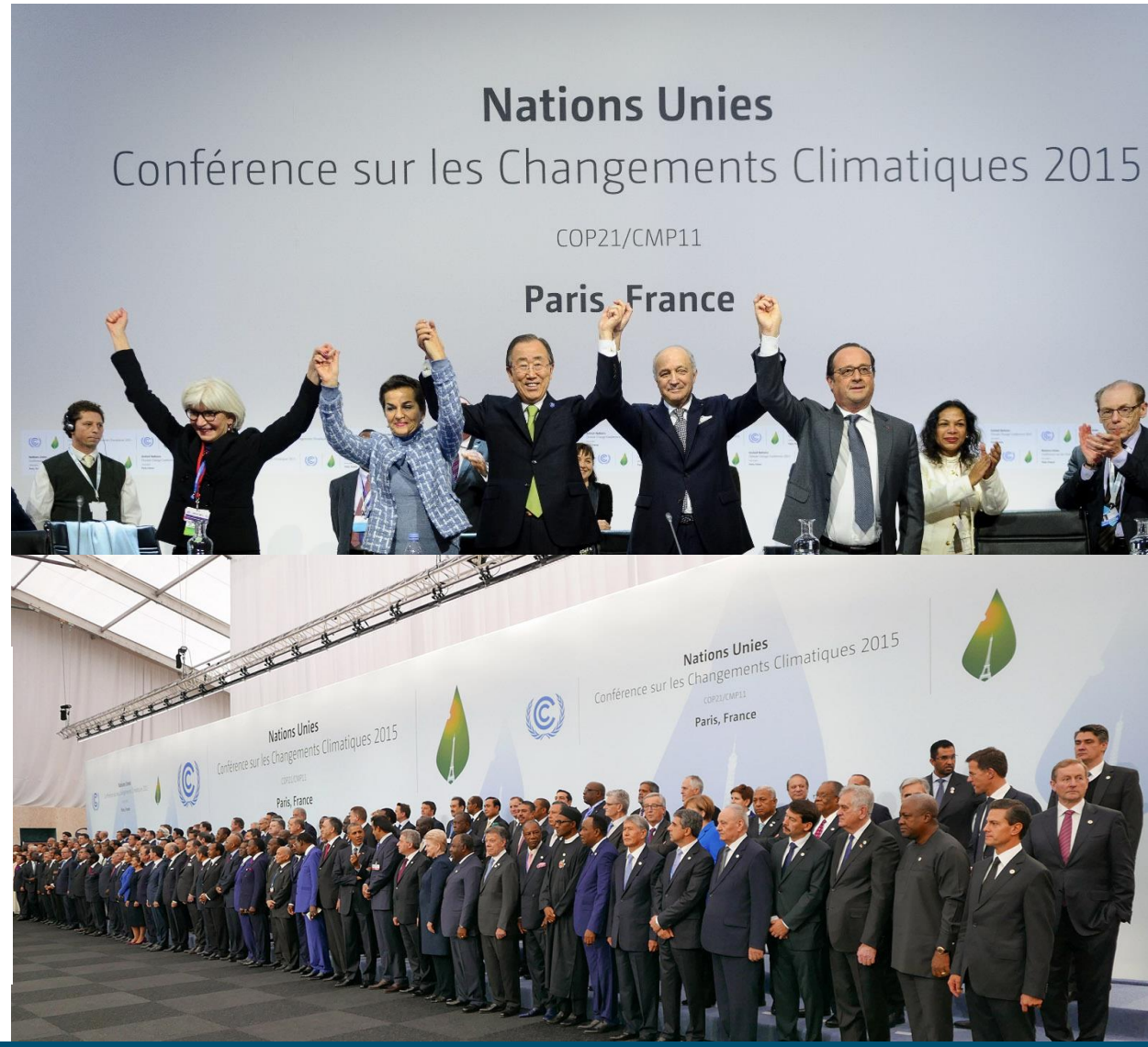
Edinburgh flooding: Half of July rain fell in one hour

