Edward De Brouwer

Machine Learning Ph.D Student

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31 years old

Education

2018–2022   **PhD in Machine Learning for Healthcare**, *KU Leuven*, Belgium.
Title: Machine learning modeling of time-dependent patient trajectories (with Prof. Yves Moreau)

2020–2022   **Bachelor in Philosophy**, *Institute of Philosophy, KU Leuven*, Belgium.

2016–2017   **Master Degree in Financial Mathematics and Actuarial Sciences**, *UCLouvain*, Belgium,
2013-2014   *Magna Cum Laude*.

2011–2014   **Double Master Degree in Electrical Engineering**, *KU Leuven and UCLouvain*, Belgium,
Magna Cum Laude.
Specialization in Telecoms and Signal Processing.

2008–2011   **Bachelor in Engineering**, *UCLouvain*, Belgium, *Cum Laude*.
Options in Electrical and Mechanical Engineering

Experience

2018–Present   **Ph.D Student**, *ESAT, Katholieke Universiteit Leuven*, Leuven.
Machine learning for healthcare.
Thesis title : Machine learning modeling of time-dependent patient trajectories.
Supervisor : Pr. Dr. Ir. Yves Moreau.
Funded by FWO.

2021-2022   **Part-time Visiting Researcher**, *Massachusetts Institute of Technology (MIT)*, Boston, USA.
External collaborator in the clinical ML group of Professor David Sontag. Working on modeling of clinical time series and survival analysis.

May-Jul/2021   **Machine Learning Intern**, *Microsoft Research*, Cambridge, United Kingdom.
Machine Learning Researcher supervised by Stephanie Hyland, co-supervised by Javier Gonzalez Hernandez and Melanie Pradier. Working on causal inference with uncertainty estimates for longitudinal observational data.

2020-2021   **Visiting Researcher**, *ETH Zürich*, Basel, Switzerland.
Machine Learning Researcher in the group of Prof. Karsten Borgwardt (MLCB). Working on topological data analysis and stochastic processes for medical time series data.

Sep-Nov/2020   **Digital Arts Resident**, *Cinema Jolia*, Brussels, Belgium.
Working on digital artistic production, linking literature, photography and artificial intelligence. Production of "The Labyrinth", a poem generator through a journey in a labyrinth video game. Publication in Backslash Lit, a magazine for digital literature. `http://3.134.244.254/`

Oct-Dec/2019   **Machine Learning Researcher Intern**, *Janssen pharmaceutica*, Beerse, Belgium.
Machine learning for real world evidence in type-2 diabetes. Using CPRD data, I designed an algorithm to predict future occurrence of lower limb complication in type-2 diabetes.

Jun-Sep/2019   **Artificial Intelligence Resident**, *[Google] X, the moonshot factory*, Mountain View, California.
Making the world a radically better place with machine learning empowered moonshots. Contributed to project Amber, aiming at addressing depression with EEG. Designed machine learning workflow to analyze the EEG data.

Jun-Aug/2017	**Data Scientist Intern**, *Data Innovation Lab, AXA*, Brussels. Worked on computer vision for car crash detection and estimation. Deep convolutional neural networks and visualization using class activation maps.
2016–2017	**Teaching Assistant**, *ISBA, Université Catholique de Louvain*, Louvain-la-Neuve. I was in charge of the practical sessions of courses given by the Institute of Statistics, Bio-Statistics and Actuarial Sciences. Courses given : Statistics I, Statistics II and Econometrics
2014–2015	**Software Design Engineer**, *Alcatel-Lucent*, Antwerp. I was member of the software development team for the G.Fast technology. Programming was done in C++.
2013–2013	**Research Student**, *IMEC Research Center*, Leuven. As an internship student, I worked on the Massive MIMO project MAMMOET (European Consortium). Part of my master thesis
2011–2011	**Tutor**, *UCL*, Louvain-la-Neuve. I was in charge of the practical sessions of the course "LFSAB1104 : Methodes Numerique"

