

# Antoine Wehenkel

PH.D. CANDIDATE · MACHINE LEARNING

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## EDUCATION

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|--|-----------------|
| Ph.D. student in Machine Learning - <i>ULiège, Liège</i><br>Advisor: Professor Gilles Louppe<br>Research interests: generative modeling, causal models and simulation-based inference. | Oct 18 - Oct 22 |
| Master in Computer Engineering - <i>ULiège, Liège</i><br><i>Summa Cum Laude</i> - 88%  | Sep 16 - Jun 18 |
| Exchange student in the Master in Data Science - <i>EPFL, Lausanne</i><br><i>Average score: 5.8/6 - 97%</i>  | Sep 17 - Jun 18 |
| Bachelor in Engineering - <i>ULiège, Liège</i><br><i>Magna Cum Laude</i> - 81%   | Sep 13 - Jun 16 |

## PUBLICATIONS

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) 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 2018 (Contributed talk).*

## TALKS

"Normalizing Flows and Bayesian Networks". CogSys seminar (DTU). Remote. October 2020.

"Normalizing Flows for Probabilistic Modeling and Inference". Montefiore (ULiège) journal club, Liège. April 2020.

"Neural Likelihood-Free Inference". GRAPPA (UvA) journal club, Amsterdam. November 2019.

"Unconstrained Monotonic Neural Networks". Benelearn 2019, Brussels. November 2019.

## TECHNICAL SKILLS

Programming in Python, C++ and C.

Pytorch, Scikit-Learn, Pandas, etc...

General expertise in Deep Learning, Machine Learning, Optimisation, and Statistics.

## TEACHING

*Current:* Deep Learning (ULiège), Introduction to Artificial Intelligence (ULiège).

*Past:* Computer Organization (ULiège), Electric Measurements (ULiège), Data Structures and Algorithms (ULiège), Electronic 2 (EPFL).

## OTHER WORK EXPERIENCE

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|---|-------------|
| Development of an RFID fish tracker<br><i>Laboratory of Veterinary Immunology (ULiège)</i><br>Electronic design, microcontroller programming, web server implementation (Django and PostgreSQL) and a monitoring system (Python). | Summer 2017 |
| Web Developer<br><i>Wikipower" company</i><br>Implementation of a new design in CSS and HTML. Implementation of new features in javascript and PHP.   | Winter 2015 |

## PERSONAL RESEARCH PROJECTS

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### Deep Learning for inverse problems in Science

2018-2022

*Antoine Wehenkel - Gilles Louppe*

In my research, I wish to advance simulation-based inference by exploring new means for implementing more effectively inductive bias into deep generative models. My main research interests are in generative modelling, causal models and simulation-based inference. See the list of publications for further details.

### Parameter estimation of transmission lines from synchrophasor measurements

2017-2018

*Antoine Wehenkel - Arpan Mukhopadhyay, Mario Paolone, Jean-Yves Le Boudec*

I worked on the estimation of the admittance matrix of an electrical grid based on Phasor Measurements Unit measurements. Mathematically this corresponds to a linear inverse problem whose optimization is non-convex. See the corresponding publication for further details.

### An algorithmic approach for harvesting renewable energy with electric vehicles

2016-2017

*Antoine Wehenkel - Antoine Dubois, Raphael Fonteneau, Damien Ernst*

I developed optimisation algorithms for the integration of Electric vehicle fleets in the electrical network. This project was done in collaboration with Engie Company.

## REVIEWING

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NeurIPS 2020; ICLR 2021; AISTATS 2021.

## AWARDS

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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.

Winning team of 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

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Gilles Louppe (g.louppe@uliege.be) - Ph.D. advisor.

Michael Kagan (makagan@slac.stanford.edu) - Collaborator.

Jean-Yves Le Boudec (jean-yves.leboudec@epfl.ch) - Master's thesis advisor.

## OTHER ACTIVITIES AND HOBBIES

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Co-organiser of the research unit's PhD meetings.

Padel, tennis and hiking.

Wine tasting.