

Alexander Meulemans

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Education

2018 - 2019	ETH Zürich – Exchange program M.Sc. in Mathematical Engineering <i>Switzerland</i> <ul style="list-style-type: none">Average grade: 94.4%Advanced courses in machine learning, deep learning and neuro-informatics
2017 - 2019	University of Leuven – M.Sc. in Mathematical Engineering <i>Belgium</i> <ul style="list-style-type: none">Degree: Summa Cum Laude with congratulations of the Board of Examiners (average grade: 92%)Advanced engineering courses in data modelling, machine learning, numerical optimization, scientific computing and programming.
2014 - 2017	University of Leuven – B.Sc. in Engineering Sciences <i>Belgium</i> <ul style="list-style-type: none">Degree: Summa Cum LaudeCore engineering courses (Mathematics, Mechanics, Computer Science, etc.) build a solid analytical basis to solve (technical) problems of all kinds. Specialisation in Electrical and Mechanical Engineering
2015-2016	Luca School of Arts - Courses in Bachelor of Music <i>Belgium</i> <ul style="list-style-type: none">Average: 84.44% (27 ECTS)Main Instrument: violaPractical courses in viola, orchestra and music history

Academical Experience

2019 - present <i>Switzerland</i>	ETH Zürich Institute of Neuroinformatics - Ph.D. candidate <ul style="list-style-type: none">Research at the interface of artificial intelligence and neuroscience. Inspired by our brain, I am developing new algorithms for deep learning and artificial intelligence that mitigate hard problems in AI such as continual learning and long-term credit assignment in Reinforcement Learning.Teaching Assistant for the course 'Learning in Artificial and Biological Neural Networks' at ETH.Supervised by prof. Benjamin Grewe
2018 - 2019	ETH Zürich & KULeuven – Master thesis in Mathematical Engineering <i>Switzerland - Belgium</i> <ul style="list-style-type: none">'Towards a mathematical understanding of biologically plausible learning methods for deep neural networks'Developed a new mathematical foundation for target propagation and created various biologically plausible network models for the target propagation methodExtensive programming in Python (Tensorflow, Pytorch and custom code)Supervised by prof. Benjamin Grewe and prof. Johan Suykens (Grade: 95%)
2017 - 2018	University of Leuven – Teaching Assistant <i>Belgium</i> <ul style="list-style-type: none">Giving and organising exercise sessions for the course 'Applied Linear Algebra' to bachelor students of Engineering Sciences
2016 - 2018	University of Leuven – Research Honours Project <i>Belgium</i> <ul style="list-style-type: none">Extracurricular research program of 18 ECTS on developing a sensitivity analysis framework for a patient specific growth and remodelling model of an arteryProgramming in Matlab and AbaqusSupervised by prof. Jos Vander Sloten
August - September 2017	Reilly Lab Trinity College Dublin – Neural Engineering Research Intern <i>Ireland</i> <ul style="list-style-type: none">Research project on laying the foundation for machine learning and deep learning on neuroimaging data in DystoniaProgramming in Matlab and Python with machine learning toolboxes such as PRoNTto and Scikit-learnPaper in review in Neuroimage: ClinicalSupervised by prof. Richard Reilly
July - August 2016	University of Leuven – Software Engineering Intern <i>Belgium</i> <ul style="list-style-type: none">Made part of a software engineering team for developing a graphical and computational environment for modelling 3D dynamical structures for educational purposeObject oriented programming in Python with scientific and graphical libraries

Industrial Experience

July- August 2018	Bain & Company – Associate Consultant Intern <i>Belgium</i> <ul style="list-style-type: none">Worked as a full-time member in a Bain strategic consultancy case teamGained thorough experience in efficient communication, business strategy and project management
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Extra-Curricular Experience

