

SINA BAHARLOUEI

+6 years experience in research and development of stochastic optimization algorithms for large-scale machine learning models in academia and industry with a solid background in statistics, optimization, and data processing under uncertainty and adversarial settings.

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WORK EXPERIENCE

Machine Learning Research Intern

Bosch Center of AI

May 2021 – Oct 2021

Pittsburgh - PA

- Design and Implementation of Robust Verifiable Neural Networks Against Adversarial Attacks using Joint Deep Network Classifiers and Detectors
- Beating the SOTA deep network verifiers/trainers up to 7% in just 2× runtime. Published as a research paper at AISTATS 2023

Researcher Assistant

University of Southern California

Aug 2017 – Dec 2023

Los Angeles - California

Algorithmic Fairness: Designing scalable in-processing methods to promote fairness in supervised learning tasks

- Lowy, Baharlouei, et al., "A Stochastic Optimization Framework for Fair Risk Minimization." *TMLR* 2022. [paper] [code]
- Baharlouei, et al., "Rényi Fair Inference." *ICLR* 2020. [paper] [code]
- Contributed Talk:** "FERMI: Fair Empirical Risk Minimization via Exponential Rényi Mutual Information." *ICML SRML workshop*, 2021.

Robust Machine Learning: Learning robust models against adversarial attacks and robust imputation (0.14 improvement in RMSE for imputation of datasets containing 80% missing values).

- Baharlouei et al., "RIFLE: Robust Imputation and Inference from Low Order Marginals." *TMLR*, 2023. [paper] [code]
- Baharlouei et al., "Improving Adversarial Robustness via Joint Classification and Multiple Explicit Detection Classes." *AISTATS*, 2023. [paper] [code]
- Talk:** "Fair and Robust Machine Learning Through Min-Max Optimization." *Google Research*, Sep 2022.

Learning Under the Uncertainty (Distribution Shift):

- Baharlouei et al., "f-FERM: A Scalable Framework for Robust Fair ERM." *NeurIPS OPT workshop* 2023. [paper] [code]
- Baharlouei, and Razaviyayn. "Dr. FERMI: A Stochastic DRO Fair ERM Framework." *NeurIPS AFT workshop* 2023. [paper] [code]
- Dai, Baharlouei, et al., "Feature Selection in the Presence of Monotone Batch Effects." *ICML SCIS workshop* 2023. [paper] [code]



Selected Paper Reviews

Top ML Conferences & Journals

ISIT 2019

AISTATS 2021

ICLR 2022

ICML 2023

UAI 2023

NeurIPS 2023

AAAI 2024

JMLR

Server Side Software Engineer

Quiz of Kings

May 2015 – Sep 2015

Tehran - Iran

- Implementing a ranking system for active players (>3M) via Redis

SKILLS

Programming: Python, C++, Java, Bash

ML: PyTorch, Numpy, Pandas, Scikit

Database: SQL, MongoDB, Redis

Optimization: CVX, AMPL, SciPy

Big Data: Spark, OpenMPI, HPC

RESEARCH INTERESTS

Distributionally Robust Optimization

Scalable Optimization

Robust Deep Learning

Algorithmic Fairness

Fair Language Models

ACHIEVEMENTS



Top 3 Papers

ICML 2023 DP4ML Workshop



Bronze Medal

International Math Competition (IMC), Bali, Indonesia, 2011



Viterbi Graduate Student Fellowship



Editorial Board

International Journal of Data Science



Session Chair

"Robust and Fair Machine Learning in the Presence of Distribution Shifts." *INFORMS 2023*, Phoenix, Arizona.

EDUCATION

PhD (Operations Research, Machine Learning)

University of Southern California

Aug 2017 – Dec 2023

Thesis: Scalable Optimization for Fair & Robust AI

M.Sc. in Statistics [GPA: 3.97]

University of Southern California

Aug 2020 – May 2023

B.Sc. in Computer Engineering

Amirkabir University of Technology

Sep 2012 – Sep 2016

MENTORSHIP

- Mentor of Shivam Patel: Working on transferable large-scale fair models (Accepted Paper)