Herlock Rahimi

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Education

Ph.D. of Electrical and Computer Engineering, Yale University — Sept 2023 – Ongoing
- Advisors: Dionysis Kalogerias, Amin Karbasi

B.Sc. of Computer Engineering, Sharif University of Technology (SUT) — Sept 2018 – July 2023
- GPA 18.79/20

B.Sc. of Mathematics and Applications, Sharif University of Technology (SUT) — Sept 2019 – July 2023
- GPA 18.79/20

Iran National Summer Camp for Math Olympiad, — July 2017 - Sept 2017
- Silver Medalist

Research Interests

Learning Theory Optimization Geometric ML Quant Researcher Risk-Averse Optimization Information Theory Reinforcement Learning (RL)

Teaching

Teaching Information Geometry, Yale — Spring 2025
- Five session Mini-Course about Information Geometry (statistical Geometry), with more that fifty students.
- You can access videos on my Youtube Channel .

Teaching Machine Learning, Online - Sharif University — Winter 2022
- An introductory course in Machine Learning, both theory and applied.
- More than 100 students attended classes.
- You can access videos on my YouTube channel (@AISholmes).

Research Assistant

Reasoning For LLMs, Amin Karbasi, Zhouran Yange, Yale — December 2024 - Ongoing

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Risk-Averse Federated Learning, Dionysis Kalogerias, Yale — March 2024 - December 2024

Supersymmetry in Machine Learning (Bachelor Thesis), Mohammad Hossein Rohban, SUT, Tehran, Iran — September 2022 - January 2023

Attention-RL for Visual Question Answering, Hamid Rabiee, SUT, Tehran, Iran — April 2022 - April 2023
- Our aim is to find RL agent for Visual Question Answering (VQA) and Image Captioning (IC).
- We have proposed a new idea, using patches of the image to find relationships and generate output using RL.

Reinforcement Learning Attention for Image Captioning, Rabiee, SUT, Tehran, Iran — May 2022 - March 2023
- RL-based image captioning which I proposed the idea for Prof. Rabiee.
- One agent mocks humans' eye movements along with an attention mechanism. Using traced patches, another agent attempts to make a plausible caption. Dataset: COCO

Histopathology Image Classification and Explainability with GNNs, Mohammad Hossein Rohban, SUT, Tehran, Iran — August 2021 - March 2023
- Designing risk-aware Machine Learning methods, especially GNNs for cancer detection.
- Experimenting with adversarial robust networks, alongside GNNs, to catch both high precision and an acceptable explainable model.

Few-Shot Meta Reinforcement Learning, Mohammad Hossein Rohban, SUT, Tehran, Iran — April 2021 - Feb 2022

- Our research is mainly focused on self-supervised methods in Meta RL and Reward-free pre-training.
- Experimenting with self-supervised methods in context-aware dynamic model prediction and similar ideas that had been published in CADM; is one of our approaches in meta reinforcement learning.
- I proposed the idea of decoupling meta-exploration, exploration and exploitation; and using uncertainty estimation methods: Intrinsic reward for the agent, reward for meta-setting, alongside the extrinsic reward agent receives from the environment.
- Reward-free pre-training and uncertainty estimation methods were my major study during the research.
- The research was suspended, and later canceled due to hardware problems.

Information Theory, Mohammad Hossein Yassaee, SUT, Tehran, Iran — Sep 2021 - Jan 2022

- The Research is in the field of information theory and is focused on finding information theoretic bounds for one-shot achievability via fidelity.
- We are currently discussing different approaches in both information theory and high-dimensional statistics to help us to find bounds for our problem.

