Mukund Raj

email: mraj [at] digidual.com Boston, Massachusetts, USA web: digidual.com/mraj

---

EXPERIENCE

Argonne National Laboratory May 2018 - May 2021
Postdoctoral Appointee
Implemented a parallel particle tracer for in-situ analysis and visualization of MPAS-Ocean simulation output. Researched and implemented novel load balancing methods for the parallel particle tracer. Languages used: C++/Fortran.

SCI Institute, Univ. of Utah Jul 2013 - May 2018
Graduate Research Assistant
Developed novel visualizations and statistical methods to summarize ensemble data of various types such as ensembles of isosurfaces, paths on a graph, high dimensional data and graphs. Languages used: Python, JavaScript, HTML, C++

Visual Perception lab, Univ. of Utah Jan 2012 - Jun 2013
Graduate Research Assistant
Designed and developed VR experiments to evaluate the effect of animated self avatars in virtual environments. Languages used: Python

Infosys labs, Infosys Tech. Ltd. Jul 2008 - Jul 2011
Systems Engineer
Maintained reporting module for a web accessibility, assessment & remediation tool and developed prototype social networking and augmeted reality platform for retail customers. Languages used: Java, JavaScript, HTML, SQL

EDUCATION

University of Utah, Salt Lake City
PhD, Computing, GPA: 3.92 2013 - 2018
Thesis: Depth based Visualizations for Ensemble Data and Graphs
Advisor: Ross T. Whitaker

MS, Computing, GPA: 3.93 2011 - 2013
Thesis: Effect of Animated Self-avatars in Virtual Environments
Advisors: William B. Thompson(Computing) & Sarah Creem-Regehr (Psychology)

University of Pune, Pune
BEng., Electronics & Telecomm., First Class with Distinction 2004 - 2008
Senior Project: Real-time Hand Gesture Recognition and Tracking

SKILLS

Languages : C++, Python, Javascript/Typescript, HTML
Visualization tools: OpenGL, VTK/Paraview
HPC/Parallel programming: MPI, C++11 threads
Web technologies: React, babylon.js, d3
Other tools: LaTeX, Git, CMake, spack, pnetcdf, vim, tmux

AWARDS

- 2021: IEEE Pacific Visualization Best Paper Award
- 2019: IEEE Visualization Best Paper Award (Scientific Visualization track)
- 2017: IEEE Visualization Doctoral Colloquium Travel Grant
- 2016: Best Poster Award at UofUtah School of Computing annual poster session
- 2016: Lt Governor of Utah's Certificate of Appreciation for Volunteering
- 2015: Best Poster Award at UofUtah School of Computing annual poster session
- 2010: Spot Award, an Infosys performance award, for work on VR platform
- 2008: Medal for Best Senior Project in Electronics & Telecomm. department

PUBLICATIONS

Journal

- Jiayi Xu, Hanqi Guo, Han-Wei Shen, Mukund Raj, Xueqiao Xu, Xueyun Wang, Zhehui Wang, Tom Peterka. Asynchronous and Load-Balanced Union-Find for Distributed and Parallel Scientific Data Visualization and Analysis, IEEE Transactions on Visualization and Computer Graphics, , 1-1, 2021
- Wenbin He, Junpeng Wang, Hanqi Guo, Ko-Chih Wang, Han-Wei Shen, Mukund Raj, Youssef S. G. Nashed, Tom Peterka. InSituNet: Deep Image Synthesis for Parameter Space Exploration of Ensemble Simulations, IEEE Transactions on Visualization and Computer Graphics, 26(1), 23-33, 2019
- Mukund Raj and Ross T. Whitaker. Visualizing Multidimensional Data with Order Statistics. Computer Graphics Forum, 37(3), 277-287, 2018
- Mukund Raj, Mahsa Mirzargar, Robert Ricci, Robert M. Kirby and Ross T. Whitaker. Path Boxplots: A Method for Characterizing Uncertainty in Path Ensembles on a Graph Journal of Computational and Graphical Statistics, 26(2), 243-252, 2016
- Mukund Raj, Mahsa Mirzargar, J. Samuel Preston, Robert M. Kirby, and Ross T. Whitaker. Evaluating Shape Alignment via Ensemble Visualization IEEE Computer Graphics and Applications, 36(3), 60-71, 2016

