# Eda Bayram

Dublin, Ireland


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| Professional Summary | AI Researcher with PhD in computer science and +10 years of research and engineering experience in both academic and industry settings. Passionate about research in cognitive science.<br>Proven expertise in implementation of ML models with a strong focus on graph machine learning, knowledge graph reasoning, and explainable AI. Skilled in Python and DL frameworks (PyTorch, TensorFlow) with git and issue tracking systems.<br>Experienced in designing GenAI assistants, context-aware LLM reasoning with prompt engineering, RAG, fine-tuning with LLM frameworks.<br>**Languages:** Turkish (native), English (fluent), French (B1), German (A2)<br>CliftonStrengths: Discipline \| Learner \| Input \| Relator \| Intellection |

## Education

**Nov 2025 - Sep 2023** (Part Time)

MSc, Cognitive Sciences

**University College Dublin (UCD)**, Ireland

- Course work and projects in the cross-disciplinary field of psychology, neuroscience, linguistics, philosophy and artifical intelligence,
- Essays on neuropsychological cases on perception and action, enactive social cognition, dissociative theory of consciousness: access vs phenomenal consciousness, phenomenalism vs illusionism.

**Dec 2021 - Apr 2017**

PhD, Computer Science

**École Polytechnique Fédérale de Lausanne (EPFL)**, Switzerland

- Research projects on *Graph Representation Learning*, *Knowledge Graph Completion*, *Statistical Inference with Graphical Models*, *Graph Signal Processing*,
- Teaching assistant in courses *Digital Signal Processing*, *Network Data Science*,
- Supervision of master students' semester projects in *Graph Signal Processing*, *Graph Representation Learning*,
- Courses: *Optimization for Machine Learning*, *Computational Optimal Transport*, *Network Data Science*, *Teaching Science Engineering*,
- Thesis study: *Representation Learning on Multi-relational Data*, Advisor: Prof. Pierre Vandergheynst.

**Feb 2017 - Sep 2014**

MSc, Electrical and Electronics Engineering (Honor Student)

**Middle East Technical University (METU)**, Turkey

- Specialization on adaptive signal processing with courseworks on linear algebra, optimization, machine learning, computer vision and image processing
- Thesis study on exploitation of spectral graph theory and graph signal processing frameworks for the analysis of 3D LiDAR point clouds under co-supervision of Prof. Aydın Alatan and Prof. Elif Vural.

**Jun 2013 - Sep 2009**

BSc, Electrical and Electronics Engineering (Honor Student)

**Middle East Technical University (METU)**, Turkey

- Senior year specialization on telecommunications and signal processing
- Graduation project: Interior route-finding, wearable assistive device for visual-defective people

## Employment

**Present - Nov 2024** — AI Researcher
**Huawei Ireland Research Center, Dublin**, Ireland

- At Smart Network Innovation (SNI) Lab, researched and engineered AI models for digital twin technology in the telecom industry, covering wireless, optical fiber, and IP networks.
- Developed and evaluated generative models for synthetic data generation and simulation of real-world network events.
- Investigated world models (action-conditioned generative models) and physics-informed neural networks for applications in physical AI.
- Explored digital twin–AI agent interactions to improve simulation fidelity, scalability, and adaptability.
- Designed and deployed interactive prototype web applications using Streamlit, enabling stakeholders to visualize, test, and validate AI-driven simulations in real time.

**Oct 2024 - Feb 2022** — AI Researcher
**Accenture Labs, Dublin**, Ireland

- Research in graph ML and explainable AI in biomedical applications with university collaborations towards paper submissions to machine learning and data mining conferences
- Implementation of code base, proof of concept and prototypes for query answering systems on biomedical databases, knowledge graph embedding learning for multi-hop link prediction
- Patent submissions and supervision of PhD intern students with research on neuro-symbolic models for explainability, transparency and computation-memory-parameter efficiency with ontology-driven graph representation learning
- Designed prototypes of GenAI assistants with context-aware LLM reasoning using prompt engineering, fine-tuning, tool-use and RAG applications with LLM frameworks (GPT, Lama, Autogen, LangChain).

**Jan 2017 - May 2015** — System and Design Engineer
**Aselsan SST (R&D Defense Industry)**, Turkey

- Research and development of target tracking algorithms for day-TV and thermal camera systems.

