Soumya Dutta

Contact Information

Assistant Professor (Grade - I)
Department of Computer Science and Engineering
H. R. Kadim Diwan (KD) Building, Room: 224
Indian Institute of Technology Kanpur (IIT Kanpur)
Kanpur, Uttar Pradesh, India
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Research Interests

- AI/ML for Visual Computing
- AI/ML for Scientific Computing
- Explainable, Interpretable, & Trustworthy AI
- Data Visualization & Visual Analytics
- Data Science
- HPC and Big Data Exploration

Education

Doctor of Philosophy (Ph.D.) & Master of Science (M.S.) September 2011 - May 2018
@ **The Ohio State University, Ohio, USA**
- Computer Science and Engineering (CSE)

Bachelor of Technology (B.Tech.) June 2005 - August 2009
@ **West Bengal University of Technology, West Bengal, India**
- Electronics and Communication Engineering (ECE)

Research Experience

Department of Computer Science and Engineering, Indian Institute of Technology Kanpur (IITK), India
Assistant Professor October 2022 - Current

Computer, Computational, and Statistical Sciences (CCS) Division, Los Alamos National Laboratory, USA
Scientist-II July 2019 - August 2022

Applied Computer Science (CCS-7), Los Alamos National Laboratory, USA
Postdoctoral Research Associate June 2018 - July 2019

Graphics and Visualization Study (Gravity) Lab, The Ohio State University, USA
Graduate Research Associate July 2013 - May 2018

Applied Computer Science (CCS-7), Los Alamos National Laboratory, USA
Graduate Research Associate May - Jul. 2015, May - Aug. 2016, May - Aug. 2017

AEIE Department, Heritage Institute of Technology (HIT), India
Independent Researcher 2010 - 2011

CVPR Unit, Indian Statistical Institute (ISI), India

Independent Student Researcher Dec. 2008 - Sept. 2009

Honors & Awards

- **Best Reviewer, Honorary Mention Award** for providing insightful reviews for the journal IEEE Transactions on Visualization & Computer Graphics (TVCG) for the year 2021.
- **Best Paper Award** at In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV) 2021, co-located with Supercomputing (SC) 2021.
- **LAAP Award** for exceptional dedication and leadership of the Data Science at Scale Summer School program at Los Alamos National Laboratory, 2021.
- **Best Paper Award** in Topological Methods in Data Analysis and Visualization (TopoInVis) 2019.
- **Best Paper Award** in In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV) 2018, co-located with Supercomputing (SC) 2018.
- **Best Poster Award** in 12th Annual CSE Student Poster Exhibition 2018, The Ohio State University.
- **Nominated for Ohio State University's Presidential Fellowship**, 2017, from CSE Department. This is the most prestigious fellowship given by the Graduate School at the Ohio State University.
- **Best Poster Award** in 11th Annual CSE Student Poster Exhibition 2017, The Ohio State University.
- **Best Paper, Honorable Mention Award** in IEEE Visualization (IEEEVIS) 2016. IEEE Visualization is the premier and largest visualization conference in the world.

Research Grants

[5] **Project Title: Intelligent Visual Computing of Extreme-scale Data for Accelerating Scientific Discovery**
PI: Soumya Dutta (IIT Kanpur)
Duration: 2 years
Funding Amount: $\approx$ INR 30.00 Lakh
Funding Agency: IIT Kanpur Initiation Grant

[4] **Project Title: Development of AI-Enabled National Portal for Efficient Search of Missing People**
PI: Tufan Guha (IIT Kanpur)
Co-PI: Soumya Dutta (IIT Kanpur)
Duration: 2 years
Funding Amount: $\approx$ INR 20.00 Lakh
Funding Agency: C3iHub, IIT Kanpur

[3] **Project Title: Proactive and Generalized Deepfake Defense Mechanisms to Reinforce Cyberspace**
PI: Chandranath Adak (IIT Patna),
Co-PIs: Soumi Chattopadhyay (IIT Indore), Soumya Dutta (IIT Kanpur), Zahid Akhtar (State University of New York Polytechnic Institute)
Duration: 3 years
Funding Amount: $\approx$ INR 34.00 Lakh
Funding Agency: C3iHub, IIT Kanpur

[2] **Project Title: Enabling Interactive Big Data Analytics and Visualization at Exascale via In Situ Efficient Statistical Data Modeling**
PI: Soumya Dutta (IIT Kanpur)
Duration: 2 years (Dec 2023-Dec 2025)

Book Chapters

[4]. **Soumya Dutta**, Subhashis Hazarika, and Han-Wei Shen, *In Situ Statistical Distribution-based Data Summarization and Visual Analysis*, **In Situ Visualization for Computational Science**, Springer International Publishing, 2022, https://link.springer.com/chapter/10.1007/978-3-030-81627-8_4.

