Ritesh Sharma

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https://sharmrit.github.io/Homepage

Education

Ph.D. in Computer Science (CGPA 4.0/4.0)   December, 2023
Thesis: Navigation Structures for Flows, Formations and Decision Making
Current Advisor: Professor Shawn Newsam
Former 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

Publications

Peer-Reviewed Journal Articles

[J6] **Sharma, R.**, Weiss, T., Kallmann, M., Formation-Aware Planning and Navigation with Corridor based Shortest Path Maps, Computer Graphics Forum 2023 (Accepted).

[J5] **Sharma, R.**, Kallmann, M., Computing and Analyzing Decision Boundaries from Shortest Path Maps, Computer & Graphics, Vol 117, pp. 73-84, 2023.

[J4] **Sharma, R.**, Kallmann, M., Spatially Distributed Lane Planning for Navigation in 3D Environments, Vol 34, Issue 3-4, e2162, Computer Animation and Virtual Worlds 2023 (presented at CASA 2023).

[J3] 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), 45.1 (2018): pp. 62-75.

[J2] 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, 31(8), pp. 1521-1540.

[J1] 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, pp.1248-1260, March 1, 2016. (Appeared at **ACM SIGGRAPH ASIA 2016** and **IEEEVIS 2016**).

Peer-Reviewed Conference Articles

[C8] **Sharma, R.**, Bier, E., Nelson, L., Bhandari, M S., Kunwar, N, Automatic Digitization and Orientation of Scanned Mesh Data for Floor Plan and 3D Model Generation, 40th International Conference on Computer Graphics International 2023 (Selected for publication at Springer's Lecture Notes in Computer Science proceedings).

[C7] Bier, E; Brito, A., Mostafavi, S., Nelson, L. D., **Sharma, R.**, Bhandari, M S., Kunwar, N, Li, S., Sensorium: commissioning abundant sensors with augmented reality and QR codes, 18th International IBPSA conference and Exhibition, Building Simulation 2023.

[C6] Roumen,T., Apel, I., Kern, T., Taraz, M., **Sharma, R.**, Schlueter, O., Johnson, j., Meier, D., Lempert, C. and Baudisch, P., Structure-Preserving Editing of Plates and Volumes for Laser Cutting, SCF '22: Proceedings of the 7th Annual ACM Symposium on Computational Fabrication, October 2022, Article 20, Pages 1-12.

[C5] **Sharma, R.**, Weiss, T., Kallmann, M., Plane-Based Local Behaviors for Multi-Agent 3D Simulations with Position-Based Dynamics, 2020 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR), Utrecht, Netherlands, 2020, p. 214-217.

[C4] **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.

[C3] **Sharma, R.**, Tomson, A., Lobato, E., Kallmann, M., Padilla, L., Data Driven Multi-Hazard Risk Visualization, EuroVis 2020-poster, Extended Abstract, Norrkoping, Sweden, May 25th-29th, 2020.

[C2] **Sharma, R.**, Farias, R., Kallmann, M., Integrating Local Collision Avoidance with Shortest Path Maps, EuroGraphics 2020, Poster paper, Norrkoping, Sweden, May 25th-29th, 2020.

[C1] **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.

Peer-Reviewed Book Chapter
[B1] Zhang, Y., Roy, L., **Sharma, R.**, Zhang, E. Maximum Number of Transition Points in 3D Linear Symmetry Tensor Fields, Topological Methods in Data Analysis and Visualization V, 2020, **pp. 237–250** (Appeared in the conference proceedings of TopoInVis 2017, Tokyo, Japan, Feb 27th-28th, 2017.

Patent
[1] System and Method for Automatic Floorplan Generation
Inventors: Eric A Bier and **Ritesh Sharma**
US Patent App. 18/297,506

Peer-Reviewed Conference Posters
[2] 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.

[1] 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.

Other articles
[2] **Sharma, R.**, Palacios, J., Zhang, E., 3D Symmetric Tensor Field Visualization, Engineering Research Expo (Poster) Portland, Oregon, Mar 1, 2016.

[1] **Sharma, R.**, Palacios, J., Zhang, E.,Mode Surface Extraction Using A-Patches, Engineering Research Expo (Poster), Portland, Oregon, Mar 4, 2015.

