

# JIAYUAN WANG

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My page <https://wangjiayuan007.github.io/jiayuan/>

## EDUCATION

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### The Ohio State University

PhD candidate, Computer Science, expected date of graduation: 2020 Jan.

Co-advised by Prof. Tamal Dey and Prof. Yusu Wang

Sep 2014 - Present

Overall GPA: 3.96

### Zhejiang University

BSc in Mathematics and Applied Mathematics

2010-2014

Overall GPA: 3.89/4.0

## EXPERIENCE

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### Graduate Research Associate and Teach Associate

*Department of Computer Science and Engineering, The Ohio State University*

Sep 2014 - Present

## TECHNICAL STRENGTHS

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### Programming Languages

Python, C++, C#, Matlab, Java, JavaScript

### Technologies

PyTorch, scikit-learn, WebGL/OpenGL, Unity, OpenCV, D3.js, ParaView

## RESEARCH

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My research focuses on **computational geometry/topology** algorithms with applications in **machine learning, computer vision, visualization** and **graphics**. More specifically, I work on processing noisy datasets in the following scenarios: Removing outliers from point clouds and recovering signals from density fields.

## PROJECTS

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### Automatic Road Extraction from Satellite Images

- Implemented a method that consists of image segmentation by CNN(U-Net) and centerline extraction.
- Conducted experiments on datasets from Spacenet challenge. Scores are higher than the winners with better connections and less noise. Developed a novel framework without labelled data by applying the graph reconstruction algorithm iteratively to improve the accuracy of the CNN.

### Ridge extraction from density field with discrete Morse theory

- Designed the first noise model and proved the theoretical guarantee for a ridge extraction algorithm.
- Applied the algorithm to reconstructing road networks from GPS trajectories/satellite images, extracting the filament structures from the cosmology data/biomedical images of neurons and bones, and simplifying lines for rough sketches.

### Outlier removal for point clouds

- Implemented a parameter-free denoise algorithm for arbitrary dimensions. The result is guaranteed to be Hausdorff close to the ground truth.
- Removed outliers for 2D/3D generated by uniform/adaptive sampling. Improved classification error from 4.09% to 2.45% on mislabeled handwritten digits in which each image is a high dimension point.

## PUBLICATIONS (DETAILS ON MY PAGE )

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Dey, T.K., **Wang, J.** and Wang, Y., Road Network Reconstruction from satellite images with Machine Learning Supported by Topological Methods. *ACM SIGSPATIAL 2019*, poster paper.

Dey, T.K., **Wang, J.** and Wang, Y., Graph Reconstruction by Discrete Morse Theory. *SoCG 2018*.

Dey, T.K., **Wang, J.** and Wang, Y., Improved Road Network Reconstruction using Discrete Morse Theory. *ACM SIGSPATIAL 2017*, poster paper.

Buchet, M., Dey, T.K., **Wang, J.** and Wang, Y., Declutter and Resample: Towards parameter free denoising. *SoCG 2017*