[3]. Ayan Biswas, **Soumya Dutta**, Terece Turton, and James Paul Ahrens, *Sampling for Scientific Data Analysis and Reduction*, **In Situ Visualization for Computational Science**, Springer International Publishing, 2022, https://link.springer.com/chapter/10.1007/978-3-030-81627-8_2.

[2]. David Rogers, **Soumya Dutta**, Divya Banesh, Terece L. Turton, Ethan Stam, and James Ahrens, *In situ Solutions with CinemaScience*, **In Situ Visualization for Computational Science**, Springer International Publishing, 2022, https://link.springer.com/chapter/10.1007/978-3-030-81627-8_14.

[1] Roxana Bujack, **Soumya Dutta**, Duan Zhang, Tobias Günther, *Objective Finite-Time Flow Topology from Flowmap Expansion and Contraction*, **Topological Methods in Data Analysis and Visualization VI, Springer**, 2021, https://link.springer.com/chapter/10.1007/978-3-030-83500-2_7.

Journal Publications

[17] James Ahrens, Marco Arienti, Utkarsh Ayachit, Janine Bennett, Roba Binyahib, Ayan Biswas, Peer-Timo Bremer, Eric Brugger, Roxana Bujack, Hamish Carr, Jieyang Chen, Hank Childs, **Soumya Dutta**, Berk Geveci, Cyrus Harrison, Subhashis Hazarika, Megan Hickman Fulp, Petar Hristov, Xuan Huang, Joseph Insley, Yuya Kawakami, Chloe Keilers, Mark Kim, James Kress, Matthew Larsen, Dan Lipsa, Meghanto Majumder, Nicole Marsaglia, Victor Mateevitsi, Valerio Pascucci, John Patchett, Saumil Patel, Steve Petruzza, David Pugmire, Silvio Rizzi, David H. Rogers, Oliver Rubel, Jorge Salinas, Sudhanshu Sane, Sergei Shudler, Alexandra Stewart, Karen Tsai, Terece L Turton, Will Usher, Zhe Wang, Gunther Weber, Corey Wetterer-Nelson, Jonathan Woodring, Abhishek Yenpure, *The ECP ALPINE project: In Situ and Post Hoc Visualization Infrastructure and Analysis Capabilities for Exascale*, **International Journal of High Performance Computing Applications (IJHPCA).**

[16] Atul Kumar, Siddharth Garg, and **Soumya Dutta**, *Uncertainty-Aware Deep Neural Representations for Visual Analysis of Vector Field Data*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)** [Proceedings of IEEE Visualization 2024].

[15] **Soumya Dutta**, Faheem Nizar, Ahmad Amaan, and Ayan Acharya, *Visual Analysis of Prediction Uncertainty in Neural Networks for Deep Image Synthesis*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2024, DOI: 10.1109/TVCG.2024.3406959.

[14] **Soumya Dutta**, Terece L. Turton, David Rogers, Jordan M. Musser, James Ahrens, and Ann S. Almgren, *In Situ Feature Analysis for Large-scale Multiphase Flow Simulations*, **Journal of Computational Science (Elsivier)**, 2022, Volume: 63, DOI: https://doi.org/10.1016/j.jocs.2022.101773.

[13] Humayra Tasnim, **Soumya Dutta**, Terece L. Turton, David Rogers, and Melanie E. Moses, *Information-theoretic Exploration of Multivariate Time-Varying Image Databases*, **IEEE Computing in Science & Engineering (IEEE CiSE)**, 2022, Volume: 24, Issue 3, pp. 61 - 70. DOI: 10.1109/MCSE.2022.3188291.

[12] Jiayi Xu, **Soumya Dutta**, Wenbin He, Joachim Moortgat, and Han-Wei Shen, *Geometry-Driven Detection, Tracking and Visual Analysis of Viscous and Gravitational Fingers*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2022, Volume: 28, Issue 3, pp. 1514 - 1528, DOI: 10.1109/TVCG.2020.3017568.

