

Geosciences for the energy system transition | GeoT

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

Activity report brief

Université de Strasbourg

2023



ITI GeoT is managed by a team of scientists who ensure effective coordination, administrative and financial management as well as strategic development:

- ◆ **Direction committee**
Includes director, deputy director and manager
- ◆ **Executive committee**
Includes all working group leaders
- ◆ **Steering committee**
Includes all partners' representatives
- ◆ **Orientation committee**
Includes international scientists

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 are based on a unique structuring "research-education" link. The ITI GeoT relies on the scientific expertise acquired by the "Labex G-eau-thermie profonde" during its 8 years of existence (2012-2020) in connection with industrial and institutional players. The ITI 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)

Organisation & partners

7 research labs & observatory:

- ◆ École et Observatoire des sciences de la Terre (EOST) including the national seismic survey (BCSF-RENAISS)
- ◆ 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)

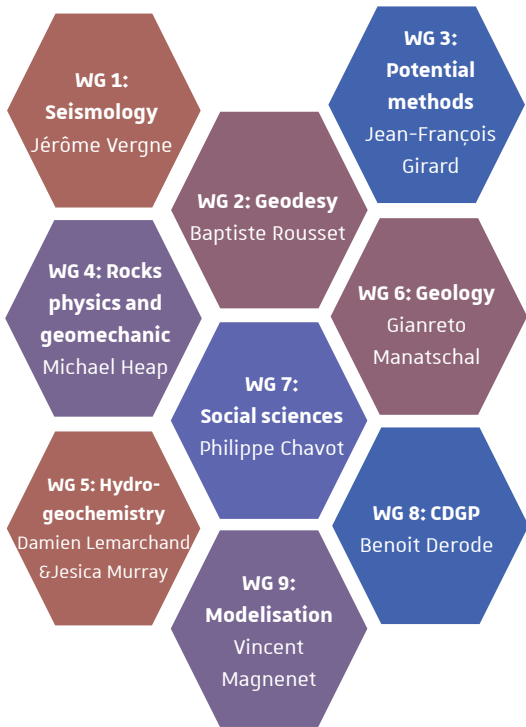
2 engineering school :

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

1 doctoral school :

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

9 working research groups + 1 Master of Science



Objectives

The establishment of deep geothermal energy as a major contributor to the European energy sector by improving the economic viability and profitability of these systems.

The rationalisation of the exploration and characterisation of crustal reservoirs, by developing low-cost methods that repurpose geophysical imaging techniques and integrate emerging technologies to more efficiently assess temperature and fluid-flow in the crust.

The optimization of how we exploit deep groundwater resources, which requires robust on-site workflows to maintain resource production, while monitoring seismic risk in real-time.

The improvement of how we manage risk by improving how we monitor aseismic deformation and anthropogenic seismicity.

The understanding of public perception and enhancing public engagement in geo-energy projects.

Research projects

9 working groups (WG) equally financed

6 projects submitted to the ITI "call for project" financed

- Hybrid gravity applied to the monitoring of the Theistareykir geothermal reservoir (PI: Jacques Hinderer)
- Mechanical behaviour and permeability of porous volcanic geothermal reservoir rock (PI: Micheal Heap)
- Influence of the intermediate principal stress on inelastic compaction and compaction localization in porous sandstone (PI: Patrick Baud)
- HT-HP experimental approach for native hydrogen generation by CO₂ injection in granitic geothermal reservoir (PI: Damien Lemarchand)
- Temporal and Spatial Evolution of the Lower Triassic Buntsandstein Formation (PI: Guilherme Bozetti)
- Coupling between pressure and opening during fluid migration along a fault – implication for remote induced seismicity triggering (PI: Jean Schmittbuhl)

11 national and international projects supported by ANR, EU or local grants (Strasbourg Eurometropole and university) as well as industrial partnerships



Education program

The ITI GeoT supports a new education program within the EOST Master's degree "Earth and Planetary Sciences, Environment".

The "Geosciences for the Energy System Transition | GeoT" program will train the next generation of scientists specialized in georesources for a low-carbon future. The ITI has developed an adapted training program, interdisciplinary and rich in practical experiences. The ITI GeoT can count on its member laboratories and proposes courses from EOST, Lisec and Icube as well as with its partnership with IFP School.

