

# Vijay Natarajan

## Curriculum Vitæ

Department of Computer Science and Automation  
Indian Institute of Science  
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Citizen of India

### Research Interests

Scientific visualization, computational topology, computational geometry, geometry 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

- 2018-present Professor  
Department of Computer Science and Automation  
Indian Institute of Science, Bangalore
- 2012 – 2018 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

- 2019 Fellow, Indian National Academy of Engineering (INAE)
- 2018 – 2021 Mindtree Chair Professor, IISc Bangalore
- 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 – 2022	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

## Selected Press and Media Coverage

1. Entrepreneurs born under the microscope.  
Economic Times. January 03, 2019.  
[http://www.ecoti.in/gvD\\_BZ40](http://www.ecoti.in/gvD_BZ40)
2. Mindtree partners with IISc Bangalore to advance research in artificial intelligence.  
Analytics India Magazine, November 15, 2018.  
<https://www.analyticsindiamag.com/mindtree-partners-with-iisc-bangalore-to-advance-research-in-ai/>
3. Mindtree partners with IISc for AI research.  
Economic Times. November 14, 2018.  
<http://www.ecoti.in/lrNxxY>
4. Scientists develop endoscopy simulator 'EndoMimyk'.  
Times of India. July 10, 2018.  
[http://toi.in/\\_NFwJY36/a24gk](http://toi.in/_NFwJY36/a24gk)
5. Gush of health science at IISc.  
Forbes India. May 11, 2018.  
<http://www.forbesindia.com/article/innovation-nation/gush-of-health-science-at-iisc/50071/1>
6. Interview on Visualizing Scientific Data.  
Simplifyd. May 8, 2017.  
<https://youtu.be/mszDUpvxCo0>

## Publications

### Book Chapters

- [8] Tripti Agarwal, Amit Chattopadhyay, and Vijay Natarajan.  
Topological feature search in time-varying multifold data.  
Topological Methods in Data Analysis and Visualization VI : Theory, Applications, and Software.  
Ingrid Hotz, Talha Bin Masood, Filip Sadlo, and Julien Tierny (Eds.)  
Springer Nature, *Mathematics and Visualization Series*, 2021, 197–217.
- [7] Adhitya Kamakshidasan and Vijay Natarajan.  
Mergemaps: treemaps for scientific data.  
Topological Methods in Data Analysis and Visualization VI : Theory, Applications, and Software.  
Ingrid Hotz, Talha Bin Masood, Filip Sadlo, and Julien Tierny (Eds.)  
Springer Nature, *Mathematics and Visualization Series*, 2021, 19–38.
- [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 Nature, *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 Nature, *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

- [43] Raghavendra Sridharamurthy and Vijay Natarajan.  
Comparative analysis of merge trees using local tree edit distance.  
*IEEE Transactions on Visualization and Computer Graphics*. 2022, In Press.
- [42] Signe Sidwall Thygesen, Talha Bin Masood, Mathieu Linares, Vijay Natarajan, and Ingrid Hotz.  
Level of detail exploration of electronic transition ensembles using hierarchical clustering.  
*Computer Graphics Forum (EuroVis 2022)*, 2022, In Press.
- [41] Upkar Singh, T.M. Dhipu, P. N. Vinayachandran, and Vijay Natarajan.  
Front and skeleton features based methods for tracking salinity propagation in the ocean.  
*Computers and Geosciences*, 159, 2022, 104993:1–9.
- [40] Karran Pandey, Talha Bin Masood, Saurabh Singh, Ingrid Hotz, Vijay Natarajan, and Tejas G. Murthy.  
Morse theory-based segmentation and fabric quantification of granular materials.  
*Granular Matter*, 2022, In Press.
- [39] Lin Yan, Talha Bin Masood, Raghavendra Sridharamurthy, Farhan Rasheed, Vijay Natarajan, Ingrid Hotz, and Bei Wang.  
Scalar field comparison with topological descriptors: properties and applications for scientific visualization.  
*Computer Graphics Forum (EuroVis STAR 2021)*, 40(3), 2021, 599–633.
- [38] Talha Bin Masood, Signe Sidwall Thygesen, Mathieu Linares, Alexei I. Abrikossov, Vijay Natarajan, and Ingrid Hotz.  
Visual analysis of electronic densities and transitions in molecules.  
*Computer Graphics Forum (EuroVis 2021)*, 40(3), 2021, 287–298.

