

Wesley Chang

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Education

PhD in Computer Science @ University of California, San Diego

2022 - Present

- Advisors: Prof. Tzu-Mao Li and Prof. Ravi Ramamoorthi
- Topics: Differentiable and inverse rendering, inverse graphics, real-time rendering
- GPA: 4.0/4.0

BASc in Computer Engineering @ University of British Columbia

2017 - 2022

- Advisors: Prof. Toshiya Hachisuka and Prof. Derek Nowrouzezahrai (NSERC USRA, Waterloo URF), Prof. Tor Aamodt (UBC URA)
- Overall average: 92% (3.92/4.0, A+) - Ranked top 4 out of 98 students

Publications

Transforming Unstructured Hair Strands into Procedural Hair Grooms

Wesley Chang, Andrew L. Russell, Stephane Grabli, Matt Jen-Yuan Chiang, Christophe Hery, Doug Roble, Ravi Ramamoorthi, Tzu-Mao Li, and Olivier Maury

ACM Transactions on Graphics (Proceedings of SIGGRAPH 2025)

Vector-Valued Monte Carlo Integration Using Ratio Control Variates

Haolin Lu, Delio Vicini, **Wesley Chang**, and Tzu-Mao Li

ACM Transactions on Graphics (Proceedings of SIGGRAPH 2025)

Spatiotemporal Bilateral Gradient Filtering for Inverse Rendering

Wesley Chang*, Xuanda Yang*, Yash Belhe*, Ravi Ramamoorthi, and Tzu-Mao Li (*equal contribution)

SIGGRAPH Asia 2024 (Conference Track)

Real-Time Path Guiding Using Bounding Voxel Sampling

Haolin Lu, **Wesley Chang**, Trevor Hedstrom, and Tzu-Mao Li

ACM Transactions on Graphics (Proceedings of SIGGRAPH 2024)

Parameter-space ReSTIR for Differentiable and Inverse Rendering

Wesley Chang, Venkataram Sivaram, Derek Nowrouzezahrai, Toshiya Hachisuka, Ravi Ramamoorthi, and Tzu-Mao Li

SIGGRAPH North America 2023 (Conference Track)

Intersection Prediction for Accelerated GPU Ray Tracing

Lufei Liu, **Wesley Chang**, Francois Demoullin, Yuan Hsi Chou, Mohammadreza Saed, David Pankratz, Tyler Nowicki, Tor M. Aamodt

54th IEEE/ACM International Symposium on Microarchitecture (MICRO), 2021

Industry and Research Experience

Research Intern @ NVIDIA

Jun. 2024 - Sep 2024

- Researched ambiguities in inverse rendering with Thomas Müller, Merlin Nimier-David, and Alexander Keller.

Research Scientist Intern @ Meta Reality Labs

Jun. 2023 - Sep 2023

- Researched optimization of hair for digital avatars with Stephane Grabli, Olivier Maury, Matt Chiang, Christophe Hery, and Doug Roble.
- Developed a method to convert 3D hair geometry into procedural hair models.

Undergraduate Researcher @ University of British Columbia

Sep. 2021 - Aug 2022

- Researched improvements to ReSTIR under supervision of Prof. Toshiya Hachisuka from the University of Waterloo and Prof. Derek Nowrouzezahrai from McGill University.
- Received the NSERC USRA and Waterloo's Undergraduate Research Fellowship (URF) awards for summer 2022.

Rendering Engineer Intern @ Huawei Vancouver

May. 2021 - Aug. 2021

- Researched screen-space global illumination and directional occlusion algorithms for mobile platforms.
- Developed and improved sampling strategies, resulting in over a magnitude of visual quality and performance improvements.

Software Engineer @ Vital Mechanics Research

Jan. 2021 - Apr. 2021

- Investigated mesh deformation and digital sculpting techniques for adjusting garments and body parts on a 3D model in real-time.
- Designed a BVH library for accelerating ray casting and nearest-neighbour searching, improving the virtual body-garment tape measure tool performance by 30x.

Undergraduate Research Assistant @ University of British Columbia

Sep. 2020 - Apr. 2021

- Investigated ray tracing accelerator architectures on GPUs under supervision of Prof. Tor Aamodt.
- Designed techniques and algorithms to improve the performance of hardware-accelerated ambient occlusion workloads and modelled them in GPGPU-Sim.
- Second-authored a paper at the 54th IEEE/ACM International Symposium on Microarchitecture (MICRO).

Software Engineer Intern @ Vital Mechanics Research

May. 2020 - Aug. 2020

- Re-architected a 3D model viewer for visualization of apparel fit simulation results using React, ThreeJS, and WebGL, leading to the VitalFit product's first beta test.
- Developed multiple interactive 3D tools such as a probe to query body and garment attributes, and a tape measure to calculate point-to-point lengths.
- Designed an extensible placement tool for adjusting garments on the body in real time by leveraging digital sculpting techniques such as Laplacian smoothing.

Projects

Nova

Jul. 2019 - Sep 2021

- Developed a GPU, physically based, ray tracing renderer using OpenCL/CUDA from scratch without any ray tracing frameworks.
- Implemented an end-to-end pipeline for rendering with Monte Carlo path tracing and incorporated deep learning based denoising.
- Designed an abstraction layer over OpenCL and CUDA to enable single-source kernels.

Skills

Programming C++, Python, JavaScript, CUDA, OpenCL, OpenGL, GLSL, HLSL

Tools/Technologies PyTorch, Mitsuba 3, LaTeX, Docker, Git, Linux