Ioannis Mitliagkas, assistant professor **Curriculum Vitae, May 2021**

CONTACT INFORMATION

Department of Computer Science and Operations Research
University of Montréal

Mila, Quebec AI Institute
6666 St. Urbain, Montréal

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RESEARCH INTERESTS

Statistical machine learning, optimization, high-dimensional statistics, MCMC methods, large-scale and distributed learning systems.

ACADEMIC APPOINTMENTS

University of Montréal September 2017 -

Assistant Professor, Department of Computer Science and Operations Research
Core member, Mila
Canada CIFAR AI chair

Stanford University 2015-2017

Postdoctoral Research Fellow, Departments of Statistics and Computer Science
Supervised by: Associate Prof. Christopher Ré, Adjunct Prof. Lester Mackey

INDUSTRY AFFILIATIONS

ElementAI, Montréal 2018-2020

Faculty Fellow

EDUCATION

The University of Texas at Austin

PhD, ECE department. Awarded in August 2015
Advised by: Prof. Constantine Caramanis and Prof. Sriram Vishwanath
Thesis topic: Resource-Constrained, Scalable Learning

Technical University of Crete, Chania, Greece

MSc., ECE department. 2008 - 2010

Diploma, Electronic and Computer Engineering (5 year degree), 2002 - 2008
Advisor: Professor Nikos D. Sidiropoulos

Research grants

During my first four years of tenure-track work, I was awarded a total of about 67 PhD-years in competitive funding (about 1.8 million CAD after subtracting any overhead), to be disbursed over a period of 6 years.

- Microsoft Research collaborative grant, awarded January 2021
- Samsung-Mila collaborative three-year grant, awarded September 2020.
- IVADO Postdoctoral Scholarship, for my postdoc K. Ahuja, awarded August 2020
- CIFAR Catalyst Grant, in collaboration with Murat Erdogdu (UofT, Vector).
- IVADO Postdoctoral Scholarship, Fellow tier, for my postdoc N. Loizou, awarded December 2019
- Microsoft Research collaborative grant, awarded June 2019
- NSERC Discovery, awarded April 2019 (+ competitive accelerator supplement)
- CIFAR Canada AI chair, awarded December 2018
- Fonds de Recherche du Québec, Nature et technologies, Nouveau Chercheur, 2018
- IVADO professorship grant, 2017

Current students and postdocs

Brady Neal (PhD student)
Reyhane Askari (PhD student)
Adam Ibrahim (PhD student)
Alexia Jolicoeur-Martineau (PhD student)
Rémi Piché-Taillefer (MSc student)
Nicolas Loizou (postdoctoral scholar)
Manuela Girotti (postdoctoral scholar)
Charles Guille-Escuret (PhD student)
Ryan D'Orazio (PhD student)
Hiroki Naganuma (PhD student)
Kartik Ahuja (postdoctoral scholar)
Mehrnaz Mofakhami (MSc student; starting September 2021)
Divyat Mahajan (MSc student; starting September 2021)

Past Students, Interns and Mentees

Amartya Mitra (intern, summer 2020; PhD candidate at UC Riverside)
Baptiste Goujeaud (intern, winter and summer 2020; PhD candidate Ecole Polytechnique)
Brady Neal (graduated MSc, December 2019; continuing his PhD at Mila)
Séb Arnold (intern, summer 2018; PhD candidate at USC)
Nicolas Gagné (intern, summer 2018; PhD candidate at McGill)
Vinayak Tantia (intern, 2018, now at FAIR Montréal)
Jian Zhang (mentee; PhD candidate at Stanford)
Panos Achlioptas (mentee; PhD candidate at Stanford)

Teaching

University of Montreal — Latest teaching evaluation: 3.7/4.0

Theoretical principles for deep learning	**Winter 2021**
Fundamentals of machine learning	**Fall 2020**
Theoretical principles for deep learning	**Winter 2020**
Fundamentals of machine learning	**Fall 2019**
Theoretical principles for deep learning	**Winter 2019**
Fundamentals of machine learning	**Fall 2018**
Theoretical principles for deep learning	**Winter 2018**

The University of Texas at Austin

Teaching Assistant—Information Theory	**Spring 2012**

Technical University of Crete

Teaching Assistant—Telecommunication Networks	**Fall 2008**

Publications

A. Jolicoeur-Martineau, R. Piche-Taillefer, **I. Mitliagkas**, R. Tachet des Combes.
Adversarial score matching and improved sampling for image generation
International Conference on Learning Representations (ICLR), 2021.

