Dr. Robin Thibaut

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Professional Summary

Computational geoscientist with an M.Sc. in Geological Engineering and a Ph.D. in Geosciences, blending advanced software engineering, machine learning, and domain expertise. Pioneered experimental design frameworks and uncertainty quantification methods in advanced Earth system simulations. Skilled in Python-based development, data-driven solutions, and interdisciplinary collaboration—committed to improving resource management through innovation and rigorous scientific practice.

Work Experience

Computational Geoscientist at **Zanskar Geothermal & Minerals**, SLC, UT, USA Oct 2024 – Present

- Develop data assimilation, modeling, and optimization workflows to reduce costs in geothermal exploration.
- Apply machine learning to integrate diverse datasets for improved decision-making in resource development.

Postdoctoral Researcher at **Lawrence Berkeley National Laboratory** Aug 2023 – Sep 2024

- Integrated geophysical, hydrological, satellite, and field data to investigate watershed processes and vegetation properties.
- Employed machine learning and data mining to predict watershed functions under changing climate conditions.
- Collaborated with cross-functional teams to address environmental and water resource challenges.

Postdoctoral Researcher at **Ghent University** Mar 2023 – May 2023

- Contributed to the TURBEAMS project by developing ML and deep learning models to predict turbidity and suspended particulate matter from multibeam sonar backscatter.
- Utilized large-scale point cloud analytics to optimize data handling and model accuracy.

PhD Fellow at **Ghent University** Mar 2019 – Mar 2023

- Developed a novel framework for experimental design in Earth Sciences using Bayesian Evidential Learning.
- Published multiple peer-reviewed articles and presented at international conferences.
- Demonstrated advanced modeling and validation techniques across diverse geological applications.

Project Engineer at **G-tec** Mar 2018 – Jan 2019

- Conducted marine geophysical surveys for unexploded ordnance detection and geological layer mapping.
- Managed data acquisition and processing using advanced data mining techniques.
- Coordinated equipment mobilization and ensured compliance with safety standards.

Education

2019–2023	Ph.D. in Geological Sciences (Laboratory for Applied Geology and Hydrogeology), **Ghent University**	
2014–2017	M.Sc. in Geological Engineering, **University of Liège**	Cum Laude
2010–2014	B.Sc. in Geological Sciences, **Free University of Brussels**	Cum Laude

Projects

Rare Earth Elements – Multiphysics AI-aided Autonomous Prospecting (REE-MAP)
Pennsylvania, USA (2023–ongoing)

- Collected geophysical datasets as part of an AI-aided, multiphysics approach to identify REE-CM hot zones in coal mine tailings.
- Collaborated with peers gathering radiological and optical data; contributed to machine-learning analyses correlating multiphysical signals with REE concentrations.

Towards 3D TURbidity by correlating multiBEAM sonar and in-situ Sensor data (TURBEAMS)
Belgium (2023–ongoing)

- Developed ML and deep learning models to estimate turbidity and suspended particulate matter from multibeam backscatter.
- Managed extensive datasets to validate and enhance predictive accuracy.

Experimental Design in Earth Sciences using Bayesian Evidential Learning Belgium (2019–2023)

- Established a framework for reducing predictive uncertainty in Earth Sciences.
- Conducted numerical experiments to validate Bayesian Evidential Learning techniques.

Impact of Saltwater Intrusion on Water Resources in Vietnam Vietnam, Belgium (2019–ongoing)

- Led intensive fieldwork in the Southern Central region of Vietnam to evaluate the impacts of saltwater intrusion on groundwater resources and agriculture.
- Processed and interpreted environmental data, co-authoring a peer-reviewed publication that proposed management strategies to mitigate these impacts.

Publications

Tas, Luka, Niels Hartog, Martin Bloemendal, David Simpson, Tanguy Robert, **Robin Thibaut**, Le Zhang, and Thomas Hermans (Jan. 2025). "Efficiency and heat transport processes of low-temperature aquifer thermal energy storage systems: new insights from global sensitivity analyses". In: *Geothermal Energy* 13. Open access, published 07 January 2025, Article number: 2.

