

Dr. Robin Thibaut

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PROFESSIONAL SUMMARY

Postdoc researcher with a Ph.D. in Geological Sciences and extensive experience in integrating machine learning, data mining, and geophysical methods to solve complex problems. Proven ability to spearhead interdisciplinary projects, author high-impact publications, and devise novel solutions. Known for effective collaboration across diverse teams and a strong commitment to advancing scientific knowledge through rigorous research and dissemination.

WORK EXPERIENCE

Postdoctoral Researcher at Lawrence Berkeley National Laboratory Aug 2023 - Present

Integrating geophysical, hydrological, satellite, and field data to link tree and vegetation properties with subsurface characteristics. Using machine learning and data mining techniques to predict watershed functions and dynamics, addressing climate change impacts and improving water resource management.

Postdoctoral Researcher at Ghent University Mar 2023 - May 2023

Part of the TURBEAMS project, developing machine learning and deep learning models to estimate turbidity and suspended particulate matter in seawater columns using multibeam sonar backscatter values. Utilized various approaches to manage and analyze large point cloud datasets.

PhD Fellow at Ghent University Mar 2019 - Mar 2023

Developed a new framework for experimental design in Earth Sciences utilizing machine learning and Bayesian Evidential Learning. Published multiple papers in peer-reviewed journals and presented research at international conferences. Employed a variety of techniques to rigorously test and improve model accuracy and reliability.

Project Engineer at G-tec Mar 2018 - Jan 2019

Conducted marine geophysical surveys for detecting unexploded ordnance and mapping geological layers. Utilized data mining techniques to process and analyze survey data. Responsibilities included planning, equipment mobilization, data acquisition, and processing.

EDUCATION

2019–2023 PhD Fellow in the Laboratory for Applied Geology and Hydrogeology, Department of Geology, **Ghent University**

2014–2017 Master's Degree in Geological Engineering, **University of Liege** Cum Laude

2010–2014 Bachelor's Degree in Geological Sciences, **Free University of Brussels** Cum Laude

PROJECTS

Rare Earth Elements – Multiphysics AI-aided Autonomous Prospecting (REE -MAP)

Pennsylvania, USA. 2023 – ongoing

Gathered an extensive dataset for an AI-aided multi-physics approach to characterize REE-CM hot zones in coal mine tailings, integrating geophysical, radiological, and optical technologies. Collaborated with peers who applied machine learning and data mining techniques to analyze multiphysical signals and correlate them with REE concentrations.

Towards 3D TURbidity by correlating multiBEAM sonar and in-situ Sensor data - TURBEAMS

Belgium. 2023 – ongoing

Developed machine learning and deep learning models to estimate suspended particulate matter and turbidity in the Belgian North Sea using multibeam backscatter signals. Managed and analyzed extensive datasets to support model development and validation.

Experimental Design in Earth Sciences using Bayesian Evidential Learning

Belgium. 2019 – 2023

Developed a framework for experimental design to reduce uncertainty in Earth Sciences predictions using Bayesian Evidential Learning and machine learning techniques. Designed and conducted experiments to validate the framework.

Impact of Saltwater Intrusion on Water Resources in Vietnam

Vietnam, Belgium. 2019 – ongoing

Led intensive fieldwork to assess saltwater intrusion impacts on groundwater resources and agriculture in the Southern Central region of Vietnam. Processed and interpreted environmental data, and co-authored a paper to develop management solutions for mitigating these impacts

PUBLICATIONS

- 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.japgeo.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.jhydro.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

- 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 for the **Python Workshop, Ghent University**
- 2016–2019 Private tutoring in Mathematics and Physics for university students

PEER-REVIEW

- 2021–present Reviewer for journals including **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 Software	Python, Matlab, Wolfram Mathematica
	Git, PyCharm, MODFLOW, MT3DMS, MODPATH, ModelMuse, CRTOMO, RES2DINV, SGEMS, GMS, Microsoft Office, Adobe Illustrator, LaTeX, BibTeX, TensorFlow, PyTorch, scikit-learn
Other	Linux, Windows, Mac OS

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