C. Guille-Escuret*, B. Goujaud*, M. Girotti, **I. Mitliagkas**.
A Study of Condition Numbers for First-Order Optimization
Artificial Intelligence and Statistics (AISTATS) 2021. [**best student paper award OPT2020**]

G. K. Dziugaite, A. Drouin, B. Neal, N. Rajkumar, E. Caballero, L. Wang, **I. Mitliagkas**, D. Roy.
In search of robust measures of generalization
Neural Information Processing Systems (NeurIPS), 2020.

N. Loizou, H. Berard, A. Jolicoeur-Martineau, P. Vincent, S. Lacoste-Julien, **I. Mitliagkas**.
Stochastic Hamiltonian Gradient Methods for Smooth Games
International Conference on Machine Learning (ICML), 2020.

A. Ibrahim, W. Azizian, G. Gidel, **I. Mitliagkas**.
Linear Lower Bounds and Conditioning of Differentiable Games
International Conference on Machine Learning (ICML), 2020.

W. Azizian, D. Scieur, **I. Mitliagkas**, S. Lacoste-Julien, G. Gidel.
Accelerating Smooth Games by Manipulating Spectral Shapes
Artificial intelligence and Statistics (AISTATS), 2020

W. Azizian, **I. Mitliagkas**, S. Lacoste-Julien, G. Gidel.
A Tight and Unified Analysis of Gradient-Based Methods for a Whole Spectrum of Differentiable Games
Artificial Intelligence and Statistics (AISTATS), 2020

S. M. Arnold, P. A. Manzagol, R. Babanezhad, **I. Mitliagkas**, N. L. Roux.
Reducing the variance in online optimization by transporting past gradients.
Neural Information Processing Systems (NeurIPS), 2019 [**spotlight presentation**].

I. Albuquerque, J. Monteiro, T. Doan, B. Considine, T. Falk, **I. Mitliagkas**.
Multi-objective training of Generative Adversarial Networks.
International Conference on Machine Learning (ICML), 2019.

V. Verma, A. Lamb, C. Beckham, A. Najafi, **I. Mitliagkas**, A. Courville, D. Lopez-Paz, Y. Bengio.
Manifold Mixup: Better Representations by Interpolating Hidden States .
International Conference on Machine Learning (ICML), 2019.

A. Lamb, J. Binas, A. Goyal, S. Subramanian, **I. Mitliagkas**, Y. Bengio, M. Mozer.
State-Reification Networks: Improving Generalization by Modeling the Distribution of Hidden Representations.
International Conference on Machine Learning (ICML), 2019 [**oral presentation**].

G. Gidel, R. Askari, M. Pezeshki, G. Huang, S. Lacoste-Julien, **I. Mitliagkas**.
Negative Momentum for Improved Game Dynamics.
Artificial Intelligence and Statistics (AISTATS), 2019.

J. Zhang, **I. Mitliagkas**.
YellowFin and the Art of Momentum Tuning.
Systems and ML (SysML), 2019.

P. Achlioptas, O. Diamanti, **I. Mitliagkas**, L. Guibas.
Learning Representations and Generative Models for 3D Point Clouds.
International Conference on Machine Learning (ICML), 2018.

J. Zhang, **I. Mitliagkas**.
YellowFin: Adaptive optimization for (A)synchronous systems.
Systems and ML (SysML), 2018 [**oral presentation**].

C. De Sa, B. He, **I. Mitliagkas**, C. Ré, P. Xu.
Accelerated stochastic power iteration.
Artificial Intelligence and Statistics (AISTATS), 2018.

