

Ritesh Sharma

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<https://sharmrit.github.io/Homepage>

Education

Ph.D. in Computer Science (CGPA 4.0/4.0) August, 2018 - Present

Research Area: Computer Graphics, Navigation, Path planning, Spatial representation and Visualization

Advisor: Professor Marcelo Kallmann

University of California, Merced, California

M.S. in Computer Science (CGPA 3.45/4.0) March, 2017

Computer Graphics and Visualization

Thesis: Interactive Design and Transition Point Analysis of 3D Linear Symmetric Tensor Fields

Advisor: Professor Eugene Zhang

Oregon State University, Corvallis, Oregon

B. Tech. in Computer Science and Engineering (CGPA 8.45/10) August, 2010

West Bengal University of Technology, India

Professional Experience

Graduate Student Researcher, *University of California, Merced, United States* May 19 - Present

- Investigating research topics in Path planning, Navigation and Crowd Simulation in 2D and 3D and visualization of navigation metrics in 2D.

PhD Researcher(Intern), *Hasso-Plattner-Institut, Potsdam, Germany* May 20 - present

- Investigating topics in geometry interaction related to laser cutting.

Senior Graphics Programmer, *Passur Aerospace Inc., United States* May 17 - August 18

- Software Development
 - Developed interactive graphical user interface and visualize shape files for new functionalities in Passur's web tracker and desktop-based flight tracking system.
 - Contributed to back-end by writing server side code to communicate with database.
 - Contributed to the foundation of the company's product used by major airlines and airports, US and International, by building core functionality and integration with React/Redux from scratch.

Intern (Mathematica Algorithm R&D), *Wolfram Research Inc., United States* Apr 16 - Aug 16

- Software Development
 - Developed software package to connect Wolfram's Mathematica with Pixar's Renderman.
 - Software package testing for geometry primitives, plot functions and functionalities used for 3D Printing.

Graduate Research Assistant, *Oregon State University, United States* Mar, 14 - Dec, 16

- 3D Symmetric Tensor Field Analysis and Visualization
 - Improved topology extraction techniques using A-Patches and by solving analytical solutions.

Research Assistant, *Indian Institute of Technology Bombay, India* Oct, 10 - Dec, 13

- Virtual Laboratory for Urban Transportation System Planning Course
 - Developed an accurate, reliable and autodidactic web-based virtual laboratory

Publications

- **Sharma, R., Weiss, T., Kallmann, M., Formation-Aware Planning and Navigation, Eurographics (Full paper), 2021 (Submitted).**
- **Sharma, R., Weiss, T., Kallmann, M., Plane-Based Local Behaviors for Multi-Agent 3D Simulations with Position-Based Dynamics, IEEE International Conference on Artificial Intelligence and Virtual Reality (IEEE AIVR), 2020.**

- **Sharma, R.**, Weiss, T., Kallmann, M., *3D Behaviors for Multi-Agent Simulations with Position-Based Dynamics*, ACM SIGGRAPH Symposium of Interactive 3D Graphics and Games(I3D) 2020 (Poster paper), San Francisco, United States, 14th-18th September, 2020.
- **Sharma, R.**, Farias, R., Kallmann, M., *Integrating Local Collision Avoidance with Shortest Path Maps*, EuroGraphics 2020 (Poster paper), Norrkoping, Sweden, May 25th-29th, 2020.
- **Sharma, R.**, Tomson, A., Lobato, E., Kallmann, M., Padilla, L., *Data Driven Multi-Hazard Risk Visualization*, EuroVis 2020 (Poster paper), Norrkoping, Sweden, May 25th-29th, 2020.
- Zhang, Y., **Sharma, R.**, Zhang, E., *Maximum Number of transition points in a 3D Linear Symmetric Tensor Fields*, TopoInVis 2017, Tokyo, Japan, Feb 27th-28th, 2017
- Jenny, B., Stephen, D. M., Muehlenhaus, I., Marston, B. E., **Sharma, R.**, Zhang, E., Jenny, H, *Force-directed layout of origin-destination flow maps*, International Journal of Geographic Information Science (IJGIS), 2017
- Zhang, E., Palacios, J., Yeh, H., Wang, W., Zhang, Y., Laramee, B., **Sharma, R.**, Schultz, T., *Feature Surfaces in Symmetric Tensor Fields Based on Eigenvalue Manifold*, IEEE TVCG, Issue 99, March 1, 2016. Also featured at **ACM SIGGRAPH ASIA 2016** and **IEEEVIS 2016**.
- Jenny, B., Stephen, D. M., Muehlenhaus, I., Marston, B. E., **Sharma, R.**, Zhang, E., Jenny, H, *Design Principles for Origin-destination Flow Maps*, Cartography and Geographic Information Science (CaGIS), 2016
- Nelson, V., **Sharma, R.**, Zhang, E., Schmittner, A., Jenny, B., *3D visualization of global ocean circulation*, AGU Fall Meeting, San Fransisco, CA, Dec 18, 2015
- Stephen, D., Jenny, B., **Sharma, R.**, Zhang, E., Muehlenhaus, I. (2015). *Automatic Flow map creation using a force-directed layout*. North American Cartographic Information Society Annual Meeting, Minneapolis, MN Oct. 15, 2015
- **Sharma, R.**, Jadhav, S., Tripathy, D., Sardar, V. H., Patil, G. R., *Virtual Laboratory: An alternative approach to Urban Transportation Systems Planning Lab*, Transportation Research Board, 93rd Annual Meeting, Washington, D.C, USA, 2014

