Jerry Hsu

University of Utah, PhD Student

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Education

Computer Science, PhD Student

University of Utah, GPA 4.00
Advisor: Prof. Cem Yuksel, Utah Graphics Group
Focus on computer graphics and simulations
2020 ~ current

Computer Science, B.S.
Mathematics, B.S.

Purdue University, GPA 3.81
2017 ~ 2020

Work Experience

Research Intern
Tencent Lightspeed & Quantum Studios
2022 Summer

- Performed research, implementation, and experimentation on state-of-the-art hair simulation methods.
- **Sag-free initialization** of said simulation performed by the inverse solve of hair rest configurations to counter sagging due to gravity.

Research Intern
Adobe Computational Artistry Team (CAT)
2021 Summer

- Performed research through mathematical derivation to implementation and experimentation.
- ***Intelligent adaptive splitting***: A representation independent way of optimizing over discrete parameters in vector graphics.
- Currently working on publishing.

Software Engineering Intern
Amazon Commerce Platform
2019 Summer

- Implemented diagnostic data processing on cloud systems for bill computation.
- Designed data chunking systems that reduced network transfer usage by 70% when accessed.

Technical

- Languages: C & C++, CUDA, GLSL/HLSL, C#, Mathematica, Matlab
- Familiar with: OpenGL, eigen3, SCS, ipopt, Intel MKL/Pardiso

Research & Publications

ACM SIGGRAPH 2022: A general two-stage initialization for sag-free deformable simulations

University of Utah, 2020 - 2022

- Jerry Hsu, Nghia Truong, Cem Yuksel, and Kui Wu. 2022. A general two-stage initialization for sag-free deformable simulations. ACM Trans. Graph. 41, 4, Article 64 (July 2022)
- Physically based simulations often suffer from sagging on initialization due to naïve assumptions on rest state and material parameters. This often requires artists to compensate manually and perform costly warmup simulations.
- This is a general framework to efficiently solve for sag free initializations applicable to cloth, FEM, MPM, and PBD based simulations.

Sag Free Initialization for Complex Hair Simulations

Tencent Lightspeed & Quantum Studios, 2022 - Present

- Currently working on publication.
- A continuation of the above work on sag-free initializations with the goal of addressing sag on complex hair simulations with full collision, friction, and many thousands of individual guide hairs.
- Hair simulation using XPBD Cosserat Rods coupled to a MPM continuum friction model.

Intelligent Adaptive Splitting for Vector Representations

Adobe, 2021 - Present

- Currently working on publication.
- Discrete parameters like the number of nodes in a Bezier curve are often optimized through handcrafted heuristics.
- This provides a theoretically sound and generalizable framework to intelligently perform discrete node additions (or splitting) on vector representations like splines, diffusion curves, or gradient meshes.
- Applications include curve fitting, image fitting, and adaptive simulations.

Yarn-Level Cloth Simulation

University of Utah, 2020

- An implementation of J. Kadors yarn-level cloth simulation with a couple of differences.
- Implicit backwards Euler time integration with Newton steps.
- Massively parallelized CUDA implementation from collision detection to sparse matrix creation and PCG solve.