Lieyu Shi

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EDUCATION

PhD. Candidate in Computer Science, University of Houston, Houston, TX, USA
Research focus in **scientific data visualization and analysis** *Aug. 2014 – May 2020*
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 Clustering, Optimization, Matlab,
Proficient: Linux, VTK, svn, git, Java, R, OpenMP, **Basic**: OpenGL, QT, AWS, Shell, CUDA,

WORK EXPERIENCE

Data Engineer, Shell International Inc., Houston, TX *May 2019 – Aug. 2019, May 2018 – Aug. 2018*
- Explored the utility of AWS for cloud-based 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

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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

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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

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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 Lagragian-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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COURSES

Graduate: Computer Architecture, Computer Network, Operating System, Machine Learning (A), Data Structure, Algorithm (A-), Computer Graphics (A), Visualization (A), Numerical Analysis (A), Theory of Computation (A), Fundamental of Medical Imaging (A), Artificial Intelligence (A)

PUBLICATIONS

[1] **L Shi**, R Laramee and G Chen, "Integral curve clustering and simplification for flow visualization: a comparative evaluation", *IEEE Transactions on Visualization and Computer Graphics* 2019 (to appear)
[2] **L Shi** and G Chen, "Metric-based curve clustering and feature extraction in flow visualization", *IEEE CAD & CG 2017 short paper*
[3] **L Shi**, L Zhang, W Cao and G Chen, "Analysis-enhanced particle based flow visualization", *Visualization and Data Analysis 2017*, 12-21(10)