

Vijay Natarajan

Curriculum Vitæ

Department of Computer Science and Automation
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Citizen of India

Research Interests

Scientific visualization, computational geometry, computational topology, mesh processing.

Education

- 1999 – 2004 Duke University: Ph.D. in Computer Science
Advisor: Prof. Herbert Edelsbrunner
- 1994 – 1999 Birla Institute of Technology and Science, Pilani, India: (dual degree program)
M.Sc. (Hons.) in Mathematics. Advisor: Prof. B.S. Panda
B.E. (Hons.) in Computer Science

Employment

- 2012-present Associate professor
Department of Computer Science and Automation
Indian Institute of Science, Bangalore
- 2012 – 2015 Associate professor
Supercomputer Education and Research Centre
Indian Institute of Science, Bangalore
- 2006 – 2012 Assistant professor
Department of Computer Science and Automation, and
Supercomputer Education and Research Centre
Indian Institute of Science, Bangalore
- 2004 – 2006 Postdoctoral researcher, Institute for Data Analysis and Visualization, UC Davis
- 2001 – 2004 Research assistant, Department of Computer Science, Duke University
- May-July 2003 Intern, Lawrence Livermore National Laboratory, California
- Fall 2000 Teaching assistant, Department of Computer Science, Duke University
(CPS 124/CPS 296: Introduction to computer graphics)
- Jan-June 1999 Intern, Tata Elxsi Ltd., Bangalore, India
- May-July 1998 Summer intern, Tata Institute for Fundamental Research, Mumbai, India

Visiting Positions

- Oct 2013-Sep 2014 Guest Professor, Zuse Institute Berlin, Germany
- May 2011 Laboratoire Jean Kuntzmann, INRIA Rhône-Alpes, France
- Jan-Aug 2002 Visiting researcher, Lawrence Livermore National Laboratory, California

Awards and Recognitions

2016	Swarnajayanti Fellowship, DST, Govt. of India
Nov 2013	Plenary speaker, SIAM GD/SPM 2013, Denver, USA
2013 – 2014	Humboldt Research Fellowship for Experienced Researchers
2013-present	Young Associate of Indian National Academy of Engineering (INAE)
2011	Indian National Academy of Engineering (INAE) Young Engineer Award
2011	Microsoft Research India Outstanding Young Faculty Award
2010	Indian National Science Academy (INSA) Young Scientist Medal
2010 – 2013	Associate of Indian Academy of Sciences
1999 – 2000	Fellowship, Department of Computer Science, Duke University, Durham NC
1995 – 1999	University merit scholarship, Birla Institute of Technology and Science, Pilani
2017	Best Poster Award, SciVis Track, IEEE Visualization Conference, 2017
2012	Student Best Paper Award Finalist, ACM/IEEE Supercomputing 2012
2011	Third Best Paper Award, EuroVis 2011

Publications

Book Chapters

- [6] Nithin Shivashankar and Vijay Natarajan.
Efficient software for programmable visual analysis using Morse-Smale complexes.
Topological Methods in Data Analysis and Visualization IV.
Hamish Carr, Christoph Garth, and Tino Weinkauff (Eds.)
Springer-Verlag, *Mathematics and Visualization Series*, 2017, 317–331.
- [5] Raghavendra Sridharamurthy, Talha Bin Masood, Harish Doraiswamy, Siddharth Patel, Raghavan Varadarajan, and Vijay Natarajan.
Extraction of robust voids and pockets in proteins.
Mathematical Methods for Visualization in Medicine and Life Sciences.
Lars Linsen, Hans-Christian Hege, and Bernd Hamann (Eds.)
Springer-Verlag, *Mathematics and Visualization Series*, 2016, 329–349.
(Cover Image)
- [4] Eugene Zhang and Vijay Natarajan.
Derived fields.
Scientific Visualization: Uncertainty, Multifield, Biomedical, and Scalable Visualization.
Hansen, C.D., Chen, M., Johnson, C.R., Kaufman, A.E., and Hagen, H. (Eds.)
Springer-Verlag, *Mathematics and Visualization Series*, 2014, 139–160.
- [3] Robert S. Laramée, Hamish Carr, Min Chen, Helwig Hauser, Lars Linsen, Klaus Mueller, Vijay Natarajan, Harald Obermaier, Ronald Peikert, and Eugene Zhang.
Future challenges and unsolved problems in multi-field visualization.
Scientific Visualization: Uncertainty, Multifield, Biomedical, and Scalable Visualization.
Hansen, C.D., Chen, M., Johnson, C.R., Kaufman, A.E., and Hagen, H. (Eds.)
Springer-Verlag, *Mathematics and Visualization Series*, 2014, 205–214.
- [2] Suthambhara N. and Vijay Natarajan.
Simplification of Jacobi sets.
Topological Data Analysis and Visualization: Theory, Algorithms and Applications.
Valerio Pascucci, Xavier Tricoche, Hans Hagen, and Julien Tierny (Eds.)
Springer-Verlag, *Mathematics and Visualization Series*, 2011, 91–102.
- [1] Vijay Natarajan, Patrice Koehl, Yusu Wang, and Bernd Hamann.
Visual analysis of biomolecular surfaces.
Mathematical Methods for Visualization in Medicine and Life Sciences.
Lars Linsen, Hans Hagen, and Bernd Hamann (Eds.)
Springer-Verlag, *Mathematics and Visualization Series*, 2007, 237–255.

