

AYUSH BARIK

(424) 385-8111 $\diamond$ barik2@illinois.edu $\diamond$ ayushbarik.github.io

RESEARCH INTERESTS

Diffusion/Flow-Matching, Computer Vision, Audio, Algorithms, Inference, Systems for ML, Efficiency

EDUCATION

University of Illinois Urbana-Champaign

Aug. 2023 – May 2027

Bachelor of Science in Computer Engineering, GPA: 3.91/4.00

Illinois, USA

James Scholar Honors Student

Advised By Prof. Fan Lai, Prof. Francis Yan, and Prof. Romit Roy Choudhury

PUBLICATIONS & PREPRINTS

- SoundWeaver: Compositional Warm-Starting for Text-to-Audio Diffusion Serving**
Ayush Barik¹, Sofia Stoica¹, Nikhil Sarda², Arnav Kethana¹, Abhinav Khanduja¹, Muchen Xu¹, Fan Lai¹
¹UIUC, ²Assured Intelligence
(ICLR 2027 in-submission)
- VideoRAG+: Rethinking Graph-Structured Retrieval for Long Video Understanding**
Ayush Barik¹, Fan Lai¹, Francis Yan¹
¹UIUC
(CVPR 2027 submitting-soon)
- CHOIR: Generating High-Fidelity Room Impulse Responses Using Conditional Flows**
Chaitanya Amballa¹, Ayush Barik¹, Steve Lin¹, Jim Sun², Mehmet Ergezer², Vamshi Krishna Chillara², Wontak Kim², Romit Roy Choudhury^{1,2}
¹UIUC, ²Amazon
(ICASSP 2027 in-submission)
- FlashDiff: Efficient Regional Execution and Scheduling for Diffusion Model Serving**
Yaqi Qiao¹, Ping He², Songrun Xie³, Ayush Barik¹, Chensong Zhang⁴, Zhengzhong Tu⁵, Fan Lai¹
¹UIUC, ²Vanderbilt University, ³HKUST, ⁴Nvidia, ⁵Texas A&M University
(MLSys 2027 submitting-soon)
- RewardFlow: Generate Images by Optimizing What You Reward**
Onkar Susladkar¹, Dong-Hwan Jang¹, Tushar Prakash², Adheesh Juvekar¹, Vedant Shah¹, Ayush Barik¹, Nabeel Bashir¹, Muntasir Wahed¹, Ritish Shrirao¹, Ismini Lourentzou¹
¹UIUC, ²Sony
(CVPR 2026)
- Toward Engineering AGI: Benchmarking the Engineering Design Capabilities of LLMs**
Xingang Guo¹, Yaxin Li¹, Xiangyi Kong¹, ..., Ayush Barik¹, ..., Bin Hu¹
¹UIUC, ²University of Pennsylvania, ³UC San Diego, ⁴University of Michigan, ⁵Amazon AGI
(NeurIPS 2025)

PROJECTS

GPT-2 Inference Engine (CUDA)

Built GPT-2 Inference from scratch (attention, FFN, LayerNorm) and profiled on NVIDIA A40 GPUs; optimized with FlashAttention-2, KV caching, CUTLASS kernel fusion, double-buffering, and shared memory swizzling.

Real-Time Quantized Video Streaming on FPGA (SystemVerilog)

Real-time OV7670 camera feed rendered to HDMI from on-chip BRAM. SCCB controller configures the camera to output a quantized 12-bit RGB444 Quantized VGA stream. Everything composited in 813 LUTs at 0.35 W.

TEACHING

ECE 220: Computer Systems & Programming

Undergrad TA, University of Illinois Urbana-Champaign

Fall 2024, Spring 2025, Fall 2025

Illinois, USA

MATH 257: Linear Algebra w/ Computational Applications

Undergrad TA, University of Illinois Urbana-Champaign

Summer 2025

Illinois, USA

ECE 364: Programming Methods for Machine Learning

Undergrad TA, University of Illinois Urbana-Champaign

Fall 2025, Fall 2026

Illinois, USA

USA Computing Olympiad Tutor

Private Online Tutor

Fall 2024

Online

English Tutor

DMNAPK Rehabilitation Center for Young Girls

Spring 2022, Fall 2022

Dhaka, Bangladesh

SERVICE

Reviewer

ICLR (2027)

AWARDS

Illinois Engineering Achievement Scholarship

Fall 2024