Ruyu Yan

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EDUCATION

Princeton University   Princeton, NJ

Ph.D. in *Computer Science*   Aug 2023 - Present

- Research interest: AI for Content Creation, Computational Photography

Cornell University   Ithaca, NY

B.S. in *Computer Science* | *Minor* in *Psychology* | GPA: 3.96   Aug 2019 - May 2023

- Honors in Computer Science, *Magna cum laude*
- Dean's List of College of Engineering
- Davis United World College Scholar
- Cornell Bowers Computing and Information Science Dream Grant receiver (Fall 2021)

PUBLICATION

Ruyu Yan, Jiatian Sun, Longxiulin Deng, and Abe Davis. Recapture: Ar-guided time-lapse photography. UIST '22, 2022.

Eric Ming Chen, Sidhanth Holalkere, **Ruyu Yan**, Kai Zhang, and Abe Davis. Ray conditioning: Trading photo-realism for photo-consistency in multi-view image generation. IEEE/CVF International Conference on Computer Vision, 2023.

Ilya Chugunov, David Shustin, **Ruyu Yan**, Chenyang Lei, and Felix Heide. Neural spline fields for burst image fusion and layer separation. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2024.

Ruyu Yan, Jiatian Sun, and Abe Davis. Chromaticity gradient mapping for interactive control of color contrast in images and video. UIST '24, 2024.

EXPERIENCE

Adoble   New York, NY

Research Scientist/Engineer Intern   May 2024 - Aug 2024

- Lead research project in computational perspective editing at capture time.

Google   Sunnyvale, CA

Software Engineering Intern @ Chat iOS   Jun 2023 - Aug 2023

- Developed outbound sharing feature for the Chat iOS App that allows users to share messages from Chat to other Apps.
- Prototyped three UI designs of the sharing feature and interfaced with the UX team for the final decision.
- Designed data-layer API with publisher-subscriber pattern for asynchronously downloading files and authorizing media streaming.
- Integrated data privacy protection and user-facing error handling to the outbound sharing feature.

Cornell Vision and Graphics Lab — Ithaca, NY
Full-time Research Assistant — Aug 2022 - Dec 2022

- ○ Led the project of Color Gradient Curves, which aims to build an image/video processing system for performing edge-aware color tone mapping with a user-controlled notion of color contrast.
- ○ Researched color temperature approximation algorithm and how it relates to perceptual brightness, and employed it on extending the perceived dynamic range of HDR images.
- ○ Designed web interface for controlling non-linear adjustment on the color contrast with real-time visualization.
- ○ Developed multi-pass pipeline for efficient image and video processing using WebGL, OpenGL, and Halide.

Summer Geometry Initiative @ MIT — Remote
Research Fellow — Jul 2022 - Aug 2022

- ○ **Making Deep Implicit Fields Local**: Studied recent literature on implicit neural representations of 3D geometry, and experimented with different auto-decoder-based architectures to extend the expressiveness of local details for large scenes.
- ○ **Scene Mixing for 3D Point Clouds**: Developed various algorithms on dividing and re-assembling point clouds to generate new scenes with novel out-of-context environments.
- ○ **SE(3) Invariant and Equivariant Neural Network for Geometry Processing**: Implemented SE(3) invariant point cloud classifier with PyTorch by augmenting the vanilla PointNet architecture with frame averaging operator.

Academic Projects

ReCapture: AR-Guided Time-lapse Photography — Ithaca, NY
Research Assistant @ Abe Davis's Lab — Jun 2021 - Oct 2022

- ○ Researched an Augmented-Reality-based image sampling system for time-varying appearances, which helps the user create cool time-lapse video with sparse-sampled images using their mobile phone.
- ○ Independently developed an iOS APP that provides intuitive guidance for how to pose the camera. Applied graphics techniques such as homography and reprojection for visualizing the varying appearances of a scene across time and space.
- ○ Created a web interface using React and D3.js for visualizing image sample distribution and preview time-lapse videos.

