STÉPHANE D'ASCOLI

Ph.D. student in deep learning

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EXPERIENCE

Ph.D. student & Teacher Assistant
École Normale Supérieure (ENS) & Facebook AI Research (FAIR)

Sep 2018 – Present Paris

- Main research topics: theory of overparametrization and applications of transformers for vision and symbolic mathematics.
- Published 13 papers in top-tier conferences and scientific journals, including 10 as first author (full record on Google Scholar).
- Open-sourced several deep learning codebases and demos.
- Gave many talks, including an interview with Yannic Kilcher.
- Teacher assistant of Marc Lelarge, Giulio Biroli and Francis Bach for graduate courses at ENS.

AI research intern
Snips.ai

Feb 2020 – Aug 2020 Paris

Developed an open-source deep learning codebase to generate text for data-privacy focused vocal assistants.

Visiting scholar
NASA Goddard & Rochester Institute of Technology

Feb 2017 – Aug 2017 Rochester, NY

Built a large-scale computational simulation of the light coming from a binary black hole and produced an explanatory video.

"Classe préparatoire" examiner
Lycées Henri-4, Saint-Louis, Michelet

Sep 2016 – Sep 2019 Paris

Oral examinations for undergraduate students in top institutions.

OUTSIDE WORK

Science outreach

- Wrote several science books, all published by First Editions. Some were adapted to audio book and translated abroad.
- Spoke on radio and TV (France Culture with Etienne Klein, France Bleu with Sidonie Bonnec, France Info, ...).

Music

- Obtained a final Conservatoire diploma in clarinet, and earned first and second prizes in international competitions.
- Performed in solo, chamber music and orchestra concerts. See my YouTube channel for some videos.
- Managed an orchestra for a year.

EDUCATION

M.Sc. in Theoretical Physics
École Normale Supérieure, Paris

Sep 2016 – Sep 2018

First class honours.

B.Sc. in Physics
École Normale Supérieure, Paris

Sep 2015 – Sep 2016

First class honours.

"Classe préparatiore"
Lycée Thiers, Marseille

Sep 2013 – Sep 2015

Entered ENS Paris (ranked 6th nation-wide).
Prior to this, obtained a scientific bac-calaureate (average grade: 19.63/20).

SKILLS

Programming: Python | Pytorch | C/C++

Tools: Git | Unix | Slurm | Mathematica

Other: Driving license

LANGUAGES

English (native) ●●●●●

French (native) ●●●●●

German ●●●○○

Spanish ●●●○○

PUBLICATIONS

Conference Proceedings

- **d'Ascoli, Stéphane**, Gabrié, M., Sagun, L., & Biroli, G. (2021). On the interplay between loss function and data structure in classification problems. In ***NeurIPS***.
- **d'Ascoli, Stéphane**, Touvron, H., Leavitt, M., Morcos, A., Biroli, G., & Sagun, L. (2021). Convit: Improving vision transformers with soft convolutional inductive biases. In ***ICML***.
- **d'Ascoli, Stéphane**, Coucke, A., Caltagirone, F., Caulier, A., & Lelarge, M. (2020). Conditioned text generation with transfer for closed-domain dialogue systems. In ***SLSP***.
- **d'Ascoli, Stéphane**, Refinetti, M., Biroli, G., & Krzakala, F. (2020). Double trouble in double descent: Bias and variance (s) in the lazy regime. In ***ICML***.
- **d'Ascoli, Stéphane**, Refinetti, M., Ohana, R., & Goldt, S. (2020). The dynamics of learning with feedback alignment. In ***ICML***.
- **d'Ascoli, Stéphane**, Sagun, L., & Biroli, G. (2020). Triple descent and the two kinds of overfitting: Where and why do they appear? In ***NeurIPS***.
- **d'Ascoli, Stéphane**, Sagun, L., Biroli, G., & Bruna, J. (2019). Finding the needle in the haystack with convolutions: On the benefits of architectural bias. In ***NeurIPS***.

