SINA BAHARLOUEI

6+ years academia and industry experience in research and development of **stochastic optimization algorithms** for **large-scale machine learning** applications including **Responsible AI** (fair & robust ML), vision, image-recognition and language learning tasks under **uncertainty** and **adversarial** settings.

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WORK EXPERIENCE

Machine Learning Research Intern

Bosch Center for Artificial Intelligence

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 $2\times$ 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)