

Berkay Guler

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Professional Summary

I am a machine learning researcher specializing in wireless communications with a focus on developing novel deep learning solutions for next-generation wireless systems. My research and professional experience span machine learning applications in vision, language, and signal processing, grounded in strong fundamentals in electrical engineering and computer science.

Education

University of California, Irvine

Ph.D. in Networked Systems, Computer Science

Sept. 2023 – June 2028

Irvine, California

- Advised by Prof. Hamid Jafarkhani
- Research on Machine Learning for Wireless Communication Networks

University of California, Irvine

M.S. in Networked Systems, Computer Science, (GPA: 3.82/4.0)

Sept. 2023 – June 2025

Irvine, California

- Networked Systems Fellowship recipient
- Research on Machine Learning for Wireless Communication Networks

École Polytechnique Fédérale de Lausanne (EPFL)

Exchange Student in School of Computer and Communication Sciences

Feb. – Aug. 2022

Lausanne, Switzerland

- Advised by Prof. Touradj Ebrahimi

Bilkent University

B.S. in Electrical Engineering, Summa Cum Laude (GPA: 3.82/4.0)

Sept. 2019 – June 2023

Ankara, Turkey

- Full tuition waiver and stipend scholarship during the entire program

Experience

UC Irvine, Center of Pervasive Communications and Computing (CPCC)

Irvine CA, USA

Graduate Student Researcher (*Part-time*)

Sep. 2023 – Present

- Innovating on **wireless channel** representation and understanding using **self-supervised** approaches to achieve **task-agnostic** behavior that matches supervised task-specific baselines.
- Advancing the state-of-the-art in **deep learning-based channel estimation** for **OFDM** systems using a novel adaptive **transformer** model.
- Developing data-driven wireless solutions for **channel characterization, beamforming, CSI feedback, and channel estimation**.

DataBoss Security & Analytics

Ankara, Turkey

Machine Learning Engineer (*Full-time*)

Feb. – Sep. 2023

- Conducted R&D on **text summarization** and **text normalization** using encoder-only and encoder-decoder transformer-based architectures in **Torch**.
- Developed **APIs** to host inference endpoints in **Python** with **Flask** and **Docker**.
- Created an **image processing** and **deep learning-based document-AI** pipeline in **Python** for automatic information extraction from scanned PDF documents with irregular structure that were challenging to parse using conventional approaches.

Huawei R&D Center

Istanbul, Turkey

Machine Learning Researcher/Engineer Intern (*Part-time*)

Aug. 2022 – Feb. 2023

- Conducted research on **active learning** with **Transformers** to improve sample efficiency of labeled address data for a named entity recognition module within Petal Maps.

- Developed a **Python** web data-mining tool to enhance dictionary-based methods used for address parsing within Petal Maps.

Multimedia Signal Processing Lab, EPFL

Undergraduate Student Researcher (*Part-time*)

Lausanne, Switzerland

Feb. 2022 – Aug. 2022

- Conducted comprehensive analysis of top-performing **deep learning** models from the DeepFake Detection Challenge, implementing and evaluating **EfficientNet-B7**, **3D-CNN**, and **ensemble-based architectures** for **face swap detection**.
- Developed robust evaluation framework using multiple test sets and metrics including ROC-AUC, weighted precision, and log-loss to assess model performance under heavy augmentations, revealing significant ranking differences compared to original DFDC results.

ICON Lab, Bilkent University

Undergraduate Student Researcher

Ankara, Turkey

Mar. 2022 – Sep. 2022

- Conducted research on synthetic data generation using **Diffusion Probabilistic Models** to address class imbalance in skin cancer classification and augment retinal image datasets for glaucoma detection.

Baykar Technology

Embedded AI Intern

Istanbul, Turkey

June 2021 – Sep. 2021

- Developed embedded **C/C++** applications for **ARM** microprocessors, focusing on troubleshooting real-time **CAN communication** in UAV systems.

Publications

- B. Guler, G. Geraci, H. Jafarkhani, "Robust Channel Representation for Wireless: A Multi-Task Masked Contrastive Approach," *NeurIPS 2025 Workshop: AI and ML for Next-Generation Wireless Communications and Networking*, (accepted for oral presentation (**top %10**))
- B. Guler, G. Geraci, H. Jafarkhani, "A Multi-Task Foundation Model for Wireless Channel Representation Using Contrastive and Masked Autoencoder Learning," *IEEE Journal on Selected Areas in Communications (JSAC): Large AI Models for Future Wireless Communication Systems*, (under major revision)
- B. Guler, H. Jafarkhani, "AdaFortiTran: An Adaptive Transformer Model for Robust OFDM Channel Estimation," *2025 International Conference on Communications (ICC)*, Montreal, Canada
- B. Guler, B. Aygun, A. Gerek and A. S. Gurel, "Deep Active Learning for Address Parsing Tasks with BERT," *2023 31st Signal Processing and Communications Applications Conference (SIU)*, Istanbul, Turkey

Skills

- **Programming Languages:** Python, MATLAB, C/C++, Java
- **Frameworks & Tools:** Sionna, Torch, TensorFlow, Hugging Face, Scikit-learn, Git, Docker, Bash
- **Machine Learning & AI:** Self-Supervised Learning, LLMs, CNNs, Generative Models (Diffusion, GANs, VAEs, Flow Models), Sequential Models (Transformer, RNNs, LSTMs, GRUs), Contrastive Learning, Deep Reinforcement Learning, Classical ML
- **Languages:** English (Fluent), Turkish (Native)

Selected Coursework

- **Machine Learning & AI:** Deep Generative Models, Introduction to Machine Learning, Image Analysis and Pattern Recognition
- **Communications:** Digital Communications I & II, Error Correcting Codes, Digital Signal Processing, Signal Processing for Communications
- **Mathematical Foundations:** Optimization, Random Processes, Statistics, Control Systems
- **Computer Science:** Graph Algorithms, Design and Analysis of Algorithms, Data Structures

- **Networks:** Computer Networks, Communications Networks, Network and Distributed Systems Security

Teaching Experience

Teaching Assistant, Bilkent University

Jan. 2020 – Jan. 2022

Tutored students in Introduction to Data Analysis in Python, Programming for Engineers, and Electricity and Magnetism courses

Professional Activities

Presenter, "AdaFortiTran: An Adaptive Transformer Model for Robust OFDM Channel Estimation," IEEE International Conference on Communications (ICC 2025), Montreal, Canada 2025

Reviewer, IEEE Journal of Selected Areas in Communications 2025

Reviewer, Data Compression Conference (DCC 2026) 2025

Professional Memberships: IEEE Student Member, IEEE Communications Society Member 2025

Leadership & Activities

Volunteer, Orange County Alumni Association 2024 – Present

Mentor, Undergraduate Research Opportunities Program (UROP), UC Irvine 2024 – 2025

Peers Offering Wellness Educations Resources (POWER) Ambassador, UC Irvine 2024 – 2025

Mentor, Graduate International Connection, UC Irvine 2023 – 2024

Head of Sponsorship, Bilkent MUN Club 2021 – 2022

President, Bilkent Judo Club 2020 – 2021