T. Kurth, J. Zhang, N. Satish, **I. Mitliagkas**, E. Racah, M.A. Patwary, T. Malas, N. Sundaram, W. Bhimji, M. Smorkalov, J. Deslippe, M. Shiryaev, S. Sridharan, P. Dubey.
Deep Learning at 15PF: Supervised and Semi-Supervised Classification for Scientific Data.
Supercomputing (SC), 2017.

I. Mitliagkas, L. Mackey.
Improving Gibbs Sampler Scan Quality with DoGS.
International Conference on Machine Learning (ICML), 2017.

I. Mitliagkas, C. Zhang, S. Hadjis, C. Ré.
Asynchrony begets Momentum, with an Application to Deep Learning.
Allerton Conference on Communication, Control, and Computing, 2016.

B. He, C. De Sa, **I. Mitliagkas**, C. Ré.
Scan Order in Gibbs Sampling: Models in Which it Matters and Bounds on How Much.
Neural Information Processing Systems (NIPS), 2016.

I. Mitliagkas, M. Borokhovich, A. Dimakis, C. Caramanis.
FrogWild! – Fast PageRank Approximations on Graph Engines.
VLDB, 2015.

D. Papailiopoulos, **I. Mitliagkas**, A. Dimakis, C. Caramanis.
Finding dense subgraphs through low-rank approximations.
International Conference on Machine Learning (ICML), 2014.

I. Mitliagkas, C. Caramanis, P. Jain.
Memory-limited Streaming PCA.
Neural Information Processing Systems (NIPS), 2013.

I. Mitliagkas, A. Gopalan, C. Caramanis, S. Vishwanath.
User Rankings from Comparisons: Learning Permutations in High Dimensions.
Allerton Conference on Communication, Control, and Computing, 2011.

I. Mitliagkas, N. D. Sidiropoulos, and A. Swami.
Joint Power and Admission Control for Ad-hoc and Cognitive Underlay Networks: Convex Approximation and Distributed Implementation.
IEEE Transactions on Wireless Communications, 2011.

I. Mitliagkas, S. Vishwanath.
Strong Information-Theoretic Limits for Source/Model Recovery.
Allerton Conference on Communication, Control, and Computing, 2010.

I. Mitliagkas, N. D. Sidiropoulos, and A. Swami.
Distributed Joint Power and Admission Control for Ad-hoc and Cognitive Underlay Networks.
ICASSP 2010.

I. Mitliagkas, N. D. Sidiropoulos, and A. Swami.
Convex Approximation-based Joint Power and Admission Control for Cognitive Underlay Networks.
International Wireless Comm. and Mobile Computing Conference, 2008. IWCMC'08. IEEE.

Preprints, workshop papers

R. Askari Hemmat*, A. Mitra*, G. Lajoie, **I. Mitliagkas**.
LEAD: Least-Action Dynamics for Min-Max Optimization
under review, 2021.

I. Albuquerque, J. Monteiro, T. Falk, **I. Mitliagkas**.
Generalizing to unseen domains via distribution matching
preprint, 2020.

A. Jolicoeur-Martineau, **I. Mitliagkas**.
Gradient penalty from a maximum margin perspective
preprint, 2020

B. Neal, **I. Mitliagkas**.
In Support of Over-Parametrization in Deep Reinforcement Learning: an Empirical Study
ICML 2019 Workshop on Identifying and Understanding Deep Learning Phenomena

B. Neal, S. Mittal, A. Baratin, V. Tantia, M. Scicluna, S. Lacoste-Julien, **I. Mitliagkas**.
A Modern Take on the Bias-Variance Tradeoff in Neural Networks
ICML 2019 Workshop on Identifying and Understanding Deep Learning Phenomena

J. Zhang, C. De Sa, **I. Mitliagkas**, C. Ré.
Parallel SGD: When does averaging help?
Optimization Methods for the Next Generation of Machine Learning Workshop, ICML 2016.

S. Hadjis, C. Zhang, **I. Mitliagkas**, C. Ré.
Omnivore: An Optimizer for Multi-device Deep Learning on CPUs and GPUs. Technical report, arXiv:1606.04487.

