

# Tushar Athawale

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## SUMMARY

- Expertise in the field of uncertainty quantification for visualization of scientific data
- Strong background in statistical analysis demonstrated through publications
- Strong interpersonal skills developed through collaborative research conducted in academia and the role of technical support engineer at MathWorks
- Computer Languages: C++, C, OpenGL, CUDA, Latex
- Computer Software: MATLAB, Maple, ParaView, and Isosurface Jeneration Kode (IJK)

## EDUCATION

**Doctor of Philosophy in Computer and Information Science and Engineering** **May 2015**

University of Florida, Gainesville, FL

GPA: 3.75/4.00

**Master of Science in Computer and Information Science and Engineering** **May 2014**

University of Florida, Gainesville, FL

GPA: 3.75/4.00

**Relevant Coursework:** Analysis of Algorithms, Advanced Data Structures, Computer Graphics, GPU Architecture and Programming, Machine Learning

**Bachelor of Engineering in Computer Engineering** **May 2010**

University of Pune, India

GPA: 8.81/10.00

## RESEARCH INTERESTS

- Scientific Visualization
- Uncertainty Quantification
- Statistical Analysis

## EXPERIENCE

**Postdoctoral Fellow**, University of Utah, Salt Lake City, Utah **October 2016 – Present**

- Quantification and visualization of topological variations for isosurfaces extracted using the marching squares/cubes algorithm in uncertain data
- Uncertainty visualization of imaging in deep brain stimulation domain for treating Parkinson's patients
- **Co-instructor for courses:** Decomposition Techniques for Computational Data-Enabled Science Engineering, Visualization for Scientific Data (<http://tusharathawale.info/teaching/>)
- Reviewing peer-reviewed journal papers

**Application Support Engineer**, MathWorks, Inc., Natick, MA **July 2015 – October 2016**

- Provided solutions to complex technical issues experienced by the customers working with MATLAB
- Worked as a lead contributor to the design and implementation of the in-built MATLAB function IMROTATE3 introduced in the release of R2017a for rotation of 3D images
- Conducted technical interviews for hiring new candidates for the technical support engineering role
- Worked with peers to share technical knowledge and resolve complex customer cases

**Research Assistant**, University of Florida, Gainesville, FL **August 2011 – May 2015**

- Study of the marching cubes algorithm for isosurface extraction in uncertain data

**Teaching Assistant**, University of Florida, Gainesville, FL **August 2011 – May 2015**

- **Courses:** Computer Graphics, Advanced Data Structures, and Basic Java Programming
- Assisted students in problem solving and grading of the courses
- Presented on Nvidia's CUDA technology and conducted Java programming labs for undergraduate classes

**Software Engineering Intern**, Nvidia Corporation, Pune, India **August 2009 – May 2010**

- Studied the screen space ambient occlusion (SSAO) algorithm used in computer graphics
- Embedded game-specific SSAO profiles into the Nvidia drivers for video games, such as Gears of War and Mass Effect

## JOURNAL PUBLICATIONS (<https://scholar.google.com/citations?user=sMiEw1YAAAAAJ&hl=en>)

- B. Ma, T. M. Athawale, E. Sakhaee, C. R. Johnson, and A. Entezari, Nonparametric Models for Direct Volume Rendering of Uncertain Data Using Multidimensional Transfer Functions, *Computer Graphics Forum* (submitted to), 2019
- T. M. Athawale and C. R. Johnson, Probabilistic Asymptotic Decider for Topological Ambiguity Resolution in Level-Set Extraction for Uncertain 2D Data, *IEEE Transactions on Visualization and Computer Graphics*, Special Issue on IEEE Visualization, vol. 25, no. 1, pp 1163-1172, Jan 2019
- T. M. Athawale, K. Johnson, C. R. Butson, and C. R. Johnson, A Statistical Framework for Quantification and Visualization of Positional Uncertainty in Deep Brain Stimulation Electrodes, *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, 2018 (to appear)
- T. M. Athawale, E. Sakhaee, and A. Entezari, Isosurface Visualization of Data with Nonparametric Models for Uncertainty, *IEEE Transactions on Visualization and Computer Graphics*, Special Issue on IEEE Visualization, vol. 22, no. 1, pp. 777-786, August 12, 2015
- T. M. Athawale and A. Entezari, Uncertainty Quantification in Linear Interpolation for Isosurface Extraction, *IEEE Transactions on Visualization and Computer Graphics*, Special Issue on IEEE Visualization, vol. 19, no. 12, pp. 2723-2732, October 16, 2013

## CONFERENCE PRESENTATIONS

**IEEE VIS 2018**, Berlin, Germany **October 2018**

- **Title:** Probabilistic Asymptotic Decider for Topological Ambiguity Resolution in Level-Set Extraction for Uncertain 2D Data
- Presentation slides: <http://tusharathawale.info/wp-content/uploads/2019/02/VISpresentation18.pdf>
- Video preview: <https://vimeo.com/290325318>

**IEEE VIS 2015**, Chicago, IL **October 2015**

- **Title:** Isosurface Visualization of Data with Nonparametric Models for Uncertainty
- Presentation slides: <http://tusharathawale.info/wp-content/uploads/2019/02/VISpresentation15.pdf>
- Video preview: <https://vimeo.com/136147397>

**IEEE VIS 2013**, Atlanta, GA **October 2013**

- **Title:** Uncertainty Quantification in Linear Interpolation for Isosurface Extraction
- Presentation slides: <http://tusharathawale.info/wp-content/uploads/2019/02/VISpresentation13.pdf>
- Video preview: <https://vimeo.com/74500826>

## INVITED TALKS

**Los Alamos National Laboratory**, Los Alamos, New Mexico **December 2018**

- **Title:** Statistical Analysis for Quantification and Visualization of Spatial Variability in Features of Uncertain Data

## ACADEMIC PROJECTS

**August 2010 – August 2012**

- **Computer Graphics:** Implemented shading, rasterization, and z-buffering stages of the graphics pipeline; the loop subdivision algorithm for smooth surfaces; and smoothing filters for image processing
- **Machine Learning:** Designed and implemented systems in a supervised machine-learning framework that utilize techniques such as least squares, principal component analysis, and local-linear embedding
- **CUDA:** Developed CUDA applications for fast matrix multiplication and the breadth-first search

## INVOLVEMENT

**Treasurer**, Gator Cricket Club at UF, Gainesville, FL **August 2014 – December 2014**

- Performed accounting duties related to tournament organizations and fundraising events

**Student Volunteer**, IEEE VIS 2013, Atlanta, GA **October 2013**

- Helped in miscellaneous activities, such as setting up the speaker/poster sessions and distribution of conference materials

## WORK STYLE

- Investing time and resources appropriately
- Ability to take decisions with minimal guidance
- Strong communication skills and positive attitude
- Continuous learning and self-improvement