2018-2019	Music for Parkinson – Organizer and Musician <ul style="list-style-type: none">Created the ‘Music for Parkinson’ initiative, a benefit concert in collaboration with the Demoucelle Parkinson Charity and organized and performed its first instance.Experience in budgeting, and musical performing on a professional level, networking in the charity world	<i>Belgium</i>
2017 - 2019	MUN Society Belgium – Member <ul style="list-style-type: none">Participate in the most competitive Model United Nations (MUN) competitions over the worldEngage in extensive trainings on public-speaking, negotiating, debating, leadership, critical analysis and technical writing from top-diplomats, industry experts and renowned professionals	<i>Belgium</i>
2016 - 2019	Altelier – Viola teacher <ul style="list-style-type: none">Preparing and giving viola lessons to children of various ages at Alteliers summer masterclasses	<i>Belgium</i>
2016 - 2017	VTK Student board – Coordinator Orientation First Bachelor Students <ul style="list-style-type: none">Supervision and organization of all the activities for first-year bachelor students at the Faculty of Engineering Sciences of the University of Leuven	<i>Belgium</i>
2012 – 2017	Sport Flanders – Waterski & Wakeboard instructor <ul style="list-style-type: none">Teaching children and young adults how to water ski or wakeboard during summer campsOrganising animation on summer camps	<i>Belgium, Italy</i>
August 2015, 2016	Ervin Schiffer – International Music Master Classes <ul style="list-style-type: none">Professional viola classes and chamber music classes from renowned music teachers in an international environment.	<i>Hungary</i>

Awards, Prizes & Recognition

2018	Harvard University – Distinguished large delegation Award <ul style="list-style-type: none">Awarded to the second best delegation (out of +50 delegations) in terms of public speaking, negotiating and leadership, on the Harvard Model United Nations conference	<i>Panama</i>
2018 – 2019	London International Model United Nations – Diplomacy Award (x2) <ul style="list-style-type: none">Awarded to the best public speaker, negotiator and diplomat of the committee (70 people) on the largest Model United Nations conference of Europe.	<i>Great Britain</i>
2015	University of Leuven – Best Student Award <ul style="list-style-type: none">Awarded to the 10 best students of the first bachelor of Engineering Sciences (600+ students)	<i>Belgium</i>
2015	University of Leuven – Best Engineering Project <ul style="list-style-type: none">As elected leader of a team of 6 multi-disciplined engineers, the jury of professors and industry experts awarded us the first prize for our electrical hand prosthesis (50 other participating groups)	<i>Belgium</i>
2014	City of Lier - City Medal of Arts <ul style="list-style-type: none">Awarded to the best music students in the city of Lier	<i>Belgium</i>
2014	St. Gummarus College Lier - Prize of natural sciences <ul style="list-style-type: none">Awarded to the most promising student in natural sciences of all graduating students (+300 people in last grade)	<i>Belgium</i>

Publications

Alexander Meulemans, Francesco S. Carzaniga, Johan A.K. Suykens, João Sacramento, Benjamin F. Grewe. A Theoretical Framework for Target Propagation - *NeurIPS 2020 (spotlight presentation)*

Johannes von Oswald*, Seijin Kobayashi*, João Sacramento*, **Alexander Meulemans**, Christian Henning, Benjamin F. Grewe. Neural Networks with Late-Phase Weights - *Accepted for ICLR 2021*

Benjamin Ehret*, Christian Henning*, Maria R. Cervera*, **Alexander Meulemans**, Johannes von Oswald, Benjamin F. Grewe. Continual Learning in Recurrent Neural Networks with Hypernetworks - *Accepted for ICLR 2021 (* equal contribution)*

Additional Information

Language Skills:	Dutch: Native	English: Fluent	French: Intermediate	German: Basic
IT Skills:	Python (Scikit-learn, Tensor flow, Pytorch, Numpy), Matlab & Simulink, C++, Fortran, Microsoft Office, LaTeX, ...			
Performance Skills:	Numerous music performances made me comfortable with big audiences. Professional trainings with MUN society Belgium fine tuned my public speaking and debating skills.			
Personal Interests:	Viola, guitar, piano, saxophone, chamber music, waterski & wakeboard, karate, hiking, literature, philosophy			