Eric Ming Chen

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Education

Cornell University Fall 2020 - Spring 2024
B.S. in Computer Science (Honors)
Minor in Mathematics
Advisors: Abe Davis and Noah Snavely
Research Interests: 3D Computer Vision, Computer Graphics, Geometric Machine Learning

Research Experience

Pocket Time-lapse Summer 2023 - Present
Undergraduate Researcher with Prof. Abe Davis

- Building a method to create 3D time lapses from sparse hand-captured data.
- Designing a framework for users to control semantic and temporal variation of time lapses, allowing users to synthesize time lapses under new conditions.
- Mentoring an undergraduate in their first research project.

Topics: image synthesis, scene understanding, 3D content creation

Ray Conditioning [ICCV 2023] Fall 2022 - Spring 2023
Undergraduate Researcher with Prof. Abe Davis

- Introduced ray conditioning, a lightweight method for photo-realistic viewpoint control over generative models.
- Demonstrated that it is possible to train a GAN for view synthesis without a 3D geometry-based model.
- Illustrated that ray conditioning can outperform geometry-based methods in image quality for view synthesis.

Topics: 3D content creation, view synthesis, light fields

What's in a Decade? [Eurographics 2023] Spring 2021 - Spring 2022
Undergraduate Researcher with Prof. Hadar Averbuch-Elor and Prof. Noah Snavely

- Designed a framework to synthesize portrait photos across time, imagining how a person would look throughout 14 decades, and discovering trends in fashion and culture.
- Compiled a diverse dataset of 25,000+ historical people, along with detailed demographics and metadata.

Topics: style transfer, visual discovery, GANs

Riemannian Residual Neural Networks [NeurIPS 2023] Fall 2021 - Spring 2022
Undergraduate Researcher with Prof. Chris De Sa

- Introduced a general way to design ResNets on Riemannian manifolds.
- Constructed a Riemannian ResNet for hyperbolic space which outperforms previous work on link prediction and node classification for graphs.
- Demonstrated that our Riemannian ResNet for SPD matrices improves performance for time series classification.

Topics: Riemannian geometry, geometric deep learning, graph neural networks

Publications

1. **Eric M. Chen**, Sidhanth Holalkere, Ruyu Yan, Kai Zhang, Abe Davis, "Ray Conditioning: Trading Photo-consistency for Photo-realism in Multi-view image Generation," *ICCV 2023*
2. **Eric M. Chen**, Jin Sun, Apoorv Khandelwal, Dani Lischinski, Noah Snavely, Hadar Averbuch-Elor, "What's in a Decade? Transforming Faces Through Time," *Computer Graphics Forum (Eurographics) 2023*
3. Isay Katsman*, **Eric M. Chen***, Sidhanth Holalkere*, Anna Asch, Aaron Lou, Ser-Nam Lim, Chris De Sa, "Riemannian Residual Neural Networks," *NeurIPS 2023*

* Equal Contribution.

Leadership and Extracurriculars

Cornell University Artificial Intelligence (CUAI) Fall 2021 - Present

Co-President

Responsible for leading and mentoring a team of 16 undergraduate researchers. Fostering an environment for undergrad-led research. Organizing a weekly reading group on recent papers for undergrads.

Cornell Data Journal Fall 2020 - Fall 2021

Member

Wrote an article about how geometry and combinatorics are used for efficient COVID testing in Rwanda. [PDF]

Selected Coursework

CS 6630: Realistic Image Synthesis Spring 2022

- Built a path tracer with multiple importance sampling to render dielectrics and caustics.
- Created a volume renderer for hair and fur for the Cornell rendering competition. [Course Project PDF]
- Won a copy of Fundamentals of Computer Graphics signed by Steve Marschner!

CS 5643: Physically Based Animation for Computer Graphics Spring 2021

- Implemented a smoke animation simulator in Taichi. [Course Project PDF]
- Investigated how to use divergence-free neural fields to model smoke animation as an optimal transport problem.

Other courses: Interactive Computer Graphics, Matrix Groups, Theoretical Linear Algebra and Calculus

TA Experience

- Introduction to Computer Graphics (Fall 22, Fall 23)
- Numerical Analysis: Linear and Nonlinear Problems (Spring 22, Spring 23)
- Computational Mathematics for Computer Science (Fall 21)
- Object Oriented Programming and Data Structures (Spring 21)

Honors

- Rawlings Cornell Presidential Research Scholar, 2020
- Dean's List, 2020-2023

Talks

Enabling Control Over Large Image Collections

- MIT Scene Representation Group, Nov. 27, 2023
- Stanford Vision and Learning Lab, Dec. 7, 2023

Service

- Reviewer for CVPR 2024

Skills

Languages: Python, Julia, C++, Java, OCaml **Frameworks:** PyTorch, OpenCV, OpenGL, Taichi, Solidworks