[11] Ayan Biswas, **Soumya Dutta**, Earl Lawrence, John M. Patchett, Jon C. Calhoun, and James Ahrens, *Probabilistic Data-Driven Sampling via Multi-Criteria Importance Analysis*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2021, Volume 27, Issue 12, pp. 4439-4454, DOI: 10.1109/TVCG.2020.3006426.

[10] **Soumya Dutta**, Terece L. Turton, and James Ahrens, *A Confidence-guided Technique for Tracking Time-varying Features*, **IEEE Computing in Science & Engineering (IEEE CiSE)**, 2021, Volume 23, Issue 2, pp. 84-92, DOI: 10.1109/MCSE.2020.3047979.

[9] Ayan Biswas, James Ahrens, **Soumya Dutta**, Jordan Musser, Ann Almgren, and Terece Turton, *Feature Analysis, Tracking, and Data Reduction: An Application to Multiphase Reactor Simulation MFiX-Exa for In-Situ Use Case*, **IEEE Computing in Science & Engineering (IEEE CiSE)**, 2021, Volume 23, Issue 1, pp. 75-82, DOI: 10.1109/MCSE.2020.3016927.

[8] Hank Childs, Sean D. Ahern, James Ahrens, Andrew C. Bauer, Janine Bennett, E. Wes Bethel, Peer-Timo Bremer, Eric Brugger, Joseph Cottam, Matthieu Dorier, **Soumya Dutta**, Jean M. Favre, Thomas Fogal, Steffen Frey, Christoph Garth, Berk Geveci, William F. Godoy, Charles D. Hansen, Cyrus Harrison, Bernd Hentschel, Joseph Insley, Chris R. Johnson, Scott Klasky, Aaron Knoll, James Kress, Matthew Larsen, Jay Lofstead, Kwan-Liu Ma, Preeti Malakar, Jeremy Meredith, Kenneth Moreland, Paul Navrátil, Patrick O'Leary, Manish Parashar, Valerio Pascucci, John Patchett, Tom Peterka, Steve Petruzza, Norbert Podhorszki, David Pugmire, Michel Rasquin, Silvio Rizzi, David H. Rogers, Sudhanshu Sane, Franz Sauer, Robert Sisneros, Han-Wei Shen, Will Usher, Rhonda Vickery, Venkatram Vishwanath, Ingo Wald, Ruonan Wang, Gunther H. Weber, Brad Whitlock, Matthew Wolf, Hongfeng Yu, Sean B. Ziegeler, *A Terminology for In Situ Visualization and Analysis Systems*, **International Journal of High Performance Computing Applications (IJHPCA)**, 2020, Volume 34, Issue 6, pp. 676-691, https://doi.org/10.1177/1094342020935991.

[7] **Soumya Dutta**, Ayan Biswas, and James Ahrens, *Multivariate Pointwise Information-driven Data Sampling and Visualization*, **MDPI Entropy (Special issue in Information Theory Application in Visualization)**, 2019, Volume 21, Issue 7, https://doi.org/10.3390/e21070699.

[6] Subhashis Hazarika, **Soumya Dutta**, Han-Wei Shen, and Jen-Ping Chen, *CoDDA: A Flexible Copula-based Distribution Driven Analysis Framework for Large-Scale Multivariate Data*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2019, Volume 25, Issue 1, pp. 1214-1224, DOI: 10.1109/TVCG.2018.2864801.

[5] Subhashis Hazarika, Ayan Biswas, **Soumya Dutta**, and Han-Wei Shen, *Information Guided Exploration of Scalar Values and Isocontours in Ensemble Datasets*, **MDPI Entropy (Special issue in Information Theory Application in Visualization)**, 2018, Volume 20, Issue 7, https://doi.org/10.3390/e20070540.

[4] **Soumya Dutta**, Chun-Ming Chen, Gregory Heinlein, Han-Wei Shen, and Jen-Ping Chen, *In Situ Distribution Guided Analysis and Visualization of Transonic Jet Engine Simulations*, **IEEE**

Transactions on Visualization and Computer Graphics (TVCG), 2017, Volume 23, Issue 1, pp. 811-820, DOI: 10.1109/TVCG.2016.2598604.

[3] **Soumya Dutta** and Han-Wei Shen, *Distribution Driven Extraction and Tracking of Features for Time-varying Data Analysis*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2016, Volume 22, Issue 1, pp. 837-846, DOI: 10.1109/TVCG.2015.2467436.

