

# Geosciences for the energy system transition | GeoT

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

## Activity report brief

Université de Strasbourg

2024

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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 school :

- 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).

### Mi-term evaluation

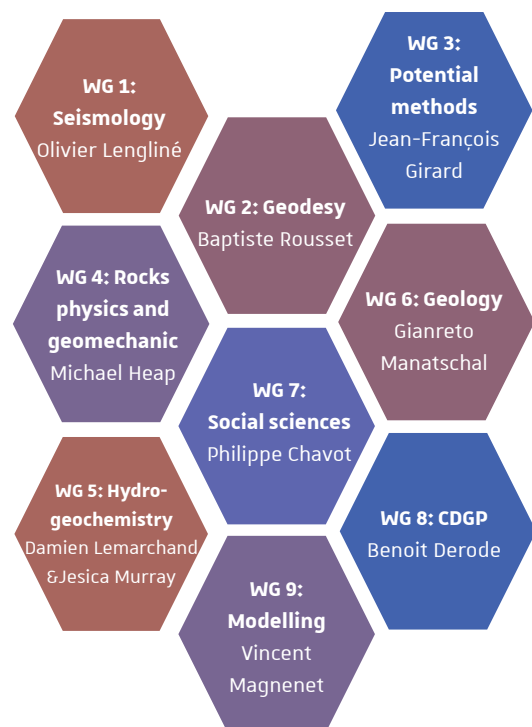
The mid-term evaluation of the Interdisciplinary Thematic Institutes (ITI) of the University of Strasbourg, in partnership with CNRS and INSERM, was conducted between January and July 2024. Both the written and oral components of the evaluation were carried out by an international panel of 10 experts from diverse disciplines, including specialists in interdisciplinarity, pedagogical innovation, and the integration of research and training.

The jury acknowledged the excellence of the research conducted within ITI GeoT, the strength and quality of its Master's program, and its forward-looking ambitions. As a result, ITI GeoT is among the 12 institutes renewed out of the 15 originally accredited in 2021.

**« GeoT is clearly an ITI with high societal impact, a motivated team, high external visibility, and is on an upward trajectory in terms of collaborative research across the ITI. The team is very strong, attracting 3rd party funding and the societal impact is unarguable. »**

Funded under the **Excellence Initiative** program &





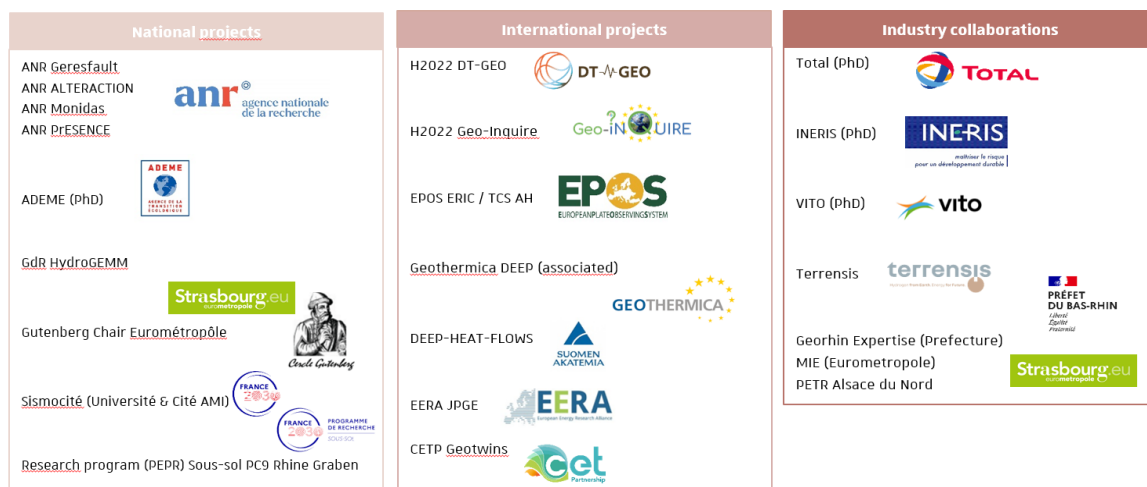
## Research projects

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

### 6 projects supported within the ITI "call for project"

- To better understand the link between the induced seismicity and the development of the aseismic slip on a fault plane (O. Lengliné)
- GNSS network installation (B. Rousset)
- Hybrid gravity applied to the monitoring of the Theistareykir geothermal reservoir (J. Hinderer)
- Toward intermediate reservoirs appraisal in the Upper Rhine Graben: Petrophysical and mechanical characterization of the Grande Oolithe (Dogger) in the Rhine Graben (P. Baud & M. Schuster)
- The influence of pressure and temperature on the electrical conductivity of geothermal reservoir rocks from Soultz-sous-Forêts (France) (M. Heap)
- H<sub>2</sub> generation and stimulation with CO<sub>2</sub> in granitic geothermal reservoirs of the Upper Rhine Graben (J. Murray)