Selected publications and participation in international conferences

April. 2022	**AISTATS**, Edward De Brouwer et al., *Predicting the impact of treatments over time with uncertainty aware neural differential equations*.
April. 2022	**ICLR**, Max Horn, Edward De Brouwer et al., *Topological Graph Neural Networks*.
Sep. 2021	**Neurology**, Steve Simpson-Yap & Edward De Brouwer et al., *Associations of Disease-Modifying Therapies With COVID-19 Severity in Multiple Sclerosis*.
July 2021	**Conference on Machine Learning, Optimization, and Data Science (LOD)**, Jaak Simm, Adam Arany, Edward De Brouwer and Yves Moreau, *Expressive Graph Informer Networks*. Grasmere, United Kingdom
May 2021	**International Conference on Learning Representations (ICLR)**, *Poster*, Edward De Brouwer et al., *Latent Convergent Cross Mapping*. Vienna, Austria
April 2021	**Computer Methods and Programs in Biomedicine**, *Journal article*, Edward De Brouwer et al., *Longitudinal machine learning modeling of MS patient trajectories improves predictions of disability progression*.
Dec. 2020	**Conference on Neural Information Processing Systems (NeurIPS): Causality workshop**, *Spotlight*, Edward De Brouwer et al., *Latent Convergent Cross Mapping*. Vancouver, Canada
Nov. 2020	**Multiple Sclerosis and related disorders**, *Journal article*, Liesbet Peeters, ..., Edward De Brouwer et al., *Multiple Sclerosis Data Alliance–A global multi-stakeholder collaboration to scale-up real world data research*.
June 2020	**International Conference of Machine Learning (ICML): Artemis workshop**, *Poster*, Edward De Brouwer et al., *Inferring Causal Dependencies between Chaotic Dynamical Systems from Sporadic Time Series*. Vienna, Austria
June. 2020	**Multiple Sclerosis Journal**, *Article*, Liesbet Peeters, ..., Edward De Brouwer et al., *COVID-19 in people with multiple sclerosis: A global data sharing initiative*.
Dec. 2019	**Conference on Neural Information Processing Systems (NeurIPS)**, *Poster*, Edward De Brouwer et al., *GRU-ODE-Bayes: Continuous modeling of sporadically-observed time series*. Vancouver, Canada

Sep. 2019 **European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS) Conference**, *Talk and Poster*, Edward De Brouwer et al., *Introducing Machine Learning for full MS patient trajectories improves predictions for disability score progression*.
Stockholm, Sweden

Dec. 2018 **Conference on Neural Information Processing Systems (NeurIPS): ML4Health workshop**, *Poster*, Edward De Brouwer et al., *Deep ensemble tensor factorization for longitudinal patient trajectories classification*.
Montreal, Canada

Talks

Oct. 2021 **UC San Diego Health Department of Biomedical Informatics Seminar**, Machine Learning for Patients Trajectories.
San Diego, USA

Oct. 2021 **Fall Workshop on Computational Geometry**, Topological Graph Neural Networks.
Montana State University, USA

Sep. 2021 **University of Torino**, Neural Differential Equations: Handling irregularly sampled time series with a focus on healthcare..
Torino, Italy

Jul. 2021 **Microsoft Research Cambridge**, Counterfactual ODEs : predicting the impact of treatments over time with uncertainty aware neural differential equations.
Cambridge, United Kingdom

Nov. 2020 **Imperial College London**, *Invited speaker at the DataLearning seminar*, ODE-Based RNNs for sporadic time series..
London, United Kingdom

Nov. 2020 **BeneLearn**, *Contributed Talk*, GRU-ODE-Bayes: Continuous modeling of sporadically-observed time series.
Leiden, Netherlands

Nov. 2019 **Bienal Internacional Covalente**, *Keynote*, *Machine learning for patient trajectories*.
Cucuta, Colombia

Nov. 2019 **IEEE EMBS Benelux Chapter symposium**, *Contributed Talk*, *Dealing with sporadic observations for critical care patient trajectories*.
Leuven, Belgium

Dec. 2017 **BigData.be**, *Meetup*, *Deep convolutional networks for car damages automatic detection*.
Brussels, Belgium

Awards

2019-2023 **FWO-SB PhD grant**, Competitive research grant (17% success rate) for a fully funded 4 years PhD program.

Languages

French Mother Tongue
English Fluent
Spanish Fluent
Dutch Fluent
Italian Basic

Computer skills

Programming	Python, C++	Misc.	Matlab, Git
Statistics	R, SAS	Specific.	Pytorch, Tensorflow, Keras

Reviewer

Since 2021	**NeurIPS, ICLR, ICML, AISTATS**.
Since 2021	**International Conference on Machine Learning, Optimization, and Data Science**, *LOD*.
Since 2020	**Transactions on Neural Networks and Learning Systems**, *IEEE*.
Since 2020	**Artificial Intelligence Review**, *Springer-Nature*.
Since 2019	**Machine Learning for Healthcare (ML4H)**, *NeurIPS workshop*.
Since 2018	**Bioinformatics**, *Oxford Academic*.

Gap Year 2015-2016

2015-2016	I traveled for 13 months backpacking around South America. I spent most of my time volunteering in NGO's, toured with a circus as performer and discovered the continent and its culture. I also took the advantage of the opportunity to learn Spanish.

Interests

Arts and Technology	I spend most of my free time working on projects linking arts, technology and architecture. This includes digital poems generators, making a piano that serves cocktails based on the mood of what you played or the design of virtual reality experiences.
Music	I'm a huge fan of music. I play jazz guitar and love tweaking with synthetisers. Check out my latest project on electronic music for fridges : *Wagner & Faust* on Spotify.
Oldtimer	I am the happy owner of a 1977 VW T2 bay window that I use to tour around Europe. In the process of converting it into an electric powered vehicle.
Festivals	I helped organizing several festivals. Among them, a two weeks jazz festival: openjazz.be.
Scouts	I was a scout leader for 3 years, taking care of teenagers from 12 to 16 years old.