Samy Jelassi

CONTACT INFORMATION

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RESEARCH INTERESTS

Deep learning theory, non-convex optimization

EDUCATION

Princeton University, Princeton, New Jersey, USA

Ph.D. Candidate, Operations Research and Financial Engineering (ORFE), September 2017 (expected graduation date: May 2023)

- Advisors: Profs. Yuanzhi Li, Joan Bruna and Boris Hanin

- M.A., Operations Research, May 2019

ENS de Cachan, France.

- M.S., Applied Mathematics, May 2017
  - Advisor: Prof. Francis Bach

ENS de Lyon, France

B.S., Computer Science, May 2015

Lycée Louis-le-Grand, France.

Classes Préparatoires aux Grandes Écoles, September 2011 - June 2014
University-level preparation for the competitive entrance to French Engineering Schools.

PROFESSIONAL EXPERIENCE

Google Research, New York City. **May 2022 - September 2022**
Research intern
Design of optimization algorithms that are robust to hyper-parameter tuning in language models.
Hosts: Srinadh Bhojanapalli, Sashank J. Reddi and Sanjiv Kumar.

Deepmind, London, UK **May 2021 - August 2021**
Research intern
Learning representations for reinforcement learning.
Hosts: Bernardo Avila Pires and Remi Munos.

Facebook AI Research, New York City. **May 2020 - August 2020**
Research intern
Adapting Dual Averaging to deep learning optimization.
Host: Aaron Defazio.

Institute for Advanced Study, Princeton. **January 2020 - April 2020**
Visiting student
Special Year on Optimization, Statistics, and Theoretical Machine Learning.

Princeton University **September 2018 - May 2022**
Teaching assistant
Duties including office hours, designing and leading weekly exercises and grading.

- ORF 350, Analysis of Big Data, Spring 2019, 2021, 2022.

– ORF 409, Introduction to Monte Carlo Simulation, Fall 2020.
– ECE 435/535, Machine Learning and Pattern Recognition, Fall 2018, 2019, 2021.

MSRI summer school, Seattle, Washington USA **Summer 2019**
Teaching assistant
Co-designed and co-taught an advanced research course on deep learning theory with Joan Bruna.

INRIA de Paris, Paris, France **Summer 2019**
Visiting student Hosted by Prof. Francis Bach.

Publications

Jelassi, S., Sander, M., and Li, Y. Vision Transformers learn patch association. NeurIPS 2022.

Jelassi, S., Mensch, A., Gidel, G., and Li, Y. Adam is no better than normalized SGD: Dissecting how adaptive methods improve GANs performance. Submitted.

Jelassi, S., and Li, Y. Towards understanding how momentum improves generalization in deep learning. **Oral presentation** at OPPO workshop ICML 2021. Main conference at ICML 2022.

Defazio, A, and Jelassi, S. Adaptivity without compromise: a momentumized, adaptive, dual averaged gradient method for stochastic optimization. JMLR.

Rahme, J., Jelassi, S., and Weinberg, S. M. Auction learning as a two-player game. ICLR 2021.

Rahme, J., Jelassi, S., Bruna, J., and Weinberg, S. M. A Permutation-Equivariant Neural Network Architecture For Auction Design. AAAI 2021.

Domingo-Enrich, C., Jelassi, S., Mensch, A., Rotskoff, G., and Bruna, J. A mean-field analysis of two-player zero-sum games. NeurIPS 2020.

Sebbouh, O., Gazagnadou, N., Jelassi, S., Bach, F., and Gower, R. M. Towards closing the gap between the theory and practice of SVRG. NeurIPS 2019.

Jelassi*, S., Domingo Enrich*, C., Scieur, D., Mensch, A., and Bruna, J. Extra-gradient with player sampling for provable fast convergence in n-player games. ICML 2020. **Equal contribution*

Rotskoff, G., Jelassi, S., Bruna, J., and Vanden-Eijnden, E. 2019. Global convergence of neuron birth-death dynamics. ICML 2019.

Pumir*, T., Jelassi*, S., and Boumal, N. Smoothed analysis of the low-rank approach for smooth semidefinite programs. NeurIPS 2018.
Equal contribution*, **Oral presentation (top 2.8%, one of 30 among 1100 accepted papers).

Honors and Awards

NeurIPS travel award, 2018

Princeton SEAS travel grant, 2018

Talks

Towards understanding how momentum improves generalization in deep learning. ICML. July 2021 and July 2022.

Smoothed analysis of some machine learning problems. Seminar at Google Brain Montreal, Canada. October 2019.

Global Convergence of the neuron birth-death dynamics. Math and Deep Learning seminar at New

York University, USA, February 2019.

Smoothed analysis of the low-rank approach for smooth semidefinite programs. Plenary oral presentation at the NeurIPS conference, Montreal, Canada, December 2018.

Handling non-convexity in low rank approaches for semidefinite programming. MIC seminar at New York University, USA, November 2018.

SERVICE

Reviewer for NeurIPS 2019, 2020, 2021, 2022, MSML 2020, ICML 2020, JMLR.