

JIATIAN SUN

jjatians@cs.cornell.edu | 607-262-7831

EDUCATION

CORNELL UNIVERSITY

Ph.D. in Computer Science
expected May 2026
GPA 4.1/4.3

CARNEGIE MELLON UNIV.

B.S. in Computer Science
Minor in Machine Learning
Graduated May 2020
QPA 3.82/4.0

PUBLICATIONS

ACM SIGGRAPH | 2023

Eventfulness for Interactive Video
Alignment - J Sun, L Deng, T Afouras,
A Owens, A Davis

Frontiers in robotics & AI | 2021

Characterizing continuous manipulation
families for dexterous soft robot hands
- J Sun, JP King, NS Pollard

ACM UIST | 2022

ReCapture: AR-Guided Time-lapse
Photography - R Yan, J Sun, L Deng, A
Davis

SKILLS

C++ • C# • Python • Java • C • SML
OpenGL • DirectX • HLSL • MSL
Pytorch • Tensorflow • Unity • Maya •
Blender

TEACHING EXPERIENCE

at CORNELL UNIVERSITY

- Physically Based Animation for CG
- Intro to Computer Graphics

at CARNEGIE MELLON UNIV.

- Principles of Software Construction
- Principles of Functional Programming
- Intro to Computer Systems
- Concepts of Mathematics

LINKS

Github: [jjatiansun](https://github.com/jjatiansun)
LinkedIn: [linkedin.com/in/jjatians](https://www.linkedin.com/in/jjatians)
Website: jjatiansun.github.io

RESEARCH EXPERIENCE

Physically-based Fiber Assembly Modeling Fall 2023 - Present

Advised by Steve Marschner

Goal: Generate fiber assembly with physically-based fine-scale details. e.g. no fiber-fiber intersection, fiber shape variation that follows real-world data.

- Reproduced the dynamical simulator from *Discrete Elastic Rods* and validated its physical accuracy against existing real-world data.
- Measure the small-scale elastic properties of individual fibers by measuring their equilibrium shapes under different controlled settings and finding the elastic parameters that minimize the forces on those shapes.
- Build generative stochastic models that represent the distributions of elastic properties of collected fibers. Fibers with elastic properties sampled from the models can be used to formulate large assemblies of hair.

Eventfulness for Interactive Video Alignment Jan 2021 - Aug 2022

Advised by Abe Davis | website: cs.cornell.edu/abe/projects/eventfulness

Goal: Facilitate interactive video alignment tasks (e.g. audio-video alignment) by learning a visual event descriptor from the synthetically generated videos.

- Trained a deep neural network (modified 2+1D ResNet) to generate per-frame contextual embeddings with eventfulness (motion saliency) prediction of input videos as the objective. These embeddings enable downstream video alignment tasks, such as sound effect editing and video dandification.
- Designed an interactive interface through which users can search for salient events in a video with selected examples.
- Resolved data scarcity by synthetically generating video data and improved the generalizability of the model toward real-world videos through data augmentation.

WORK EXPERIENCE

ACTIVISION | Computer Graphics Intern | May 2021 - Aug 2021 | Metal Shading Language (MSL), DirectX, HLSL

- Achieved 4 times speedup of compute passes' performance on Apple devices by saving the intermediate results between render and compute passes in faster tile memory (for the game *Call of Duty: Vanguard*).
- Automatized conversion of HLSL compute shaders to MSL tile shaders by expanding an internal HLSL cross-compiler.

UNITY TECHNOLOGIES | Software Engineering Intern | May 2020 - August 2020 | C#, HLSL

- Created a physically accurate camera in Unity's High Definition Render Pipeline to render high-quality images for sensor-required AI training processes, e.g. autonomous driving. Specifically, the camera emulates:
 - ray-traced optics configured by lens stack table (DirectX Raytracing)
 - color filter array, demosaicing, and bilateral denoising process
- Implemented a new camera node in SystemGraph, a UI framework that visualizes mechanical objects in a physical system, to facilitate users' customization of the camera.