

# Xu Liu

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## Skills

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C++/Java/Python/Scheme/ML, HTML/CSS/JavaScript,  
OpenGL/WebGL/CUDA, SQL/MongoDB

## Projects ([github.com/liuxu1005](https://github.com/liuxu1005) / [liux1005.github.io](https://liux1005.github.io))

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[Sphere in Water](#) (Computer Graphics)

Implemented with CSS, Html, JavaScript and WebGL.

It has features of recursively ray tracing with reflections and refractions, collision detection and response, water wave simulation, caustics simulation

[Sorting on CPU and GPU](#) (Computer Architecture)

Implemented with C and CUDA.

It compares performance on CPU and GPU of various sorting algorithms including merge sort, quick sort, radix sort, bitonic sort.

[Triangulation/Monotonicity](#) (Computational Geometry)

Implemented with Java applet.

Three geometry algorithms including detecting monotonicity in  $O(n)$ , separating non-monotonic polygons into monotonic pieces in  $O(n \log n)$ , triangulating the monotonic in  $O(n)$ .

[Channel Code/Modulation/Demodulation/Routing](#) (Networks)

Implemented in Python.

For studying details of various layers of networks, it includes basic source coding and channel coding algorithms (data layer), modulating and demodulating signals to medium (data layer), medium access control (data layer), routing algorithm (network layer), transportation control algorithm (transport layer), simple http sever (application layer).

[JOS](#) (Operating System)

Implemented in C and assembly.

For studying details of operating system. It includes booting, process scheduling, memory management, file system, network card driver, web server.

[KNN/Naive Bayes/Perceptron](#) (Machine Learning)

Basic algorithms from Machine Learning.

[Content Centric Network Report](#) (System Design)

Final paper for System Design class, discuss features of CCN network architecture

## Courses

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**From Tufts University:**

Computation Theory, Programming Languages, Discrete Mathematics, Algorithm, Data Structures  
Artificial Intelligence, Machine Learning, Computational Geometry, Computer Graphics,  
Advanced Computer Architecture, Machine Architecture and Assembly Language,

Database, System Design

**Taught by self:**

Operating System (following MIT 6.828 Operating System Engineering)

Networks (following MIT 6.02 Digital Communication and 6.829 Networks)

**Education**

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**Master of Computer Science**    Tufts University, US    Aug. 2016

**Master of Material Science**    Southwest Jiaotong University, China    June 2008

**Other Experiences**

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**Application Engineer**    Angstrom Advanced, Braintree MA    Mar. 2012 – Jan. 2015

Technical support on application, installation & troubleshooting for chemical/material analysis instruments such as SEM, AFM/SFM, XRD, EDS/WDS, ICP-AES, GC-MS.

**Lithograph/Intergrated Process Engineer**    Shanghai, China    Feb. 2008 – Aug. 2010

Develop and maintain processes for 6” silicon wafer production line.