- [37] Karran Pandey, Joy Merwin Monteiro, and Vijay Natarajan.  
An integrated geometric and topological approach for the identification and visual analysis of Rossby wave packets.  
*Monthly Weather Review*, 148 (8), 2020, 3139–3155.
- [36] Talha Bin Masood, Tathagata Ray, and Vijay Natarajan.  
Parallel computation of alpha complexes for biomolecules.  
*Computational Geometry : Theory and Applications*, 90, 2020, 1–17.
- [35] Raghavendra Sridharamurthy, Talha Bin Masood, Adhitya Kamakshidasan, and Vijay Natarajan.  
Edit distance between merge trees.  
*IEEE Transactions on Visualization and Computer Graphics*, 26(3), 2020, 1518–1531.
- [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*, 25(3), 2019, 1460–1473.
- [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]

- [29] Mohit Sharma, Talha Bin Masood, Signe S. Thygesen, Mathieu Linares, Ingrid Hotz, and Vijay Natarajan.  
Segmentation driven peeling for visual analysis of electronic transitions.  
*IEEE VIS 2021: Proc. IEEE Conference on Visualization*, 2021, 1–5.
- [28] Varshini Subhash, Karran Pandey, and Vijay Natarajan.  
GPU parallel computation of Morse-Smale complexes.  
*IEEE VIS 2020: Proc. IEEE Conference on Visualization*, 2020, 36–40.
- [27] Talha Bin Masood, Tathagata Ray, and Vijay Natarajan.  
Parallel computation of alpha complexes for biomolecules.  
*SoCG 2020 : Proc. Symp. Computational Geometry*, 2020, 17.1–17.16.
- [26] Preeti Malakar, Vijay Natarajan and Sathish S. Vadhiyar.  
Adaptive and efficient transfer for online remote visualization of critical weather applications.  
*ICCS 2020 : Proc. International Conference on Computational Science*, 2020, 674–693.
- [25] Mohit Sharma and Vijay Natarajan.  
On-demand augmentation of contour trees.  
*ICVGIP 2018*, 31.1–31.8.

- [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**

- [17] Michael Kerber, Vijay Natarajan, and Bei Wang (eds.).  
*Topology, Computation and Data Analysis – Dagstuhl Seminar 19212*.  
Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2019.
- [16] Vijay Natarajan.  
Topology-driven approaches for analysis and visualization of material structures.  
In *Visual Computing in Materials Sciences – Dagstuhl Seminar 19151*, Christoph Heinzl, Robert Michael Kirby, Stepan V. Lomov, Guillermo Requena, and Rüdiger Westermann (eds.), Schloss Dagstuhl - Leibniz-Zentrum für Informatik, Germany, 2019.
- [15] Adhitya Kamakshidasan and Vijay Natarajan.  
Understanding merge trees with force-directed landscapes.  
Poster at *IEEE VIS*, 2019.
- [14] Adhitya Kamakshidasan and Vijay Natarajan.  
Topological analysis of the 2D von Kármán street.  
Poster at *IEEE VIS*, 2019.



- [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, and 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 355919, 2021.

## 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

- [7] Adhitya Kamakshidasan and Vijay Natarajan. Visual Comparison of Topological Features. *Research Report*, hal-02569089, 2020.
- [6] Vijay Natarajan. Scientific visualization: from data to insight. *Resonance*, 18(7), 2013, 615–629.  
(Cover Image)
- [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\*

- [62] *Spatiotemporal Data Analysis and Visualization: A Topological Feature-Directed Approach*, Samvaad talk series, IIIT Bangalore, April 2022.
- [61] *Foundations of Topological Data Analysis for Biomolecular Visualization*, Spring School on Bio+Med+Vis, May 2021.
- [60] *Scientific visualization : From data to insight*, Webinar, DA-IICT, Gandhinagar, November 2020.
- [59] *Topological Data Analysis*, Webinar, Rajagiri School of Engineering & Technology, Kochi, September 2020.
- [58] *Edit distance between merge trees*, Asia Pacific Seminar on Applied Topology and Geometry, September 2020.
- [57] *Topological Data Analysis*, Webinar, Dr. Ambedkar Institute of Technology, Bangalore, June 2020.
- [56] *Reeb graphs : Algorithms and Applications*, ACM Summer School on Geometric Algorithms and their Applications, NISER Bhubaneswar, June 2019.
- [55] *Topology driven analysis and visualization methods in material science*, Dagstuhl Seminar on Visual Computing in Materials Sciences, Dagstuhl, Germany, April 2019.