[2] Chun-Ming Chen, **Soumya Dutta**, Xiaotong Liu, Gregory Heinlein, Han-Wei Shen, and Jen-Ping Chen, *Visualization and Analysis of Rotating Stall for Transonic Jet Engine Simulation*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2016, Volume 22, Issue 1, pp. 847-856, DOI: 10.1109/TVCG.2015.2467952.

[1] Ayan Biswas, **Soumya Dutta**, Han-Wei Shen, and Jonathan Woodring, *An Information-Aware Framework for Exploring Multivariate Data Sets*, **IEEE Transactions on Visualization and Computer Graphics (TVCG)**, 2013, Volume 19, Issue 12, pp. 2683-2692, DOI: 10.1109/TVCG.2013.133.

Conference & Workshop Publications

[26] Shanu Saklani, Tushar M. Athawale, Nairita Pal, David Pugmire, Chris R. Johnson, and, **Soumya Dutta**, *REV-INR: Regularized Evidential Implicit Neural Representation for Uncertainty-Aware Volume Visualization*, **19th IEEE Pacific Visualization Conference (IEEE PacificVis 2026)**. [Accepted]

[25] Manish Agrawal, Prashik Ganer, Amit Bhasita, Khushwant Kaswan, Tippireddy Yashwanth, **Soumya Dutta**, and Purushottam Kar,, *DAVi: A Slim, Secure and Scalable Framework for Developing Data Analytics and Visualization Platforms*, **19th Innovations in Software Engineering Conference (ISEC 2026)**. [Accepted]

[24] Bibek Das, Chandranath Adak, Anurag Deo, Aditya Bangar, Rahul Verma, Zahid Akhtar, Soumi Chattopadhyay, **Soumya Dutta**, Ashutosh Parihar, Anand Suralkar, Deepak Nagar, Vishal Kumar, *Securing AI-Generated Media: Rethinking Deepfake Vulnerabilities in Side-Face Perspectives*, **IEEE Building a Secure & Empowered Cyberspace (BuildSEC 2025)**.

[23] Humayra Tasnim, **Soumya Dutta**, and Melanie Moses, *Dynamic Spatio-Temporal Summarization using Information Based Fusion*, **International Conference on Computational Science and Computational Intelligence (CSCI 2025)**.

[22] Abhay Kumar Dwivedi, Shanu Saklani, and **Soumya Dutta**, *Compressive Modeling and Visualization of Multivariate Scientific Data using Implicit Neural Representation*, **16th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2025)**.

[21] Anurag Deo, Aditya Bangar, Chandranath Adak, Rahul Verma, Deepak Nagar, Zahid Akhtar, **Soumya Dutta**, Soumi Chattopadhyay and Sukalpa Chanda, *IndicSideFace: A Dataset for Advancing Deepfake Detection on Side-Face Perspectives of Indian Subjects*, **19th International Conference on Automatic Face and Gesture Recognition (FG 2025)**.

[20] Shanu Saklani, Chitwan Goel, Shrey Bansal, Zhe Wang, **Soumya Dutta**, Tushar M. Athawale, David Pugmire, Christopher R. Johnson, *Uncertainty-Informed Volume Visualization using Implicit Neural Representation*, **IEEE Workshop on Uncertainty Visualization: Applications, Techniques, Software, and Decision Frameworks** (in conjunction with IEEEVIS), 2024.

[19] Li Tang, **Soumya Dutta**, Natalie Klein, Wayne Yu Wang, Jonathan David Wolfe, Luke Van Roekel, Nathan Urban, Ayan Biswas, and Earl Lawrence, *Julia for HPC: In Situ Data Analysis with Julia for Climate Simulations at Large Scale*, **Proceedings of JuliaCon**, 2024.

[18] **Soumya Dutta**, Dan Lipsa, Terece L. Turton, Berk Geveci, and James Ahrens, *In Situ Analysis and Visualization of Extreme-Scale Particle Simulations*, **WOIV: 6th International Workshop on In Situ Visualization, 2022 (co-located with ISC High Performance Conference)**.

[17] **Soumya Dutta**, Humayra Tasnim, Terece L. Turton, and James Ahrens, *In Situ Adaptive Spatio-Temporal Data Summarization*, **IEEE International Conference on Big Data (IEEE Bigdata) 2021**, pp. 315-321, DOI: 10.1109/BigData52589.2021.9671581.

[16] **Soumya Dutta**, Natalie Klein, Li Tang, Jonathan Wolfe, Luke Van Roekel, James Benedict, Ayan Biswas, Earl Lawrence, and Nathan Urban, *In Situ Climate Modeling for Analyzing Extreme Weather Events*, **In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV 2021)**, pp. 18-23, co-located with SC 2021, https://doi.org/10.1145/3490138.3490142.