In the Press

Trudeau meets with newly appointed Canada CIFAR AI Chairs, **CIFAR News**

NERSC Scales Scientific Deep Learning to 15 Petaflops, **HPC Wire**

De la Grèce à l'UdeM: l'étonnant parcours d'Ioannis Mitliagkas, **UdeM Nouvelles**

Awards, Distinctions

NeurIPS Foundation, top 10% of reviewers, 2020

CIFAR Canada AI chair

NIPS Foundation, listed among best reviewers, 2018

Gerondelis Foundation Inc.: Graduate Scholarship, 2014

The University of Texas at Austin: Microelectronics and Computer Development (MCD) Fellowship, 2009-2011

Technical University of Crete: Undergraduate excellence award, 2008

State Scholarships Foundation (Greece): Undergraduate excellence award, 2005

Technical Chamber of Greece: Undergraduate excellence award, 2005

Professional Service

Co-organizer of INFORMS 2021 workshop:
"Accelerated methods in convex and non-convex optimzation"

Co-founder and organizer of MTL MLOpt, a Montreal-based group of researchers from many universities and industrial labs.

Member of the inaugural program committee of MLSys:
The committee's role was to decide the conference's focus and steer its future goals.

Organizer of NeurIPS 2018, 2019 workshop:
"Smooth Games Optimization and Machine Learning"

Reviewer of MITACS Accelerate grants

Served as head of the scientific committee in charge of evaluating IVADO grants

(2018) and as member in subsequent years.

Reviewer and AC for a number of journals and conferences including NeurIPS, ICML, COLT, AISTATS, AAAI, ICLR, JMLR (editorial board), IJCAI, SIGGRAPH, Transactions on Information Theory, ISIT, ICASSP, Transactions on Wireless Communications.

Recent Invited Talks (not including accepted paper presentations)

Simons semester in game theory, Berkeley, CA	January-March, 2022
SIAM conference in optimization OP21, Spokane, WA	July 2021
Neuromatch Academy Deep Learning Track, World-wide	Summer 2021
AI4Good Summer School, Canada	May 2021
Google Brain, Montreal, QC	November 2020
ITA, San Diego, CA	February 2020
INFORMS, Seattle, WA	October 2019
Microsoft Research workshop, Montréal, QC	October 2019
Theoretical Advances in Deep Learning, Workshop, Istanbul	July 2019
UT Austin, TX	March 2019
NVIDIA, Webinar	March 2019
ElementAI, Toronto, ON	November 2018
BorealisAI, Toronto, ON	October 2018
USC, Los Angeles, CA	October 2018
Microsoft Research workshop, Montréal, QC	October 2018
ElementAI, Toronto, ON	September 2018
Microsoft Research, Montréal, QC	August 2018
ElementAI, Montréal, QC	June 2018
FAIR, Montréal, QC	May 2018
RLLab, McGill, Montréal, QC	April 2018
ElementAI, Montréal, QC	April 2018
TechAide, Montréal, QC	April 2018
ECE Seminar, UT Austin, TX	March 2018
BayesComp, Barcelona Spain	March 2018
SysML, Stanford CA	February 2018
Google Brain, Montréal	November 2017
Texas Wireless Summit, Austin, TX	October 2017
Colloquium, University of Montréal	September 2017
Colloquium, The University of Texas, Austin	September 2017
AutoML workshop, ICML, Sydney	August 2017
Workshop on Advances in Computing Architectures, Stanford SystemX	April 2016
ITA workshop, San Diego, CA	February 2017
AAAI 2017 Workshop on Distributed Machine Learning	February 2017
Microsoft Research, Cambridge, UK	December 2016
SystemX Stanford Alliance Fall Conference	November 2016
Microsoft Research, New England	October 2016
Allerton Conference, Monticello, IL	September 2016
Google Brain, Mountain View, CA	August 2016
MIT Lincoln Labs, MA	August 2016
NVIDIA, Santa Clara, CA	July 2016