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\*Excluding paper presentations at conferences and workshops

- [54] *Topological feature directed visualization*, Tech Talk at Osmosis, Mindtree Ltd, February 2019.
- [53] *Reeb Graph: Computation and Applications*, Invited talk at Workshop on Topological Data Analysis, Rajagiri School of Engineering & Technology, Kochi, December 2018.
- [52] *Topological feature directed visualization*, Invited talk at International Conference on Topology & Applications, Rajagiri School of Engineering & Technology, Kochi, December 2018.
- [51] *Scientific visualization : From data to insight*, Keynote talk, Emerging Topics in Computational Intelligence - Theory and applications, IEEE Computational Intelligence Society, IISc Bangalore, January 2018.
- [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.
- [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 73<sup>rd</sup> 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

2021 – 2023	DST - Sweden VR Programme (Rs. 23.4L)	<i>Robust topological methods for analysis of dynamic large-scale data for modern material design</i>	with Ingrid Hotz (PI)
2018 – 2021	Mindtree Chair Research Grant (Rs. 18L)	<i>Topological approaches to data analysis and visualization</i>	
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

2022 – 2025	SERB (Rs. 193L)	<i>High performance simulations and visualization for fine-resolution ocean modeling</i>	with Sathish S Vadhiyar (PI); PN Vinayachandran (co-PI)
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2021 – 2023	RGUHS-IISc Digital Health Initiative (Rs. 25L)	<i>A patient-specific augmented reality simulation of brachytherapy applicator insertion</i>	with G. K. Ananthasuresh (PI); Kirthi Koushik A. S., Ramiah Medical College (co-PI)
2021 – 2022	Portescap India Pvt. Ltd. (Rs. 21L)	<i>Smart Endoscopy</i>	with G. K. Ananthasuresh (PI);
2019 – 2022	IoE research proposal at IISc (Rs. 150L)	<i>An integrated HPC stack for extreme scale computing</i>	with Sathish Vadhiyar (PI) and 6 co-PIs
2019 – 2020	Pratiksha Trust Initiatives at IISc (Rs. 10L)	<i>Deep neural networks for unsupervised 3D object reconstruction from 2D images</i>	with R. Venkatesh Babu (PI)
2018 – 2021	Department of Biotechnology	<i>Biodesign-Bioengineering Initiative</i>	with G. K. Ananthasuresh (PI), Mazumdar Shaw Medical Foundation, St. John's Research Institute
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)	<i>Topology-based methods for analysis and visualization of noisy data</i>	with Bernd Hamann (PI), Valerio Pascucci (co-PI), Gunther Weber (Senior Personnel), and Gerik Scheuermann (International Collaborator)
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## Teaching

Jan 2022	(CSA, IISc)	E0 207: Computational Topology : Theory and Applications (jointly with Gugan Thoppe)
Aug 2021	(CSA, IISc)	E0 271: Graphics and Visualization
Feb 2021	(CSA, IISc)	E0 207: Computational Topology : Theory and Applications (jointly with Gugan Thoppe)
Oct 2020	(CSA, IISc)	E0 271: Graphics and Visualization
Jan 2020	(CSA, IISc)	E0 244: Computational Geometry and Topology (jointly with Sathish Govindarajan and Rahul Saladi)
Aug 2019	(CSA, IISc)	E0 271: Graphics and Visualization
Jan 2019	(CSA, IISc)	E0 244: Computational Geometry and Topology (jointly with Sathish Govindarajan)
Aug 2018	(CSA, IISc)	E0 271: Graphics and Visualization
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 R. 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<sup>†</sup>

Saurabh Singh	Postdoc	2021-present	<i>Granular materials, visualization, feature extraction and analysis</i>
Somenath Das	Raman Postdoc	2018 – 2021	<i>Time-varying data visualization, computational geometry</i>
Krishnaraj KP	Postdoc	Oct-Nov 2020	<i>Study of granular material: computational, imaging, and visualization tools</i>
Talha Bin Masood	Postdoc	2017 – 2018	<i>Topological analysis for visualization, visualization in life sciences</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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<sup>†</sup>Thesis/Project advisor unless otherwise specified

