

# Thomas Mesnard

Graduate Student in Applied Mathematics and  
Machine Learning from *École Normale Supérieure*

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## Education

- 2015 – 2016 **École Normale Supérieure**, Paris, France.  
MSc in Applied Mathematics, Machine Learning, Computer Vision (a.k.a Master MVA).  
Supervisor: Francis Bach. Completed summa cum laude.
- 2013 – 2016 **École Normale Supérieure**, Paris, France.  
MSc in Computer Science, Neuroscience and Chemistry.
- 2011 – 2013 **Lycée René Cassin**, "Classes préparatoires PC\*", Bayonne, France.  
Two-year program in Mathematics and Physics for competitive entrance to top French engineering schools. Completed summa cum laude.

## Work Experience

- 2017-2018 **Montreal Institute of Learning Algorithms**, *Research Intern*, Montreal, Canada.  
1 year Supervisors: **Yoshua Bengio**, **Blake Richards**.
  - Exploring new learning paradigms for GAN
  - Investigating predictive coding and learning in binarized neural networks⇒ See publication below
- 2016 **EPFL**, *Research Intern*, Switzerland. Supervisors: **Wulfram Gerstner**, **Johanni Brea**.  
4 months
  - Exploring deep learning techniques with spiking neurons in energy based models
  - Investigating backpropagation with random feedback weights in deep neural networks⇒ See publication below
- 2015 **Montreal Institute of Learning Algorithms**, *Research Intern*, Montreal, Canada.  
5 months Supervisor: **Yoshua Bengio**.
  - Focusing on new biologically plausible deep learning algorithms
  - Exploring new versions of RNNs/Clockwork RNNs using LSTM and GRU⇒ See publications below
- 2014 **Institut Curie**, *Research Intern*, Paris, France. Supervisor: **Filippo Del Bene**.  
2 months
  - ZebraFish visual system mapping using data-analysis and machine learning

## Publications

- [1] Benjamin Scellier, Anirudh Goyal, Jonathan Binas, **Thomas Mesnard**, and Yoshua Bengio. “[Extending the Framework of Equilibrium Propagation to General Dynamics](#)”. In: *International Conference on Learning Representations* (2018). Workshop.
- [2] Yoshua Bengio, **Thomas Mesnard**, Asja Fischer, Saizheng Zhang, and Yuhuai Wu. “[STDP-Compatible Approximation of Backpropagation in an Energy-Based Model](#)”. In: *Neural computation* 29 (2017), pp. 555–577.
- [3] **Thomas Mesnard**, Wulfram Gerstner, and Johanni Brea. “[Towards deep learning with spiking neurons in energy based models with contrastive Hebbian plasticity](#)”. In: *Proceedings of the 29th Neural Information Processing Systems*. Computing with Spikes Workshop. With Oral Presentation and [Poster](#). 2016.
- [4] Yoshua Bengio, Asja Fischer, **Thomas Mesnard**, Saizheng Zhang, and Yuhuai Wu. “[From STDP towards Biologically Plausible Deep Learning](#)”. In: *Proceedings of the 32th international conference on Machine learning*. Deep Learning Workshop. 2015.
- [5] Yoshua Bengio, Dong-Hyun Lee, Jorg Bornschein, **Thomas Mesnard**, and Zhouhan Lin. “[Towards biologically plausible deep learning](#)”. In: *arXiv preprint:1502.04156v3* (2015).

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## Computer Skills and Languages

**IT Skills**

- General: Python, Julia, Matlab, Octave, Git, Unix, L<sup>A</sup>T<sub>E</sub>X
- Deep Learning: Tensorflow, Theano, Torch
- Machine Learning: Numpy, Scikit-learn

**Languages**

- French: Native
- English: Fluent
- Spanish: Intermediate

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## Implementations

**Teaching Machines to Read and Comprehend**, by Karl Moritz Hermann and al. from Google DeepMind. [Code](#). [Report](#).

With Alex Auvolat and Étienne Simon

**CTC: Labelling Unsegmented Sequence Data with RNN**, by Alex Graves and al. from Google DeepMind. [Code](#). [Report](#). [Poster](#).

With Alex Auvolat

**Predictive models for transaction volumes in financial markets**, in response to a competition proposed by Capital Fund Management. [Code](#). [Report](#).

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## Teaching and Academic Awards

2015 **École Normale Supérieure**, Paris, France.

Talk about Deep Learning

2014 **Louis Le Grand and Stanislas High Schools**, Paris, France.

Delivered lectures during the National Olympiad

2014 **Saint Louis High School**, Paris, France.

Examiner in "Classes Préparatoires" for nationwide competitive entrance to top French engineering schools

2013 – 2014 **École Normale Supérieure**, Paris, France.

Delivered lectures during the International Olympiad

2012 Selected for the French final of the International Olympiad, 3<sup>rd</sup> out of 310

2011 Selected for the final of the National Olympiad, 21<sup>st</sup> out of 2,000

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## Interests and Activities

**Music** ○ Cello, 12 years

**Arts** ○ Performed concerts alone or in an orchestra

○ Photography, 8 years

**Sports** ○ Athletics

○ Surf

○ Trekking

**Travel** ○ Many road trips around Asia, America, Africa, Europe