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 Sept. 2023 – June 2027
Ph.D. in Networked Systems, Computer Science Irvine, California
- Advised by Prof. Hamid Jafarkhani
- Research on Channel Modeling, Representation, and Estimation

University of California, Irvine Sept. 2023 – June 2025
M.S. in Networked Systems, Computer Science, (GPA: 3.82/4.0) Irvine, California
- Networked Systems Fellowship recipient
- Research on Channel Modeling, Representation, and Estimation

École Polytechnique Fédérale de Lausanne (EPFL) Feb. – Aug. 2022
Exchange Student in School of Computer and Communication Sciences Lausanne, Switzerland
- Advised by Prof. Touradj Ebrahimi
- Research on Assessment of Deep learning-based Deepfake Detectors

Bilkent University Sept. 2019 – June 2023
B.S. in Electrical Engineering, Summa Cum Laude (GPA: 3.82/4.0) Ankara, Turkey
- Full tuition waiver and stipend scholarship during the entire program
- Research on AI for medical imaging & NLP

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 modeling using **self-supervised** approaches to achieve **task-agnostic** performance that matches supervised task-specific baselines.
- Advanced the state-of-the-art in **deep learning-based channel estimation** for **OFDM** systems using a novel adaptive **transformer-based** 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 **PyTorch**.
- Developed **APIs** to host summarization inference endpoints in **Python** with **Flask** and **Docker**.
- Created a traditional **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 Huawei Petal Maps app.
- Developed a data-mining tool in **Python** to expand a dictionary used for dictionary-based methods for address parsing within Petal Maps.

Multimedia Signal Processing Lab, EPFL Lausanne, Switzerland
Undergraduate Student Researcher *(Part-time)* 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 an evaluation framework for videos to assess deepfake detectors' performance under different perturbations, revealing significant ranking differences compared to original results.

ICON Lab, Bilkent University Ankara, Turkey
Undergraduate Student Researcher Mar. 2022 – Sep. 2022

- Conducted research on effective synthetic data generation with **Diffusion Probabilistic Models** (DPMs) for skin cancer and retinal image datasets.

Baykar Technology Istanbul, Turkey
Embedded AI Intern 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 (2025)*, (*under 2nd round 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, PyTorch, 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 Graduate Level Coursework

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

Professional Activities

Presenter, "AdaFortiTran: An Adaptive Transformer Model for Robust OFDM Channel Estimation," IEEE International Conference on Communications (ICC 2025), Montreal, Canada 2025
Reviewer, International Conference on Learning Representations (ICLR 2026) 2025
Reviewer, IEEE Journal of Selected Areas in Communications (JSAC) 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

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