[15] **Soumya Dutta**, Riley X. Brady, Mathew E. Maltrud, Philip Wolfram, and Roxana Bujack, *Leveraging Lagrangian Analysis for Discriminating Nutrient Origins*, **Visualization in Environmental Sciences (EnvirVis)**, 2019, pp. 17-24, https://doi.org/10.2312/envirvis.20191100.

[14] Roxana Bujack, **Soumya Dutta**, Duan Zhang, Tobias Günther, *Objective Finite-Time Flow Topology from Flowmap Expansion and Contraction*, **Workshop on Topological Methods in Data Analysis and Visualization (TopoInVis)**, 2019.

[13] Roxana Bujack, **Soumya Dutta**, Irene Baeza Rojo, Duan Zhang, Tobias Günther, *Objective Finite-Time Saddles and their Connection to FTLE*, **EG/VGTC Conference on Visualization (EuroVis Short Paper)**, 2019, pp. 49-53, https://doi.org/10.2312/evs.20191169.

[12] Ayan Biswas, **Soumya Dutta**, Jesus Pulido, and James Ahrens, *In Situ Data-Driven Adaptive Sampling for Large-scale Simulation Data Summarization*, **In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV)**, pp. 13-18, co-located with SC 2018, https://doi.org/10.1145/3281464.3281467.

[11] **Soumya Dutta**, Han-Wei Shen, and Jen-Ping Chen, *In Situ Prediction Driven Feature Analysis in Jet Engine Simulations*, **IEEE Pacific Visualization Symposium** (IEEE PacificVis), 2018, pp. 66-75, DOI: 10.1109/PacificVis.2018.00017.

[10] Matthew Larsen, Amy Woods, Nicole Marsaglia, Ayan Biswas, **Soumya Dutta**, Cyrus Harrison, and Hank Childs, *A Flexible System For In Situ Triggers*, **In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV 2018)**, pp. 1-6, co-located with SC 2018, https://doi.org/10.1145/3281464.3281468.

[9] Tzu-Hsuan Wei, **Soumya Dutta**, and Han-Wei Shen, *Information Guided Data Sampling and Recovery using Bitmap Indexing*, **IEEE Pacific Visualization Symposium** (IEEE PacificVis), 2018, pp. 56-65, DOI: 10.1109/PacificVis.2018.00016.

[8] **Soumya Dutta**, Xiaotong Liu, Ayan Biswas, Han-Wei Shen, and Jen-Ping Chen, *Pointwise Information Guided Visual Analysis of Time-varying Multi-fields*, **SA'17, SIGGRAPH Asia Symposium on Visualization**, 2017, pp. 1-8, https://doi.org/10.1145/3139295.3139298.

[7] **Soumya Dutta**, Jonathan Woodring, Han-Wei Shen, Jen-Ping Chen, and James Ahrens, *Homogeneity Guided Probabilistic Data Summaries for Analysis and Visualization of Large-Scale Data Sets*, **IEEE Pacific Visualization Symposium** (IEEE PacificVis), 2017, 111-120, DOI: 10.1109/PACIFICVIS.2017.8031585.

[6] Gregory Heinlein, Jen-Ping Chen, Chun-Ming Chen, **Soumya Dutta**, and Han-Wei Shen, *Sta-*

tistical Anomaly Based Study of Rotating Stall in a Transonic Axial Compressor Stage, **Turbomachinery Technical Conference & Exposition** (ASME Turbo Expo, GT 2017), https://doi.org/10.1115/GT2017-64685.

[5] Subhashis Hazarika, **Soumya Dutta**, Han-Wei Shen, *Visualizing the Variations of Ensemble of Isosurfaces*, **IEEE Pacific Visualization Symposium** (IEEE PacificVis Notes), 2016, 209-213, DOI: 10.1109/PACIFICVIS.2016.7465272.

[4] **Soumya Dutta** and Madhurima Chattopadhyay, *A change detection algorithm for medical cell images*, **International Conference on Scientific Paradigm Shift in Information Technology and Management** (SPSITM 2011), 2011, 524-527.

[3] **Soumya Dutta** and Bidyut B. Chaudhuri, *A Color Edge Detection Algorithm in RGB Color Space*, **Advances in Recent Technologies in Communication and Computing** (ARTCOM 2009), 2009, 337-340, DOI: 10.1109/ARTCom.2009.72.