**Apr 2015 - Jul 2013** — Software Engineer
**Aselsan MGEO (R&D Defense Industry)**, Turkey

- Software design and development for the communication of the peripheral modules in embedded systems.

## Publications

- Izzy Newsham, Eda Bayram, Luca Costabello, "Subgraph Imputation for Open Query Answering in Incomplete Knowledge Graphs", preprint under review, 2023.
- Eda Bayram, "Representation Learning for Multi-relational Data", *Doctoral Thesis*, EPFL, Dec 2021.
- Eda Bayram, "Propagation on Multi-relational Graphs for Node Regression", *International Conference on Complex Networks and Their Applications, 2021.* Springer
- Eda Bayram, Alberto Garcia Duran and Robert West, "Node Attribute Completion on Knowledge Graphs with Multi-Relational Propagation", *ICASSP - IEEE International Conference on Acoustics, Speech and Signal Processing, 2021*
- Eda Bayram, Dorina Thanou, Elif Vural and Pascal Frossard, "Mask Combination of Multilayer Graphs for Global Structure Inference", *IEEE Transactions on Signal and Information Processing over Networks 6 : 394-406*, 2020

- Eda Bayram, Pascal Frossard, Elif Vural and Aydin Alatan, "Analysis of airborne LiDAR point clouds with spectral graph filtering", *IEEE Geoscience and Remote Sensing Letters 15.8 : 1284-1288.*, 2018
- Eda Bayram, Elif Vural, and Aydin Alatan. "A graph signal filtering-based approach for detection of different edge types on airborne lidar data" *Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing XIII. Vol. 10429. International Society for Optics and Photonics*, 2017.
- Eda Bayram, "Spectral Graph Based Approach for Analysis of 3D LiDAR Point Clouds" *Master Thesis, METU*, Ankara, 2017.

## Patents

- Eda Bayram, Luca Costabello "Ontology-Driven Parameter-Efficient Representations for Knowledge Graphs", *U.S. Patent Application* 18/161,260 filed in January 30, 2023
- Eda Bayram, Adrianna Janik "Rule-based hypothesis refinement module for link prediction systems", *U.S. Patent Application* 18/356,832 filed in July 21, 2023
- Adrianna Janik, Eda Bayram, Alberto Bernardi "Explanations for Knowledge Graph Embedding Models Based on Game Theory", *Italian Patent Application* 102023000017535 filed in August 23, 2023

## Academic Cohorts

### Invited Talks

- Participation and presenter in *IEEE SPS/EURASIP Summer School in Network and Data-Driven Learning Fundamentals*, May 2019, Lecce, Itay
- Seminar on *Structure Inference* @ METU, OGAM, Jan 2020, Ankara, Turkey
- Presenter in *2020 IMPRS-IS PhD Symposium* @ The International Max Planck Research School for Intelligent Systems, Tubingen, Germany
- Lightning Talk @ *WiDS Cambridge 2021* virtual conference
- Participation and presenter in *IJCLR 2021 Workshop: Statistical Relational AI (StarAI)*

### Events Organized

- Organization team member of *3rd Graph Signal Processing Workshop – GSP'18* at EPFL, Switzerland
- Volunteer in the organization of *SIGKDD'20*, virtual conference
- Volunteer in the organization and presenter in *WiML 2020* @NeurIPS virtual conference
- Program committee member of *Workshop on Graph Neural Networks and Systems – GNNSys'21* @ MLSys virtual conference
- Organizer and presenter of *Tutorial: Knowledge Graph Embeddings for NLP: From Theory to Practice (KGE4NLP)* @ COLING 2022, Gyeongju, Republic of Korea

### Service

- Reviewer for IEEE-TSIPN 2020 *Transactions on Signal and Information Processing over Networks*
- Research Fellowship in *DAAD AINet 2021*, German Academic Exchange Service (DAAD)
- Participation in the mentoring program organized by *Fix the Leaky Pipeline* @ ETH domain
- Reviewer for *Learning on Graphs (LoG) Conference 2022*
- Reviewer for *SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2023*
- Reviewer for *Learning on Graphs (LoG) Conference 2023*