Amritendu Dhar Shekhar	Ph.D. (CSA)	ongoing	
Agneedh Basu	Ph.D. (CSA)	ongoing	
Upkar Singh	Ph.D. (CSA)	ongoing	<i>Feature tracking and visualization in oceanography</i>
Mohit Sharma	Ph.D. (CSA)	ongoing	<i>Topological analysis of multivariate data</i>
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>
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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/>			
Sai Manoj Kumar Jakkani	M.Tech. (CSA)	2022–present	
Dhurjati Prasad Das	M.Tech. (CSA)	2022–present	
Nirmalya Gayen	M.Tech. (CSA)	2022–present	
Dinesh Rathod	M.Tech. (CSA)	2022–present	
Aditya Kumar	M.Tech. (CSA)	2021–present	<i>Data driven anatomical structure analysis and visualization</i>
Vijay Kumar Boda	M.Tech. (CSA)	2021–present	<i>Visualization in Oceanography</i>
Nandini Gour	M.Tech. (CSA)	2021–present	<i>Extremum graphs</i>
Abhijath Ande	M.Tech. (CSA)	2020 – 2021	<i>Scalable computation of extremum graphs</i>
Toshit Bazaz	M.Tech. (CSA)	2020 – 2021	<i>Visualizing time varying topological structures</i>
Neeraj Badal	M.Tech. (CSA)	2020 – 2021 (primary advisor Rajiv Soundararajan, ECE)	<i>No reference quality assessment of pan-sharpened images through deep feature similarity</i>



Nishit V Pandya	MS (Math)	2020 – 2021	<i>Comparative measures for topological structures</i>
Dhipu TM	M.Tech. (CSA)	2019 – 2020	<i>Visual Analysis of the Propagation and Cyclic Regulation of Salinity Levels in the Bay of Bengal</i>
Akshay Jain	M.Tech. (CSA)	2017 – 2018 (jointly advised by Swami Manohar, Microsoft Research India)	<i>Use of spatial audio in immersive analytics</i>
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>
<hr/>			
Varshini Subhash	Project Assistant	June 2019 - July 2021	<i>Parallel computation of extremum graph</i>
Karthik Karanth	Project Assistant	August 2018 - June 2019	<i>Visualizing LiDAR data and medical simulations</i>
Karran Pandey	Intern, Project Assistant	July 2018 - July 2021	<i>Topological analysis of atmospheric and material science data</i>
Adhitya Kamakshidasan	Intern, Project Assistant	Sep 2016-Jan 2018	<i>Symmetry Viewer for cryo-EM data, Contour tree computation and analysis</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>
Abhishek Rathod	Senior Research Fellow	Dec 2012-Dec 2013	<i>Computational topology</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>
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Sinduja S. Santosh	Summer Intern	Aug-Oct 2021	<i>Extremum graph visualization</i>
Somaditya Santra	Summer Intern	June-July 2021	<i>Visualization in oceanography</i>
Shashank Singh	Summer Intern	June-July 2021	<i>Visualization in oceanography</i>
Saswat Kumar Dash	Summer Intern	May-June 2020	<i>Visualizing extremum graphs</i>
Bhawna Paliwal	Summer Intern	May-June 2019	<i>Visualizing the merge tree edit distance matrix</i>
Aswanth Saravanan	Summer Intern	May-July 2019	<i>Visualizing symmetry in protein structures</i>
Jessica Bodosa	Summer Intern	May-July 2019	<i>Visualizing symmetry in protein structures</i>
Vishnu Nandakumaran	Summer Intern	May-July 2018	<i>Monotonic tree</i>
Dhruv Sharma	Summer Intern	May-June 2018	<i>GPU accelerated medical simulation</i>
Bhawna Malhotra	Summer Intern	June-July 2018	<i>Web based visualization of NFHS data</i>
Rahul Sinha	Summer Intern	June-July 2018	<i>LiDAR data visualization</i>
Yuki Fujita	Exchange student, JAIST, Japan	Oct-Dec 2017	<i>High-dimensional data visualization</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>
Romain Tetley	Exchange student, ENS de Lyon, France	Jan-May 2013	<i>Visualization in ecology</i>
Pranav Bagur	Summer Intern	May-July 2012	<i>Accelerating visualization of large biomolecules</i>
Rajesh Bhasin	Summer Intern	June-July 2008	<i>Protein Viewer</i>
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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*