[2] **Soumya Dutta** and Bidyut B. Chaudhuri, *Homogeneous region based color image segmentation*, **The World Congress on Engineering and Computer Science** (WCECS 2009), 2009, vol 2, 1301-1305.

[1] **Soumya Dutta** and Bidyut B. Chaudhuri, *A Statistics and Local Homogeneity Based Color Edge Detection Algorithm*, **Advances in Recent Technologies in Communication and Computing** (ARTCOM 2009), 2009, 546-548, DOI: 10.1109/ARTCom.2009.71.

Peer-reviewed White Papers

[3] **Soumya Dutta**, Divya Banesh, Li-Ta Lo, Roxana Bujack, and David Rogers, *Model-based Visual Analytics of Big Data: Challenges and Opportunities*, DOE ASCR Workshop on Visualization for Scientific Discovery, Decision-Making, & Communication, January 18-20, 2022. [Accepted for presentation]

[2] Roxana Bujack, Divya Banesh, **Soumya Dutta**, and Li-Ta Lo, *Vector Field Segmentation for Data Analysis*, DOE ASCR Workshop on Visualization for Scientific Discovery, Decision-Making, & Communication, January 18-20, 2022.

[1] Li-Ta Lo, Roxana Bujack, **Soumya Dutta**, and Divya Banesh, *Sparsity for Extreme Scale Visualization and Data Analysis*, DOE ASCR Workshop on Visualization for Scientific Discovery, Decision-Making, & Communication, January 18-20, 2022.

Tech. Reports/ Posters

[5] Jiayi Xu, **Soumya Dutta**, Wenbin He, Joachim Moortgat, and Han-Wei Shen, *Geometry-Driven Detection, Tracking and Visual Analysis of Viscous and Gravitational Fingers*, **15th Annual CSE Student Research Poster Exhibition, The Ohio State University**, 2021. [Poster]

[4] **Soumya Dutta**, Han-Wei Shen, and Jen-Ping Chen, *In Situ Prediction Driven Feature Analysis in Jet Engine Simulations*, **12th Annual CSE Student Research Poster Exhibition, The Ohio State University**, 2018. [Poster]

[3] **Soumya Dutta**, Chun-Ming Chen, Gregory Heinlein, Han-Wei Shen, and Jen-Ping Chen, *In Situ Distribution Guided Analysis and Visualization of Transonic Jet Engine Simulations*, **11th Annual CSE Student Research Poster Exhibition, The Ohio State University**, 2017. [Poster]

[2] Garrett A. Aldrich, **Soumya Dutta**, and Jonathan Woodring, *OpenMC In Situ Source Convergence Detection*, **Los Alamos National Laboratory** (LA-UR-16-23217), 2016. [Tech. Report]

[1] **Soumya Dutta**, Xiaotong Liu, Ayan Biswas, Han-Wei Shen, Yifan Hu, James Giuliani, and Jen-

Ping Chen, *Pointwise Information Analysis for Multivariate Time-varying Feature Identification*, (OSU-CISRC-6/14-TR13), 2013. [Tech. Report]

Talks/Seminars

- Invited talk at the Five-day program on "Technology, Economics, and Public Policy: A Training on Data-Driven Governance", 2025, at IIT Kanpur
  Title: Fundamentals of Data Visualization

- Invited talk at the Five-day program on "Technology, Economics, and Public Policy: A Training on Data-Driven Governance", 2025, at IIT Kanpur
  Title: Modern Data Visualization for Policy Making

- Invited talk at the Scientific Visualization Workshop, in conjunction with IEEE Pacific Visualization Conference, Taiwan, 2025
  Title: Visual Computing of Scientific Data using Uncertainty-aware Deep Learning Models

- Invited talk at the International Symposium on Science and Education hosted by National Taiwan Normal University (NTNU), Taiwan, 2024
  Title: Visual Computing of Scientific Data using Uncertainty-aware Deep Learning Models

- Invited talk at the National Energy Technology Laboratory (NETL) Workshop on Multiphase Flow Science 2023
  Title: End-to-end Interactive Feature Analysis in Large-scale Multiphase Flow Simulations using In Situ Feature Extraction and Post-hoc Visual Analytics

- IEEE Visualization Application Spotlights: Data Analysis Methods for Climate Modeling of Extreme Weather Events, October 2022
  Title: Efficient Predictive Analytics of Extreme Weather Events via In Situ Data Modeling