Refereed Journal Papers

- [34] Akash Anil Valsangkar, Joy Merwin Monteiro, Vidya Narayanan, Ingrid Hotz, and Vijay Natarajan. An exploratory framework for cyclone identification and tracking. *IEEE Transactions on Visualization and Computer Graphics*, 2018, In Press.
- [33] Girijanandan Nucha, Georges-Pierre Bonneau, Stefanie Hahmann, and Vijay Natarajan. Computing contour trees for 2D piecewise polynomial functions. *Computer Graphics Forum (EuroVis 2017)*, 36(3), 2017, 23–33.
- [32] Abhishek Rathod, Talha Bin Masood, and Vijay Natarajan. Approximation algorithms for max Morse matching. *Computational Geometry: Theory and Applications*, 61, 2017, 1–23.
- [31] Nithin Shivashankar, Sonali Patil, Amrisha Bhosle, Nagasuma Chandra, and Vijay Natarajan. MS3ALIGN: an efficient molecular surface aligner using the topology of surface curvature. *BMC Bioinformatics*, 17:26, 2016.
- [30] Nithin Shivashankar, Pratyush Pranav, Vijay Natarajan, Rien van de Weygaert, E. G. Patrick Bos, and Steven Rieder. Felix: A Topology based Framework for Visual Exploration of Cosmic Filaments. *IEEE Transactions on Visualization and Computer Graphics*, 22(6), 2016, 1745–1759.
- [29] Talha Bin Masood, Sankaran Sandhya, Nagasuma Chandra, and Vijay Natarajan. ChExVis: a tool for molecular channel extraction and visualization. *BMC Bioinformatics*, 16:119, 2015.
- [28] Dilip Mathew Thomas and Vijay Natarajan. Multiscale symmetry detection in scalar fields by clustering contours. *IEEE Transactions on Visualization and Computer Graphics (IEEE SciVis 2014)*, 20 (12), 2014, 2427–2436.
- [27] Dilip Mathew Thomas and Vijay Natarajan. Detecting symmetry in scalar fields using augmented extremum graphs. *IEEE Transactions on Visualization and Computer Graphics (IEEE SciVis 2013)*, 19 (12), 2013, 2663–2672.
- [26] Harish Doraiswamy, Vijay Natarajan, and Ravi S. Nanjundiah. An exploration framework to identify and track movement of cloud systems. *IEEE Transactions on Visualization and Computer Graphics (IEEE SciVis 2013)*, 19 (12), 2013, 2896–2905.
- [25] Harish Doraiswamy, Nithin Shivashankar, Vijay Natarajan, and Yusu Wang. Topological saliency. *Computers & Graphics*, 37 (7), 2013, 787–799.
- [24] Talha Bin Masood, Dilip Mathew Thomas, and Vijay Natarajan. Scalar field visualization via extraction of symmetric structures. *The Visual Computer (CGI 2013)*, 29 (6-8), 2013, 761–771.
- [23] Harish Doraiswamy and Vijay Natarajan. Computing Reeb graphs as a union of contour trees. *IEEE Transactions on Visualization and Computer Graphics*, 19 (2), 2013, 249–262.
- [22] Nithin Shivashankar and Vijay Natarajan. Parallel computation of 3D Morse-Smale complexes. *Computer Graphics Forum (EuroVis 2012)*, 31 (3), 2012, 965–974.
- [21] Dilip Mathew Thomas, Phaneendra K. Yalavarthy, Deepak Karkala, and Vijay Natarajan. Mesh simplification based on edge collapsing could improve computational efficiency in near infrared optical tomographic imaging. *IEEE Journal of Selected Topics in Quantum Electronics (issue on biophotonics)*, 18(4) , 2012, 1493–1501.
- [20] Nithin Shivashankar, Senthilnathan M., and Vijay Natarajan. Parallel computation of 2D Morse-Smale complexes. *IEEE Transactions on Visualization and Computer Graphics*, 18(10), 2012, 1757–1770.

- [19] Vijeth Dinesha, Neeharika Adabala, and Vijay Natarajan.
Uncertainty visualization using HDR volume rendering.
Visual Computer, 28(3), 2012, 265–278.
- [18] Harish Doraiswamy and Vijay Natarajan.
Output-sensitive construction of Reeb graphs.
IEEE Transactions on Visualization and Computer Graphics, 18(1), 2012, 146–159.
- [17] Dilip M. Thomas and Vijay Natarajan.
Symmetry in scalar field topology.
IEEE Transactions on Visualization and Computer Graphics (IEEE VIS '11), 17(12), 2011, 2035–2044.
- [16] Suthambhara Nagaraj, Vijay Natarajan, and Ravi S. Nanjundiah.
A gradient-based comparison measure for visual analysis of multifield data.
Computer Graphics Forum (EuroVis 2011), 30(3), 2011, 1101–1110.
(Third Best Paper Award, Back Cover Image)
- [15] Suthambhara N. and Vijay Natarajan.
Relation-aware isosurface extraction in multi-field data.
IEEE Transactions on Visualization and Computer Graphics, 17(2), 2011, 182–191.
- [14] Dilip Mathew Thomas, Vijay Natarajan, and Georges-Pierre Bonneau.
Link conditions for simplifying meshes with embedded structures.
IEEE Transactions on Visualization and Computer Graphics, 17(7), 2011, 1007–1019.
- [13] Ichitaro Yamazaki, Vijay Natarajan, Zhaojun Bai, and Bernd Hamann.
Segmenting point-sampled surfaces.
The Visual Computer, 26(12), 2010, 1421–1433.
- [12] Scott E. Dillard, Vijay Natarajan, Gunther H. Weber, Valerio Pascucci, and Bernd Hamann.
Topology-guided tessellation of quadratic elements.
Intl. J. Computational Geometry and Applications, 19(2), 2009, 195–211.
(invited paper in special issue of Intl. Symp. Algorithms and Computation, 2006)
- [11] Harish Doraiswamy and Vijay Natarajan.
Efficient algorithms for computing Reeb graphs.
Computational Geometry: Theory and Applications, 42, 2009, 606–616.
- [10] Manohar B. Srikanth, P.C. Mathias, Vijay Natarajan, Prakash Naidu, and Timothy Poston.
Visibility volumes for interactive path optimization.
The Visual Computer (CGI '08), 23, 2008, 1–13.
- [9] Attila Gyulassy, Vijay Natarajan, Valerio Pascucci, and Bernd Hamann.
Efficient computation of Morse-Smale complexes for three-dimensional scalar functions.
IEEE Transactions on Visualization and Computer Graphics (IEEE VIS '07), 13(6), 2007, 1440–1447.
- [8] Attila Gyulassy, Mark Duchaineau, Vijay Natarajan, Valerio Pascucci, Eduardo Bringa, Andrew Higginbotham, and Bernd Hamann.
Topologically clean distance fields.
IEEE Transactions on Visualization and Computer Graphics (IEEE VIS '07), 13(6), 2007, 1432–1439.
- [7] Oliver G. Staadt, Vijay Natarajan, Gunther H. Weber, David F. Wiley, and Bernd Hamann.
Interactive processing and visualization of image data for biomedical and life science applications.
Auer, M., Peng, H. and Singh, A., eds., *BMC Cell Biology* (special issue), 8:S10, 2007.
- [6] Vijay Natarajan, Yusu Wang, Peer-Timo Bremer, Valerio Pascucci, and Bernd Hamann.
Segmenting molecular surfaces.
Computer Aided Geometric Design, 23(6), 2006, 495–509.
(special issue on Applications of Geometric Modeling in the Life Sciences)

- [5] Attila Gyulassy, Vijay Natarajan, Valerio Pascucci, Peer-Timo Bremer, and Bernd Hamann.
A topological approach to simplification of three-dimensional scalar fields.
IEEE Transactions on Visualization and Computer Graphics, 12(4), 2006, 474–484.
(invited paper in special issue on IEEE Conf. Visualization, 2005)
- [4] Vijay Natarajan and Valerio Pascucci.
A topological method for analysis of 3D scalar functions.
Computer Graphics and Geometry, 8(1), 2006, 66–76.
(invited paper in special issue on Intl. Conf. Shape Modeling and Applications, 2005)
- [3] Vijay Natarajan and Herbert Edelsbrunner.
Simplification of three-dimensional density maps.
IEEE Transactions on Visualization and Computer Graphics, 10(5), 2004, 587–597.
- [2] Kree Cole-Mclaughlin, Herbert Edelsbrunner, John Harer, Vijay Natarajan, and Valerio Pascucci.
Loops in Reeb graphs of 2-manifolds.
Discrete and Computational Geometry, 32(2), 2004, 231–244.
(invited paper in special issue on 19th Annual Symposium on Computational Geometry, 2003)
- [1] B.S. Panda, Vijay Natarajan, and Sajal K. Das.
Parallel algorithms for Hamiltonian 2-separator chordal graphs.
Parallel Processing Letters, 12(1), 2002, 51–64.

