Emir Ceyani

PhD Student in Electrical & Computer Engineering, University of Southern California

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Research Interests

- Large Language Models
- Graph Neural Networks
- Generative Adversarial Networks
- Flow-Based Generative Models
- Conformal Prediction
- Uncertainty Quantification
- Federated Learning
- Bayesian Methods
- AI For Science & Engineering

Education

University of Southern California, PhD in Electrical & Computer Engineering — **Jan 2021 – May 2026**
Thesis: Federated Learning over Graphs. Advisor: Salman Avestimehr — *Los Angeles, California*

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**

- **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.
- **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.
- **Theory & Applications of Generative Flow Networks:** Researching on the fundamentals and the applications of generative flow netowkrs (GFlowNets) inclusind sample efficiency, exploitation-exploration tradeoffs, and applications to hyperbolic geometry and federated learning(*SIAM-SDM'25*)In collaboration with Prof. Salem Lahlou from MBZUAI.
- **Federated MRI Image Generation:** 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.*)
- **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 (*SIAM-SDM'25 & AAAI'22.*)

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

- **FedGraphNN:** Developed a secure & private data sharing platform for GNNs tailored for recommendation systems and drug discovery.

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

- **Qualcomm Innovation Fellowship 2025 North America:** Finalist as a group of two Ph.D. students with project title "AI Powered Revolution: Automating Analog and Radio Frequency Circuit Design."
- **2025 SIAM Travel Grant:** Awarded by the SIAM for the 2025 SIAM International Conference on Data Mining.
- **2018 5G and Beyond Joint Graduate Support Programme:** First-time scholarship . Under this program, I have collaborated with Turkcell Technology R&D Team.
- **Distinguished Graduate Fellowship, Bilkent University:** Awarded by the Department of Electrical and Electornics Engineering during MS.c. studies.
- **2018 Research Excellence Award, Bilkent University:** Awarded by the Department of Electrical and Electronics Engineering for research studies during BS.c. studies, May 2018.

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. UH. Dar, Y. Korkmaz, **E. Ceyani**, B. Susam, M. Ozbey, 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] **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.* (acceptance rate: 26.7%)

[2] 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.

[3] 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)

[4] 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)

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

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

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

Professional Service

- **Reviewer:** ICLR'24, NeurIPS'22-'23 (Main & Dataset and Benchmark Tracks), 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 Assistant**: ProbAI 2021 Summer School

Teaching Experience

University of Southern California, Graduate Teaching Assistant **Sep 2023 – Present**

- **EE364- Introduction to Probaility & Statistics for Electrical Engineering and Computer Science :**
  - Head Teaching Assistant during Fall'24 & Spring'25 semesters.
  - Guest Lecturer for the Fall'24 semester teavhing introduction to detection & estimation theory.

- **EE547 - Applied and Cloud Computing for Electrical Engineers**
  - Head Teaching Assistant

Bilkent university, Graduate Research Assistant **Sep 2018 – Dec 2020**

- **EE 443 - Neural Networks, Fall 2020**: Grader for course projects.
- **EE493/494 - Industrial Design Project I/II (Fall 2019 - Spring 2020)**
- **EE321 - Signals & Systems (Spring 2019):** Teaching assistant proctoring lab sessions and recitations.
- **EE 424- Digital Signal Processing (Fall 2018):** Head teaching assistant designing homeworks and recitations.

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, Cooking