Valentin Thomas

PhD student in machine learning

✉ *vltn.thomas@gmail.com*
valthom
French citizenship

Interests Reinforcement learning, optimization for machine learning, representation learning, deep learning

Education

2017–2022 **PhD in Computer Science**, *Mila, Université de Montréal*, Montréal, Canada, Supervised by Y. Bengio.
Working mainly on reinforcement learning (planning, control as inference and optimization).

2015–2016 **MSc in Machine Learning & Computer vision**, *École Normale Supérieure*, Cachan, France, *(Mention très bien)*.
Known as *Master MVA*, leading master in France for machine learning & computer vision.
Courses: computer vision, discrete optimization, graphical models, kernel methods, random matrices, graph theory, text processing.

2013–2016 **MSc in Applied Mathematics**, *Mines ParisTech*, *Paris, France*, *(Mention très bien)*.
Top-ranking French engineering school. School's acceptance rate below 3%. *Majoring in applied mathematics & automatic control.*
- Specialization courses: control theory, optimization, stochastic processes, signal processing
- Fundamental courses: Mathematics (variation calculus, probability, statistics, complex analysis, PDEs), Physics (statistical, quantum, fluid, solid, thermodynamics, material sciences), Computer science

2010–2013 **Classes préparatoires**, *Lycée Clemenceau*, Nantes, France, Ranked $1^{st}/43$ the last year.
Preparation for the national exam for admission to the Grandes Écoles. Specializing in mathematics, physics & theoretical computer science.

Publications

Stars * indicate first authorship.

Pre-prints

- **Beyond Target Networks: Improving Deep Q-learning with Functional Regularization** (Alexandre Piché*, **Valentin Thomas***, Joseph Marino, Gian Maria Marconi, Christopher Pal, Mohammad Emtiyaz Khan), *https://arxiv.org/abs/2106.02613*.

Published papers

- **The Importance of Baselines in Policy Gradient Optimization** (with Jincheng Mei*, Wesley Chung, **Valentin Thomas**, Bo Dai, Csaba Szepesvari and Dale Schuurmans). To be added on arxiv, *In NeurIPS 2022*.
- **On the role of overparameterization in Temporal Difference learning with linear function approximation** (**Valentin Thomas***). To be added on arxiv, *In NeurIPS 2022*.
- **Beyond variance reduction: Understanding the true impact of baselines on policy optimization** (Wesley Chung*, **Valentin Thomas***, Marlos C. Machado, Nicolas Le Roux), *In ICML 2021*.
- **Information matrices and generalization** (**Valentin Thomas***, Fabian Pedregosa, Bart van Merriënboer, Pierre-Antoine Mangazol, Yoshua Bengio, Nicolas Le Roux), *Oral talk at the 2020 Workshop on theory of deep learning at the Institute for Advanced Studies, Princeton / published in AISTATS 2020*.
- **Probabilistic Planning with Sequential Monte Carlo methods** (**Valentin Thomas***, Alexandre Piché*, Cyril Ibrahim, Yoshua Bengio and Chris Pal), *Contributed talk at NeurIPS 2018 workshop Infer to Control/published in ICLR 2019*.
- **Planning with Latent Simulated Trajectories** (Alexandre Piché*, **Valentin Thomas**, Cyril Ibrahim, Yoshua Bengio, Julien Cornebise and Chris Pal), *In ICLR 2019 Workshop on Structure & Priors in Reinforcement Learning*.
- **Disentangling the independently controllable factors of variation by interacting with the world** (**Valentin Thomas***, Emmanuel Bengio*, William Fedus*, Jules Pondard, Philippe Beaudoin, Hugo Larochelle, Joelle Pineau, Doina Precup and Yoshua Bengio), *Oral at NeurIPS 2017 workshop on Learning Disentangled Representations: from Perception to Control*.
- **Independently Controllable Factors** (**Valentin Thomas***, Jules Pondard*, Emmanuel Bengio*, Marc Sarfati, Philippe Beaudoin, Marie-Jean Meurs, Joelle Pineau, Doina Precup and Yoshua Bengio), *Presented at the Montreal AI Symposium*.

