

Geosciences for the energy system transition | GeoT

The **interdisciplinary thematic institutes** of the University of Strasbourg & **cnrs** & **Inserm**

Activity report brief

Université de Strasbourg

2025



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Organisation & partners

7 research labs & observatory:

- École et Observatoire des sciences de la Terre (EOST) including the national seismic survey (BCSF-RENASS)
- Institut Terre et Environnement (ITES)
- Laboratoire des sciences de l'ingénieur, de l'informatique et de l'imagerie (ICube)
- Laboratoire Inter-universitaire des Sciences de l'Éducation et de la Communication (Lisec)
- Centre de recherche sur les médiations (CREM, Université de Lorraine)
- Sociétés, Acteurs, Gouvernement en Europe (Sage)

2 engineering schools:

- École et Observatoire des sciences de la Terre (EOST)
- IFP School (IFPEN)

1 doctoral school:

- Sciences de la Terre et l'Environnement (ED413)

The ITI GeoT is one of the 15 projects labeled for 8 years (2021-2028) by the University of Strasbourg. Launched in January 2021, the ITIs aim to provide an innovative framework for developing interdisciplinarity at the University of Strasbourg. This framework is based on a unique link between research and training, and ensures continuity between the Master's degree and the doctoral thesis.

It is supported by the University of Strasbourg, in partnership with the CNRS and Inserm, as part of the initiative of excellence "Beyond Borders" and the Strat'us project (ANR-10-IDEX-0002 & ANR-20-SFRI-0012).

The year 2025 was marked by a significant increase in the international visibility and relevance of ITI GeoT. This momentum was reflected in our hosting of several major international events, highlighting our growing role within the scientific and academic community. In particular, ITI GeoT organized the Consortium Board meeting of the EPOS ERIC TCS Anthropogenic Hazards (AH) and hosted the Geothermal Innovation Days, further strengthening its position as a key actor in geoscience research and innovation.



Objectives

Deep Reservoir Exploration Develop innovative, low-cost modeling and geophysical imaging techniques to explore fractured geothermal reservoirs, while studying rock-fluid interactions to optimise their stimulation and anticipate their long-term deformation.

Multi-Resource Valorisation Enhancing the profitability of deep underground water reservoirs through the co-production of strategic resources like lithium, hydrogen, heat, and storage.

Optimised Exploitation Designing robust solutions for real-time field operation management, including risk monitoring and pump engineering adapted to extreme underground conditions.

Risk Management Strengthening monitoring and alert systems with AI-powered geomechanical models, while fostering partnerships between public institutions and industrial operators.

Societal Engagement Analyzing media dynamics, citizen perceptions, and participatory initiatives to support the deployment of deep geo-energy projects.

Research projects

Nine disciplinary working groups (WGs) are the pillars for developing interdisciplinary projects

6 projects supported within the ITI "call for project"

- Mechanical behaviour and permeability evolution of hyaloclastite from the geothermal reservoir at Krafla volcano (Iceland) (M. Heap)
- Geochemistry of CO₂ and redox control during alteration of granitic rocks in faults and geothermal reservoirs: key aspects for exploration and stimulation of H₂ (PI: Damien Lemarchand et Jessica Murray)
- Laser ablation U-series dating of the Soultz-sous-Forêts hydrothermal fracture fillings (PI: Sophie Rihs)
- GO@URG 2.0 – Catching up on the Great Oolite in the Upper Rhine Graben : Performing the first integrated study of the well of Chalampé in order to define the reference geological section for future research and exploration (PI: Mathieu Shuster & P. Baud)
- Sedimentological and petrophysical analysis of the Middle to Upper Buntsandstein transition: Upper Grès Vosgien to Conglomerat Principal, East France (PI: Guilherme Bozetti)
- Analysis of the media coverage and framing of deep geothermal energy in Alsace (PI: Yenny Serrano)

National and international affiliated projects involving numerous working groups, fostering additional funding opportunities and actively promoting interdisciplinary collaborations

Projets nationaux	Projets internationaux	Collaborations industrielles
ANR Geresfault ANR ALTERATION ANR Monidas ANR PRESENCE ADEME (PhD) GdR HydroGEMM Gutenberg Chair Eurométropole Sismocité (Université & Cité AMI) PEPR Sous-sol PC9 Fossé Rhénan PEPR Sous-sol REINFORCE	H2022 DT-GEO H2022 Geo-Inquire EPOS ERIC / TCS AH Geothermica DEEP (associé) DEEP-HEAT-FLOWS EERA JPGE CETP Geotwins TALENTS	Total (PhD) INERIS (PhD) VITO (PhD) Terrensis Georhin Expertise (Préfecture) MIE (Eurométropole) PETR Alsace du Nord

