

Lieyu Shi

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🌐 [lieyushi.github.io](https://github.com/lieyushi)

EDUCATION

Ph.D. Candidate in Computer Science, University of Houston, Houston, TX, USA

Research focus in **scientific data visualization and analysis**

Aug. 2014 – Dec 2019

Bachelor in Computational Mathematics, Xi'an Jiaotong University, China.

Sep. 2009 – June 2013

KEY SKILLS

Professional: C++, Python, Paraview, Data Structures & Algorithms, Mathematics, Data Visualization, Unsupervised machine learning, Optimization, Matlab,

Proficient: Linux, VTK, svn, git, Java, R, OpenMP, JavaScript
Basic: OpenGL, QT, AWS, Shell, CUDA, Spark, SQL

WORK EXPERIENCE

Data Analyst, Shell International Inc., Houston, TX

May 2019 – Aug. 2019, May 2018 – Aug. 2018

- Explored the utility of AWS and Google Cloud for video analysis on Windows with C++ and Java
- Assisted wells engineers in conducting data processing and visualization for drilling-oriented task
- Helped to refactor algorithm-related code from Matlab into Python
- Built the online visualization platform with Python Plotly for drilling data analytics
- Established data-driven DASH applications for drilling interactive data visualization and analysis
- Implemented robust filtering models for time-based data (GBs) fetched from database

Teaching Assistant: Introduction to C++/Java, Operating System, Visualization

Jan. 2015 – now

- Tutored undergraduate students in the lab courses; Helped organize and grade assignments;
- Provided research-oriented instructions for graduate students

ACADEMIC/COURSE PROJECTS

Separation Estimates from Integral Curves for Flow Visualization

Jan. 2019 – now

- Designed algorithms to detect the separation behaviors from line-based input of flow fields
- Implemented and visualized the separation results with scalar-based varying opacity using C++ and Paraview
- Achieved a **first**, **robust**, and **effective** feature detection and highlighting from flows

Integral Curve Clustering and Simplification for Flow Visualization

Jan. 2017 – Dec. 2018

- Implemented all the unsupervised clustering algorithms with similarity measures for a comparative evaluation of these techniques in flow visualization
- Utilized a ranking-based visualization method to quantitatively evaluate clustering results
- Provided the **first** and **instructive** empirical guidelines for flow visualization community to select appropriate combinations of clustering techniques and similarity measures
- Proposed a simple and effective similarity measure to extract physical features in dynamical flows
- Released a **cross-platform**, **extensible** and **robust** C++ software for clustering lines of flows

Particle-based Fluid Simulation and Analysis

Sep. 2014 – Jan. 2017

- Proposed a revised FTLE estimation technique for selectively analyzing particle-based simulation data in a Lagrangian-based representative form
 - Used C++ and OpenMP to simulate fluid scenarios by applying position-based fluids to solve incompressible dynamic equations
 - Designed an interactive visualization GUI with OpenGL and GLUI for preliminary flow visualization
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Sharding and Replication Implementation for Online Storage

Fall 2016

- It is a final project for Computer Network graduate course
 - Designed a simplified two-way online storage system with Java socket programming
 - Enabled backup and record of data information while downloading and uploading data
 - Used makefile to compile and run Java software on server with local library linkage
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PUBLICATIONS

- [1] **L Shi** and G Chen, "Estimate separation structure from sets of integral curves", *IEEE Pacific Vis 2020* (under review)
- [2] **L Shi**, R Laramée and G Chen, "Integral curve clustering and simplification for flow visualization: a comparative evaluation", accepted by *IEEE Transactions on Visualization and Computer Graphics* 2019 (best journal in visualization)
- [3] **L Shi** and G Chen, "Metric-based curve clustering and feature extraction in flow visualization", *IEEE CAD & CG 2017 short paper*
- [4] **L Shi**, L Zhang, W Cao and G Chen, "Analysis-enhanced particle based flow visualization", *Visualization and Data Analysis 2017*, 12-21(10)