Peer Reviewed Conference

- Dmitriy Morozov, Tom Peterka, Hanqi Guo, Mukund Raj, Jiayi Xu, and Han-Wei Shen. IExchange: Asynchronous Communication and Termination Detection for Iterative Algorithms. Proceedings of IEEE Symposium on Large Data Analysis and Visualization, 2021. (Accepted)
- Xin Liang, Hanqi Guo, Sheng Di, Franck Cappello, Mukund Raj, Chunhui Liu, Kenji Ono, Zizhong Chen and Tom Peterka. Towards Feature Preserving 2D and 3D Vector Field Compression. 13th IEEE Pacific Visualization Symposium, Tianjin, China, Apr 14-17, 2020.
- Mukund Raj and Ross T. Whitaker. Anisotropic Radial Layout for Visualizing Centrality and Structure in Graphs. Proceedings of the 25th International Symposium on Graph Drawing & Network Visualization, pp. 351-364, Springer, Cham, 2017
- Mukund Raj, Sarah H. CreemRegehr, Kristina M. Rand, Jeanine K. Stefanucci, and William B. Thompson. Kinect based 3D object manipulation on a desktop display. Proceedings of the ACM Symposium on Applied Perception, pp. 99-102, ACM, 2012

Patents

- U.S. Patent 9342630 B2, (granted), "System and Method for Monitoring and Analyzing Social Network Databases"

Posters

- Mukund Raj, Mahsa Mirzargar, Robert M. Kirby, Ross T. Whitaker."Summarizing and Visualizing Graph Ensembles with Rank Statistics and Boxplots'. 2017 International Symposium on Graph Drawing and Network Visualization, 09/25/17
- Mukund Raj, Robert M. Kirby, Ross T. Whitaker. "Network Boxplots: A Method to Visualize Network Ensembles". 2016 School of Computing poster session (UofUtah), 02/19/16
- Mukund Raj, Mahsa Mirzargar, Robert M. Kirby, Ross T. Whitaker,"Generalized Data Depth and Applications", 2015 School of Computing poster session (UofUtah), 02/20/15

PRESENTATIONS (selected)

Invited

- "Decoupled Parallel Particle Tracing and Visualization for Stochastic Flows", Invited talk at Los Alamos National Laboratory (Los Alamos), 03/04/2019
- "Depth based Visualizations for Ensemble Data and Graphs", Invited talk at U of Arizona CS colloquium (Tuscon), 10/03/17

Conference

- "Visualizing Multidimensional Data with Order Statistics", EuroVis 2018 (Brno, Czech Republic), 06/06/18
- "Anisotropic Radial Layout for Visualizing Centrality and Structure in Graphs", GD 2017 (Boston), 09/27/17
- "Evaluating Alignment of Shapes for Ensemble Visualization", IEEE VIS 2016 (Baltimore), 08/27/16
- "Kinect based 3D object manipulation on a desktop display ", ACM SAP 2012 (Los Angeles), 08/04/13

Seminars

- "Graph Kernels for Chemical Informatics", Data Group Seminar (UofUtah, 11/10/15
- "Generalized Notions of Data Depth", Data Group Seminar (UofUtah), 03/12/15
- "The Power Crust", SCI Imaging Seminar (UofUtah), 04/23/12

SERVICE

Reviewer

- 2021: IEEE Visualization, IEEE PacificVis, IEEE/ACM CCGrid, The Visual Computer
- 2020: IEEE Visualization, Journal of Visualization, IEEE Computational Science and Engineering
- 2019: IEEE Visualization, Journal of Visualization, Scientific Programming, International Conference on Image & Graphics, Workshop on Visual Analytics in Healthcare
- 2018: IEEE Visualization, EuroVis

Other

- 2020-2021: Mentor, NAACP's Afro-Academic, Cultural, Technological and Scientific Olympics (ACT-SO)
- 2020: Volunteer, Argonne Coding for Science Camp
- 2019: Volunteer, Argonne CAPS High School Computing Workshop
- 2018: Symposium Organizing Committee Member, Argonne Postdoctoral Symposium
- 2016: Volunteer Coordinator, UServeUtah Cyber Seniors (Pilot) Program
- 2012: Student Volunteer, Siggraph