Rohan Sawhney

http://www.rohansawhney.io

Skill set

Computer Graphics, Geometry Processing, Monte Carlo Methods, Partial Differential Equations, Realtime Rendering, Differential Geometry, Stochastic Calculus, Numerical Analysis & Optimization.

Education

2016-2022	РнD in Computer Science Advisor: Keenan Crane	Carnegie Mellon University
2020	MS in Computer Science	Carnegie Mellon University
2015	BA in Physics and Computer Science	Columbia University

Honors and awards

- 2024 SIGGRAPH Best Paper
- 2022 SIGGRAPH Best Paper Honorable Mention
- 2021-2022 NVIDIA Graduate Fellowship
- 2019-2020 Presidential Fellowship Carnegie Mellon University
- 2019 Outstanding Software Project (Boundary First Flattening) Symposium on Geometry Processing

Employment

2023- NVIDIA Corporation Senior Research Scientist, High Fidelity Physics Research

2021 NVIDIA Corporation

Research Intern, mentored by Matt Pharr Conducted research on real-time raytracing, culminating in an ACM TOG publication.

2020 nTopology

Software Engineer Intern

Implemented grid-free Monte Carlo methods to solve partial differential equations on complex implicit geometry without mesh generation, enabling alternative workflows to finite element analyses and field driven design that provide immediate feedback for modeling applications.

Adobe Systems Inc.

Research Intern, worked with Noam Aigerman, Danny Kaufman, Vladimir Kim and Nathan Carr Conducted research on fast updates to finite element matrix factorizations in geometry processing and simulation applications such as surface parameterization and fracture involving topological operations (cuts, edge flips, subdivision) on the underlying mesh.

2015-2016 IrisVR Inc.

Graphics Engineer

Designed workflows to optimize mesh and texture data from architectural CAD tools for real-time VR walkthroughs in IrisVR Prospect. Implemented critical algorithms for efficient data processing such as mesh repair, segmentation, simplification, remeshing, occlusion culling and texture compression.

2014 Dreamworks Animation SKG

Research & Development Intern

Restructured the server client model of the Moonlight renderer and Torch lighting application to enable remote rendering of large scenes on the campus render-farm. Also developed a Lua based programming interface for the Moonlight renderer to enable fast prototyping of scene geometry and lighting.

Publications

JOURNAL PAPERS

- 2024 Differential Walk on Spheres Bailey Miller, Rohan Sawhney, Keenan Crane, Ioannis Gkioulekas ACM Transactions on Graphics Paper | Project Page
- Walkin' Robin: Walk on Stars with Robin Boundary Conditions
 Bailey Miller*, Rohan Sawhney*, Keenan Crane[†], Ioannis Gkioulekas[†]
 ACM Transactions on Graphics (Best Paper)
 Paper | Project Page

Decorrelating ReSTIR Samplers via MCMC Mutations Rohan Sawhney, Daqi Lin, Markus Kettunen, Benedikt Bitterli, Ravi Ramamoorthi, Chris Wyman, Matt Pharr ACM Transactions on Graphics Paper | Video

²⁰²³ Walk on Stars: A Grid-Free Monte Carlo Method for PDEs with Neumann Boundary Conditions Rohan Sawhney*, Bailey Miller*, Ioannis Gkioulekas[†], Keenan Crane[†] ACM Transactions on Graphics Paper | Project Page | Talk

Boundary Value Caching for Walk on Spheres Bailey Miller*, Rohan Sawhney*, Keenan Crane[†], Ioannis Gkioulekas[†] ACM Transactions on Graphics Paper | Talk

2022Grid-Free Monte Carlo for PDEs with Spatially Varying CoefficientsRohan Sawhney*, Dario Seyb*, Wojciech Jarosz†, Keenan Crane†ACM Transactions on Graphics (Best Paper Honorable Mention)Paper | Project Page

2020 Monte Carlo Geometry Processing: A Grid-Free Approach to PDE Methods on Volumetric Domains Rohan Sawhney and Keenan Crane *ACM Transactions on Graphics* Paper | Project Page | Talk

Boundary First Flattening

2018

Rohan Sawhney and Keenan Crane ACM Transactions on Graphics Paper | Project Page | Talk | Web Demo

Open-source software

boundary-first-flattening

Highly optimized state-of-the-art surface parameterization tool for interactive editing of meshes with millions of triangles.

Zombie

Header only C++ library for Monte Carlo PDE Solvers.

FCPW: Fastest Closest Points in the West

GPU accelerated C++ and Python library for fast closest point and ray intersections queries.

geometry-processing-js

Fast and flexible framework for 3D geometry processing on the web. Suitable for mobile apps, online demos, and course content. Performance within striking distance of native C++ code.

linear-algebra-js

Optimized linear algebra library in pure Javascript. Supports sparse and dense matrix routines with Cholesky, LU and QR support.

Invited talks

	Monte Carlo Geometry Processing: Building "Renderers" for Problems Beyond Light Transport	
2024	Stanford, Gordon Wetzstein Computational Imaging Lab	
2023	University of California San Diego, Center of Visual Computing	
2021	Massachusetts Institute of Technology, Computational Design and Fabrication Group	
2021	NVIDIA Research Graphics Forum	
2020	SIGGRAPH	
2020	Massachusetts Institute of Technology, Geometric Data Processing Group	
2020	Florida State University	
2020	Toronto Geometry Colloquium	
	Decorrelating ReSTIR Samplers via MCMC Mutations	
2024	SIGGRAPH	
	Walk on Stars: A Grid-Free Monte Carlo Method for PDEs with Neumann Boundary Conditions	
2023	SIGGRAPH	
	Grid-Free Monte Carlo for PDEs with Spatially Varying Coefficients	
2022	SIGGRAPH	
2022	Florida State University	
	Boundary First Flattening	
2018	SIGGRAPH	
2017	Carnegie Mellon University Graphics Group	

Courses & Teaching

2024	Monte Carlo Geometry Processing, Symposium on Geometry Processing Graduate School
	Project Page

Teaching assistant

2020	Computer Graphics 15-462, Carnegie Mellon University
2017	Discrete Differential Geometry 15-858, Carnegie Mellon University

Professional Services

Journal & Conference reviewing

SIGGRAPH 2024-2020; SIGGRAPH Asia 2024-2021; Eurographics 2021, 2019-2018; Graphics Interface 2021, 2019; Pacific Graphics 2018.

- ²⁰²⁴ Eurographics 2025 International Program Committee
- 2017-2018 PhD Admissions Committee Member at Carnegie Mellon University

Undergraduate Student Mentoring

2021 Max Slater (CMU CS)

2020Ray Ye (CMU Physics)2018-2019Joshua Kalapos (CMU CS)

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