5 July

Paris Agreement - 2015

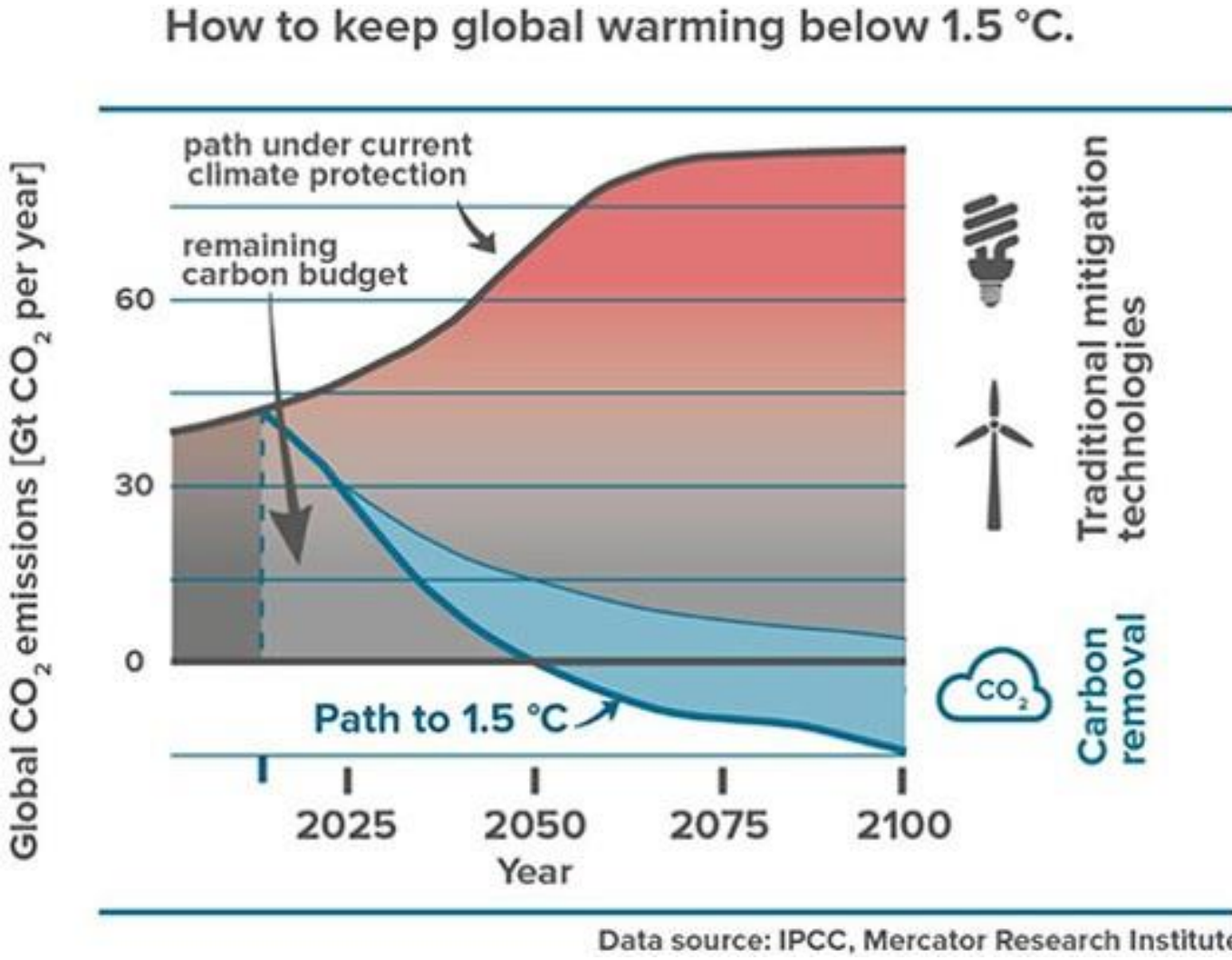
Aim: Limit increase in global av. temperature to well below 2 °C above pre-industrial levels; and to limit the increase to 1.5 °C, to ***substantially reduce the risks and effects of climate change***

- 194 states & EU have signed. 178 states & the EU, ***representing more than 87%*** of global greenhouse gas emissions, have ratified or acceded



Net Zero

- Our MSc enables you to pursue a geosciences career in the **energy sector as it transitions from fossil fuels** to enable a low carbon economy



Why Edinburgh?

- Learn from **internationally renowned researchers** accelerating the transition to a low-carbon economy
- Benefit from the strength of our **research groups and established networks with organisations leading the energy transition**
- Gain real-world geological field skills through **fully-funded field trips to the Scottish Highlands**

Full-time programme structure

Find a full list of compulsory and optional courses on Degree Programme Tables

- **Students with a geoscience background**
  - 6 compulsory courses, including Future GeoEnergy Resources
  - 1 or 2 option courses
  - 4 month Dissertation on a topic of your choice
- **Students without a geoscience background**
  - 7 compulsory courses, including Future GeoEnergy Resources
  - 1 or 2 option courses
  - 4 month Dissertation on a topic of your choice

Part-time structure

- A two-year part-time option is available
- We recommend living within a commutable distance from Edinburgh in order to undertake part-time study

- **Students with a geoscience background**
  - Year 1
    - 4 compulsory courses
    - 1 or 2 option courses
  - Year 2
    - 2 compulsory courses
    - Dissertation

- **Students without a geoscience background**
  - Year 1
    - 5 compulsory courses
    - 1 or 2 option courses
  - Year 2
    - 2 compulsory courses
    - Dissertation

Teaching and assessment

- Courses are delivered through a mix of lectures, group practical sessions, student-led presentations, discussion sessions, and field work
- Assessments include exams, technical reports, posters, individual and group presentations

Field trips

- Our programme provides several cohort-building day trips that may encompass either local fieldwork or site visits to various locations across southern Scotland
- Please note that field course locations may vary year to year, but will always align with course learning outcomes

