## Subhashis Hazarika


**Contact Information**

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**Research Interests**

Large-Scale Data Visualization, Statistical Data Modeling, Machine Learning, Visual Analytics.

**Education**

**The Ohio State University**, Columbus, Ohio, USA **Aug 2013 - present**
Ph.D. Candidate, Computer Science and Engineering
- Major: *Computer Graphics*
- Minors: *Artificial Intelligence*, *High Performance Computing.*
- CGPA: 3.82/4.00
- Advisor: Dr. Han-Wei Shen

**National Institute of Technology**, Durgapur, West Bengal, India **2007 - 2011**
B.Tech., Computer Science and Engineering,
- CGPA: 9.12/10.00

**Professional Experience**

**Los Alamos National Laboratory**, Los Alamos, New Mexico, USA
Graduate Research Intern (Data Science at Scale, CCS-7) **May, 2019 - August, 2019**

**Gravity Research Lab, The Ohio State University**, Columbus, Ohio, USA
Graduate Research Associate **May, 2016 - present**

**Los Alamos National Laboratory**, Los Alamos, New Mexico, USA
Graduate Research Intern (Programming Models Team, CCS-7) **May, 2017 - August, 2017**

**Novell Software Development (India) Pvt. Ltd.**, Bangalore, Karnataka, India
Senior Software Engineer **June, 2011 - May, 2013**

**European Organization for Nuclear Research, CERN**, Geneva, Switzerland
Summer Intern Student **May, 2010 - August, 2010**

**Teaching Experience**

**Department of Computer Science, OSU**, Columbus, OH, USA
Graduate Teaching Instructor **August, 2014 - April, 2016**
CSE1222:Introduction to Computer Programming in C++.

**Research Projects**

**Deep Learning Assisted Visual Analysis Framework:**
We use DNNs as surrogate models to assist complex compute-intensive scientific simulations. We then utilize the state-of-the-art interpretability and uncertainty quantification techniques for DNNs to gain insights into the simulated physical phenomena. The trained model serves as an effective backend for our interactive visual analytic tool.

**Flexible Multivariate Statistical Models for Visualization using Copula Functions:**
We propose a flexible approach towards modeling multivariate distributions using Gaussian Copula functions. This allows us to use hybrid mixture of distributions (parametric and/or non-parametric)

for data modeling. We show how to use such hybrid distribution models for probabilistic feature extraction and visual analysis in large-scale simulations.

**Extreme-scale Distribution-based Data Analysis Library (EDDA):**
This *C++/Python* library aims at visualizing distribution data for uncertainty analysis. The goal is to provide a unified data model with generic distribution representations for the development of uncertainty visualization algorithms.

**Information-theoretic Framework for Visualizing Ensemble Isocontours:**
Using information-theory measures like mutual-information, specific-information and conditional entropy, we propose novel analysis techniques to understand ensemble of isocontours in large-scale data generated from scientific simulations.

## Publications

**Subhashis Hazarika**, Haoyu Li, Ko-Chih Wang, Han-Wei Shen, Ching-Shan Chou: "*NNVA: Neural Network Assisted Visual Analysis of Yeast Cell Polarization Simulation* ", IEEE Transactions on Visualization and Computer Graphics (to appear). **Best Paper Honorable Mention** at IEEE Vis (VAST) 2019

**Subhashis Hazarika**, Soumya Dutta, Han-Wei Shen, Jen-Ping Chen: "*CoDDA: A Flexible Copula-based Distribution Driven Analysis Framework for Large-Scale Multivariate Datasets*", IEEE Transactions on Visualization and Computer Graphics, 25(1): 1214-1224 (2019).

Junpeng Wang, **Subhashis Hazarika**, Cheng Li, Han-Wei Shen: "*Visualization and Visual Analysis of Ensemble Data: A Survey*", IEEE Transactions on Visualization and Computer Graphics, 25(9): 2853-2872 (2019).

**Subhashis Hazarika**, Ayan Biswas, Han-Wei Shen: "*Uncertainty Visualization Using Copula-Based Analysis in Mixed Distribution Models*", IEEE Transactions on Visualization and Computer Graphics, 24(1): 934-943 (2018).

**Subhashis Hazarika**, Ayan Biswas, Soumya Dutta, Han-Wei Shen: "*Information Guided Exploration of Scalar Values and Isocontours in Ensemble Datasets*", Entropy 2018, 20(7), 540. (Special Issue Information Theory Application in Visualization).

**Subhashis Hazarika**, Soumya Dutta, Han-Wei Shen: "*Visualizing the Variations of Ensemble of Isosurfaces*", Pacific Visualization Symposium (PacificVis), 2016 IEEE, 209-213.

**Subhashis Hazarika**, Tzu-Hsuan Wei, Rajaditya Mukherjee, Alexandru Barbur: "*Visualizing the life and anatomy of dark matter*", Scientific Visualization Conference (SciVis), 2015 IEEE, 101-106.

Sanjib Sadhu, **Subhashis Hazarika**, Kapil Jain, Saurav Basu, Tanmay De: "*GRP-CH Heuristic for Generating Random Simple Polygon*", 23rd International Workshop on Combinatorial Algorithms 2012: Page 293-302, Springer LNCS Volume.

## Honors and Awards

- Best Paper Honorable Mention Award at IEEE Vis 2019.
- O'Donnell Graduate Fellowship for Ph.D, 2013.
- Summer Student at CERN, Geneva, 2010.

## Technical Skills

- Programming Language: C/C++, Python.
- Web Technology: HTML, JavaScript, D3.js.
- Graphics Programming: OpenGL, GLSL.
- ML tools: Keras, Tensorflow, PyTorch, SciKit-learn.