

# Ritesh Sharma

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

## Education

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### 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 & 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

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### Research Intern, Palo Alto Research Center, A Xerox Company, United States

May 21 - Present

- *Building Mapping & Sensors*

### PhD Researcher(Intern), Hasso-Plattner-Institut, Potsdam, Germany

May 20 - Aug 20

- *Investigating topics in geometry interaction related to laser cutting.*

### Graduate Student Researcher, University of California, Merced, United States

May 19 - Dec 20

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

### 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

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- *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

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- **Programming and Scripting Languages:** C(Proficient), C++(Proficient), Python, GLSL, PHP, HTML, CSS, Javascript, JQuery, Wolfram Language
- **Frameworks and Platforms:** wxWidgets, QT, OpenGL, OpenMP, OpenCL, EmberJS, React, Redux, GitHub, BitBucket, GitLab and Microsoft Hololens 2
- **Software:** Microsoft Visual Studio, Matlab, Eclipse, Netbeans, Renderman, Mathematica, Wolfram Workbench, Rhinoceros 3D, Unity3D, Unreal Engine 4.0

## Teaching Experience

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**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 2021)
- 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

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- *Bird Call Identification using Content Based Image Retrieval*

- Achieved precision of 65.8% accuracy to identify bird call using Content Based Image Retrieval (CBIR) Framework with Gabor Filter(texture) based features
- 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

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University of California Merced	Grades
• EECS 207: Digital Image Processing	A
• EECS 287: Computer Animation and Simulation	A
<b>Oregon State University</b>	
• CS 551: Computer Graphics	A
• CS 554: Geometric Modeling	A-
• CS 557: Computer Graphics Shaders	A
• CS 575: Intro to Parallel Computing	A

## Awards

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- UC Merced GRAD EXCEL Peer Mentorship Award 2020-2021
- 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

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- *IEEE VIS 2021*
- *ACM MIG 2019, ACM MIG 2020*
- *CASA 2019, CASA 2020*
- *ICAPS 2019*

## Co-Curricular

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- *Peer mentor for three 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

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### **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*

*Email: mattmarcella@passur.com*

### **Charles Pooh**

*Manager, Mathematica Algorithm R & D*

*Wolfram Research Inc., USA*

*Email: charlesp@wolfram.com*