2021-present	Chair, Senate curriculum committee
2021-present	Member, Senate Committee on Research Conferments
2021-present	Member, IISc PMRF Committee
2021-present	Chair, Student awards committee, Department of Computer Science and Automation
2020-present	Chair, Collaborative research initiatives committee, Department of Computer Science and Automation
2020-present	Chair, MTech (AI) labs purchase committee, EECS Division
2020-present	Member, CSA building committee, Department of Computer Science and Automation
2019 – 2021	Member, Senate curriculum committee
2019 – 2020	Chair, CSA building committee, Department of Computer Science and Automation
2019-present	Chair, IoE maintenance grant purchase committee, Department of Computer Science and Automation
2016-present	Member, Faculty advisory committee, IISc webpage
2015 – 2019	Chair, Department curriculum committee, Department of Computer Science and Automation
2014 – 2017	Member, Committee for computerization and IT (Opera)
2013 – 2018	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

- Posters Chair, IEEE VIS 2022, Oklahoma City, Oklahoma, USA
- Posters Chair, IEEE VIS 2021, New Orleans, Louisiana, USA
- Co-organizer, Dagstuhl Seminar on “Topology, Computation, and Data Analysis”, 2019, Dagstuhl, Germany
- Steering Committee Member, TopoInVis, 2019-present
- Program Co-Chair, ICVGIP 2016, Guwahati
- Visualization Track Chair, Workshop at SIGGRAPH ASIA 2012 (WASA), Singapore
- Area Chair, ICVGIP 2021, Jodhpur

- Area Chair, ICVGIP 2018, Hyderabad
- Area Chair, ICVGIP 2014, Bangalore
- Review Editor, Computer Graphics and Visualization, Frontiers in Computer Science
- Member, Virtual IEEE VIS 2021 (VIV2021) Committee
- Member, Virtual IEEE VIS 2020 (VIV2020) Committee
- SPCOM 2020 Doctoral Dissertation Award committee member
- LDAH 2017 Best Paper Award committee member
- Organizer, GIAN Short Course on Sampling for Signal Reconstruction vs Numerical Integration: Theory and Practice, IISc Bangalore, August 27-31, 2018
- Program committee member
  - VIS 2022 : IEEE Conference on Visualization, Oklahoma City, October 2022.
  - EuroVis 2022, Rome, Italy, June 2022.
  - EuroVis 2022 (STAR), Rome, Italy, June 2022.
  - VIS 2021 : IEEE Conference on Visualization, New Orleans, October 2021.
  - EuroVis 2021 (STAR), Zurich, Switzerland, June 2021.
  - PacificVis 2021, Tianjin, China, June 2021.
  - LDAH 2020 : IEEE Symposium on Large Data Analysis and Visualization, Salt Lake City, USA, October 2020.
  - VCBM 2020 : Eurographics Workshop on Visual Computing for Biology and Medicine, Tübingen, Germany, September 2020.
  - PacificVis 2020, Tianjin, China, June 2020.
  - IEEE Scientific Visualization (SciVis 2019), Vancouver, Canada, October 2019.
  - EuroVis 2019, Porto, Portugal, June 2019.
  - EuroVis 2019 (STAR), Porto, Portugal, June 2019.
  - VCBM 2019 : Eurographics Workshop on Visual Computing for Biology and Medicine, Brno, Czech Republic, September 2019.
  - Graphics Replicability Stamp Initiative, 2018-present.
  - PacificVis 2019, Bangkok, Thailand, April 2019.
  - TopoInVis 2019, Nyköping, Sweden, June 2019.
  - IEEE Scientific Visualization (SciVis 2018), Berlin, Germany, October 2018.
  - LDAH 2018: IEEE Symposium on Large Data Analysis and Visualization, Berlin, Germany, October 2018.
  - VCBM 2018 : Eurographics Workshop on Visual Computing for Biology and Medicine, Granada, Spain, September 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.
  - LDAH 2017: IEEE Symposium on Large Data Analysis and Visualization, 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.
  - LDAV 2014 : IEEE Symposium on Large-Scale Data Analysis and Visualization, 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.
  - LDAV 2013 : IEEE Symposium on Large-Scale Data Analysis and Visualization, 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.
  - LDAV 2011 : IEEE Symposium on Large-Scale Data Analysis and Visualization, 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)