

PRANAV JAIN

University of Southern California

Email: pranavj@usc.edu

[Website](#) , [Scholar](#)

RESEARCH INTERESTS

Geometry Processing, Physical Simulations, Computer Graphics, Discrete Differential Geometry, Numerical Analysis of Partial Differential Equations

EDUCATION

University of Southern California

Doctor of Philosophy (PhD), Computer Science
CGPA: 3.85/4.0

August 2023 - Present

Los Angeles, USA

New York University

Master of Science (MS), Scientific Computing
CGPA: 3.778/4.0

September 2021 - May 2023

New York, USA

Indraprastha Institute of Information & Technology Delhi (IIITD)

Bachelor of Technology with Honors (B-Tech Hons),
Computer Science and Applied Mathematics
CGPA: 8.59/10.0

August 2016 - August 2020

New Delhi, India

PUBLICATIONS

Pranav Jain, Ziyin Qu, Peter Yichen Chen, and Oded Stein. 2024. Neural Monte Carlo Fluid Simulation. In ACM SIGGRAPH 2024 Conference Papers (SIGGRAPH '24). [\[link\]](#)

Liam Martin, **Pranav Jain**, Zachary Ferguson, Torkan Gholamalizadeh, Faezeh Moshfeghifar, Kenny Erleben, Daniele Panozzo, Steven Abramowitch, Teseo Schneider. A systematic comparison between FEBio and PolyFEM for biomechanical systems. In Computer Methods and Programs in Biomedicine, 2023. [\[link\]](#)

Zachary Ferguson, **Pranav Jain**, Denis Zorin, Teseo Schneider, and Daniele Panozzo. High-Order Incremental Potential Contact for Elastodynamic Simulation on Curved Meshes. In ACM SIGGRAPH 2023 Conference Proceedings (SIGGRAPH '23). [\[link\]](#)

Pranav Jain, Munawar Hasan, Donghoon Chang. Spy based analysis of selfish mining attack on multi-stage blockchain. In Cryptology ePrint Archive, 2019. [\[link\]](#)

RESEARCH EXPERIENCE

University of Southern California

PhD Student

Advisor: Dr. Oded Stein

August 2023 - Present

Los Angeles, USA

- Research on using a marriage of neural networks and Monte Carlo methods for grid-free fluid simulations

New York University

Research Assistant

Advisor: Dr. Daniele Panozzo, Dr. Denis Zorin

September 2021 - May 2023

New York, USA

- Formulated a high-order finite element formulation (high-order basis) for elastodynamic simulation on high-order (curved) meshes with contact handling based on the recently proposed Incremental Potential Contact model

- Analyzed the differences and experimented with FEBio and PolyFEM for biomechanical simulations

nTopology

Software Engineer Intern in Geometry Team

Advisor: Suraj Musuvathy, Ranjeeth Mahankali

June 2022 - August 2022

New York, USA

- Formulated and implemented a new algorithm from scratch that could preserve the original analytical faces of a CAD once it's been converted to an implicit

Freie Universität Berlin [\[link\]](#)

Research Intern

Advisor: Dr. Konrad Polthier, Dr. Sunil Kumar Yadav

September 2020 - August 2021

(Virtual) Berlin, Germany

- Proposed and developed a robust point cloud denoising technique that automatically tunes the required parameters resulting in a filtered point cloud without the need of manual testing

Fields Undergraduate Summer Research Programme 2020 [\[link\]](#)

Research Intern

Advisor: Dr. Thomas Uchida

July 2020 - August 2020

(Virtual) Toronto, Canada

- Explored the reverse mechanism synthesis problem where given a path of a mechanical linkage, the task is to design a mechanism (such as a four-bar mechanism) that would trace the given path
- Created, analyzed, and tested an algorithm that could synthesize mechanisms that trace open curves

Indraprastha Institute of Information & Technology Delhi [\[link\]](#)

Research Assistant

Advisor: Dr. Kaushik Kalyanaraman

August 2018 - August 2020

New Delhi, India

- Developed DECAGT – a C++ library that provides a general, extendable software framework for discretizations of the objects and operators of exterior calculus
- Added support for interpolation on simplicial complexes using Gaussian quadratures and high-order finite element basis functions

Indraprastha Institute of Information & Technology Delhi [\[link\]](#)

Undergraduate Thesis

Advisor: Dr. Donghoon Chang

August 2018 - August 2020

New Delhi, India

- Proved and analyzed mathematically the Selfish Mining Strategy for multiple mining pools in Bitcoin Blockchain using probabilistic tools
- Proved, analyzed, and developed a mathematical model motivated from Multi-Stage Blockchain which is resistant to Selfish Mining Attacks

TEACHING EXPERIENCE

University of Southern California

Teaching Assistant: CSCI 596 - Scientific Computing and Visualization

Teaching Assistant: CSCI 104 - Data Structures and Object Oriented Design

September 2024 - December 2024

January 2024 - April 2024

New York University

Grader: MATH 263.3 - Applied Partial Differential Equations

Grader: MATH 252 - Numerical Analysis

Grader: MATH 263 - Partial Differential Equations

January 2023 - April 2023

January 2023 - April 2023

September 2021 - November 2021

AWARDS

Fields Undergraduate Summer Research Program 2020: One of 32 selected students from 200+ applicants for a funded research opportunity at the Fields Institute, Canada.

Dean's Award for Academic Excellence: For excellent academic performance in the 2018-19 undergraduate academic session.

ACADEMIC COMMUNITY WORK

Volunteered as a Teaching Assistant for the Poisson Reconstruction Project at Summer Geometry Initiative (SGI) 2024.	July 2024
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Member of the Conference Coffee team at SIGGRAPH Research Career Development Committee. Organized the conference coffee event for SIGGRAPH and SIGGRAPH ASIA 2021 & 2022.	2021-2022
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