# Thomas George

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Citizenship: France

## Research interests

My research is focused on understanding the generalization properties of deep neural networks and develop efficient training techniques. I am interested in trying to build bridges between deep learning training mechanisms and more established machine learning techniques such as linear models and ensemble methods.

## Education

2017 – Present **Mila - Université de Montréal** – Montréal, Canada
PhD in Computer Science
Mentors: Professors Pascal Vincent and Guillaume Lajoie

2015 – 2017 **Université de Montréal** – Montréal, Canada
Master in Computer Science
Mentor: Professor Pascal Vincent

2010 – 2013 **École des Mines** – Paris, France
Master of Science and Executive Engineering

2009 – 2010 **University of Bristol** – Bristol, United-Kingdom
Bachelor in mathematics, 1 year exchange student

2007 – 2010 **Sorbonne Université (Pierre et Marie Curie)** – Paris, France
Bachelor in mathematics, with minors in computer science, physics and mechanics

## Industry experience

2013 – 2015 **Eco-Adapt (hardware/software engineer)** – Paris, France
I led the design of hardware and implemented software for a wireless communicating electrical meter aimed at detecting faults.

Summer 2013 **FieldBox.ai (Research engineer internship)** – Paris, France
I designed a scripting framework for automated analysis of time series.

## Selected publications

*for a full list including pre-prints and workshop papers, please go to my scholar page.*

2021 **Implicit Regularization via Neural Feature Alignment**
Aristide Baratin*, Thomas George*, César Laurent, R Devon Hjelm, Guillaume Lajoie, Pascal Vincent, and Simon Lacoste-Julien
*AISTATS 2021*

2018 **Fast Approximate Natural Gradient Descent in a Kronecker-factored Eigenbasis**
Thomas George*, César Laurent*, Xavier Bouthillier, Nicolas Ballas, Pascal Vincent
*NeurIPS 2018*

2017 **Factorized second order methods in neural networks**
Thomas George
*MSc thesis*

## Software

2020 **NNGeometry: Easy and Fast Fisher Information Matrices and Neural Tangent Kernels in PyTorch**
https://github.com/tfjgeorge/nngeometry/
Thomas George.

## Teaching experience

October 2019 **Invited lecturer, IFT3395: Fundamentals of machine learning (Université de Montréal)**
Material design and lecture for a 2hrs course on the backpropagation algorithm.

March 2019 **Invited lecturer, IFT6760A: Matrix and tensor factorization techniques for machine learning (Université de Montréal)**
Material design and lecture for a 2hrs course on efficient factorized natural gradient in deep networks.

Fall 2016, 2018, 2019, 2020 — **Teaching assistant, IFT6390: Fundamentals of machine learning (Université de Montréal)**
Lab content design and labs teaching. Kaggle competition leading. Homework and exams grading.

Spring 2010 — **Teaching assistant: Mathematics and physics refresher course for 1st year students (Sorbonne Université)**
Tutorial teaching during a 3-weeks intensive class aimed at prospective 1st year students.

## Talks and tutorials

June 2021 — Implicit Regularization via Neural Feature Alignment
*Conférence sur l'apprentissage automatique 2021, Saint-Étienne, France (remote)*

February 2021 — Optimization and generalization through the lens of the linearization of neural networks training dynamics
*Weekly seminar of Roger Grosse's group at Vector Institute, Toronto, Canada (remote)*

## Technical skills

**Programming languages**
Proficient in: Python, PyTorch
Familiar with: Javascript

**Software**
LaTeX, Git

**Languages**
French (fluent), English (professional working proficiency)

## Other interests

Olympic handball, bouldering (climbing), Savate boxe française