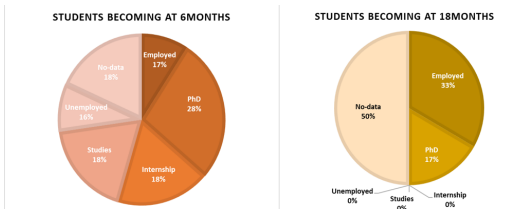
Education program

The ITI GeoT supports a comprehensive educational program within the EOST Master's degree "Earth and Planetary Sciences, Environment" specialisation **Geosciences for the energy system** | **GeoT** co-accredited with IFP School. The Master's program is constantly evolving thanks to feedbacks and expectations from students in order to offer the most relevant and effective training experience. Starting in 2025 academic year, new course modules were introduced, along with deeper integration of the 3rd year engineering curriculum, further strengthening the interdisciplinary dimension and the overall quality of our educational offering. These changes have already led to positive outcomes, with a growing number of engineering students enrolling in the master's program

Year	2023	2024	2025
Applications (M1+M2)	60	75	77
M1	5	8	4 (+2 visa issues)
M2	6	6	12
Including 3A in M2	2	0	4
Internationalisation	55%	85%	81%

Enrolment in the GeoT master's program

Preliminary analyses of our students' career paths indicate good professional integration in the private sector and in further academic studies. These analyses will need to be extended over the coming years to ensure greater relevance.



Preliminary results for the first two cohorts (at 6m, n=12 students; at 18m n= 6 students)



Young researchers training

The ITI GeoT is committed to providing quality training to future generations of researchers through the hosting of students and young researchers within their research team.

In 2025, we have welcomed / financed:

- 3** new PhD students,
- 1** new post-docs,
- 11** internship students.

1 PhD defended

Rémi Fiori, 2021-2025 "Optimising monitoring networks for induced seismicity detection in an urban context: application to the development of deep geothermal energy"

Dissemination

19 Publications in scientific journals

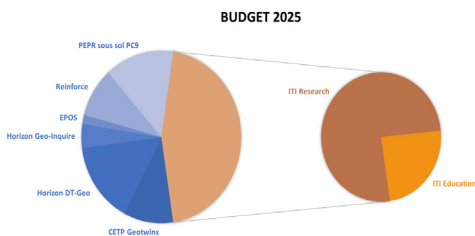
16 presentations in conferences & workshops around the world

Geothermal field school:

organised by ITI GeoT / Unistra and KIT. The school is part of the M2 program and gathered 15 students (including 12 GeoT students). Since 2024, this school has been opened within the EPICUR framework and in 2025 has welcomed its first EPICUR student.

Budget

8 years budget reaching 2,771,200 € for research and 767,584 € for education (*reduced after the mid-evaluation*) to which other fundings can be added from external pro-



Videos in connection with the ITI GeoT



Perspectives

Research

ITI GeoT aims to develop strong relationships with industry and institutions, demonstrating the university's commitment to considering the georesources needed for the energy transition. ITI GeoT's interdisciplinary skills cluster is a key player in the dialogue between science and society, addressing the numerous questions society has about using the subsurface. At the heart of ITI GeoT's ambitions lies the establishment of an innovative deep reservoir observatory — a pioneering initiative designed to promote interdisciplinary collaboration, scientific breakthroughs and public engagement.

Education

Three years into its creation, our Master's program remains committed to expand its national/international reach and enhance its academic recognition. Since its launch, the number of students' applications has increased and has led to an increase in the percentage of international students at EOST. In parallel, a dedicated PhD funding initiative amplifies the opportunities available to our Master's students within the framework of our graduate program.

To access all our communication materials



ITI GeoT communication

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Events

January 2025. Organisation of a Master/Doctoral workshop "From lab to life bring research product into the world" in partnership with PUI-A and pépite Etena.

August 2025. Finalisation of the Horizon Europe DT-Geo project.

September 2025. Entry of the third Master's class in M1 and M2, with a total of 16 students.

November 2025. Organisation of the EPOS TCS AH consortium board meeting followed by the 2025 Anthropogenic Hazard symposium.

December 2025. New PEPR sous-sol Reinforce project coordinated by ITES/ITI GeoT. It will be funded by the ANR over 2025-2029 with more than 375k€.

December 2025. Hosting of the 2025 Geothermal Innovation Days.