Refereed Conference Papers

[Conference proceedings that appeared as a journal issue are listed under journal papers]

- [24] Talha Bin Masood and Vijay Natarajan.
An integrated geometric and topological approach to connecting cavities in biomolecules.
PacificVis 2016 : IEEE Pacific Visualization Symposium, 2016, 104–111.
- [23] Roxana Bujack, Jens Kasten, Vijay Natarajan, Gerik Scheuermann, and Kenneth I. Joy.
Clustering moment invariants to identify similarity within 2D flow fields.
EuroVis 2015: Proc. Eurographics Conf. Visualization (short papers), 2015, 31–35.
- [22] Vidya Narayanan, Dilip Mathew Thomas, and Vijay Natarajan.
Distance between extremum graphs.
PacificVis 2015 : IEEE Pacific Visualization Symposium, 2015, 263–270.
- [21] Aditya Acharya and Vijay Natarajan.
A parallel and memory efficient algorithm for constructing the contour tree.
PacificVis 2015 : IEEE Pacific Visualization Symposium, 2015, 271–278.
- [20] Talha Bin Masood, Hari Krishna Malladi and Vijay Natarajan.
Facet-JFA: Faster computation of discrete Voronoi diagrams.
ICVGIP 2014, 1–8.
- [19] Kanuj Kumar, Vijay Natarajan, S. K. Sikdar, and Kalyan V. Srinivas.
An interactive framework for reconstructing 3D neuronal structures.
ICVGIP 2014, 1–8.
- [18] N. Anurag Murty, Vijay Natarajan, and Sathish Vadhiyar.
Efficient homology computations on multicore and manycore systems.
HiPC '13: Proc. Intl. Conf. High Performance Computing, 2013, 1–10.
- [17] Preeti Malakar, Vijay Natarajan, Sathish S. Vadhiyar and Ravi S. Nanjundiah.
A diffusion-based processor reallocation strategy for tracking multiple dynamically varying weather phenomena.
ICPP 2013: Proc. Intl. Conf. Parallel Processing, 2013, 50–59.
- [16] Raghavendra Sridharamurthy, Harish Doraiswamy, Siddharth Patel, Raghavan Varadarajan, and Vijay Natarajan.
Extraction of robust voids and pockets in proteins.
EuroVis 2013: Proc. Eurographics Conf. Visualization (short papers), 2013, 67–71 .

- [15] Senthilnathan Maadasamy, Harish Doraiswamy, and Vijay Natarajan.
A hybrid parallel algorithm for computing and tracking level set topology.
HiPC 2012: Proc. Intl. Conf. High Performance Computing, 2012, 1–10.
- [14] Pranav Bagur, Nithin Shivashankar, and Vijay Natarajan.
Improved quadric surface impostors for large bio-molecular visualization.
ICVGIP 2012, 33.1–33.8.
- [13] Preeti Malakar, Thomas George, Sameer Kumar, Rashmi Mittal, Vijay Natarajan, Yogish Sabharwal, Vaibhav Saxena, and Sathish S. Vadhiyar.
A divide and conquer strategy for scaling weather simulations with multiple regions of interest.
SC 2012: Proc. IEEE/ACM Supercomputing, 2012, 37.1–37.11.
(Best Student Paper Award Finalist)
- [12] Preeti Malakar, Vijay Natarajan, and Sathish S. Vadhiyar.
INST: An integrated steering framework for critical weather applications.
ICCS 2011: Proc. International Conference on Computational Science, *Procedia Computer Science*, 4, 2011, 116–125.
- [11] Preeti Malakar, Vijay Natarajan, and Sathish S. Vadhiyar.
An adaptive framework for simulation and online remote visualization of critical climate applications in resource-constrained environments.
SC 2010: Proc. IEEE/ACM Supercomputing, 2010, 10.1–10.11.
- [10] Harish Doraiswamy and Vijay Natarajan.
Efficient output-sensitive construction of Reeb graphs.
ISAAC '08: Proc. Intl. Symp. Algorithms and Computation, LNCS 5369, Springer-Verlag, 2008, 557–568.
- [9] Scott E. Dillard, Vijay Natarajan, Gunther H. Weber, Valerio Pascucci, and Bernd Hamann.
Tessellation of quadratic elements.
ISAAC '06: Proc. Intl. Symp. Algorithms and Computation, LNCS 4288, Springer-Verlag, 2006, 722–731.
- [8] Ichitaro Yamazaki, Vijay Natarajan, Zhaojun Bai, and Bernd Hamann.
Segmenting point sets.
SMI '06: Proc. IEEE Intl. Conf. Shape Modeling and Applications, 2006, 4–13.
- [7] Attila Gyulassy, Vijay Natarajan, Valerio Pascucci, Peer-Timo Bremer, and Bernd Hamann.
Topology-based simplification for feature extraction from 3D scalar fields.
VIS '05: Proc. IEEE Conf. Visualization, 2005, 535–542.
- [6] Vijay Natarajan and Valerio Pascucci.
Volumetric data analysis using Morse-Smale complexes.
SMI '05: Proc. Intl. Conf. Shape Modeling and Applications, 2005, 320–325.
- [5] Michael Schlemmer, Ingrid Hotz, Vijay Natarajan, Bernd Hamann, and Hans Hagen.
Fast Clifford Fourier transformation for unstructured vector field data.
Proc. Intl. Conf. Numerical Grid Generation in Computational Field Simulations, 2005, 101–110.
- [4] Herbert Edelsbrunner, John Harer, Vijay Natarajan, and Valerio Pascucci.
Local and global comparison of continuous functions.
VIS '04: Proc. IEEE Conf. Visualization, 2004, 275–280.
- [3] Kree Cole-Mclaughlin, Herbert Edelsbrunner, John Harer, Vijay Natarajan, and Valerio Pascucci.
Loops in Reeb graphs of 2-manifolds.
SoCG '03: Proc. ACM Symposium on Computational Geometry, 2003, 344–350.
- [2] Herbert Edelsbrunner, John Harer, Vijay Natarajan, and Valerio Pascucci.
Morse-Smale complexes for piecewise linear 3-manifolds.
SoCG '03: Proc. ACM Symposium on Computational Geometry, 2003, 361–370.