Handheld Unstructured Time-lapse Reconstruction — Ithaca, NY
Research Assistant @ Abe Davis's Lab — Oct 2022 - Jan 2023

- ○ Implemented baseline time-lapse reconstruction pipeline with Gaussian convolution in the time domain, which allows image sorting and filtering by time, angle of sun, and image global features.
- ○ Applying structure from motion algorithms for extracting camera poses and depth maps from time-lapse image data. Researching representations for multi-plane time-lapse data and methods for smooth interpolation in latent domain.

Real-time 3D Renderer for Chinese Ink Painting — Ithaca, NY
Graduate Course Project — Apr - May 2022

- ○ Built a rasterization pipeline for rendering 3D scenes in the style of Chinese ink painting with interactive camera control.
- ○ Created a novel brush stroke detection and painting algorithm for adaptively drawing the silhouette and interior of objects, which realistically simulates the effects of ink diffusion and varying stroke width.

Monitoring Maize Phenotype with UAV Image via Computer Vision
Graduate Course Project

Ithaca, NY

Sep - Dec 2021

- Collaboratively research on extracting phenotype information of maize from aerial images and field data provided by the Robins Lab at Cornell University. Develop a self-supervised machine learning solution for differentiating genotypes of maize to support selective breeding.
- Applied signal analysis and feature matching methods to identify bounding boxes of crops in a field, and trained object detector for crops based on Faster-RCNN framework. Explored methods of embedding phenotype information with latent codes through variational auto-encoder.

Minibot Remote Control and Path Planning
Member of Cornell Cup Robotics

Ithaca, NY

Feb - Dec 2022

- Worked on the prototype of a programmable robot Minibot dedicated to youth programming and robotics education.
- Implemented remote control feature with Xbox Controller and positioning feature with IMU and rotary encoder. Designed path planning algorithms based on ultrasonic sensor and vision system, and developed a 2D graphics-based software simulator for testing.

SERVICE

Talks and Panels

- **Graphics/Vision Seminar @ Cornell**: Gave seminar presentation for the Cornell Graphics and Vision Lab on the topic of *Designing Interactive Tools for Users in Photography and Image Toning*.
- **UIST 2022**: Presented *ReCapture: AR-guided Time-lapse Photography* during the XR Applications paper session.
- **ACSU Research Night**: Shared research-related experience with over 100 undergraduate students interested in getting involved in computer science research.

Undergraduate Teaching Assistant

Ithaca, NY | Aug 2020 - May 2023

- **Record**: Introduction to Computing Using Python (Fall 2020, Summer 2021), Data Structures and Functional Programming (Spring 2021, Fall 2021), Introduction to Computer Vision (Spring 2022, Spring 2023), Introduction to Computer Graphics (Fall 2022)
- **Service**: Hold weekly office hours, answer questions on online discussion platform, and grade homework and exams.
  - * Advised student teams on their final projects of OCaml programming. Provided suggestions on collaborative programming practice, coding style, and interface design.
  - * Posed homework questions on image processing and supervised homework grading.

Rising Sophomore Summer Program in Computer Science

Ithaca, NY | Jul 2021 - May 2022

- **Program**: A four-week program that aims to broaden the participation of underrepresented minorities and first-generation college students in computer science through interactive learning, research exposure, and social engagement.
- **Service**: Worked as a teaching assistant for the functional programming course; peer mentored four students in two years; shared research experience as student panelist.

CURIE Academy

Ithaca, NY | Summer 2021

- **Program**: An one-week program that introduces high school girls to various disciplines in engineering.
- **Service**: Facilitated the lectures and labs in electrical and computer engineering and mentored student groups on IoT system development.

Hello World: Intro to Programming

Remote | Summer 2020

- **Program**: An one-week program that introduces high school girls to various disciplines in engineering.
- **Service**: Taught a short introductory course on programming using Scratch and Python remotely for over 80 students in Xinjiang, China.