Zhang, Le, Anne-Catherine Dieudonné, Alexandros Daniilidis, Longjun Dong, Wenzhuo Cao, Luka Tas, **Robin Thibaut**, and Thomas Hermans (2024). "Thermo-Hydro-Mechanical Modeling of Geothermal Energy Systems in Deep Mines: Uncertainty Quantification and Design Optimization". In: *Applied Energy, Under review.*

Thibaut, **Robin**, Ty Ferré, Eric Laloy, and Thomas Hermans (2023). "Sequential optimization of flux measurement to estimate groundwater-surface water interactions". In: *In preparation.*

Thibaut, **Robin**, Nicolas Compaire, Nolwenn Lesparre, Maximilian Ramgraber, Eric Laloy, and Thomas Hermans (Nov. 2022). "Comparing Well and Geophysical Data for Temperature Monitoring Within a Bayesian Experimental Design Framework". In: *Water Resources Research* 58 (11). ISSN: 0043-1397. DOI: 10.1029/2022WR033045. URL: https://onlinelibrary.wiley.com/doi/10.1029/2022WR033045.

Cong-Thi, Diep, Linh Pham Dieu, **Robin Thibaut**, Marieke Paepen, Huu Hieu Ho, Frédéric Nguyen, and Thomas Hermans (June 2021). "Imaging the Structure and the Saltwater Intrusion Extent of the Luy River Coastal Aquifer (Binh Thuan, Vietnam) Using Electrical Resistivity Tomography". In: *Water* 13 (13), p. 1743. ISSN: 2073-4441. DOI: 10.3390/w13131743. URL: https://www.mdpi.com/2073-4441/13/13/1743.

Thibaut, **Robin**, Thomas Kremer, Annie Royen, Bun Kim Ngun, Frédéric Nguyen, and Thomas Hermans (Apr. 2021). "A new workflow to incorporate prior information in minimum gradient support (MGS) inversion of electrical resistivity and induced polarization data". In: *Journal of Applied Geophysics* 187, p. 104286. ISSN: 09269851. DOI: 10.1016/j.jappgeo.2021.104286. URL: https://linkinghub.elsevier.com/retrieve/pii/S0926985121000331.

Thibaut, **Robin**, Eric Laloy, and Thomas Hermans (Dec. 2021). "A new framework for experimental design using Bayesian Evidential Learning: The case of wellhead protection area". In: *Journal of Hydrology* 603, p. 126903. ISSN: 00221694. DOI: 10.1016/j.jhydrol.2021.126903. URL: https://linkinghub.elsevier.com/retrieve/pii/S0022169421009537.

Software and Datasets

Deleersnyder, Wouter and **Robin Thibaut** (2022). *Scale-dependent wavelet-based regularization scheme for geophysical 1D inversion.* [**Software**]. DOI: 10.5281/zenodo.6552695. URL: http://dx.doi.org/10.5281/zenodo.6552695.

Lesparre, Nolwenn, Nicolas Compaire, Thomas Hermans, and **Robin Thibaut** (2022). *4D Temperature Monitoring.* [**Dataset**]. DOI: 10.34740/kaggle/dsv/3819983. URL: https://www.kaggle.com/dsv/3819983.

Thibaut, **Robin** (2021). *WHPA Prediction.* [**Dataset**]. DOI: 10.34740/kaggle/dsv/2648718. URL: https://www.kaggle.com/dsv/2648718.

Thibaut, **Robin** and Maximilian Ramgraber (Sept. 2021). *SKBEL - Bayesian Evidential Learning framework built on top of scikit-learn.* [**Software**]. Version v2.0.0. DOI: 10.5281/zenodo.6205242. URL: https://doi.org/10.5281/zenodo.6205242.

Thibaut, **Robin** and Guillaume Vandekerckhove (May 2021). *pysgems–Use SGeMS (Stanford Geostatistical Modeling Software) within Python.* [**Software**]. Version v1.3. DOI: 10.5281/zenodo.4773587. URL: https://doi.org/10.5281/zenodo.4773587.

