

ZALAN FABIAN, PHD CANDIDATE

University of Southern California, Ming Hsieh Dept. of Electrical and Computer Engineering, Los Angeles, CA

Email: zfabian@usc.edu | Homepage: z-fabian.github.io | LinkedIn: linkedin.com/in/zalan-fabian/ | GitHub: github.com/z-fabian

RESEARCH INTERESTS

- Deep learning and optimization
- Artificial intelligence for the basic sciences - MRI, computational imaging and microscopy
- Data-efficient training of deep learning models, data augmentation
- Federated continual learning, large-scale distributed computing
- Efficient second-order optimization for deep neural network training

ACTIVE PROJECTS

- **Deep learning with limited data:** designing novel techniques to reduce the reliance of deep learning models on large training datasets; particular focus on vision problems in the sciences and emerging MRI technologies
- **Federated continual learning:** flexible modeling of client activity and preferences in federated settings; memory bank design to tackle catastrophic forgetting in federated continual learning
- **Second-order optimizers for deep learning:** designing scalable and efficient optimization algorithms for deep learning to accelerate training via exploiting local curvature information

RESEARCH EXPERIENCE

Amazon

Applied Scientist Intern

Alexa Perceptual Technologies

May 2022 to August 2022

- Mentor: Rajath Kumar,
- Designed and implemented novel data augmentation techniques for speech spectrograms
- Implemented and tested semi-supervised learning techniques for wake word verification models

University of Southern California

Research Assistant

Department of Electrical and Computer Engineering

Jan 2018 to present

- Advisor: Mahdi Soltanolkotabi
- Research assistant at USC Foundations of Learning from Signals and Data Lab
- Projects on the intersection of deep learning and optimization
- Focusing on applications for the basic sciences and medical imaging
- Understanding deep learning and learning from limited data

University of New Hampshire

Research Assistant

Department of Electrical and Computer Engineering

Aug 2015 to May 2017

- Advisor: Se Young Yoon
- Research assistant at UNH Robotics Lab
- Projects on intelligent robotic swarm control both in theory and practice

EDUCATION

- **PhD, Electrical Engineering**, University of Southern California, 2017 - present
 - Advisor: Mahdi Soltanolkotabi
 - Focus: machine learning, deep learning, optimization, medical imaging
- **MSc, Electrical Engineering**, University of New Hampshire, 2017
 - Advisor: Se Young Yoon
 - Focus: non-linear and robust control, multi-agent robotic systems
- **BSc, Electrical Engineering**, Budapest University of Technology, 2014
 - Focus: signals and systems, control theory
- **BSc (double degree program), Engineering**, Kyungpook National University, 2014
 - Focus: computer vision, intelligent systems and data mining

AWARDS AND DISTINCTIONS

- Ming Hsieh Institute PhD Scholar 2021-2022
- Annenberg PhD Fellow, 2017-2021
- BSc degree *summa cum laude*, 2014
- Academic Scholarship recipient, 2010-2014

PUBLICATIONS

- [1] **Z. Fabian** and M. Soltanolkotabi, *HUMUS-Net: Hybrid unrolled multi-scale network architecture for accelerated MRI reconstruction*, 2022, arXiv preprint arXiv:2203.08213
- [2] **Z. Fabian**, R. Heckel and M. Soltanolkotabi, *Data Augmentation for Deep Learning Based Accelerated MRI Reconstruction with Limited Data*, 2021, International Conference on Machine Learning
- [3] **Z. Fabian**, J. Haldar, R. Leahy and M. Soltanolkotabi, *3D Phase Retrieval at Nano-Scale via Accelerated Wirtinger Flow*, 2020, European Signal Processing Conference
- [4] S. M. M. Kalan, **Z. Fabian**, A. S. Avestimehr and M. Soltanolkotabi, *Minimax Lower Bounds for Transfer Learning with Linear and One-hidden Layer Neural Networks*, 2020, Neural Information Processing Systems
- [5] S. Oymak, **Z. Fabian**, M. Li and M. Soltanolkotabi, *Generalization Guarantees for Neural Networks via Harnessing the Low-Rank Structure of the Jacobian*, 2019, arXiv preprint arXiv:1906.05392
- [6] **Z. Fabian** and S. Y. Yoon, *Coordination of Balanced Leader-Follower Swarms with Time-Varying Social Potential Functions*, 2017, IEEE Conference on Decision and Control
- [7] **Z. Fabian** and S. Y. Yoon, *Coordination of Multi-Agent Leader-Follower System with Time-Varying Objective Function*, 2016, IEEE Conference on Decision and Control

TEACHING AND MENTORING EXPERIENCE

University of Southern California

Teaching Assistant

- Optimization for the Information and Data Sciences

Department of Electrical and Computer Engineering

Fall 2019

University of Southern California

Graduate Mentor

- Student mentor in the Viterbi Graduate Mentorship Program
- Supporting and advising incoming engineering graduate students

Viterbi School of Engineering

Fall 2019 - present

University of Southern California

Research Mentor

- Mentoring and advising a student in their undergraduate research and thesis
- Research project on over-parameterized neural networks

Department of Electrical and Computer Engineering

Fall 2019 - Spring 2020

University of New Hampshire

Teaching Assistant

- Computer Organizations

Department of Electrical and Computer Engineering

Fall 2016 - Spring 2017

CONFERENCE REVIEW

- International Conference on Machine Learning (ICML 2021, 2022 - Outstanding Reviewer)
- International Conference on Learning Representations (ICLR 2020, 2021, 2022)
- Neural Information Processing Systems (NeurIPS 2020, 2021, 2022)
- Sampling Theory and Applications (SampTA 2019)
- IEEE Conference on Decision and Control (CDC 2016, 2017)

OTHER SKILLS

Software Python, Pytorch, Tensorflow, Matlab, C/C++, LaTeX

Languages English: professional. Hungarian: native. German: basic.