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



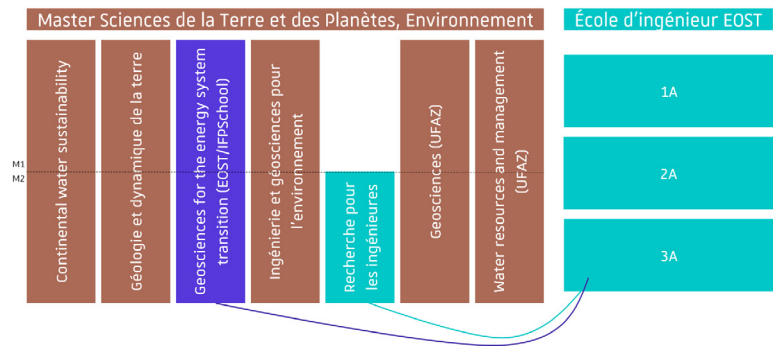
## Education program

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 by IFP School. In 2024, the Master's program welcomed a growing number of students, reflecting its increasing attractiveness and outreach.

	2023	2024
M1	5	8
M2	6	6
Internationalisation	55%	85%

Enrolment in the GeoT master's program

Our Master's program is in constantly evolving shaped by the feedback and expectations of our students to offer the most relevant and effective training experience. Starting in the 2025 academic year, new course modules will be introduced, along with deeper integration of the 3rd year engineering curriculum, further strengthening the interdisciplinary dimension and the overall quality of our educational offering.



**Geothermal field school:** organised by ITI GeoT / Unistra and KIT. The school is part of the M2 program and gathered 15 students (including 6 GeoT students). Since 2024, this school has been opened within the EPICUR framework.



## 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 2024, we have welcomed / financed:

- 4 new PhD students,
- 2 new post-docs,
- 14 internship students.

## 3 PhDs defended

- Kamel Drif**, 2019-2024 "Development of tools for monitoring and predicting seismicity induced by fluid injection into fractured deep geothermal reservoirs (EGS)"
- Weiwei Shu**, 2020-2024 "Analogical modelling of frictional slip on faults: implications for induced and triggered seismicity"
- Lucas Boffill**, 2021-2024 "From outcrop to fluid flow: sedimentary architecture, permeability heterogeneity, and the effect of sedimentary facies in fluid flow modeling: a case study of continental sandstones of the Middle Buntsandstein (Triassic, eastern France)"

## Dissemination

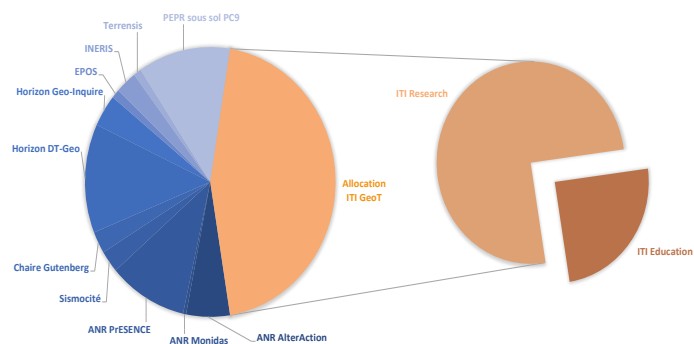
- 14 Publications in scientific journals
- 15 presentations in conferences & workshops around the world



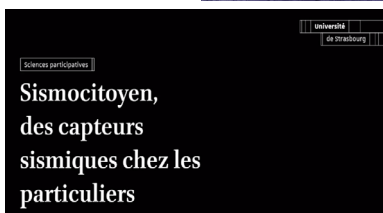
## Budget

**8 years** budget reaching 2,771,200 € for research and 903,040 € for education to which other fundings can be added from external projects.

BUDGET 2024



Videos in connection with the ITI GeoT



## Events

**From January 2024 to July 2024.** Mid-term evaluation of the ITI GeoT project by the University of Strasbourg and an international jury, leading to confirmation of the project until 2028.

**June 2024.** Finalisation of the Geothermica-DEEP project

**September 2024.** Entry of the second Master's class in M1 and M2, with a total of 14 students.

**September 2024.** New CETP Geotwins project coordinated by ETH Zurich. It will be funded by the ANR over 2024-2027 with more than 325k€.

**December 2024.** New website [sismo-citoyen.fr](http://sismo-citoyen.fr) and publication of the first Newsletter in connection with SismoStammtiscs.

**December 2024.** Finalisation of the SismoCité project

To access all our communication materials and the complete activity report 2023 - 2024 including all our results and outreach initiatives, please visit



ITI GeoT communication

## 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

Two years into its creation, our Master's program remains committed to expanding its national/international reach and enhancing its academic recognition. Since 2024, a dedicated PhD funding initiative has been launched to amplify the opportunities available to our Master's students and to foster the development of a comprehensive graduate program.

### Contact

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