Conferences and Talks

Wu, Yuxin, Karthika Balan, Chunwei Chou, Jun Woo Chung, Baptiste Dafflon, Nicola Falco, Jim Panaro, Arun Persaud, Brian Quiter, Emil Rofors, **Robin Thibaut**, Jiannan Wang, Michael L. Whittaker, and John Wu (2024). *RARE EARTH ELEMENTS – MULTIPHYSICS AI-AIDED AUTONOMOUS PROSPECTING (REE -MAP).* Anaheim, U.S.A. DOI: 10.1130/abs/2024AM-404345.

Thibaut, **Robin**, Ty Ferré, and Thomas Hermans (2023). *Sequential Optimization Of Temperature Measurements To Estimate Groundwater Surface Water Interactions.* San Fransisco, U.S.A.

Thibaut, **Robin**, Nicolas Compaire, Nolwenn Lesparre, Maximilian Ramgraber, Eric Laloy, and Thomas Hermans (2022). *Comparing well and geophysical data for temperature monitoring within a Bayesian Experimental Design framework.* Gdansk, Poland.

Hermans, Thomas, Nicolas Compaire, **Robin Thibaut**, and Nolwenn Lesparre (2021). *Bayesian evidential learning : an alternative to hydrogeophysical coupled inversion.* online. URL: http://dx.doi.org/10.1190/segam2021-3580979.1.

Thibaut, **Robin**, Thomas Hermans, and Eric Laloy (2021a). *A new framework for experimental design using Bayesian Evidential Learning : the case of wellhead protection area.* New Orleans, U.S.A.

– (2021b). *Bayesian Evidential Learning combined with experimental design : the case of wellhead protection area prediction.* Brussels, Belgium. URL: https://iah2021belgium.org/wp-content/uploads/2021/09/IAH-2021-Book-of-Abstracts.pdf.

– (2020). *A new framework to reduce uncertainty in Wellhead Protection Area prediction using Bayesian Evidential Learning.* Online. URL: https://iemss2020.com/.

Thibaut, **Robin**, Thomas Kremer, Annie Royen, Bun Kim Ngun, Frederic Nguyen, and Thomas Hermans (2019). *A new approach to incorporate prior information in MGS inversion of ERT/IP data.* The Hague, The Netherlands. URL: http://dx.doi.org/10.3997/2214-4609.201902391.

Teaching

2019–2023 Teaching Assistant for the course **Groundwater Modeling**, **Ghent University**.
Mar 2022 Organizer and speaker, **Python Workshop**, **Ghent University**.
2016–2019 Private tutoring in Mathematics and Physics for university students.

Peer-Review

2021–present Reviewer for **Hydrogeology Journal** (Elsevier), **Geophysics** (SEG), **Geophysical Journal International**, **Geophysical Research Letters** (AGU), **GEUS Bulletin**, **Journal of Hydrology** (Elsevier), **Pure and Applied Geophysics** (Springer), **Water Resources Research** (AGU).

Languages

English	Fluent
French	Fluent
Dutch	Intermediate
Vietnamese	Intermediate
Spanish	Basic

Skills

Programming	Python, Matlab, Wolfram Mathematica
Software	Git, PyCharm, MODFLOW, MT3DMS, MODPATH, ModelMuse, CRTOMO, RES2DINV, SGEMS, GMS, Microsoft Office, Adobe Illustrator, LaTeX, BibTeX, TensorFlow, PyTorch, scikit-learn, SQL, Google Cloud Platform
Operating Systems	Linux, Windows, macOS

Memberships and Affiliations

International Association of Hydrogeologists (IAH)
American Geophysical Union (AGU)
International Association for Mathematical Geosciences (IAMG)

Licenses and Certifications

Basic Offshore Safety Induction & Emergency Training (BOSIET)
Issued Feb. 2018 – Exp. Feb. 2022
Helicopter Underwater Escape Training (HUET)
Issued Feb. 2018 – Exp. Feb. 2022