

Atakan Topcu

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Research Interests

- Computational Imaging
- Magnetic Resonance Imaging
- Deep Learning
- Signal Processing
- Magnetic Particle Imaging
- Optimization

Education

- 2022–2025 **Bilkent University**, Ankara, Turkey
M.Sc., Electrical and Electronics Engineering, **CGPA** :3.91/4.00
Advisor: Prof. Emine Ulku Saritas, Prof. Tolga Cukur
- 2018–2022 **Bilkent University**, Ankara, Turkey
B.Sc., Electrical and Electronics Engineering, **CGPA** :3.79/4.00
Graduated with Research Excellence and *Summa Cum Laude*
- 2019–2022 **Bilkent University**, Ankara, Turkey
Minor, Philosophy

Honors & Awards

- 2022–2025 **Scientific and Technological Research Council of Turkey**, Monthly stipend and accommodation support during M.Sc. (project no: 122E162)
- 2022–2025 **Bilkent University, Graduate Scholarship**, Full tuition waiver and stipend during M.Sc.
- 2022 **Research Excellence Award**, From Bilkent University, Faculty of Engineering
- 2021 **Social Justice and Sustainability Award**, Received 2021 STS Sustainability Award from Bilkent University, Faculty of Engineering. [Link](#)
- 2018–2022 **High Honor Student at Bilkent University**
- 2019–2022 **Bilkent University Merit Scholarship**, 80% tuition waiver during B.Sc.
- 2016 **International Genetically Engineered Machine (iGEM) Golden Award**, Nominated for Best Education, Best Applied Design & Public Engagement among 299 teams from 40+ countries, organized by iGEM Foundation. [Link](#)
- 2015–2018 **METU High-school Merit Scholarship**, 70% tuition waiver

Publications

Peer-Reviewed Conference Proceedings

A. Topcu, A. Alpman, M. Utkur and E. U. Saritas, "Vicinity Effects of Field Free Point on the Relaxation Behavior of MNPs" 2022 11th International Workshop on Magnetic Particle Imaging (IWMPi), 2022. [Link](#)

Work & Research Experience

Research Experience

2022 – **Research Assistant**, NATIONAL MAGNETIC RESONANCE RESEARCH CENTER

Present Focusing on both Diffusion Magnetic Resonance Imaging (dMRI) and Magnetic Particle Imaging (MPI). In dMRI, I focus on novel unsupervised frameworks for dMRI reconstruction, do multi-shell dMRI analysis of optical nerves, and also, experiment for new MRI contrast agents in collaboration with other departments/universities. In MPI, I focus on the relaxation dynamics of magnetic nanoparticles in MPI and its contrastive effect on image acquisition.

2020 – 2022 **Undergraduate Researcher**, NATIONAL MAGNETIC RESONANCE RESEARCH CENTER

Analyzed the DC magnetic field effects on the relaxation behavior of magnetic nanoparticles (MNPs) and analyzing how they alter Magnetic Particle Imaging (MPI) signal properties using Magnetic Particle Spectroscopy (MPS).

Teaching Experience

2022-Present **Teaching Assistant**, BILKENT UNIVERSITY, Electrical and Electronics Engineering Department

○ EEE 211: Analog Electronics

○ EEE 212: Microprocessors

Work Experience

June 2021 – **Engineering Intern**, ROKETSAN

July 2021 Developed a LabVIEW program in RS-485 protocol with an easy-to-use interface for testing the Electronic Safety Arming and Ignition Unit that is responsible for the safety of warhead, rocket engine and other components of a missile.

Conferences & Presentations

International Workshop on Magnetic Particle Imaging

May 2022 **Oral Presentation**

Oral Presentation for the paper: Vicinity Effects of Field Free Point on the Relaxation Behavior of MNPs

Bilkent Graduate Research Conferences

Jan 2023 **Poster Presentation**

Poster Presentation for Relaxation Dynamics of MNPs in Magnetic Particle Imaging

Jan 2024 **Oral Presentation**

Oral Presentation for the paper: Physics-Guided Unsupervised Neural Implicit Representation for Accelerated Diffusion MRI

Selected Academic Projects

2023 **Self-Supervised Multimodal Image Super Resolution in StyleGAN2 Manifold**

Proposed a way to further upgrade the PULSE framework which already does a self-supervised image super-resolution by traversing the real image manifold. Optimized the code for PULSE with StyleGAN2 and multi-shot image generation as well as adjustable random noise layers for image style diversity. ([GitHub Link](#))

2023 **Double Inversion Recovery (DIR) for SSFP**

Implemented Double Inversion Recovery (DIR) for balanced and non-balanced SSFP using open source Pulseseq framework. The designed pulse sequence is tested and implemented on UMRAM's Siemens MAGNETOM Trio 3T MRI. ([GitHub Link](#))

2022– 2023 **Comparative Study of Medical Image Segmentation Algorithms**

Implemented four classic segmentation tasks: K-means clustering, Mean-shift clustering, GrabCut, and Conditional Random Field (CRF) for brain tumour segmentation using Medical Segmentation Decathlon dataset. ([GitHub Link](#))

2021– 2022 **Comparative Study of Image Captioning Methods**

A fused computer vision and natural language processing framework was implemented using Tensorflow for the task of producing meaningful captions for a given natural image. Proposed model includes variations of CNN, LSTM, GRU and RNN models. ([GitHub Link](#))

2021– 2022 **Deep Learning for Multi-Coil Undersampled MRI Reconstruction**

CycleGAN model was implemented for generating a robust MRI image from undersampled multi-coil MRI data and compared with classical approaches (SENSE and SPIRiT) using the fastMRI database. ([Youtube Link](#))

Skills

Programming Python, MATLAB, VHDL, LabVIEW, Assembly, C

Frameworks PyTorch, TensorFlow, NumPy, Matplotlib, OpenCV, Git

Tools \LaTeX , Conda, Adobe Photoshop, Adobe Illustrator, Docker, DICOM, FSL, MRtrix3

Languages Turkish (native), English (fluent), German (intermediate), Korean (beginner)