- [1] B.S. Panda, Vijay Natarajan, and Sajal K. Das.
Parallel algorithms for Hamiltonian 2-separator chordal graphs.
IPDPS '01: International Parallel and Distributed Processing Symposium, 2001.

Refereed Posters, Extended Abstracts, and Videos

- [13] Vijay Natarajan.
Feature-directed visualization of multifield data.
In *Topology, Computation and Data Analysis – Dagstuhl Seminar 17292*, Hamish Carr and Michael Kerber and Bei Wang (eds.), Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2018.
- [12] Raghavendra Sridharamurthy, Adhitya Kamakshidasan Vijay Natarajan.
Edit distances for comparing merge trees.
Poster at *IEEE VIS*, 2017.
(Best Poster Award, SciVis Track)
- [11] Stefan Bojarovski, Hans-Christian Hege, Marcus Weber, and Vijay Natarajan.
Topological analysis and visualization of scalar functions characterizing conformational transitions of molecules on multiple time-scales.
Poster at *Shape Up 2015 - Exercises in Materials Geometry and Topology*, 2015.
- [10] Harish Doraiswamy and Vijay Natarajan.
Computing Reeb graphs as a union of contour trees.
Poster at *IEEE VisWeek*, 2011.
- [9] Vijay Natarajan.
Derived scalar fields for visual analysis of multifield data.
In *Scientific Visualization – Dagstuhl Seminar 11231*, Min Chen and Hans Hagen and Charles D. Hansen and Arie Kaufman (eds.), Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2011.
- [8] Dilip M. Thomas and Vijay Natarajan.
Feature preserving mesh simplification.
Poster at *Microsoft TechVista*, Pune, 2011.
(Third Best Poster Award)
- [7] Vijeth Dinesha, Neeharika Adabala, and Vijay Natarajan.
Uncertainty visualization using HDR images.
Poster at *Eurographics / IEEE-VGTC Symposium on Visualization*, 2010.
- [6] Harish Doraiswamy, Aneesh Sood, and Vijay Natarajan.
Constructing Reeb graphs using cylinder maps.
ACM Symposium on Computational Geometry, Video / Multimedia Track, 2010.
- [5] Vijay Natarajan.
Jacobi sets.
In *09251 Abstracts Collection – Scientific Visualization*, David S. Ebert and Eduard Gröller and Hans Hagen and Arie Kaufman (eds.), Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2010.
- [4] Preeti Malakar, Vijay Natarajan, Sathish S. Vadhiyar, and Ravi S. Nanjundiah.
An integrated simulation and visualization framework for tracking cyclone Aila.
Student Research Symposium, HiPC, 2009.
(Best Paper Award)
- [3] Preeti Malakar, Vijay Natarajan, Sathish S. Vadhiyar, and Ravi S. Nanjundiah.
An integrated simulation and visualization framework for tracking cyclone Aila.
Poster at *ATIP Workshop on High Performance Computing in India* (held in conjunction with Supercomputing 2009), Portland, Oregon, USA, 2009.
- [2] Harish Doraiswamy and Vijay Natarajan.
Reeb graphs.
Poster at *Microsoft TechVista*, Chennai, 2008.

- [1] Nicholas J. Huerta, Megan A. Murphy, Bobby Kansara, Vijay Natarajan, Gunther H. Weber, Dawn Y. Sumner, and Bernd Hamann.
3D reconstruction of intricate archean microbial structures using neutron computed tomography and serial sectioning.
Abstract No. IN43B-0331, *In Abstract Proceedings of American Geophysical Union (AGU) Fall Meeting 2005*, Eos Trans. AGU, 86(52).

Patents

- [2] Vijay Natarajan. In-place display of sensory data. US Patent 8641617, 2014.
- [1] Vijay Natarajan. A method for in-place visualization of sensed data and a system thereof. Indian Patent Office, 766/CHE/2009, filed on April 2, 2009, published on August 31, 2012.

Ph.D. Dissertation

Vijay Natarajan. Topological analysis of scalar functions for scientific data visualization.
Ph.D. Thesis, Department of Computer Science, Duke University, 2004.

Technical Reports and Popular Articles

- [6] Vijay Natarajan.
Scientific visualization: from data to insight.
Resonance, 18(7), 2013, 615–629.
- [5] Raghavendra Sridharamurthy, Harish Doraiswamy, Siddharth Patel, Raghavan Varadarajan, and Vijay Natarajan.
Extraction of robust voids and pockets in proteins.
Technical Report, IISc-CSA-TR-2013-3, Computer Science and Automation, Indian Institute of Science, 2013.
- [4] Vijay Natarajan.
Topological structures for scientific visualization.
Annals of the Indian National Academy of Engineering, 9, 2012, 253–258.
- [3] Preeti Malakar, Vijay Natarajan, and Sathish S. Vadhiyar.
A framework for online visualization and simulation of critical weather applications.
Technical Report, IISc-CSA-TR-2011-1, Computer Science and Automation, Indian Institute of Science, 2011.
- [2] Vijay Natarajan and Rajesh Kumar. GMPOLY: A kernel level polyhedral solid modeler.
White paper, TATA ELXSI, 1999.
- [1] Vijay Natarajan. On testing the necessary conditions for visibility graphs of simple polygons.
Research report, Tata Institute of Fundamental Research, Mumbai, India, 1998.

Invited Talks*

- [50] *Feature-directed visualization of multi-field data*, Dagstuhl Seminar on Scientific Visualization, Dagstuhl, Germany, July 2017.
- [49] *Geometric and topological modeling of channels in biomolecules*, BioCS16: Meeting on the Computer Science / Biology Interface, IMSC Chennai, December 2016.
- [48] *Feature-directed visualization*, Indo-German workshop on exascale architectures and applications in high performance computing, Pune, November 2016.
- [47] *Geometric and topological modeling of biomolecular structure*, National Network for Mathematical and Computational Biology One Day Lecture Programme, Dayanand Sagar Institutions, November 2016.
- [46] *Symmetry in scientific data : An approach to feature-directed visualization*, Big Data Public Lecture, IISc Bangalore, February 2016.
- [45] *Scientific visualization : From data to insight*, Plenary talk, Alumni Research Talks, BITS Pilani, January 2016.