Professional Experience

Applied Scientist II Co-op, *Amazon Robotics, United States*   *May 23 - Present*
- *Investigating on topics including path planning considering uncertain obstacles.*

Research Intern, *PARC, part of SRI (formerly part of Xerox), United States May 21 - Aug 21 & Dec 21- Jan 22*
- *Process and analyze mesh geometry to detect interior features of multi-level buildings, and, reconstruct clutter-free models and floor plans.*

Visual Coding Intern, *Dolby Laboratories, United States*   *May 22 - Aug 22*
- *Investigated on replacing neural network with traditional machine learning techniques for Scene understanding and Scene representation in Novel View Synthesis.*

PhD Researcher(Intern), *Hasso-Plattner-Institut, Potsdam, Germany*   *May 20 - Aug 20*
- *Investigated on topics related to geometry interaction for laser cutting.*

Graduate Student Researcher, *University of California, Merced, United States*   *May 19 - Dec 20*
- *Investigated 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*

Technical Skills

- **Programming and Scripting Languages**: *C(Proficient), C++(Proficient), Python(Fluent), GLSL, PHP, HTML, CSS, Javascript, JQuery, Wolfram Language*
- **Frameworks and Platforms**: *wxWidgets, QT, OpenGL,OpenCV, OpenMP, OpenCL, EmberJS, React, Redux, GitHub, BitBucket, GitLab, Scikit-learn, Keras, Tensorflow, PyTorch, AutoML, Robot Operating System (ROS) & Microsoft Hololens*
- **Software**: *Microsoft Visual Studio, Matlab, Eclipse, Netbeans, Renderman, Mathematica, Wolfram Workbench, Rhinoceros 3D, Unity3D, Unreal Engine 4.0*

Peer Reviewed Conference/Journal Reviewer

- *IEEE TVCG*
- *IEEE VIS (2021, 2022 & 2023)*
- *EuroVIS (2022 & 2023)*
- *CASA (2019, 2020 & 2023)*
- *IEEE PACIFIC VIS (2022 & 2024)*
- *ACM MIG (2019, 2020 & 2021)*
- *SCA 2021*
- *RSS 2020*
- *ICAPS 2019*

Research Talks

- *Navigation Structures for Flows, Formations and Decision Making at Amazon Robotics, July 2023.*
- *Navigation Structures for Flows, Formations and Decision Making at Lawrence Livermore National Lab, Feb 2023.*
- *Navigation Structures for Flows, Formations and Decision Making, EECS Seminar at University of California Merced, May 2022.*

Teaching Experience

Teaching Assistant, *University of California Merced*   *Aug, 18 - Dec, 22*

- *Intro to Computing I: Java (Spring 20)*
- *Advanced Programming: C++ (Spring 22)*
- *Data Structures (Fall 18, Spring 19)*
- *Algorithm Design & Analysis: C++ (Fall 21)*
- *Intro to OOPS: C++ (Spring 21, Spring 23)*
- *Computer Graphics: C++ (Fall 19, & 22)*

Graduate Teaching Assistant, *Oregon State University*   *Jan, 14 - March, 17*
- *Analysis of Algorithm (Winter 16)*
- *Intro to Databases (Spring 14 & 15, Summer 15)*
- *CS 344: Operating Systems I (Winter 17)*
- *CS 480: Translators (Winter 14)*

Teaching Assistant, *Summer Geometry Institute 2021*   *August, 21*
Organized by Geometry Group at Massachussets Institute of Technology (MIT)

Online Course Highlights
- *Neural Networks and Deep Learning (DeepLearning.AI)*
- *Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization (DeepLearning.AI)*
- *Python for Computer Vision with OpenCV and Deep Learning (Udemy.com)*
- *ROS Tutorials for Beginners (Udemy.com)*

Awards
- *UC Merced EECS USAP Travel Fellowship 2023*
- *UC Merced GRAD EXCEL Peer Mentorship Award: 2020-2021 & 2021-2022*
- *UC Merced EECS Bobcat Travel Fellowship: 2019 & 2020*
- *Travel award for NSF sponsored SOCG 2019, Portland, Oregon*
- *UC Merced EECS Bobcat Summer Fellowship 2019*
- *Graduate Assistantship (Full tuition & Stipend) at University of California Merced (2018 - 2023)*
- *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*

Services
- *Peer mentor for nine first year PhD students under UC Merced GRAD-EXCEL Peer Mentor Program for the academic year 2020-2021 & 2021-2022.*
- *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*
- *Served as Student Volunteer at ACM SIGGRAPH 2019 held at Los Angeles, July 28th - August 1st, 2019*
- *Mentored a senior undergraduate student under Research Experience for Undergraduate (REU) Program during Summer 2015, funded by National Science Foundation (NSF).*

References

Professor Marcelo Kallmann (PhD Advisor)
University of California, Merced, USA (Now at Amazon Robotics)
Email:marcelo.kallmann@gmail.com

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

Eric Bier
Principal Scientist, Palo Alto Research Center (Now SRI), USA
Email: bier@parc.com