Abhik Ahuja

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Education

University of Cambridge October 2023 – June 2024 (Expected)
Master's Advanced Computer Science
Focus: Deep Learning, Computer Graphics and Vision
Thesis: Automatic relighting of 3D scenes constructed from images using 3D Gaussian Splatting.

University of California, Berkeley August 2019 – May 2023
B.A. Computer Science, B.A. Mathematics
GPA: 3.85/4.0 (Distinction)
Focus: Machine Learning, Computer Vision, 3D Reconstruction

San Joaquin Delta College August 2015 – May 2019
A.S. Mathematics
GPA: 3.95/4.0 (High Honors)
Studied concurrently with high school. Earned 5 Associate degrees.

Research Experience

University of Cambridge October 2023 – Present
Advisors: Professor Rafał Mantiuk, Tianhao Wu, Fangcheng Zhong

- Researching automatic relighting of 3D models constructed from photos using 3D Gaussian Splatting.
- Using neural networks to predict scene surfaces and material reflectance to relight scenes.

Berkeley AI Research Lab (BAIR) July 2022 – September 2023
Advisors: Professor Angjoo Kanazawa, Matthew Tancik

- Built text-to-3D generative models using Neural Radiance Fields (NeRF) and 2D Diffusion models for **Nerfstudio**, an open source Python NeRF repository (Co-authored paper, published SIGGRAPH '23).
- Work used by major industry players including Netflix, Lucasfilm, BBC, etc. with over 7.9k stars on Github.

UC Berkeley SLICE Lab October 2020 – May 2022
Advisors: Professor Koushik Sen, Kevin Laeufer

- Co-authored paper for automatic bug repair in Verilog code using SMT solvers (Under review, ASPLOS '24).
- Wrote compiler pass for FIRRTL language in Scala to automatically repair logical loops in circuit designs, enabling automatic translation of circuits from Verilog to FIRRTL.

Cornell, Maryland, Max Planck Pre-Doctoral Research School August 2021
Saarbrücken, Germany

- One of 120 students worldwide selected to participate in CMMRS 2021, a week long program to expose students to computer science research and life as a researcher.
- Learned about topics in Deep Learning, Robotics, and Human Computer Interaction.

Industry Experience

Amazon May 2022 – August 2022
Seattle, WA
Software Development Engineer Intern

- Designed and built AWS deployment system, automating updates and enabling seamless product rollbacks.
- Wrote custom software versioning infrastructure using Java and DynamoDB, expanding capabilities and optimizing efficiency of deployment process for 3rd party partners.
- Enhanced product reliability and reduced deployment time by over 3x.

CDK Global June 2021 – August 2021
San Jose, CA
Software Engineering Intern

- Developed a React web portal to provide a user-friendly interface and optimize software testing workflow.
- Interfaced with JIRA APIs and Postgres database to store and connect data with 100s of internal testing APIs.

Publications

RTL-Repair: Fast Symbolic Repair of Hardware Design Code
Kevin Laeufer, Brandon Fajardo*, Abhik Ahuja*, Vighnesh Iyer, Borivoje Nikolic, Koushik Sen
Under submission to ASPLOS 2024.

Nerfstudio: A Modular Framework for Neural Radiance Field Development
Matthew Tancik*, Ethan Weber*, Evonne Ng*, Ruilong Li, Brent Yi, Justin Kerr, Terrance Wang, Alexander Kristofferson, Jake Austin, Kamyar Salahi, Abhik Ahuja, David McAllister, Angjoo Kanazawa
ACM SIGGRAPH, 2023.

Projects

- **Instruct-NeRF2NeRF4D**: Text-guided editing of 4D (dynamic) NeRF models. Uses iterative dataset updates by a 2D text-image Diffusion model to gradually edit a dynamic NeRF. (Python, PyTorch)
- **CUT-Video**: Contrastive Unpaired Translation for Video-to-Video Translation. Uses Generative Adversarial Networks (GANs) to translate video frames with added loss to reduce temporal artifacts. (Python, PyTorch)
- **DiffGEM**: Diffusion-guided editing of 3D GAN Models from a text prompt. Generates photorealistic 3D objects guided by user intent with higher prompt coherence and quality than prior methods. (Python, PyTorch)
- **VRNeRFs**: A virtual reality viewer for NVIDIA's Instant-NeRF library. (Python)
- **Linux System Administration**: Self hosts multiple services behind reverse proxy for personal use on personally owned and managed Linux server using Docker, Nginx, and Apache.

Technical Skills

- **Languages**: Python, Java, Javascript, Scala, C, C++, SQL, Golang, OCaml, RISC-V, HTML, CSS, LaTeX
- **Software**: PyTorch, SciPy, NumPy, Matplotlib, Linux, Docker, React, Flask, Git

Relevant Coursework

University of Cambridge
- R255: Advanced Topics in Machine Learning
- L352: Advanced Graphics and Image Processing
- L335: Machine Visual Perception
- L314: Digital Signal Processing

UC Berkeley
- CS 294-173: Learning for 3D Vision
- CS 194-26: Introduction to Computer Vision and Computational Photography
- CS 184: Computer Graphics and Imaging
- CS 182: Deep Neural Networks
- CS 189: Introduction to Machine Learning
- CS 188: Introduction to Artificial Intelligence
- CS 170: Efficient Algorithms and Intractable Problems

Teaching

MATH 198: Introduction to Origami Art and Design	Fall 2022, Spring 2023
CS/INFO 198: Digital Privacy	Fall 2021, Fall 2022, Spring 2023
CS 170: Efficient Algorithms and Intractable Problems	Spring 2021
CS 70: Discrete Mathematics and Probability Theory	Summer 2020, Fall 2020

Awards

2023: Graduation with Distinction	UC Berkeley
2019 - 2023: Shiram Scholars	$1000 USD/year scholarship program
2019: Graduation with High Honors	San Joaquin Delta College

Leadership

Introduction to Origami Art and Design 2022 - 2023
Co-Founder of the student-led Origami course at UC Berkeley. Created and taught curriculum on origami folding practice, design principles, and mathematical connections.

Digital Privacy 2021 - 2023
Co-Founder of the student-led Digital Privacy course at UC Berkeley. Created and taught curriculum on privacy legislation and individual action surrounding personal privacy.

CAL Origami 2019 - 2023

President of the origami club at UC Berkeley. Planned and hosted the East Bay Origami Convention in Spring 2023 to support the San Francisco Bay Area origami community.