

Ecem Şimşek

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Research Interests

- Graph Signal Processing
- Time Series Analysis
- Graph Representation Learning
- Natural Language Processing

Education

Bilkent University

Master of Science in Electrical and Electronics Engineering

Supervisor: Assoc. Prof. Aykut Koç

GPA: 3.67/4.00

Aug. 2023 - Present

Ankara, Turkey

Bilkent University

Bachelor of Science in Electrical and Electronics Engineering

GPA: 3.20/4.00

Sep. 2018 - Jun. 2023

Ankara, Turkey

Publications

Journal Papers

1. **E. Şimşek**, H. M. Özaktaş and A. Koç, “Fractional-Fourier Guided Visibility Graphs,” to be submitted to *IEEE Signal Processing Letters*.
2. **E. Şimşek**, A. Topcu, E. Koç, E. Ü. Sarıtaş and A. Koç, “Emotion Classification with Visibility Graphs,” *IEEE Signal Processing Letters*, vol. 32, 2025. DOI: 10.1109/LSP.2025.3567033.

Conference Proceedings

1. **E. Şimşek**, E. Koç and A. Koç, “EpiGraphNet: Epilepsy Recognition Architecture with Graph-Based EEG Analysis,” in *Proc. 33rd IEEE Signal Processing and Communications Applications Conf. (SIU)*, 2025. DOI: 10.1109/SIU66497.2025.11111837.
2. E. Koç, İ. Şanlı, **E. Şimşek**, H. Özekin and A. Koç, “Automatic Detection of Basic Level Categories,” in *Proc. 33rd IEEE Signal Processing and Communications Applications Conf. (SIU)*, 2025. DOI: 10.1109/SIU66497.2025.11112453.
3. **E. Şimşek**, A. Güngör, Ö. Karavelioğlu, M. T. Yerli and N. G. Kuyumcuoğlu, “Wind Power Prediction Using Machine Learning and Deep Learning Algorithms,” in *Proc. 31st IEEE Signal Processing and Communications Applications Conf. (SIU)*, 2023. DOI: 10.1109/SIU59756.2023.10223936.

Honors & Awards

Fulbright Ph.D. Scholarship: Selected as a Principal Candidate for a two-year award (2026–2028) supporting the first two years of Ph.D. studies in the United States.

5-Minute Thesis Competition Award in IEEE SIU 2025: Awarded first place in the 5-Minute Thesis (5MT) Competition (Master’s category) at the 33rd IEEE SIU Conference at Işık University (June 25–28, 2025).

Türk Telekom & Information and Communication Technologies Authority: Awarded 5G and Beyond Joint Graduate Support Programme, a merit-based fellowship of monthly stipend during M.Sc.

Graduate Research Scholarship: Scientific and Technological Research Council of Turkey, monthly stipend as M.Sc. researcher on a funded project.

Bilkent University, Comprehensive Graduate Scholarship: Full tuition waiver, a monthly stipend, and accommodation support during M.Sc.

National Magnetic Resonance Center Scholarship: Granted a scholarship from National Magnetic Resonance Center under the Student Work Program as an Electrical and Electronics Engineering research intern.

High School Scholarship: Graduated third from I.D.F. Bilkent Middle School and awarded a full academic scholarship covering all four years of high school education at I.D.F. Bilkent High School.

Academic Experiences

Graduate Research Assistant 2023 - present

National Magnetic Resonance Research Center, KocLab, Bilkent University

Graduate Teaching Assistant 2023 - present

Bilkent University

- EEE 493-494: Industrial Design Project

Undergraduate Teaching Assistant 2018 - 2023

Bilkent University

- EEE 342: Feedback Control Systems
- CS 115: Introduction to Python Programming

Undergraduate Research Student 2022 - 2023

KocLab, National Magnetic Resonance Center, Bilkent University

- Implemented graph neural networks for text classification.
- Experimented with large language models such as BERT and RoBERTa.

Undergraduate Research Intern 2020 - 2021

National Magnetic Resonance Center, Bilkent University

- Implemented high-speed conversion of two analog signals using VHDL on a VC707 FPGA board.
- Transferred digitized data to memory via Direct Memory Access (DMA) for efficient handling.

Technical Skills

Programming: Python, MATLAB, HTML, CSS, Assembly, C

Frameworks: Pytorch, Pytorch-Geometric, Streamlit, Tensorflow, HuggingFace

Tools: $\LaTeX$, Bash, VSCode

Industrial Experience

5G VATS R&D Associate Feb. 2025 - Present

Türk Telekom Inc.

- Research on combining machine learning, classical signal processing, and graph neural networks in the context of 5G.

Electrical and Electronics Engineering Intern Jun. 2021 - Jul. 2021

ASELSAN

- Designed and tested a small-scale camera system using both analog and digital lenses.
- Implemented image and video acquisition, performance optimization, and motor driver integration for the digital camera lens.
- Developed Python programs to control zoom and focus functionalities.