In 2023, the Master has opened in both M1 and M2 and welcomed 11 students among which 6 are coming from all over the world.



Geothermal field school: students coming from three French and German universities focusing on theory and practical examples of geothermal energy.

In 2023: this field trip was part of our M2 program. A total of 20 students, including 6 GeoT students, participated in the course during October 2023.

Starting 2024: the success of the field school supports a continuation of this experience following the end of the EUCOR seed financing aid.

Awards

Congratulation to Mike Heap, WG4 leader, for its European Research Council (ERC) synergy grant for the project ROTnROCK. The project is financed for more than 9 millions over 72months.

Congratulation to Patrick Baud, the ITI GeoT deputy director and Master's coordinator, for its Louis Néel Medal associated with Earth Magnetism & Rock Division research for its ongoing outstanding career.



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. For this purpose, a part of its budget is dedicated to the financing of research projects carried out by students, PhD students, and post-docs as well as engineering contracts.

During 2023, we have welcomed / totally or partially financed:

- 4 new PhD students,
- 3 new post-docs,
- 10 internship students,
- 2 new young engineers.

1 PhD defended



Dariush, 20-2023,

"Modeling P-wave velocity variations related to aseismic slip in a fractured reservoir"

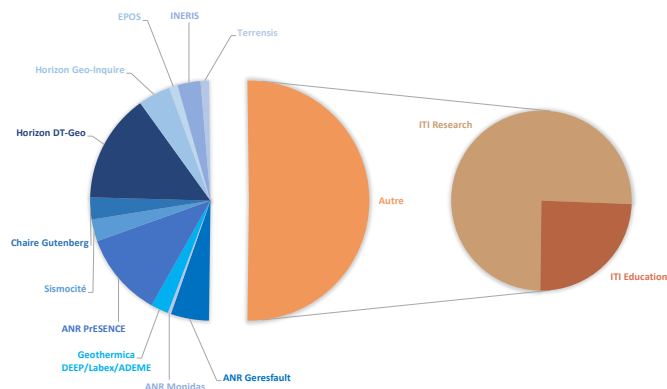
Dissemination



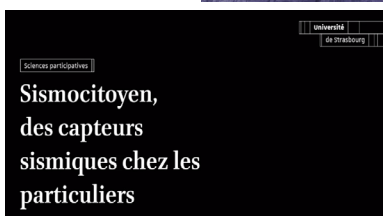
8 Publications in scientific journals
17 presentation in conferences & workshops
around the world

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.



In 2023, shooting of videos in connection with the ITI



Contact

📍 **Ecole et observatoire des sciences de la Terre | EOST**
5, rue René Descartes
67084 Strasbourg

✉ iti-geot-contact@eost.unistra.fr

🌐 geot.unistra.fr



Events

January 2023. New website online geot.unistra.fr and establishment of the ITI GeoT social media

January and February 2023. New partnerships with INERIS and Terrensis SAS

February 2023. The ITIGeoT is designated to coordinate a new high scope project PEPR (Programme et Equipement Prioritaires de Recherche) Sous-sol Project Targeted 'Rhine Graben' in collaboration with BRGM over the period 2023-2030 for more than 2 millions €

June 2023. Success of our recruitment campaign for new Sismo-Citizens. More than 200 applications have been received in the Strasbourg Eurométropole to install a sismometer in their home

September 2023. Opening of our Master in M1 and M2 with a total of 11 students

September 2023. New project awarded ANR AlterAction in collaboration with ISTerre Grenoble. It will be financed over 2024-2027 with more than 174k€.

Perspectives

Research

One important perspective for ITI GeoT is the leadership of the "Rhine Graben" project (PC9) of the national exploratory PEPR (Programme et Equipement Prioritaires de Recherche) program "Sous-sol" in collaboration with BRGM. This project is an unique opportunity to develop the research activity of ITI GeoT by initiating multiple national collaborations with numerous teams and to promote the activity of the program while obtaining new co-funding to stimulate fundamental research on deep geothermal energy and the associated exploitation of related resources such as Lithium or Hydrogen.

Education

After one year of existence, the ambition for our Master program is to keep up developing and increasing the international scope and recognition of our training. In 2024, a call for PhD funding will be specifically launched to potentiate the opportunities offered to our students.