- Paper presentation at 6th International Workshop on In Situ Visualization – held in conjunction with ISC High Performance, June 2022
  Title: In Situ Analysis and Visualization of Extreme-Scale Particle Simulations

- Project progress talk at Exascale Computing Project (ECP) Community Birds-of-a-Feather (BOF) Days, May 2022
  Title: ALPINE Infrastructure and Algorithms

- Technical Research Talk and IIT Bombay, April 2022
  Title: Efficient Knowledge Extraction and Visual Analytics of Big Data at Scale

- Technical Research Talk and IIT Kanpur, March 2022
  Title: Efficient Knowledge Extraction and Visual Analytics of Big Data at Scale

- Lightning paper talk at DOE ASCR Workshop on Visualization for Scientific Discovery, Decision-Making, & Communication, Jan. 2022.
  Title: Model-based Visual Analytics of Big Data: Challenges and Opportunities

- Paper presentation at IEEE International Conference on Big Data (IEEE BigData), December 2021.
  Title: In Situ Adaptive Spatio-Temporal Data Summarization

- Paper presentation at In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV), Nov. 2021.
  Title: In Situ Climate Modeling for Analyzing Extreme Weather Events

- Invited technical seminar talk hosted by the E.C.E. Dept. of Netaji Subhash Engineering College (NSEC), Nov. 2021.
  Title: Data Exploration at Exascale: Challenges, Solutions, and Opportunities

- Lightning research talk at JuliaCon, July 2021.
  Title: In-Situ Data Analysis with Julia for E3SM at Large Scale

- Invited panel member: NSF Center on Pervasive Personalized Intelligence for IoT Systems Scale-up, June 2021.
  Title: Opportunities and challenges on using Data Visualization

- Invited technical talk at Los Alamos - Arizona Days Conference, May 2021.
  Title: Statistical Techniques for Enabling Extreme-scale Data Summarization, Feature Exploration, and Visual Analysis

- Invited research talk at Information Sciences Group (CCS-3), Los Alamos National Laboratory, May 2021.
  Title: Statistical and Machine Learning Techniques for Enabling Extreme-scale Data Summarization, Feature Exploration, and Visual Analysis

- Early career research talk at U.S. Department of Energy Computer Graphics Forum (DOECGF), April 2021.
  Title: Extreme-scale Data Reduction, Feature Exploration, and Visual Analysis

- U.S. Department of Energy Computer Graphics Forum (DOECGF), April 2021.
  Title: Facilities and Research Update for Los Alamos National Laboratory

- Talk at 5th Exascale Computing Project (ECP) Annual Meeting, April 2021.
  Title: In Situ Scalable Data Reduction and Feature Exploration Algorithms for Exascale Simulations

- LDRD: In Situ Inference, Los Alamos National Lab, Project review. December 2020.
  Title: In Situ Climate Modeling and Analysis

- Talk at 4th Exascale Computing Project (ECP) Annual Meeting, February 2020.
  Title: In situ Statistical Feature Detection, Characterization, and Tracking

- Tutorial: ACM SIGGRAPH Asia Symposium on Visualization, November 2017.
  Title: Information Theory in Visualization (Co-delivered a tutorial session on behalf of Prof. Han-Wei Shen)

- Paper presentation at ACM SIGGRAPH Asia Symposium on Visualization, November 2017.
  Title: Pointwise Information Guided Visual Analysis of Time-varying Multi-fields

- Summer internship project talk at Applied Computer Science Group (CCS-7), Los Alamos National Laboratory, August 2017.
  Title: Uncertainty, sensitivity, and error analysis and visualization of high-dimensional Input-output models

- Paper presentation at IEEE Pacific Visualization, April 2017.
  Title: Homogeneity Guided Probabilistic Data Summaries for Analysis and Visualization of Large-Scale Data Sets

- Paper presentation at IEEE Visualization, October 2016.
  Title: In situ Distribution Guided Analysis and Visualization of Transonic Jet Engine Simulations

- Summer internship project talk at Applied Computer Science Group (CCS-7), Los Alamos National Laboratory, August 2016.
  Title: Improved Distribution Guided Data Summarization

- Invited technical talk at Statistical Sciences Group (CCS-6), Los Alamos National Laboratory, July 2016.
  Title: Distribution-driven data analysis and visualization

- Paper presentation at IEEE Visualization, October 2015.
  Title: Distribution Driven Extraction and Tracking of Features for Time-varying Data Analysis

Service & Professional Activities

Program Co-chair: Eurographics Workshop on Parallel Graphics and Visualization (EGPGV 2026) in conjunction with EuroVis 2026, Nottingham, UK.

