Omar Chehab

Postdoctoral Researcher, Carnegie Mellon University

Born September 6, 1995.
Email: `l.omarchehab@gmail.com` Website: `l-omar-chehab.github.io`

Research interests

Sampling and estimating energy-based models, diffusion and flow models, density ratio estimation, self-supervised learning, representation learning, brain imaging data.

Academic positions

Carnegie Mellon University, Machine Learning Department — **June 2025 – Present**
Postdoctoral Research Associate, advised by Pradeep Ravikumar. — Pittsburgh, USA

ENSAE, CREST, IP Paris, Statistics Department — **2023–2025**
Postdoctoral Researcher, advised by Anna Korba. — Palaiseau, France

RIKEN, Center for Brain Science — **March 2024**
Visiting Researcher, hosted by Takeru Matsuda. — Saitama, Japan

Education

Inria, Université Paris-Saclay — **2020–2023**
Ph.D., Mathematical Computer Science — Palaiseau, France
Advised by Aapo Hyvärinen and Alexandre Gramfort.
Thesis title: *Advances in Self-Supervised Learning: applications to neuroscience and sample-efficiency.*

ENS Paris-Saclay — **2018–2019**
Master, Applied Maths for Computer Vision and Machine Learning (MVA) — Palaiseau, France

ENSTA Paris — **2015–2019**
Master, Applied Maths and Engineering Science — Palaiseau, France

Lycée Louis-le-Grand — **2013–2015**
Undergraduate (classes préparatoires), Maths, Physics, Engineering — Paris, France

École Jeannine Manuel — **2013**
French Baccalaureate, Scientific Option, American Track. — Paris, France

Skills

Programming: Python and Git. Some R, MATLAB, C++.

Languages: English, French, Spanish (interm.), Arabic (interm.), Aramaic (beginner).

Conservatoire à Rayonnement Régional de Paris — **1999–2010**
Pre-professional studies, Violin, Piano, Musical Theory, Harmony. — Paris, France
Laureate and first runner-up at two national youth competitions.

Teaching and Service

I was Teacher's Assistant for the following graduate-level courses in France:

2021–2023 *Optimization for Data Science*, IP Paris, Masters 2nd year
2020–2022 *Advanced Machine Learning*, CentraleSupélec, Masters 2nd year
2020–2021 *Optimization*, CentraleSupélec, Masters 1st year

I review submissions to the following conferences and journals:

NeurIPS	Conference on Neural Information Processing Systems
ICML	International Conference on Machine Learning
ICLR	International Conference on Learning Representations
AISTATS	International Conference on Artificial Intelligence and Statistics
JMLR	Journal of Machine Learning Research
TMLR	Transactions of Machine Learning Research
AISM	Annals of the Institute of Statistical Mathematics
MMS	Mathematical Methods of Statistics

I received a top reviewer distinction (AISTATS 2022, NeurIPS 2022-23-24).

Invited Talks

03/2026	Workshop on Gradient Flows for Uncertainty Quantification	SIAM Conference, USA
11/2025	Guest Lecture at the School of Engineering	U Saint-Joseph, Lebanon
06/2025	Risteski Group Seminar	Carnegie Mellon, USA
05/2025	Center for Advanced Mathematical Sciences	AUB, Lebanon
04/2025	Department of Statistics and Data Science Seminar	NUS, Singapore
03/2025	DATA group team seminar	Lab. Kuntzmann, France
03/2025	Anima AI + Science Lab Seminar	Caltech, USA
12/2024	Kempner Institute	Harvard, USA
10/2024	Signals, Information, and Algorithms Lab Seminar	MIT, USA
10/2024	Uncertainty Quantification Group Seminar	MIT, USA
03/2024	Statistical Mathematics Group Seminar	RIKEN, USA
03/2023	Self-Supervised Learning Reading Group	Vector Institute, Canada
02/2020	First International Workshop on Nonlinear ICA	Inria, France

Publications

(* indicates co-first authorship)

Sampling from Energy-Based Models

[1] *Sampling from multi-modal distributions with polynomial query complexity in fixed dimension via reverse diffusion.*
A. Vacher, **O. Chehab**, A. Korba.
Conference on Neural Information Processing Systems (NeurIPS), 2025

[2] *Provable Convergence and Limitations of Geometric Tempering for Langevin Dynamics.*
O. Chehab, A. Korba, A. Stromme, A. Vacher.
International Conference on Learning Representations (ICLR), 2025.

[3] *A Practical Diffusion Path for Sampling.*
O. Chehab, A. Korba.
Workshop, International Conference on Machine Learning (ICML), 2024.

Estimating Energy-Based Models

[4] *Conditional Noise-Contrastive Estimation of Energy-Based Models by Jumping Between Modes.*
H. Yu, M. Gutmann, A. Klami, **O. Chehab**.
Workshop on Principles of Generative Modeling, EurIPS, 2025.

[5] *Density Ratio Estimation with Conditional Probability Paths.*
H. Yu, A. Klami, A. Hyvärinen, A. Korba, **O. Chehab**.
International Conference on Machine Learning (ICML), 2025.

[6] *Provable benefits of annealing for estimating normalizing constants: Importance Sampling, Noise-Contrastive Estimation, and beyond.*
O. Chehab, A. Hyvärinen, A. Risteski.
Spotlight, Conference on Neural Information Processing Systems (NeurIPS), 2023.

[7] *Optimizing the Noise in Self-Supervised Learning: from Importance Sampling to Noise-Contrastive Estimation.*
O. Chehab, A. Gramfort, A. Hyvärinen.
ArXiv, 2023.

[8] *The optimal noise in noise-contrastive learning is not what you think.*
O. Chehab, A. Gramfort, A. Hyvärinen.
Conference on Uncertainty in Artificial Intelligence (UAI), 2022.

Learning Representations and Causal Graphs from Brain Activity

[9] *Multi-View Causal Discovery without Non-Gaussianity: Identifiability and Algorithms.*
A. Heurtebise, **O. Chehab**, P. Ablin, A. Gramfort, A. Hyvärinen.
Oral, Workshop on Causality for Impact, EurIPS, 2025.

[10] *MVICAD2: Multi-View Independent Component Analysis with Delays and Dilations.*
A. Heurtebise, **O. Chehab**, P. Ablin, A. Gramfort.
IEEE Transactions on Biomedical Engineering, 2025.

[11] *Deep Recurrent Encoder: an end-to-end network to model magnetoencephalography at scale.*
O. Chehab*, A. Defossez*, J.-C. Loiseau, A. Gramfort, J.-R. King.
Journal of Neurons, Behavior, Data analysis, and Theory, 2022.

[12] *Uncovering the structure of clinical EEG signals with self-supervised learning.*
H. Banville, **O. Chehab**, A. Hyvärinen, D. Engemann, A. Gramfort.
Journal of Neural Engineering, 2021.

[13] *Learning with self-supervision on EEG data.*
A. Gramfort, H. Banville, **O. Chehab**, A. Hyvärinen, D. Engemann.
International Winter Conference on Brain-Computer Interface (BCI), 2021.

[14] *A mean-field approach to the dynamics of networks of complex neurons.*
M. Carlu*, **O. Chehab***, L. Dalla Porta*, D. Depannemaecker*, C. Héricé*, M. Jedynak*, E. Köksal Ersöz*, P. Muratore*, S. Souihel*, C. Capone, Y. Zerlaut, A. Destexhe, M. di Volo.
Journal of Neurophysiology, 2020.