Mahmoud Hegazy

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EDUCATION

2024 – Present	**PhD in Applied Mathematics** CMAP, École Polytechnique & Sierra, Inria Paris Supervisors: Aymeric Dieuleveut and Michael I. Jordan
2023 – 2024	**MSc, Mathématiques, Vision, Apprentissage (MVA)** École Normale Supérieure Paris-Saclay
2018 – 2022	**BSc in Mathematics and Information Engineering (ELITE Stream)** The Chinese University of Hong Kong

RESEARCH EXPERIENCE

Student Researcher, Centre de Mathématiques Appliquées, École Polytechnique Apr 2023 – Aug 2023

- Developed multi-party compression techniques for federated learning with applications to differentially private stochastic optimization and Langevin dynamics.

Student Researcher, Department of Information Engineering, CUHK Jun 2021 – Sep 2021

- Collaborated with Prof. Cheuk Ting Li on finite-blocklength channel synthesis schemes, deriving optimal additive-noise mechanisms for channel simulation that led to an ITW 2022 publication.

Student Researcher, MLO, EPFL Jun 2020 – Sep 2020

- Collaborated with Dr. Mary-Anne Hartley and Dr. Sai Praneeth Karimireddy to investigate personalized federated learning via multi-task optimization formulations.

PUBLICATIONS

Dieuleveut, Aymeric et al. (2025). "Federated Majorize-Minimization: Beyond Parameter Aggregation". In: *arXiv preprint arXiv:2507.17534*.

Hegazy, Mahmoud, Liviu Aolaritei, et al. (2025). "Valid Selection among Conformal Sets". NeurIPS25.

Hegazy, Mahmoud et al. (2025). "Scalable Utility-Aware Multiclass Calibration". Under submission.

Kondratyev, Vladimir et al. (2025). *Neural Optimal Transport Meets Multivariate Conformal Prediction*. arXiv: 2509.25444 [stat.ML]. URL: https://arxiv.org/abs/2509.25444.

Hegazy, Mahmoud, Rémi Leluc, et al. (2024). "Compression with Exact Error Distribution for Federated Learning". In: *International Conference on Artificial Intelligence and Statistics*. PMLR, pp. 613–621.

Hegazy, Mahmoud and Cheuk Ting Li (2022). "Randomized quantization with exact error distribution". In: *2022 IEEE Information Theory Workshop (ITW)*. IEEE, pp. 350–355.

Selected Honours

2022	**IP-Paris PhD-Track Full-Package Scholarship** — EUR 20,000 master's grant and funding for PhD.
2018–2022	**CUHK Faculty of Engineering Dean's List** — Annual recognition for sustained academic performance within the faculty.
2020	**Prof. Charles K. Kao Research Exchange Scholarship** — Competitive programme awarded to seven students each year to fund international summer research.
2018	**CUHK Full-ride Admission Scholarship** — USD 100,000 package covering tuition and living expenses for the full duration of studies.

Miscellaneous

Skills

- Skills: Python (JAX, PyTorch, and related ecosystems), C/C++.
- Languages: Arabic (native), English (fluent, C1), French (intermediate, B2).

Scholarly Service

- Reviewer, International Conference on Artificial Intelligence and Statistics (AISTATS) 2025, 2026.

Recent Talks - 2025

- Doctoral Seminar CMAP
- Team Seminar MLO, EPFL
- SIMPAS Team Retreat