*Excluding paper presentations at conferences and workshops

- [44] *Symmetry in scientific data : An approach to feature-directed visualization*, Plenary talk, NCVPRIPG, Patna, India, December 2015.
- [43] *Symmetry in scalar fields : An approach to query based exploration*, PacificVAST, Hangzhou, China, April 2015.
- [42] *Symmetry in scalar fields*, Workshop on Introduction to Graph and Geometric Algorithms, VNIT Nagpur, January 2015.
- [41] *Visualizing scientific data : A topological approach*, Site seminar, Unilever R & D, Bangalore, November 2014.
- [40] *Multiscale symmetry detection in scalar fields by clustering contours*, Visualization seminar, Zuse Institut Berlin, September 2014.
- [39] *Feature directed visualization*, Researchers Forum, Technologiestiftung Berlin, July 2014.
- [38] *Symmetry in scalar fields*, Jacobs University, Bremen, Germany, May 2014.
- [37] *Symmetry in scalar fields*, Berliner Visualization Colloquium, Germany, April 2014.
- [36] *Symmetry in scalar fields*, University of Leipzig, Germany, January 2014.
- [35] *Symmetry in scalar fields*, Visual computing research seminar, University of Magdeburg, Germany, December 2013.
- [34] *Topological structures for data understanding and exploration*, DLR Braunschweig, Germany, December 2013.
- [33] *Reeb graphs for data understanding and exploration*, Abteilungsmeeting, Zuse Institut Berlin, November 2013.
- [32] *Topological structures for data understanding and exploration*, Plenary talk SIAM GP/SPM, Denver, USA, November 2013.
- [31] *Isosurfacing in graphics and visualization: modeling a surface or exploring volumes*, Dreamworks, Bangalore, April 2013.
- [30] *Computing and analyzing level-set topology for graphics and visualization*, Adobe Advanced Technology Labs, Bangalore, September 2012.
- [29] *Computing and analyzing level-set topology for graphics and visualization*, TIFR-CAM, Bangalore, April 2012.
- [28] *Scalar Field Visualization: Level-set Topology*, Workshop on Introduction to Graph and Geometric Algorithms, NITK Surathkal, January 2012.
- [27] *Topology of level sets: representation, computation, and applications*, CSE Department Seminar, The Ohio-State University, Columbus, USA, November 2011.
- [26] *Computing and analyzing level-set topology for visualization*, Cosmic Web Morphology and Topology Workshop, Warsaw, Poland, July 2011.
- [25] *Derived scalar fields for visual analysis of multifield data*, Dagstuhl Seminar on Scientific Visualization, Dagstuhl, Germany, June 2011.
- [24] *Computing and analyzing level-set topology for graphics and visualization*, INRIA Rhône-Alpes, France, May 2011.
- [23] *Computing and analyzing level-set topology for graphics and visualization*, Bangalore ACM SIGGRAPH Elements '11, Bangalore, India, March 2011.
- [22] *Topology-based methods for visualization*, ICTS Workshop on Scientific Discovery through Intensive Data Exploration, Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India, February 2011.
- [21] *Scalar Field Visualization: Level-set Topology*, Workshop on Introduction to Graph and Geometric Algorithms, PSG Tech, Coimbatore, January 2011.
- [20] *Reeb graphs*, IMPECS Workshop on Geometric Computing, IIT Delhi, India, November 2010.
- [19] *Reeb graphs*, GE John F. Welch Research Centre, Bangalore, India, January 2010.

- [18] *Topological methods for visualization and shape analysis*, General Motors R&D, India Science Lab, Bangalore, India, December 2009.
- [17] *Scalar Field Visualization: Level-set Topology*, Dr. Homi J. Bhabha Birth Centenary Workshop on Introduction to Graph and Geometric Algorithms, IISc Bangalore, July 2009.
- [16] *Jacobi Sets*, Dagstuhl Seminar on Scientific Visualization, Dagstuhl, Germany, June 2009.
- [15] *Scalar Field Visualization: Level-set Topology*, Workshop on Introduction to Graph and Geometric Algorithms, BITS Pilani, January 2009.
- [14] *Scientific Visualization*, Seminar on Trends in Computer Graphics Applications, M.S. Ramaiah School of Advanced Studies, Bangalore, November 2008.
- [13] *Scalar Field Visualization: Level-set Topology*, Workshop on Introduction to Geometric Algorithms, IIT Kharagpur, November 2008.
- [12] *Feature-directed Visualization*, Vivekananda University, Belur, West Bengal, October 2008.
- [11] *Visualization for Data Understanding*, Workshop on High Performance Computing and Societal Applications, Sri Sathya Sai University, Prasanthi Nilayam, June 2008.
- [10] *Topological Analysis for Data Visualization*, Invited talk in 73rd Annual Conference of Indian Mathematical Society, December 2007.
- [9] *Topologically Clean Distance Fields*, IIIT Hyderabad, December 2007.
- [8] *Visualization for Data Understanding*, Keynote talk, Excitement of Research Workshop, IIIT Hyderabad, December 2007.
- [7] *Flow-based Segmentation*, Mechanical Engineering Seminar, Indian Institute of Science, Bangalore, April 2007.
- [6] *Topological Methods for Data Analysis and Visualization*, Sarnoff Corporation, Bangalore, India, March 2007.
- [5] *Topological Methods for Data Analysis and Visualization*, GE John F. Welch Research Centre, Bangalore, India, December 2006.
- [4] *Introduction to Visualization*, Siddaganga Institute of Technology, Tumkur, India, November 2006.
- [3] *Critical points and flow structure for 3D scalar data*, Graphics lunch, Department of computer science, UC Berkeley, USA, February, 2005.
- [2] *Critical points and flow structure for density data*, NSF site visit, BioGeometry project, Duke University, November 2003.
- [1] *Simplification of 3-dimensional density maps*, Second annual meeting of NSF ITR BioGeometry project, Stanford University, October 2001.

Research Grants

Principal Investigator

2017 – 2022	Swarnajayanti Fellowship, Department of Science and Technology (Rs. 64.7L)	<i>Topological analysis for efficient and reliable visualization and exploration of time-varying data</i>
2017 – 2018	Shell India Markets Pvt. Ltd. (Rs. 18.75L)	<i>Scalable methods for visualizing flow in a pellet filled reactor</i>

2016 – 2017	Indo-French Centre for Applied Mathematics (10,600 Euros)	<i>Topology-driven visualization of scientific data</i>	with Georges-Pierre Bonneau (PI)
2012 – 2015	Department of Science and Technology (Rs. 24.1L)	<i>Geometry and topology-driven analysis and visualization of scalar fields</i>	with Sathish Govindarajan (co-PI)
2008 – 2011	Intel India (Rs. 18L)	<i>Geometry computing on the GPU</i>	with Samvit Kaul (Intel collaborator)
2008 – 2011	Department of Science and Technology (Rs. 23.3L)	<i>Multiscale methods for scientific visualization</i>	with P.C. Mathias (co-PI)
2007 – 2008	International Swiss Bilateral Research Initiative (8,500 Swiss Francs)	<i>Point based graphics and geometry</i>	with Renato Pajarola

