

Wesley Chang

✉ wesleycanada@gmail.com | 🏠 weschang.com | 📺 wchang22 | 📺 wchang22 | 🐦 _WesChang

Education

PhD in Computer Science @ University of California, San Diego

2022 - Present

- Advisors: Prof. Tzu-Mao Li and Prof. Ravi Ramamoorthi
- Research interests: Differentiable and inverse rendering, efficient sampling for real-time rendering

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

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 Scientist Intern @ Meta Reality Labs

Jun. 2023 - Sep 2023

- Researched inverse rendering of hair for digital avatars.

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

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