Honors and Rewards

- One of the top 3 students of the Math Department of SUT to attend the Iranian National Mathematics Olympiad for college students (2022)
- One of the top 3 students of the Math Department of SUT to attend the Iranian National Statistics Olympiad for college students (2021)
- Ranked 36th in the Iranian National Math and Physics university entrance exam (2018)
- Silver medal in the Iranian National Mathematics Olympiad for students (2017)

Teaching Assistant

Information Geometry (Instructor)	Spring 2025
S&DS 317/517 (SP25): Applied Machine Learning and Causal Inference	Spring 2025
CPSC 483/683 (FA24): Deep Learning on Graph-Structured Data Website	Fall 2024
Machine Learning Theory	Spring 2023
High Dimensional Probability	Spring 2022
Artificial Intelligence (Head TA)	Spring 2022
Compiler Design	Fall 2021
Machine Learning	Fall 2021
Introduction to Bioinformatics	Fall 2021
Game Theory	Fall 2021
Design Of Algorithm	Fall 2021
Linear Algebra	Spring 2021
Compiler Design	Spring 2021
Artificial Intelligence	Spring 2021
General Math 1	Fall 2020
Linear Algebra	Fall 2020

Remarkable Courses

Ph.D. Courses

Algorithms for Optimization (CPSC 563) - H	Spring 2024
Risk-Aware Optimization, MLT (ENAS 990) - H	Spring 2024
Intro to Functional Analysis (MATH 525) - HP	Spring 2024
Adv Optimization Techniques (S&DS 632) - H	Spring 2024
High-Dimensional Statistics (S&DS 677) - H	Spring 2024
Deep Learning on Graph-Structured Data (CPSC 583) - H	Fall 2023
Detection and Estimation (ENAS 840) - H	Fall 2023

Optimization and MLT (ENAS 990) - H — Fall 2023
Measure Theory and Integration (MATH 520) - H — Fall 2023
Differentiable Manifolds (MATH 526) - H — Fall 2023

Graduate Courses

Machine Learning Theory - 19.1/20 — Spring 2022
Reinforcement Learning - 16.8/20 — Spring 2022
Information Theory and Statistical Learning - 19.3/20 — Fall 2021
Manifolds Geometry - 19.9/20 — Fall 2021
High Dimensional Probability - 19.5/20 — Spring 2021
Differential Geometry - 20/20 — Spring 2021
Advanced Topics in Statistics (Bayesian Stat.) - 17.5/20 — Fall 2020
Machine Learning - 20/20 — Spring 2020

Undergraduate Courses

Abstract Algebra III - 18.5/20 — Fall 2021
Modern Information Retrieval - 20/20 — Spring 2021
Applied Linear Algebra with Julia - 19/20 — Spring 2021
Game Theory - 19.4/20 — Fall 2020
Design Of Algorithm - 19.5/20 — Fall 2020
Mathematical Analysis 2 - 20/20 — Fall 2020
Intro. to Bioinformatics - 20/20 — Fall 2020
Artificial Intelligence - 20/20 — Spring 2020
Linear Algebra - 20/20 — Fall 2019
Engineering Probability and Statistics - 20/20 — Fall 2019

Languages

Persian: Native

English: Fluent (TOEFL:106 R:28 L:29 S:22 W:27)

Skills

Python (Pytorch, Tensorflow) Algorithms Graph Theory Problem Solving Combinatorics Geometry
Java, Julia, R, C++, Bash, SQL, MongoDB Assembly (MIPS, x86)

Notable Projects

Modern Information Retrieval - Python — Git
Upper and Lower Bounds for Stochastic Processes - Survey — Git
Sarcasm Detection - Python — Git
C-minus Compiler - Python — Git
Life Expectancy - R — Git
Plants vs. Zombies Game - Java — Git
Microarray Data Bioinformatics - R — Git

Working Experience

Summer Internship, Researcher and Data Scientist, AI med, Tehran, Iran — June 2022 - Sept 2022
- The company seeks to find models for breast cancer detection from images.

Math and Informatics Olympiad Teacher, Irysc Co., Tehran, Iran — June 2019 - June 2020
- Teaching Combinatorics and Graph Theory
- Teaching Geometry and Number Theory
- Developing test questions for contestants

Other Experiences

Winter Seminar Series (WSS), SUT, Tehran, Iran
- 5th WSS, participant (Winter 2020)
- 6th WSS, Presentation Management (Winter 2021)
- 7th WSS, participant (Winter 2022)

3rd Cognitive Neuroscience Contest Sadra, Online Oct 2020 - Dec 2020
- In 2 weeks we educated general Neuroscience through seminars. At the end, I summarized and presented 3 recent papers about decision-making processes in the brain.

Evolutionary Computation and Biological Computations Course, Sharif Interdisciplinary Schools Oct 2020 - Dec 2020