Antoine **Wehenkel**

PH.D. CANDIDATE · MACHINE LEARNING

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PERSONAL STATEMENT

"We know the past but cannot control it. We control the future but cannot know it." Claude Shannon

Passionated **Ph.D. student** in **Deep Learning**, my research goal is to advance **simulation-based inference** by exploring and developing **deep generative models**. I am an engineer excited by Machine Learning both by the theory and the breathtaking applications. I am looking for post-doc positions in Machine Learning where I could apply and develop further my research skills.

EDUCATION

Ph.D. student in Machine Learning - *ULiège, Liège* 10/2018 - 10/2022
Advisor: Professor Gilles Louppe
Research interests: generative modeling, deep learning and simulation-based inference.

Master in Computer Engineering - *ULiège, Liège* 09/2016 - 06/2018
Summa Cum Laude - 88%

Exchange student in the Master in Data Science - *EPFL, Lausanne* 09/2017 - 06/2018
Average score: 5.8/6 - 97%

Bachelor in Engineering - *ULiège, Liège* 09/2013 - 06/2016
Magna Cum Laude - 81%

WORK EXPERIENCE

Applied Scientist Internship Summer 2021
Amazon Web Services (remote)
Worked in Codeguru AI team. Defined and developped a project combining deep learning (graph neural networks) to automatic program analysis. Secured an offer for a returning internship.

Development of an RFID fish tracker Summer 2017
Laboratory of Veterinary Immunology (ULiège)
Delivered a working proof of concept tracking system for fish based on RFID chips and a web interface for visualizing the fish's positions.

Web Development Winter 2015
Wikipower company
Integrated a new design (CSS and HTML) and implemented additional features to their website (javascript and PHP).

PERSONAL RESEARCH PROJECTS

Deep Learning for inverse problems in Science 2018 - 2022
Antoine Wehenkel - Gilles Louppe
Advancing simulation-based inference by exploring new means for implementing more effectively inductive bias into deep generative models.
Co-authored 7 papers, 3 at top Machine Learning conferences and 4 at workshops (2 spotlights).

Parameter estimation of transmission lines from synchrophasor measurements 2017 - 2018
Antoine Wehenkel - Arpan Mukhopadhyay, Mario Paolone, Jean-Yves Le Boudec
Estimation of transmission lines parameters noisy phasors measurements with sparse non-convex optimisation.
Graded 6/6 as a master's thesis at EPFL and published in an international journal.

An algorithmic approach for harvesting renewable energy with electric vehicles 2016 - 2017
Antoine Wehenkel - Antoine Dubois, Raphael Fonteneau, Damien Ernst
Development of optimisation algorithms for the integration of Electric vehicle fleets in the electrical network.
This project was done in collaboration with Engie Company and led to a scientific publication.

PUBLICATIONS

Diffusion Priors In Variational Autoencoders
Wehenkel A, Louppe G
Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models at ICML 2021.

Graphical Normalizing Flows
Wehenkel A, Louppe G
International Conference on Artificial Intelligence and Statistics (AISTATS) 2021.

Neural Empirical Bayes: Source Distribution Estimation and its Applications to Simulation-Based Inference
Vandegar M, Kagan M, Wehenkel A, Louppe G.
International Conference on Artificial Intelligence and Statistics (AISTATS) 2021.

Lightning Gravitational Wave Parameter Inference through Neural Amortization
Delaunoy A, Wehenkel A, Hinderer T, Nissanke S, Weniger C, Williamson A, Louppe G.
Workshop on Machine Learning and the Physical Sciences at NeurIPS 2020.

You say Normalizing Flows I see Bayesian Networks
Wehenkel A, Louppe G.
*Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models at ICML 2020 (**Spotlight**).*

Unconstrained monotonic neural networks
Wehenkel A, Louppe G.
Neural Information Processing Systems (NeurIPS/NIPS) 2019.

Parameter Estimation for Three Phase Untransposed Short Transmission Lines from Synchrophasor Measurements
Wehenkel A, Mukhopadhyay A, Le Boudec JY, Paolone M.
IEEE Transactions on Instrumentation and Measurement. 2020 Jan 23.

Recurrent machines for likelihood-free inference.
Pesah A, Wehenkel A, Louppe G.
*Workshop on Meta-Learning at NeurIPS/NIPS 2018 (**Contributed talk**).*

SKILLS

- ***Theoretical background***: Deep Learning, Machine Learning, Optimisation, and Statistics.
- ***Programming***: Python, Git, Bash, PHP, Javascript, Java, Matlab, C++ and C.
- ***Libraries***: PyTorch, Scikit-Learn, Numpy, Pandas, D3, Matplotlib.
- ***Communication***: Technical writing, Latex, HTML/CSS, data vizualization, teaching.
- ***Languages***: French (native), English (professional proficiency).

TEACHING

- *Current*: Deep Learning, Introduction to Artificial Intelligence (ULiège).
- *Past*: Computer Organization, Electric Measurements, Data Structures and Algorithms (ULiège), Electronic 2 (EPFL).

TALKS

- *Normalizing Flows and Bayesian Networks.* CogSys seminar (DTU). Remote. 10/2020
- *Normalizing Flows for Probabilistic Modeling and Inference.* Montefiore (ULiège) journal club, Liège. 04/2020
- *Neural Likelihood-Free Inference.* GRAPPA (UvA) journal club, Amsterdam. 10/2019
- *Unconstrained Monotonic Neural Networks.* Benelearn 2019, Brussels. 11/2019

REVIEWING

- *Conferences*: PMAPS2020, NeurIPS 2020/2021, ICLR 2021/2022, AISTATS 2021, ICML 2021.
- *Workshops*: ML4PS (at NeurIPS 2020), EBM (at ICLR2021), INNF+ (at ICML2021).

AWARDS

- Outstanding reviewer award for ICLR2021 - Awarded to the top 10% reviewers.
- FNRS Research Fellowship (2018 - 2022) - Around 100 awards in Belgium each year.
- NeurIPS Travel Award (2019).
- Best Master's thesis awards from AIM and from AILg (2018) - One award for 40 candidates.
- Ranked 1^{st} the "Kaggle in class" machine learning course competition (ULiège, 2016 and 2018) - 64 teams.
- Physics award for outstanding student (2013) - One award for more than 150 students.
- Physics award at Belgian Olympiad (2012 and 2013) - Top-5 among hundreds of students in Belgium.

REFEREES

- Gilles Louppe (g.louppe@uliege.be) - Ph.D. advisor.
- Michael Kagan (makagan@slac.stanford.edu) - Collaborator.
- Pranav Garg (prangarg@amazon.com) - Internship Mentor.

OTHER ACTIVITIES AND HOBBIES

- Co-organiser of the research unit's PhD meetings.
- Padel, tennis and hiking.
- Wine tasting.