Fuat Arslan

arsln.fuat@gmail.com | LinkedIn | GitHub | Scholar | Website

Research Focus: Diffusion Models, Generative AI, and Medical Imaging

Education

Bilkent University — Ankara, Turkey
M.S. in Electrical and Electronics Engineering — *Sep 2023 – Jun 2026*
- CGPA: 4.00/4.00 — Advisor: Prof. Tolga Çukur

Bilkent University — Ankara, Turkey
B.S. in Electrical and Electronics Engineering — *Sep 2018 – Jul 2023*
- CGPA: 3.88/4.00

Experience

Graduate Research Assistant — Sep 2023 – Present
National Magnetic Resonance Research Center (UMRAM) — *Ankara, Turkey*
- Member of the **Imaging and Computational Neuroscience (ICON) Lab** led by Prof. Tolga Çukur.
- Working on deep learning algorithms for medical image synthesis.
- Developing a new **agentic diffusion** paradigm that transcends one-pass generation: large vision–language models iteratively evaluate and refine images via test-time optimization.

Researcher — Aug 2022 – Jun 2024
Hacettepe University Faculty of Medicine — *Ankara, Turkey*
- Led the development of deep learning models for melanoma classification.
- Curated and annotated a novel dataset of ∼5,000 dermoscopic images, facilitating robust model training and enabling future dermatology AI studies.
- Developed and deployed a full-stack web application (Python, React) for AI-assisted melanoma risk assessment, currently used in pilot clinical studies at Hacettepe Hospital.

Undergraduate Researcher — Jan 2023 – Mar 2023
Bilkent University — *Ankara, Turkey*
- Designed novel recursive stateful LightGBM implmentation on time series data under the supervision of Prof. Serdar Kozat.

Research Intern — Aug 2022 – Sep 2022
HAVELSAN — *Ankara, Turkey*
- Designed and implemented AI-based real-time network anomaly detection using **PyTorch** in secure communication settings.

Undergraduate Researcher — May 2022 – Sep 2022
Bilkent University — *Ankara, Turkey*
- Designed and implemented a chatbot with internet search, custom text learning, and voice interaction capabilities under Prof. Arnab Basu using **PyTorch**, **ParlAI**, and **transformers**.

Candidate Engineer — Aug 2021 – Mar 2022
ULAK Haberleşme — *Ankara/Istanbul, Turkey*
- Designed and implemented PL modules in Verilog/VHDL and PS software with OpenAMP/Libmetal on Zynq Ultrascale+ MPSoC, accelerating 5G-NR R&D workflows.
- Developed firmware for heterogeneous systems, integrating FreeRTOS, bare-metal, and Embedded Linux to optimize system-level performance.

Undergraduate Researcher — Feb 2021 – Jun 2021
Bilkent University — *Ankara, Turkey*
- Built an **MRI** coil voltage control system ensuring stable current, deployed on the VC707 Board using **VHDL** and **MATLAB**, in collaboration with Reza Babaloo and Prof. Ergin Atalar.

Publications

Journal Articles

- **F. Arslan**, B. Kabas, O. Dalmaz, M. Ozbey, and T. Çukur, "Self-Consistent Recursive Diffusion Bridge for Medical Image Translation," *Medical Image Analysis*, vol. 106, p. 103747, 2025. doi:10.1016/j.media.2025.103747.
- V. A. Nezhad, G. Elmas, B. Kabas, **F. Arslan**, and T. Çukur, "Generative Autoregressive Transformers for Model-Agnostic Federated MRI Reconstruction," *arXiv:2502.04521*, 2025. arXiv.
- B. Kabas, **F. Arslan**, V. A. Nezhad, S. Ozturk, E. U. Saritas, and T. Çukur, "Physics-Driven Autoregressive State Space Models for Medical Image Reconstruction," *arXiv:2412.09331*, 2025. arXiv.
- O. F. Atli, B. Kabas, **F. Arslan**, M. Yurt, O. Dalmaz, and T. Çukur, "I2I-Mamba: Multi-modal Medical Image Synthesis via Selective State Space Modeling," *arXiv:2405.14022*, 2024. arXiv.
- **F. Arslan** and T. Arslan, "Development of an Artificial Intelligence-Based Diagnostic System Using Dermoscopic Images and Evaluation of the Diagnostic System's Place in Dermatology," Hacettepe University, 2024.

Conference Papers

- **F. Arslan**, B. Kabas, O. Dalmaz, M. Ozbey, and T. Çukur, "A Self-Consistent Diffusion Schrödinger Bridge for Multi-Modal Medical Image Translation," *ISMRM*, 2025.
- O. F. Atli, B. Kabas, **F. Arslan**, A. C. Demirtaş, M. Yurt, O. Dalmaz, and T. Çukur, "Multi-Contrast MR Image Synthesis with Episodic State-Space Modeling," *ISMRM*, 2025.
- **F. Arslan**, M. B. Yılmaz, and T. Çukur, "Robust Brain Tumor Segmentation with Deep Residual Supervision and Mixed Precision Training," *IEEE SIU*, May 2024.
- M. U. Mirza, **F. Arslan**, and T. Çukur, "Super Resolution MRI via Upscaling Diffusion Bridges," *IEEE SIU*, May 2024.
- B. Kabas, **F. Arslan**, and T. Çukur, "Multi-Contrast MR Image Synthesis with a Brownian Diffusion Model," *IEEE SIU*, May 2024.
- V. A. Nezhad, G. Elmas, **F. Arslan**, B. Kabas, and T. Çukur, "Generalizable Deep MRI Reconstruction with Cross-Site Data Synthesis," *IEEE SIU*, May 2024.

Honors

- **ISMRM Magna Cum Laude Merit Award** (2025) — Spotlight abstract, Honolulu, USA.
- **Best Paper Award** — Bilkent Graduate Research Conference (2025).
- **TÜBİTAK Scientist Supporting Scholarship** — Merit-based stipend during M.Sc.
- Ranked 5th nationwide — Teknofest 2023 AI in Healthcare (Team Engineer Docs).
- Ranked 633rd among ∼2M participants — National University Entrance Exam (2018).

Academic Duties

- **Reviewer** — *Medical Image Analysis (MEDIA)* and *IEEE Transactions on Medical Imaging (TMI)* (2025–present).
- **Invited Talk** — "Learning Types: Classical to Deep," *Artificial Intelligence in Dermatology*, 2025.

Teaching & Leadership

Head Teaching Assistant — EEE 202 Circuit Theory Aug 2023 – Jun 2026
Bilkent University *Ankara, Turkey*

- Led laboratory sessions, graded coursework, supervised projects, and coordinated a team of 14–16 TAs each semester.
- Prepared and updated lab materials; managed course administration.

President Jan 2022 – Jul 2023
Bilkent Programming Club & Autonomous Systems Team *Ankara, Turkey*

- Managed official affairs and events; conducted tutorials on **Machine Learning** and **VHDL**.
- Led university autonomous car efforts: traffic sign detection & classification, data labeling, and model training pipelines.

Technical Skills

Programming: Python, MATLAB, VHDL, Verilog
ML Frameworks: PyTorch, HuggingFace Transformers, MONAI
Embedded/Systems: Vivado, Vitis, Petalinux, FreeRTOS, OpenAMP, Libmetal
Languages: English (Proficient), Turkish (Native), German (Elementary)

Selected Projects

Visual Odometry Navigation | *Python, PyTorch* Nov 2022 – Jun 2023

- Developed robot navigation integrating visual odometry, IMU, and GNSS; senior project in collaboration with **ROKETSAN**.