Technical Skills

- **Programming and Scripting Languages:** C(Proficient), C++(Proficient), GLSL, PHP, HTML, CSS, Javascript, JQuery, Wolfram Language
- **Frameworks and Platforms:** wxWidgets, QT, OpenGL, OpenMP, OpenCL, EmberJS, React, Redux, GitHub, GitLab and Stash
- **Software:** Microsoft Visual Studio, Matlab, Eclipse, Netbeans, Renderman, Mathematica, Wolfram Workbench, Rhinoceros 3D, Unity3D, Unreal Engine 4.0, WebStorm 2018

Teaching Experience

Teaching Assistant, University of California Merced August 18 - June 20

- CS 020: Introduction to Computing I: Java (Spring 2020)
- CS 030: Data Structures (Fall 2018, Spring 2019)
- CS 165: Introduction to Object Oriented Programming: C++ (Spring 2020)
- CS 170: Computer Graphics (Fall 2019)

Graduate Teaching Assistant, Oregon State University Jan, 14 - March, 17

- CS 325: Analysis of Algorithm (Winter 2016)
- CS 340: Introduction to Databases (Spring 2014, Spring 2015, Summer 2015)
- CS 344: Operating Systems I (Winter 2017)
- CS 480: Translators (Winter 2014)

Academic Projects

- Predictive Modeling of Flood Susceptibility, Phase 1

- Worked with group of researcher from different discipline at UC Merced and USRA (University Space Research Association) for modeling and visualization of predictive based flood visualization.
- *Realtime Multi-Agent Crowd Simulation*
 - Implemented algorithm from the paper titled *Position-Based Multi-Agent Dynamics for Real-Time Crowd Simulation* by T. weiss et. al.(2017), as part of *Computer Animation and Simulation Class* at UC Merced.
- *3D visualization of global ocean circulation*
 - Developed a visualization tool for showcasing mixing of ocean water at different density level and its effect on the distribution of tracers such as carbon isotopes.
- *Isosurface Extraction using A-Patches*
 - Achieved a better isosurface defined by a polynomial of any degree using A-Patch.
- *Smoke Simulation*
 - Implemented particle based method to simulate smoke.
- *Pool Game Animation*
 - Implemented Pool game simulation.
- *Flow Visualization*
 - Implemented Line Integral Convolution to visualize vector field using streamlines.

Graduate Course Highlights

University of California Merced	Grades
• <i>EECS 287: Computer Animation and Simulation</i>	A
Oregon State University	
• <i>CS 551: Computer Graphics</i>	A
• <i>CS 554: Geometric Modeling</i>	A-
• <i>CS 557: Computer Graphics Shaders</i>	A
• <i>CS 575: Intro to Parallel Computing</i>	A

Awards

- *GRAD EXCEL Peer Mentorship Award 2020*
- *UC Merced EECS Bobcat Travel Fellowship 2020*
- *Travel award for NSF sponsored SOCG 2019, Portland, Oregon*
- *UC Merced EECS Bobcat Fellowship 2019*
- *UC Merced EECS Bobcat Travel Fellowship 2019*
- *Graduate Assistantship (Full tuition & Stipend) at University of California Merced (2018- Present)*
- *Graduate Assistantship (Full tuition & Stipend) at Oregon State University (2014-2017)*
- *Received Honorary Citizenship of Corvallis, Oregon for contributions and achievements at Oregon State University by the mayor of city of Corvallis, Oregon, United States*

Journal/Proceedings Reviewer

- *ACM MIG 2019, ACM MIG 2020, ICAPS 2019, CASA 2019, CASA 2020*

Co-Curricular

- *Peer mentor for two first year PhD students under UC Merced GRAD-EXCEL Peer Mentor Program for the academic year 2020-2021.*

- *Served as the Secretary of the Merced Indian Graduate Student Association (MIGSA) at University of California Merced for the academic year 2019-2020, California, USA*
- *Poster Presentation on “3D Symmetric Tensor Field Visualization” at Engineering Research Expo held at Portland Art Museum, Portland, Oregon, Mar 1, 2016.*
- *Mentored a senior undergraduate student under REU (Research Experience for Undergraduate) Program during Summer 2015, funded by NSF.*
- *Poster Presentation on “Mode Surface Extraction Using A-Patches” at Engineering Research Expo held at Oregon Convention Center, Portland, Oregon, Mar 4, 2015.*
- *ACM and ACM SIGGRAPH Student Member since 2015*
- *Served as Student Volunteer at ACM SIGGRAPH 2019 held at Los Angeles, July 28th - August 1st, 2019*

References

Professor Marcelo Kallmann (PhD Advisor)

University of California, Merced, USA

Email: mkallmann@ucmerced.edu

Professor Patrick Baudisch

Hasso-Plattner-Institut, Potsdam, Germany

Email: patrick.baudisch@hpi.de

Professor Tomer Weiss

New Jersey Institute of Technology, USA

Email: tweiss@njit.edu

Matt Marcella

SVP, Software Development, Passur Aerospace Inc., USA

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Charles Pooh

Manager, Mathematica Algorithm R & D

Wolfram Research Inc., USA

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