Co-chair: IEEE Visualization Tutorials and Panels (IEEEVIS 2026).

Best Paper Award Selection Committee Member: IEEE Visualization Conference (IEEEVIS 2025).

Workshop Co-chair: Workshop on Visualization for the Digital and Public Humanities (DPH-Vis) in conjunction with IEEE Pacific Visualization Conference 2025, Taipei, Taiwan.

Proposal Reviewer: German Research Foundation: Deutsche Forschungsgemeinschaft (DFG) (2024)

Program Co-chair (VIS track): 19th International Symposium on Visual Computing (ISVC'24), Lake Tahoe, Nevada, USA.

Proposal Reviewer: United States Department of Energy (US DOE), Advanced Scientific Computing Research (ASCR) (2024)

Proposal Reviewer: German Research Foundation: Deutsche Forschungsgemeinschaft (DFG) (2023)

Best Paper Award Selection Committee Member: In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV 2023)

Posters Co-chair: IEEE Symposium on Large Data Analysis and Visualization (LDAV 2023-24)

Co-chair: IEEE Visualization Fast Forward and Video Previews (IEEEVIS 2023-24)

Workshop Co-organizer: Visualization in Environmental Sciences (EnvirVis) (Co-located with EuroVis and EUROGRAPHICS (2020-2024)

Co-chair: IEEE Visualization Application Spotlights (2021-22)

Co-chair: IEEE Visualization Open Practices (2019-20)

Co-lead: Data Science at Scale Summer School, Los Alamos National Lab. (2020-22)

Member of review board: IEEE Transactions on Parallel and Distributed Systems (TPDS) (2021)

Board member: Student Program Advisory Committee, Los Alamos National Laboratory (2021-2022)

Poster judge: ACSESS event for Computational Science Research Center (CSRC) graduate students at San Diego State University (SDSU) (2021)

Poster judge: Los Alamos National Laboratory Student Symposium (2021)

Session chair: Visualization in Environmental Sciences (EnvirVis 2021)

Tutorial Co-organizer: Statistical Data Representation, Visualization, and Uncertainty Analysis at IEEE Visualization (IEEEVIS 2019)

Co-organizer of Application Spotlights: Feature-based Visual Interactive Systems to Optimize Decision Making at IEEE Visualization (IEEEVIS 2019)

IPC member: IEEE/ACM SuperComputing (SC 2025)

IPC member: IEEE Cluster 2024

IPC member: IEEE Visualization (Full Papers) (IEEEVIS 2022-24)

IPC member: EG/VGTC Conference on Visualization (EuroVis 2023-26)

IPC member: IEEE Pacific Visualization (PacificVis 2021-26)

IPC member: IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC 2023-24)

IPC member: EuroGraphics Symposium on Parallel Graphics and Visualization (EGPGV 2021-22)

IPC member: IEEE Visualization (Short Papers) (2019-21)

IPC member: IEEE Symposium on Large Data Analysis and Visualization (LDAV 2019, 2021-22)

IPC member: Visualization in Environmental Sciences (EnvirVis 2019)

IPC member: ACM ISAV (2019-23)

IPC member: International Symposium on Visual Computing (ISVC 2019-23)

IPC member at other venues: IEEE IWBDR 2020-21, IVAPP 2020

Reviewing Activities

IEEE Transactions on Visualization & Computer Graphics (TVCG)

IEEE Transactions on Parallel & Distributed Systems (TPDS)

Computer Graphics Forum (CGF)

IEEE Transactions on Aerospace & Electronic Systems (TAES)

IEEE Visualization Conference

IEEE Transactions on Instrumentation & Measurement (TIM)

IEEE Transactions on Network Science & Engineering (TNSE)

EG/VGTC Conference on Visualization (EuroVis)

IEEE Pacific Visualization (PacificVis)

IEEE HiPC

IEEE Cluster

ACM ICVGIP

In Situ Infrastructures for Enabling Extreme-scale Analysis and Visualization (ISAV)

Knowledge-based Systems (KNOWSYS)

Journal of Visualization (JOVI)

IEEE Symposium on Large Data Analysis and Visualization (LDAV)

ACM Conference on Human Factors in Computing Systems (CHI)

Visualization in Environmental Sciences (EnvirVis)

Reviewer at other venues: IEEE IWBDR, ISVC, VISUAL