Emir Ceyani

Ph.D. Candidate in Electrical & Computer Engineering, University of Southern California

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Research Interests

- AI For Science & Engineering
- Bayesian Methods
- Generative Flow Networks
- Federated Learning
- Graph Neural Networks
- Uncertainty Quantification

Education

University of Southern California, PhD in Electrical & Computer Engineering **Jan 2021 – Jul 2026**
Thesis: Recent Advances in GNN Training: Federation, Personalization, and Applications *Los Angeles, CA*

Bilkent University, MSc in Electrical Engineering **Jun 2018 – Dec 2020**
Thesis: Spatiotemporal Forecasting over Graphs with Deep Learning *Ankara, Turkiye*

Bilkent University, BSc in Electrical Engineering **Sep 2013 – Jun 2018**

Research Experience

University of Southern California, Graduate Research Assistant **Jan 2021 – Present**

- **Federated Graph Learning:** Proposed the problem of training of graph neural networks in a federated setting and released the first benchmarking study to the literature. Improved personalization of federated graph neural networks (AAAI'22,SIAM-SDM'25.)
- **AI-Based Analog & RF Circuit Design:** Designing graph neural networks and transformers to automate analog and RF circuit design process including topology selection, layout optimization, and AI-guided circuit design (NeurIPS'25.)
- **Theory & Applications of Generative Flow Networks:** Researching on the fundamentals and the applications of generative flow netowkrs (GFlowNets) including sample efficiency, exploitation-exploration tradeoffs, and applications to hyperbolic geometry and federated learning(SIAM-SDM'25.)
- **Federated MRI Image Synthesis:** Designed the personalized & federated image generation framework using generative adversarial networks for the first time in the literature(MIA'24, IEEE TMI'23, ISBI'23. ISMRM'23.)
- **Conformal Prediction for LLMs:** Developing uncertainty-aware LLM fine-tuning methods based on conformal prediction for close-ended and open-ended tasks to reduce the need of calibration data and extra post-hoc calibration step meanwhile improving learned representations.

TensorOpera AI (formerly FEDML AI), Research Scientist Intern **May 2022 – Aug 2022**

- **FedGraphNN:** Developed a secure & private data sharing platform for graph neural networks.

Turkcell Technologies, Research & Development Engineer **Oct 2018 - Dec 2020**

- **Spatiotemporal Forecasting with ConvLSTMs:** Developed and deployed a spatio-temporal forecasting algorithm with convolutional LSTM models.

Honors & Awards

- **Top Reviewer** for **NeurIPS'25**.
- **Finalist** for **Qualcomm Innovation Fellowship 2025**.
  Abstract Title: AI Powered Revolution: Automating Analog and Radio Frequency Circuit Design
- **2025 SIAM Travel Award** for SIAM-SDM'25 conference.
- **Travel & accommodation grant** for **PRAIRE AI 2019 summer school**.
- **Travel & accommodation grant** for **Deep|Bayes 2019 summer school** (**Acceptance rate:** $\leq$ **30%**.)
- Funded through **5G and Beyond Joint Graduate Support Program** during M.Sc. studies by Information Technologies and Communication Authority(ICTA) (**First recipient**).
- **Full Scholarship** from Bilkent University for M.Sc. studies.
- **Research Excellence Award** by Bilkent University Electrical and Electronics Engineering Department.
- Bilkent University **High Honor student** during all semesters.
- Ranked in **top 2000** among 2M high school graduates in University Entrance Examinations(YGS/LYS), 2013.

Publications

Published and Accepted Journal Publications

[1] O. Dalmaz, U. Mirza, G. Elmas, M. Özbey, S. Dar, **E. Ceyani**, S. Avestimehr, and T. Çukur, "One model to unite them all: Personalized federated learning of multi-contrast MRI synthesis." In *Medical Image Analysis*,Volume 94, May 2024, 103121.

[2] G. Elmas, S. Dar, Y. Korkmaz, **E. Ceyani**, B. Susam, M. Ozbey, **A.S Avestimehr** , T. Cukur." Federated Learning of Generative Image Priors for MRI Reconstruction." in *IEEE Transactions on Medical Imaging*, July 2023.

Publications in Conference Proceedings & Workshops (Peer-Reviewed)

[1] A. Mehradfar, X. Zhao, X., Y. Huang, , **E. Ceyani**, Y. Yang, S. Han, H. Aghasi, & S. Avestimehr (2025). FALCON: An ML Framework for Fully Automated Layout-Constrained Analog Circuit Design. Accepted to NeurIPS'25," 2025.