- **Independently Controllable Features** (Emmanuel Bengio*, **Valentin Thomas**, Joelle Pineau, Doina Precup and Yoshua Bengio), *In RLDM 2017*.
- **Decoupling Backpropagation using Constrained Optimization Methods** (Akhilesh Gotmare*, **Valentin Thomas***, Johanni Brea and Martin Jaggi), *In ICML 2018 workshop on Efficent Credit Assignement*.

Projects

2014–2015 (10 months) **Spacecube project QB50**, *Mines ParisTech and École Polytechnique with the CNES (french NASA equivalent)*, Budget: €$180,000$.

Building a nano-satellite for a scientific mission in the thermosphere. Successfully deployed from ISS in January 2017.

- Responsible for the Attitude Determination & Control System: guidance, non linear estimation, sensor fusion
- Working in a team of 15 engineering students and 5 technical degree students
- Modeling the system with MATLAB, Implementing the algorithms in C++ (simulation code available on my github account)

Reviewing

Reviewer for JMLR, Neurips (Outsanding reviewer award 2021), ICLR and for several workshops at Neurips, CVPR, ICML, ICLR.

Experience

Summer 2022 (4 months) **Research Scientist Intern**, *Deepmind*, Paris, France.
Supervised by Rémi Munos. Internship subject to be determined.

2019-2020 (1 year) **Graduate student researcher (part-time)**, *Google Brain*, Montréal, Canada.
Continuation of the internship below. Supervised by Nicolas Le Roux. Working on reinforcement learning and optimization.

Summer 2019 (3.5 months) **Research Scientist Intern**, *Google Brain*, Montréal, Canada.
Supervised by Nicolas Le Roux. Working on reinforcement learning and optimization.

2017-2018 (1 year) **Part-time Research Intern**, *ElementAI*, Montréal, Canada.
Supervised by Philippe Beaudion. Working on reinforcement learning and unsupervised learning alongside with my PhD.

Summer 2017 (5 months) **Research Intern**, *University of Montréal, MILA*, Montréal, Canada.
Supervised by Yoshua Bengio.
Working on deep learning, reinforcement learning and unsupervised learning.

Fall/Winter 2016 (5 months) **Research Intern**, *École Polytechnique Fédérale de Lausanne, Machine Learning and Optimization lab*, Lausanne, Switzerland.
Supervised by Martin Jaggi. Working on distributed stochastic optimization methods for training deep neural networks.

Summer 2016 (4 months) **Research Intern**, *Inria, team* THOTH, Grenoble, France.
Supervised by: Karteek Alahari and Cordelia Schmid.
Master's thesis: *Discrete optimization for jointly estimating optical flow and segmentation labels.*

Summer 2015 (4 months) **R&D Intern**, *General Electric Global Research, Embedded Systems and Control lab*, Munich, Germany.
Supervised by Luca Parolini and Florent Di Meglio.
Parameter estimation (e.g mass flow of oil) in a large network of pipes equipped with pressure sensors.

2014–2015 (7 months) **Part-time research assistant**, *Mines ParisTech, Systems and Control Centre*, Paris, France.
Supervised by Pierre Rouchon.
Quantum mechanics and control theory for state estimation & feedback control of the entanglement of two qubits.

Computer skills

General

- Linux: using it since 2010 on a daily basis
- Git
- Windows

Programming

- Scientific Python (very proficient): pytorch, numpy, scipy, scikit-learn and tensorflow
- LaTeX (very proficient)
- MATLAB (proficient)

- C++ (intermediate)
- Java (intermediate)

Languages

- English: Fluent
- French: Native language
- German: Intermediate
- Japanese: Notions

Interests

- Piano (4 years): self-taught
- Judo (7 years): Champion of the department of Morbihan
- Reading (mostly science fiction)
- Cinema (Korean, Japanese or American)