Co-Principal Investigator

2013 – 2018	Department of Science and Technology	<i>DST Center for Mathematical Biology Phase II</i>	with Govindan Rangarajan (PI)
2012 – 2015	Robert Bosch Centre for Cyberphysical Systems (Rs. 300L)	<i>Cyber surgery and remote patient care</i>	with Ashitava Ghosal (PI) and 6 co-PIs
2010 – 2012	Centre for Development of Advanced Computing (Rs. 11.2L)	<i>Middleware for online remote visualization of weather applications</i>	with Sathish S. Vadhiyar (PI) and Ravi S. Nanjundiah (co-PI)
2010 – 2012	Nokia (Rs. 27.2L)	<i>Health monitoring and reporting using cell-phones</i>	with K. Gopinath (PI), Vinayak Naik (PI), and Chiranjib Bhattacharyya (co-PI)
2007 – 2012	Department of Science and Technology (Rs. 300L)	<i>DST Center for Mathematical Biology</i>	with Govindan Rangarajan (PI) and 18 co-PIs
Aug-Sep 2006	Lawrence Livermore National Laboratory (\$17,231)	<i>Analysis and visualization of scientific data using topology-based methods</i>	with Bernd Hamann (PI) and Gunther H. Weber (Co-PI)
Apr-Sep 2005	Lawrence Livermore National Laboratory (\$74,613)	<i>Topological analysis for scientific visualization</i>	with Bernd Hamann (PI) and Gunther H. Weber (Co-PI)

International Collaborator

2007 – 2010 National Science
Foundation, USA
(\$300,000)

*Topology-based methods for analysis and
visualization of noisy data*

with Bernd Hamann (PI),
Valerio Pascucci (co-PI),
Gunther Weber (Senior
Personnel), and Gerik
Scheuermann
(International
Collaborator)

Teaching

Jan 2018	(CSA, IISc)	E0 244: Computational Geometry and Topology (jointly with Sathish Govindarajan)
Aug 2017	(CSA, IISc)	E0 271: Computer Graphics
Jan 2017	(CSA, IISc)	E0 244: Computational Geometry and Topology (jointly with Sathish Govindarajan)
Jan 2017	(CSA, IISc)	E0 301: Virtual reality and its applications (jointly with Swami Manohar)
Aug 2016	(CSA, IISc)	E0 271: Computer Graphics
Jan 2016	(CSA, IISc)	E0 244: Computational Geometry and Topology (jointly with Sathish Govindarajan)
Jan 2016	(CSA, IISc)	E0 301: Virtual reality and its applications (jointly with Swami Manohar)
Aug 2015	(CSA, IISc)	E0 271: Computer Graphics
Jan 2015	(CSA, IISc)	E0 244: Computational Geometry and Topology (jointly with Sathish Govindarajan)
Jan 2015	(SERC, IISc)	SE 294: Data Analysis and Visualization (jointly with Venkatesh Babu and Partha Pratim Talukdar)
Jan 2013	(SERC, IISc)	SE 294: Data Analysis and Visualization
Aug 2012	(CSA, IISc)	E0 271: Computer Graphics
Jan 2012	(CSA, IISc)	E0 271: Computer Graphics
Jan 2011	(SERC, IISc)	SE 294: Data Analysis and Visualization
Aug 2010	(CSA, IISc)	E0 271: Computer Graphics
Jan 2010	(CSA, IISc)	E0 373: Topological Methods for Visualization
Aug 2009	(CSA, IISc)	E0 271: Computer Graphics
Jan 2009	(SERC, IISc)	SE 294: Data Analysis and Visualization
Aug 2008	(CSA, IISc)	E0 271: Computer Graphics
Jan 2008	(CSA, IISc)	E0 373: Topological Methods for Visualization
Jan 2008	(SERC, IISc)	SE 294: Data Analysis and Visualization (jointly with P.C. Mathias and Debnath Pal)
Aug 2007	(CSA, IISc)	E0 271: Computer Graphics
Jan 2007	(CSA, IISc)	E0 373: Topological Methods for Visualization
Spring 2006	(UC Davis)	ECS 289L: Morse Theory for Data Analysis and Visualization

Advising and Mentoring Activities[†]

Talha Bin Masood	Postdoc	2017 – 2018	<i>Topological analysis for visualization, visualization in life sciences and climate science</i>
Amit Chattopadhyay	IISc Research Associate	Sep 2015 - Jan 2016	<i>Computational topology, multi-field visualization</i>
Bharath Ram Sundar	Postdoc	Mar-July 2015	<i>Geometry processing, computational topology</i>
Sasanka Roy	IISc Centenary Postdoctoral Fellow	2009 – 2010	<i>Computational geometry</i>
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Mohit Sharma	Ph.D. (CSA)	ongoing	

[†]Thesis/Project advisor unless otherwise specified

Raghavendra G. S.	Ph.D. (CSA)	ongoing	<i>Comparative analysis of topological structures</i>
Talha Bin Masood	Ph.D. (CSA)	2018	<i>Geometric and topological methods for biomolecular visualization</i>
Dilip M. Thomas	Ph.D. (CSA)	2015	<i>Symmetry in scalar fields</i>
Nithin Shivashankar	Ph.D. (CSA)	2015	<i>Morse-Smale complexes: computation and applications</i>
Nitin Singh	Ph.D. (Interdisciplinary Mathematical Sciences)	2014 (jointly advised by Basudeb Datta, MATH)	<i>On Walkup's class of manifolds and tight triangulations</i>
Preeti Malakar	Ph.D. (CSA)	2014 (jointly advised by Sathish Vadhiyar, SERC)	<i>Integrated parallel computations, data analysis, and visualization for large-scale weather applications</i>
Harish Doraiswamy	Ph.D. (CSA)	2013	<i>Reeb graphs: computation, visualization, and applications</i>
Suthambhara N	Ph.D. (CSA)	2012	<i>Visual analysis of interactions in multi-field scientific data</i>
<hr/>			
Akash Anil Valsangkar	M.Sc. (Engg.) (CSA)	2018	<i>An exploratory framework for cyclone identification and tracking</i>
Girijanandan Nucha	M.Sc. (Engg.) (CSA)	2018	<i>Computing contour trees for 2D piece-wise polynomial functions</i>
Vidya Narayanan	M.Sc. (Engg.) (CDS)	2016	<i>Similarity between scalar fields</i>
Raghavendra G. S.	M.Sc. (Engg.) (CSA)	2013	<i>Identification and quantification of important voids and pockets in proteins</i>
Kanuj Kumar	M.Sc. (Engg.) (CSA)	2013	<i>Reconstruction of 3D neuronal structures</i>
<hr/>			
Akshay Jain	M.Tech. (CSA)	2017-present (jointly advised by Swami Manohar, Microsoft Research India)	
Jaipreet Singh	M.E. (CSA)	2016 – 2017	<i>Scalable methods for visualizing flow in a pellet filled reactor</i>
Suraj Kaushal	M.E. (CSA)	2016 – 2017	<i>Detecting topological similarity and dissimilarity in multi-field data</i>
Nirmalendu Prakash Diwakar	M.E. (CSA)	2016 – 2017 (jointly advised by Swami Manohar, Microsoft Research India)	<i>EmpathEyes: Immersive virtual reality simulation of visual impairments using smart phones</i>
Nikhil P. Ranjanikar	M.Tech. (CDS)	2015 – 2016 (jointly advised by Sathish Vadhiyar, CDS)	<i>Efficient parallel algorithm to compute a subcomplex of the weighted delaunay triangulation for molecular data</i>
Raman Preet Kaur	M.E. (CSA)	2015 – 2016	<i>Tracking change in topology during downsampling</i>
Tarun Bansal	M.E. (CSA)	2014 – 2015	<i>Development of a graphical interface for an endoscopy simulator</i>

