# Farrin Marouf Sofian

fmaroufs@uci.edu | Github | Website | Google Scholar

## Education

**University of California, Irvine** — Irvine, CA
*PhD. Computer Science* — *9/2023 – 6/2028 (Expected)*

- Supported by Chan-Zuckerberg Initiative
- Working on state-of-the-art methods for controllability in diffusion models
- GPA: 3.96/4.0

**Koç University** — Istanbul, Turkey
*B.Sc in Computer Science — Mathematics Minor* — *9/2019 – 6/2023*

- Honors: Vehbi Koç Scholar for outstanding academic performance for 4+ semesters.

## Publications

**Variational Control for Guidance in Diffusion Models**
*K. Pandey*, **FM. Sofian***, *F. Draxler, T. Karaletsos, S. Mandt*
International Conference on Machine Learning (2025)
https://arxiv.org/pdf/2502.03686

**Control-Augmented Autoregressive Diffusion for Data Assimilation**
*P. Srivastava,* ***FM. Sofian****, F. Immorlano, K. Pandey, S. Mandt*
Pre-print (2025)
https://arxiv.org/pdf/2510.06637

**Parallel Token Generation for Language Models**
*F. Draxler, J. Will,* ***FM. Sofian****, T. Karaletsos, S. Mandt*
Pre-print (2025)
https://openreview.net/forum?id=AGJomYSrUG

**SonicDiffusion: Audio-Driven Image Generation and Editing with Pretrained Diffusion Models**
*BC. Biner,* ***FM. Sofian****, UB. Karakaş, D. Ceylan, E. Erdem, et al.*
ACM Transactions on Graphics (TOG) (2024)
https://arxiv.org/abs/2405.00878

**GECTurk: Grammatical Error Correction and Detection Dataset for Turkish**
*A. Kara,* ***FM. Sofian****, A. Bond, G. G. Sahin*
IJCNLP-AACL (2023)
https://arxiv.org/abs/2309.11346

* Denotes equal contribution.

## Work & Research Experience

**Graduate Researcher at Mandt Lab** — 2/2024 – Present
*University of California, Irvine* — *Irvine, California*

- Co-developed a variational-control framework for diffusion guidance, improving LPIPS by ≈ 35% over prior state-of-the-art baselines and reducing runtime by ≈ 86% on the best performing blind image deblurring baseline.
- Co-built the first control-augmented data-assimilation method for autoregressive diffusion models, cutting RMSE by up to 83% compared to the best performing baseline.
- Co-created a novel parallel-generation scheme for large language models, achieving up to 50x faster decoding by reducing sequential model calls while preserving teacher-level accuracy.

**Machine Learning Engineer Intern** 06/2024 – 09/2024
*Adobe* *San Jose, California*

- Developed and optimized a RAG pipeline for the AI assistant in Adobe Acrobat.
- Reduced input token costs by up to 73 cents per question across various datasets, significantly improving cost efficiency.
- Made the pipeline 9x faster compared to the previous version.
- Worked with SOTA RAG techniques and diverse PDF structures.

**Research Assistant at Computer Vision Lab** 9/2021 – 12/2023
*Koç University & İş Bank Artificial Intelligence Center* *Istanbul, Turkey*

- Conducted research in Turkey's most competitive AI lab. Worked on sound-guided image manipulation and generation as well as audio identification and re-synthesis projects.
- Leveraged Stable Diffusion while designing and implementing various adapter architectures for efficient audio conditioning.
- Tested multiple image inversion techniques to identify the method that best preserves image identity while facilitating editing.
- Conducted experiments and fine-tuned the framework with audio encoding models including AudioCLIP and CLAP, to assess their performance as audio encoders in the proposed framework.
- Conducted under the supervision of Dr. Duygu Ceylan and Prof. Aykut Erdem.

**Research Assistant at NLP Lab** 10/2022 – 7/2023
*KUIS AI lab* *Istanbul, Turkey*

- Created the first high-quality dataset of 130k parallel sentences in Turkish with 25 expert curated writing rules for grammatical error schema.
- Implemented and fine-tuned NMT baseline and sequence tagger model for grammatical error correction and detection.
- Worked with High Performance Computing (HPC) clusters and contributed on writing a detailed documentation on how to use HPC clusters for graduate students and companies.
- Published in IJCNLP-AACL 2023.

**Machine Learning Engineer Intern** 6/2022 – 9/2022
*RadiusAI* *Tempe, Arizona*

- Researched and proposed deep learning-based solutions for camera calibration, tailored to the company-specific scene geometry.
- Evaluated the effectiveness of deep learning as well as other traditional methods to solve the problem.
- Optimized the computation of a semantic segmentation scores matrix by nearly 50%, utilizing dynamic programming in the pre-processing step.
- Created the company's first fully automated camera calibration, reducing the company's reliance on expensive annotators.

## Projects

**Birds of Istanbul App** 5/2021 — 7/2022

- Led a group of 4 students and collaborated with a psychology department to create Turkey's first audio-based bird identification mobile application.
- Curated a dataset of 355k bird songs local to Turkey and pre-processed the audio using various models such as Sound Separation proposed by Google.
- Examined several self-supervised transformer-based audio models and fine-tuned them on the dataset.

**Audio Re-synthesis and Conversion** 1/2022 – 4/2022

- Performed extensive literature study to identify the best suitable model for converting voice of a species into another one.
- Fine-tuned 3 pre-trained encoders, utilizing VQ-VAE and HiFi-GAN as the content encoder and vocoder respectively, on a custom dataset.
- Trained and extracted species' sound embeddings from transformer-based audio encoder model.