Residential field trip
– Scottish Highlands

- Provides a real-world synthesis of the separate strands of GeoEnergy:
  - Carbon capture and storage
  - Energy storage
  - Geothermal energy
  - Hydrogeology
  - Nuclear waste disposal in both hard and soft rocks
  - Subsurface reservoir quality
  - Unconventional and conventional hydrocarbon production

Dissertation

- An opportunity to explore, in-depth, a topic of your choice in relation to the programme, with the support of an academic supervisor
- Can be desk-based research or fieldwork
- Typically 10,000 – 15,000 words
- You may have the opportunity to complete a dissertation in collaboration with an external organisation
- You can use the dissertation to demonstrate your work to potential employers

Previous dissertation topics

- Assessing the capacity for hydrogen storage and renewable energy provision in the USA
- Assessing the potential for CO_2 storage in the East Irish Sea basin
- What offshore storage capacity for hydrogen is available to the UK in the Southern North Sea and can it be linked to an offshore renewable source?
- Are the current standard leakage mitigation and remediation approaches suitable for hydrogen leakage in the near surface?
- Modelling of microbial growth and corresponding permeability reduction in the subsurface

What a typical week looks like…

Semester 1, Week 6	
Classes	**Timetable**
Environmental Geochemistry – Lecture	Tue, 09:00-11:30
Future GeoEnergy Resources – Lecture	Thurs, 09:00-13:00
Hydrogeology 1 – Practical	Mon, 13:10-14:00
Hydrogeology 1 – Lecture	Fri, 14:10-16:00
Subsurface Reservoir Quality – Lecture	Mon, 10:00-13:00
Option course: Seismic Reflection Interpretation – Computer Workshop	Wed, 09:00-12:00
Total class hours	**Roughly 15hrs**

- Please note that the option course listed is just an example – hours will vary depending on the option courses you choose, and whether you are required to take extra compulsory courses (no geoscience background)

Other activities

- You also need to plan for your independent study hours, which are typically ~20 hours per week, in addition to taught sessions
- You choose the location for independent study, and you will have access to postgraduate only study spaces
- You can engage with teaching staff and other students during cohort events, interactive practical sessions and the fieldtrip at the end of the taught part of the programme
- You will have the opportunity to join Research Seminars and other relevant GeoSciences events

Career opportunities

- This MSc equips you with the geological knowledge and skills required to use the subsurface for GeoEnergy applications to enable a low-carbon future
- There is a diverse range of career pathways in low-carbon technologies and disposal of energy-related wastes

Career opportunities

- Our graduates are working in a variety of sectors, including:
  - Low carbon consultant
  - Energy and Climate Change Consultant
  - Research Analyst
  - Energy Officer
  - Applications Engineer
  - Hydrographic Surveyor
  - Hydrogeologist
  - Flood Risk and Sustainable Water Management Engineer

- Examples of where our graduates have gained employment:
  - Element Energy
  - The Environmental Protection Group Ltd
  - Flexitricity
  - Wood Mackenzie
  - British Geological Survey
  - Ikon Science
  - Wardell Armstrong LLP

Our alumni – Anna Morris

- Graduated 2023
- Now a **Project Engineer** for **SGN**
- “My cohort was incredibly diverse. There were people who came straight from their undergraduate degree, and there were people who'd been working in industry for 10 years, so we could really leverage those different experiences from each other.”
- https://www.youtube.com/watch?v=tOPre-VDZ-4

When to apply?

- **Due to high demand for this programme, we operate on a series of early application deadlines**
- We strongly recommend you **apply as early as possible**
- You should avoid applying to more than one degree. Applicants who can demonstrate their understanding and commitment to a specific programme are preferred
- If you plan to apply to more than one programme, you should discuss your choices with us before you submit your application
- Where possible, we may make an alternative programme offer if you have been unsuccessful in your chosen programme

Student cohort

- We welcome students with undergraduate degrees in a science or engineering subject. We will also take any relevant professional experience into account
- We may also consider your application if your background is not specifically related to these disciplines provided you have relevant work experience in a related area
- 133 applicants for 2025 entry
- 21 new students on programme in 2025/26

Scholarships and funding

- Featured funding
  - ScottishPower Master Scholarships
  - Chevening Scholarships
- School of GeoSciences scholarships
  - See potential funding for GeoSciences students
- You are encouraged to research the range of potential scholarships and other funding outside the University for which you may be eligible.
  - Search for funding

Next steps…

https://edin.ac/student-chat-pg

Contact details for follow-up questions

- We apologise if we did not get through all of your questions in the time allotted for this session. If you have further questions that have not been answered, please email: futurestudents@ed.ac.uk
- *Or if your query is specifically related to the MSc content please feel free to contact myself at: stuart.gilfillan@ed.ac.uk*

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Thank you

Dr. Stuart Gilfillan

stuart.gilfillan@ed.ac.uk

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