Aditya Acharya	M.Tech. (SERC)	2013 – 2014	<i>A parallel and memory efficient algorithm for constructing the contour tree</i>
Anurag Murty	M.Tech. (SERC)	2012 – 2013 (jointly advised by Sathish Vadhiyar, SERC)	<i>Efficient homology computations on multicore and manycore systems</i>
Rahul Sharma	M.E. (CSA)	2012 – 2013	<i>Interactive virtual endoscopy of upper GI tract and stomach</i>
Rakesh Malviya	M.E. (CSA)	2012 – 2013	<i>Channel detection in macromolecules</i>
Talha Bin Masood	M.E. (CSA)	2011 – 2012	<i>Identifying symmetry in scalar fields</i>
Debasish Tapna	M.E. (CSA)	2010 – 2011	<i>Topology preserving subsampling</i>
Vijeth Dinesha	M.E. (CSA)	2009 – 2010	<i>Uncertainty visualization using HDR volume rendering</i>
Dilip M. Thomas	M.E. (CSA)	2008 – 2009	<i>Topology preserving mesh simplification</i>
Sandeep Chakradhari	M.E. (CSA)	2007 – 2008	<i>Visualization of automation system architecture</i>
Arun Kumar Reddy	M.E. (CSA)	2007 – 2008	<i>Shape descriptors for protein molecules</i>
Sumit Kumar	M.E. (CSA)	2007 – 2008	<i>Visualization of biomolecular surfaces</i>
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Yuki Fujita	Exchange student, JAIST, Japan	Oct-Dec 2017	<i>High-dimensional data visualization</i>
Adhitya Kamakshidasan	Intern, Project Assistant	Sep 2016-Jan 2018	<i>Symmetry Viewer for cryo-EM data, Contour tree computation and analysis</i>
Sushmitha S. Jois	Summer Intern	June-July 2017	<i>Comparing contour trees</i>
Saroja Y. Talwar	Summer Intern	Apr-June 2017	<i>Edit distance for contour trees</i>
Pujitha Kothapalli	Summer Intern	June-July 2016	<i>Study of contour tree algorithms</i>
Rishabraj Dhariwal	Summer Intern	May-June 2016	<i>Scalability study of the DivCT algorithm</i>
Abhishek Balakrishna	Summer Intern	May-July 2016	<i>Memory efficient data structures for the contour tree</i>
Raj Jung Mahat	Summer Intern	June-July 2015	<i>Mask generation for MS complex computation</i>
Aparajita Haldar	Summer Intern	June-July 2015	<i>Distance between topological structures</i>
Amisha Priyadarshini	Summer Intern	May-June 2015	<i>Comparing Euclidean Voronoi diagram and power diagram</i>
Nagarjun N.	Junior Research Fellow	Jan 2015-April 2016	<i>Symmetry in cryo-EM data</i>
Sai Gokul Kanakala	Junior Research Fellow	July 2013-June 2014	<i>Virtual endoscopy</i>
Romain Tetley	Exchange student, ENS de Lyon, France	Jan-May 2013	<i>Visualization in ecology</i>
Abhishek Rathod	Senior Research Fellow	Dec 2012-Dec 2013	<i>Computational topology</i>
Pranav Bagur	Summer Intern	May-July 2012	<i>Accelerating visualization of large biomolecules</i>
Sonali D. Patil	Project Assistant	Sep 2011-Nov 2012	<i>Molecular Visualization</i>
Shantanu Choudhary	Project Assistant	Jul 2010-Aug 2011	<i>Multifield visualization</i>
Aneesh Sood	Project Assistant	Jun 2009-Jun 2010	<i>Reeb graphs</i>
Nitesh Kumar	Junior Research Fellow (DST Centre for Mathematical Biology, with Prof. S.K. Sikdar)	Feb-Jun 2008	<i>Segmentation of neurons from confocal microscopy images</i>
Rajesh Bhasin	Summer Intern	June-July 2008	<i>Protein Viewer</i>

Attila Gyulassy	Ph.D. (UC Davis)	2004-2008 (research mentor)	<i>Efficient topology-based methods for analysis and visualization of three-dimensional scalar fields</i>
Ichitaro Yamazaki	Ph.D. (UC Davis)	2004-2008 (research mentor)	<i>Segmentation of point samples</i>
Harnit Singh	Undergraduate researcher (UC Davis)	Jan-July 2005 (co-supervisor)	<i>Topology-based segmentation of molecular surfaces</i>

Service

Department and University Service

Indian Institute of Science

2016-present	Member, Faculty advisory committee, IISc webpage
2015-present	Chair, Department curriculum committee, Department of Computer Science and Automation
2014-present	Member, Committee for computerization and IT (Opera)
2013-present	Member, Senate library committee
2012 – 2017	Member, UGC CAS-2 steering committee, Department of Computer Science and Automation
2012 – 2013	Organizing committee member, Electrical Sciences Divisional Symposium, IISc
2011 – 2013	Member, SERC user support committee, Supercomputer Education and Research Centre
2011 – 2016	Member, CSA second floor building committee, Department of Computer Science and Automation
2009 – 2013	Member, Electrical Sciences division webpage committee, Divisional of Electrical Sciences
2008	Joint Coordinator, Showcase committee, IISc centenary conference, Department of Computer Science and Automation, Supercomputer Education and Research Centre
2008 – 2012	Member, Department curriculum committee, Department of Computer Science and Automation
2007 – 2014	Coordinator, CSA webpage committee, Department of Computer Science and Automation
2007 – 2009	Member, FIST implementation committee, Department of Computer Science and Automation
2006 – 2015	Member, Research students admission committee, Supercomputer Education and Research Centre
2006-present	Member, Research students admission committee, Department of Computer Science and Automation