Journal Articles

- **d'Ascoli, Stéphane**, Refinetti, M., Ohana, R., & Goldt, S. (2022). The dynamics of learning with feedback alignment. ***J. Phys. A (special issue)***.
- **d'Ascoli, Stéphane**, Sagun, L., & Biroli, G. (2022). Triple descent and the two kinds of overfitting: Where and why do they appear? ***J. Stat. Mech (special issue)***.
- Geiger, M., Jacot, A., Spigler, S., Gabriel, F., Sagun, L., **d'Ascoli, Stéphane**, … Wyart, M. (2020). Scaling description of generalization with number of parameters in deep learning. ***J. Stat. Mech***.
- Geiger, M., Spigler, S., **d'Ascoli, Stéphane**, Sagun, L., Baity-Jesi, M., Biroli, G., & Wyart, M. (2019). Jamming transition as a paradigm to understand the loss landscape of deep neural networks. ***Phys. Rev. E***.
- Spigler, S., Geiger, M., **d'Ascoli, Stéphane**, Sagun, L., Biroli, G., & Wyart, M. (2019). A jamming transition from under-to over-parametrization affects generalization in deep learning. ***J. Phys. A***.
- **d'Ascoli, Stéphane**, Noble, S. C., Bowen, D. B., Campanelli, M., Krolik, J. H., & Mewes, V. (2018). Electromagnetic emission from supermassive binary black holes approaching merger. ***The Astrophysical Journal***.

Preprints

- **d'Ascoli, Stéphane**, Kamienny, P.-A., Lample, G., & Charton, F. (2022a). Deep symbolic regression for recurrent sequences.
- **d'Ascoli, Stéphane**, Kamienny, P.-A., Lample, G., & Charton, F. (2022b). End-to-end symbolic regression with transformers.
- **d'Ascoli, Stéphane**, Refinetti, M., & Biroli, G. (2022). On the optimal learning rate schedule in non-convex optimization landscapes.
- **d'Ascoli, Stéphane**, Sagun, L., Biroli, G., & Morcos, A. (2021). Transformed cnns: Recasting pre-trained convolutional layers with self-attention.

Books

- **d'Ascoli, Stéphane**, & Bouscal, A. (2022). *Voyage au coeur de l'atome*. **First**.
- **d'Ascoli, Stéphane**, & Jaspers, J.-M. (2022). *Petit livret tricolore sur l'intelligence artificielle*. **First**.
- **d'Ascoli, Stéphane**, & Touati, A. (2021). *Voyage au coeur de l'espace-temps*. **First**.
- **d'Ascoli, Stéphane**. (2020a). *Comprendre la révolution de l'intelligence artificielle*. **First**.
- **d'Ascoli, Stéphane**. (2020b). *L'intelligence artificielle en 5 minutes par jour*. **First**.

COMMUNITY SERVICE

Organizer of the Data Science seminar at ENS Paris

Journal reviews

- Nature Communications
- Nature Machine Intelligence
- Information and Inference
- Journal of Physics A
- Journal of Statistical Mechanics
- IEEE Transactions

Conference reviews

- ICML
- NeurIPS
- ICLR

AWARDS

Fellowships

- 2015-2019: ENS scholar fellowship: 4-year fellowship covering studies at ENS
- 2019-2020: ENS Ph.D. fellowship: 4-year fellowship covering Ph.D. thesis (only used 1 year)
- 2022: EPFL AI4Science fellowship: 2-year fellowship covering independent postdoctoral research in collaboration with a board of faculty members

TALKS

Invited talks in 2019

- Machine Learning Seminar - Snips, Paris
- Inria Summer School on Deep Learning - University Pierre et Marie Curie, Paris
- Theoretical Advances in Deep Learning - Center for Mathematical Sciences, Istanbul
- NeurIPS 2019 - Conference Center, Montreal

Invited talks in 2020

- Youth in High-dimensions Conference - Abdus Salam International Centre for Theoretical Physics, Trieste
- Summer School on Statistical Physics and Machine Learning - Les Houches Summer School, Les Houches
- DeepMath Conference - Online
- Spotlight at ICML 2020 - Online
- Spotlight at NeurIPS 2020 - Online

Invited talks in 2021

- Machine Learning Seminar - GResearch, London
- Machine Learning Seminar - Research Institutes of Sweden, Gothenburg
- FAIR Conference - Online
- Spotlight at ICML 2021 - Online
- Spotlight at NeurIPS 2021 - Online

Invited talks in 2022

- Yannic Kilcher interview - YouTube
- Statistical Physics Colloquium - Ecole Normale Supérieure, Paris
- Random Matrix Theory Workshop - Ecole Normale Supérieure, Paris
- PSL intensive weeks - Ecole Normale Supérieure, Paris
- Talk at Centre Européen de Calcul Atomique et Moléculaire - EPFL, Lausanne