Karran Pandey

Curriculum Vitae

Dynamic Graphics Project
University of Toronto
karranpandey.github.io
karran@cs.toronto.edu

Research Interests

I am interested in computer graphics and geometry processing. In particular, I'm excited about structure-aware algorithms for interactive shape modeling and analysis. Currently, I'm thinking about how we can use structure-aware shape representations to build creative tools which make it convenient, intuitive and fun to model geometry.

Education

University of Toronto 2021 –2025
PhD Computer Science
Advisor: Karan Singh Toronto, Canada

Birla Institute of Technology and Science Pilani 2014 - 2019
MSc Mathematics, BE Computer Science
Advisors: Vijay Natarajan, Tathagata Ray, Sharan Gopal Hyderabad, India

Publications

Karran Pandey, Jakob Andreas Baerentzen, Karan Singh 2022
Face Extrusion Quad meshes
ACM SIGGRAPH North America.

Varshini Subhash, **Karran Pandey**, Vijay Natarajan 2022
A GPU Parallel Algorithm for Computing Morse-Smale Complexes
IEEE Transactions on Visualization and Computer Graphics (TVCG).

Karran Pandey, Talha bin Masood, Saurabh Singh, Ingrid Hotz, Vijay Natarajan, Tejas Murthy 2022
Morse Theory-based Segmentation and Fabric Quantification of Granular Materials
Granular Matter 24, 27.

Varshini Subhash, **Karran Pandey**, Vijay Natarajan 2021
GPU Parallel Computation of Morse-Smale Complexes
IEEE Visualization Conference (VIS) (Short Paper).

Karran Pandey, Joy Merwin Monteiro, Vijay Natarajan 2020
An Integrated Geometric and Topological Approach for the Identification and Visual Analysis of Rossby Wave Packets
Monthly Weather Review, 2020, 148 (8): 3139-3155.

Conference Talks

ACM SIGGRAPH North America August 2022
Face Extrusion Quad Meshes Vancouver, Canada

ACM SIGGRAPH North America (Labs Demo) August 2022
Face Extrusion Quad Meshes Vancouver, Canada

Research Experience

Dynamic Graphics Project, University of Toronto May 2021 - Present
Research Assistant
Advisor: Professor Karan Singh

- **Generalized Extrusion Meshes**
  Designed and implemented a structure-aware quad-meshing framework for construction history-based modeling. **Conference paper accepted to ACM SIGGRAPH North America 2022.**

Visualization and Graphics Lab, Indian Institute of Science July 2018 - August 2021
Research Intern and Project Assistant
Advisor: Professor Vijay Natarajan

- **Topological Analysis of Granular Material Packings**
  Designed and implemented a topology-aware framework for the segmentation and skeletonization of 3-D CT scans of granular material packings. **Journal paper accepted to Granular Matter.**
- **GPU Parallel Computation of Morse-Smale Complexes**
  Collaborated on the design of a GPU parallel algorithm for the computation and simplification of Morse-Smale complexes on 3-D scalar fields. **Papers accepted to IEEE VIS 2021 and IEEE TVCG**.
- **Automated Identification and Visual Analysis of Rossby Wave Packets**
  Designed and implemented a topological framework for the automated identification and visual exploration of wave structures in 2-D scalar fields. **Journal paper accepted to the Monthly Weather Review.**

Invited Talks

Indo-Swedish Workshop on Applications of Topological Methods to Material Science — August 2020
Topological Analysis of Material Packings — Bangalore, India

Indo-Swedish Workshop on Applications of Topological Methods to Material Science — August 2020
Topological Analysis of Material Packings — Bangalore, India

Institute of Eminence High Performance Computing Workshop, IISc Bangalore — July 2019
Identification and Visual Analysis of Rossby Wave Packets — Bangalore, India

Bangalore VIS Workshop — Feb 2019
Identification and Visual Analysis of Rossby Wave Packets — Bangalore, India