Invitation

Public PhD defense of

Robin Thibaut

Location

Ghent, Campus Sterre
Building S9
Auditorium A2

Monday 27 March 2023

16:00 - 18:00

Streaming link

A reception is held after the presentation.

To confirm your attendance at the reception, send a message to robin.thibaut@ugent.be by March 14.

GHENT UNIVERSITY

FACULTY OF SCIENCES

Machine Learning for Bayesian Experimental Design in the Subsurface

Dissertation submitted in fulfilment of the requirements for the Degree of

Doctor of Science: Geology

Ghent University

Advisors

Prof. Dr. Thomas Hermans
Ghent University

Dr. Eric Laloy
Belgian Nuclear Research Centre

Jury members

Prof. Dr. Ellen Van de Vijver
Ghent University

Prof. Dr. Frédéric Nguyen
University of Liège

Prof. Dr. Kristine Walraevens
Ghent University

Prof. Dr. Ty Ferré
University of Arizona

Chairman

Prof. Dr. Stephen Louwye
Ghent University

Personalia

Robin Thibaut is a PhD fellow in Applied Geology and Hydrogeology at Ghent University, Belgium. His research focuses on developing an experimental design framework for Earth Sciences, leveraging his expertise in machine learning and **open-source software development.**

Since 2014, Robin has earned one bachelor's and one master's degree in Geological Sciences and Geological Engineering at the Université Libre de Bruxelles and the University of Liège, respectively, and has published three A1 **peer-reviewed papers** as first author.

He also worked as a Project Engineer at an offshore survey company and participated in a geophysical mission to Cambodia to assess gold deposits. Passionate about travelling, Robin has a working knowledge of English, Vietnamese, Dutch and French, and is proficient in multiple programming languages such as Python.

His life motto: always be curious and **never stop coding**!

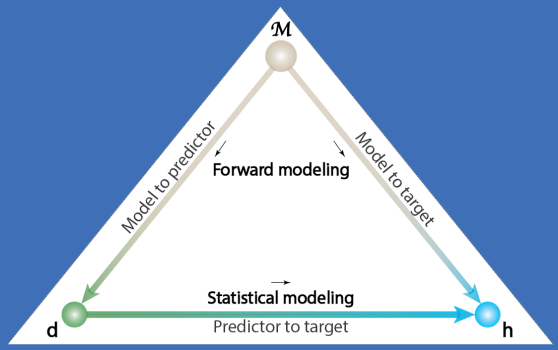
GHENT UNIVERSITY

FACULTY OF SCIENCES

Research Highlights

Presentation of a novel framework for **Bayesian optimal experimental design** that integrates simulation and data-driven methods, Bayesian inference, and **machine learning**.

The framework is based on **Bayesian Evidential Learning**, a Monte Carlo method that employs machine learning to learn a direct relationship between predictor and target variables.



The framework is adaptable and can accommodate a wide range of data sources, including field observations and simulated data.

Three case studies in groundwater modeling have demonstrated the efficacy of the framework:

- **wellhead protection area delineation**
- **aquifer thermal energy storage monitoring**
- **groundwater-surface water interaction**

Publication of several open-source Python packages and **datasets**.