Mohammad Hossein Amani

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INTERESTS

- Symbolic representation learning
- Reinforcement learning
- Unsupervised learning of reasoning, planning, and adaptive computation

EDUCATION

Ph.D. Computer Science — Sep 2022 – Present
École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

B.Sc. Electrical Engineering and Physics (double major) — Sep 2017 – Jun 2022
Sharif University of Technology, Tehran, Iran

PUBLICATIONS

- Apertus: Democratizing Open and Compliant LLMs for Global Language Environments
  Apertus Team
  Preprint arXiv'25
- RL for Reasoning by Adaptively Revealing Rationales
  MHA, Aryo Lotfi, Nicolas Mario Baldwin, Samy Bengio, Mehrdad Farajtabar, Emmanuel Abbe, Robert West
  Preprint arXiv'25
- Symbolic Autoencoding with Straight-through Gradient Estimators
  MHA, Nicolas Mario Baldwin, Amin Mansouri, Martin Josifoski, Maxime Peyrard, and Robert West
  ICLR 2024 workshop on Differentiable Almost Everything
- Sharp Asymptotics on the Compression of Two-layer Neural Networks
  MHA, Simone Bombari, Marco Mondelli, Rattana Pukdee, and Stefano Rini
  Proc. IEEE Information Theory Workshop (ITW'22)
- Memorization and Optimization in Deep Neural Networks with Minimum Over-parameterization
  Simone Bombari, **MHA**, Marco Mondelli
  Proc. of the Conference on Neural Information Processing Systems (NeurIPS'22)

AWARDS & SCHOLARSHIPS

- **EPFL doctoral school Ph.D. fellowship** — 2022
- **Ranked 7th among 176 Electrical Engineering students** — 2021
- **Ranked 370 in national university entrance exam** — 2017
  Ranked 370 out of 140000 students in national university entrance exam, Physics and Mathematics Discipline.
- **Silver medal in national Physics Olympiad** — 2016
  Exams included classical mechanics, electrodynamics, statistical physics, and basic solid state physics.

RESEARCH EXPERIENCES

- **Self-supervised symbolic representation learning with discrete autoencoders** — Sep 2022 – Present
  Supervisor: Professor Robert West
  Ecole polytechnique fédérale de Lausanne (EPFL)
- **Maximum distance-two independent-set on random graphs** — Feb 2022 – Jun 2022
  Supervisor: Professor Lenka Zdeborova
  Ecole polytechnique fédérale de Lausanne (EPFL)
- **Minimal overparameterization guarantees in the neural tangent kernel** — Apr 2021 – Feb 2022
  Supervisor: Professor Marco Mondelli
  Institute of science and technology, IST Austria
- **Foundational limits of neural network compression** — Feb 2021 – Feb 2022
  Supervisor: Professor Marco Mondelli
  Institute of science and technology, IST Austria
- **Representation limits of classical and quantum graphical models** — Jul 2019 – Sep 2019
  Supervisor: Professor Pascal Olivier Vontobel
  The Chinese university of Hong Kong (CUHK)

TEACHING

Teaching assistant at EPFL for the following courses:

- Probability and Statistics — Spring 2023
- Applied Data Analysis — Fall 2023, 2024

Teaching assistant at Sharif University of Technology for the following courses:

- High-dimensional probabilistic analysis — Spring 2021
- Signals and systems — Spring 2020
- Probability and statistics — Fall 2019
- Introduction to programming (C and C++) — Spring 2018

Teacher at Allame Helli High School — Jun 2017 – Jun 2020

- I taught electromagnetism, statistical mechanics, calculus, and thermodynamics to students preparing for Physics Olympiad.

SKILLS

- TensorFlow, Pytorch
- Python, Scikit-learn
- MATLAB
- C++
- LaTeX