[2] **E. Ceyani**, H. Xie, B. Buyukates, C. Yang, and **S. Avestimehr**. "FedGrAINS: Personalized Subgraph Federated Learning with Adaptive Neighbor Sampling." In *SIAM International Conference on Data Mining (SDM25), 2025.* (oral presentation, acceptance rate: 26.7%)

[3] O. Dalmaz, U. Mirza, G. Elmas, M. Özbey, S. Dar, **E. Ceyani**, S. Avestimehr, and T. Çukur, "A Personalized Federated Learning Approach for Multi-Contrast MRI Translation," in 31st annual meeting of International Society for Magnetic Resonance Imaging (ISMRM), Toronto, Canada, June 2023.

[4] O. Dalmaz, U. Mirza, G. Elmas, M. Özbey, S. Dar, **E. Ceyani**, S. Avestimehr, and T. Çukur, "Personalized, Federated, And Unified MRI Contrast Synthesis," in IEEE 20th International Symposium on Biomedical Imaging (ISBI), Virtual Conference, Apr. 2023. (Presented online)

[5] O. Dalmaz, U. Mirza, G. Elmas, M. Özbey, S. Dar, **E. Ceyani**, S. Avestimehr, and T. Çukur, "pFLSynth: Personalized Federated Learning of Image Synthesis in Multi-Contrast MRI," in NeurIPS Medical Imaging Meets, Virtual Conference (oral), Dec. 2022. (Presented online)

[6] **E. Ceyani*** , C. He* , K. Balasubramanian*, M. Annavaram, and A.S. Avestimehr, "SpreadGNN: Serverless Multi-task Federated Learning for Graph Neural Networks," accepted to *AAAI,* 2022. (acceptance rate of 15%) (co-first)

[7] **E. Ceyani*** , C. He*, K. Balasubramanian*, C. Yang, H. Xie, L. Sun, L. He, L. Yang, P. S. Yu, Y. Rong, P. Zhao, J. Huang, M. Annavaram, and A.S. Avestimehr, " FedGraphNN: A Federated Learning System and Benchmark for Graph Neural Networks," in *DPML workshop at ICLR and GNNSys workshop at MLSys*, 2021.

[8] Ergen, Tolga, and **Emir Ceyani**. "A highly efficient recurrent neural network architecture for data regression." 2018 26th Signal Processing and Communications Applications Conference (SIU). IEEE, 2018.

Working Papers

[1] **E. Ceyani**, V.S. Gummadi, R. Kapadia and **S. Avestimehr**. "Amortizing intractable inference in LLM-Guided Bayesian Optimization for Accellerated AI-Driven Scientific Discovery,"

[2] **E. Ceyani**, X. Zhu, S. Prakash, S. Lahlou, C. Yang, & **S. Avestimehr** "Reward-Driven Graph Synthesis for Cross-Silo Federated Learning Using GFlowNets,"

[3] **E. Ceyani**, S. Prakash, S. Lahlou, C. Yang, **S. Avestimehr** "Hyperbolic GFlowNets for Reward-Driven Graph Generation in Hyperbolic Spaces," .

Professional Service

- **Reviewer:** ICLR'24, NeurIPS'22,'23,'25(Main & Dataset and Benchmark Tracks), AAAI'26, Federated Learning with Graph Data (FedGraph2022-2023), CrossFL-MLSYS'22, IEEE Transactions of Neural Networks and Learning Systems, IEEE Transactions of Big Data
- **Organizer & Technical Committee Member:** 1st & 2nd International Workshops on Federated Learning with Graph Data, Techincal Program Committee Member at the CrossFL Workshop, MLSYS2022
- **Summer Schools Attended**: LOGML'22 Summer School, ProbAI 2021 Summer School, PAISS Summer School'19, Deep—Bayes'19 Summer School

Teaching Experience

University of Southern California, Graduate Teaching Assistant **Aug 2023 – May 2025**
California, United States

- Head Teaching Assistant for EE364: Introduction to Probability & Statistics for Electrical Engineers
  Fall 2024 (Instructor: Salman Avestimehr), Spring 2025 (Instructor: Michael Neely)
- Head Teaching Assistant for EE547: Applied Cloud Computing for Electrical Engineers
  Fall 2023 (Instructor: Brandon Franzke)

ProbAI Summer School, Voluntary Teaching Assistant **Summer 2021**
Remote

Bilkent University, Graduate Teaching Assistant **Sep 2018 – Dec 2020**
Ankara, Turkiye

- Grader for EEE443/543 - Neural Networks
- Teaching Assistant for EEE 424- Digital Signal Processing
- Teaching Assistant for EEE 321 - Signals & Systems
- Teaching Assistant for EEE 493/494 - Industrial Design Project I/II

Technical Skills

Programming Languages: Python, Matlab, Java, C++, Julia
Developer Tools: LaTeX, VS Code, Jupyter, Inkscape
Technologies/Frameworks: Linux, PyTorch, PyTorch Geometric, TensorFlow, NumPy, Matplotlib, Pandas, Github

Hobbies

Playing Bass, 8-ball pool, Trading card games, Martial arts, Travelling, Culinary arts