Department of Computer Science, Duke University

2003 – 2004	Graduate student liaison
2001 – 2003	Representative of the department to the Graduate and Professional Student Council
2000 – 2004	Member of the graduate student recruitment committee

Professional service

- Co-organizer, Dagstuhl Seminar on “Topology, Computation, and Data Analysis”, 2019, Dagstuhl, Germany
- Program Co-Chair, ICVGIP 2016, Guwahati
- Visualization Track Chair, Workshop at SIGGRAPH ASIA 2012 (WASA), Singapore
- Area Chair, ICVGIP 2014, Bangalore
- Lдав 2017 Best Paper Award committee member
- Program committee member
 - VCBM 2018 : Eurographics Workshop on Visual Computing for Biology and Medicine, Granada, Spain, September 2018.

- IEEE Scientific Visualization (SciVis 2018), Berlin, Germany, October 2018.
- EuroVis 2018, Brno, Czech Republic, June 2018.
- EuroVis 2018 (STAR), Brno, Czech Republic, June 2018.
- VCBM 2017 : Eurographics Workshop on Visual Computing for Biology and Medicine, Bremen, Germany, September 2017.
- IEEE Symposium on Large Data Analysis and Visualization (LDAV 2017), Phoenix, Arizona, October 2017.
- IEEE Scientific Visualization (SciVis 2017), Phoenix, USA, October 2017.
- EuroVis 2017, Barcelona, Spain, June 2017.
- EuroVis 2017 (STAR), Barcelona, Spain, June 2017.
- EuroVis 2017 (short papers), Barcelona, Spain, June 2017.
- International Workshop on Topology-Based Methods in Data Analysis and Visualization (TopoInVis 2017), Tokyo, Japan, Feb 2017.
- SA16VIS: ACM SIGGRAPH Asia Symposium on Visualization, Macao, December 2016.
- EuroVis 2016 (short papers), Groningen, Netherlands, June 2016.
- VCBM 2016 : Eurographics Workshop on Visual Computing for Biology and Medicine, Bergen, Norway, September 2016.
- HPDAV 2016: High Performance Data Analysis and Visualization, IPDPS Workshop, Chicago USA, May 2016.
- VHPC : Symposium on Visualization in High Performance Computing, SIGGRAPH Asia, Kobe, Japan, November 2015.
- VISTech 2015: Third Workshop on Visualization Infrastructure and Systems Technology (SC 15), Austin, Texas, USA, November 2015.
- VCBM 2015 : Eurographics Workshop on Visual Computing for Biology and Medicine, Chester, UK, September 2015.
- International Workshop on Topology-Based Methods in Data Analysis and Visualization (TopoInVis 2015), Anweiler, Germany, May 2015.
- EuroVis 2015 (short papers), Cagliari, Italy, May 2015.
- PacificVis 2015, Hangzhou, China, April 2015.
- IEEE Scientific Visualization (SciVis 2014), Paris, France, November 2014.
- IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV 2014), Paris, France, November 2014.
- VISTech 2014: Second Workshop on Visualization Infrastructure and Systems Technology (SC 14), New Orleans, USA, November 2014.
- EuroVis 2014, Swansea, UK, June 2014.
- PacificVis 2014, Yokohama, Japan, March 2014.
- Ultravis 2013, Denver, USA, November 2013.
- IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV 2013), Atlanta, USA, October 2013.
- IEEE Scientific Visualization (SciVis 2013), Atlanta, USA, October 2013.
- EuroVis 2013, Leipzig, Germany, June 2013.
- PacificVis 2013, Sydney, Australia.
- International Workshop on Topology-Based Methods in Data Analysis and Visualization (TopoInVis 2013), Davis, USA, March 2013.
- IEEE Visualization (Vis 2012), Seattle, Washington, USA, 2012.
- EuroVis 2012, Vienna, Austria, June 2012.
- IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV 2011), Providence, USA, October 2011.
- International Workshop on Topology-Based Methods in Data Analysis and Visualization (TopoInVis 2011), Zurich, Switzerland, April 2011.

- IEEE Visualization (Vis 2010), Salt Lake City, Utah, USA, 2010.
- EuroVis 2009, Berlin, Germany, June 2009.
- International Workshop on Topology-Based Methods in Data Analysis and Visualization (TopoInVis 2009), Snowbird, Utah, USA, February 2009.
- International Symposium on Volume Graphics (VG 08), Los Angeles, California, USA, August 2008.
- Symposium on Point-Based Graphics (PBG 08), Los Angeles, California, USA, August 2008.
- International Symposium on Volume Graphics (VG 07), Prague, Czech Republic, September 2007.
- International Workshop on Topology-based Methods in Visualization (TopoInVis 2007), Leipzig, Germany, March 2007.
- Organizing committee member
 - ICVGIP 2014
 - FSTTCS 2008
- Reviewer
 - ACM Computing Surveys
 - ACM Transactions on Graphics
 - IEEE Transactions on Visualization and Computer Graphics
 - Journal on Computer Aided Geometric Design
 - Discrete and Computational Geometry
 - Computational Geometry: Theory and Applications
 - Computer Graphics Forum
 - Computers and Graphics
 - Nucleic Acids Research
- Reviewer
 - IEEE Conference on Visualization
 - ACM Symposium on Computational Geometry
 - ACM Symposium on Discrete Algorithms
 - ACM Symposium on Solid Modeling
 - ACM Symposium on Theory of Computing
 - Eurovis: Eurographics / IEEE VGTC Symposium on Visualization
 - Eurographics Symposium on Geometry Processing
 - IARCS Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS)
 - International Conference on Parallel Processing
 - International Meshing Roundtable
 - International Symposium on Volume Graphics
 - LDAV: IEEE Symposium on Large-Scale Data Analysis and Visualization
 - PacificVis: IEEE Pacific Visualization Symposium
 - SMI: International Conference on Shape Modeling and Applications
 - Symposium on Point-Based Graphics
 - TopoInVis: International Workshop on Topological Methods in Data Analysis and Visualization
 - UltraVis: Ultrascale Visualization Workshop
- Proposal Reviewer

- NSA Mathematical Sciences Grant Program, USA
- Austrian Science Fund (FWF)
- Science and Engineering Research Board (SERB), India
- Board of Research in Nuclear Sciences, India
- Professional Society Membership
 - Professional Member, Association for Computing Machinery (ACM)
 - Senior Member, Institute of Electrical and Electronics Engineers, Inc. (IEEE)
 - Core Committee Member, Bangalore ACM SIGGRAPH