

## Xu Liu

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### **Profile**

Familiar with data structures and algorithms.

Familiar with procedure, object oriented, functional programming

Familiar with principles of operating system, networks and database,

Familiar with computer architecture, GPU/OpenGL/WebGL/CUDA,

Strong passion for programming and learning new technologies,

### **Skills**

C/C++/Java/Python, HTML/CSS/JavaScript, OpenGL/WebGL/CUDA, TCP/IP/HTTP, SQL, RESTful

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

#### **1. Related to infrastructures:**

[JOS](#) (Operating System, C, Assembly)

Implemented in C and assembly. It includes

1. Memory Management: allocate/free memory for page table, process control block and file directory,
2. Process Management: process scheduling, context switch, fork/spawn new process, exception handling,
3. Inter-Process Communication with message and shared memory,
4. System Calls and Atomic Operation,
5. Seven-Layer File System,
6. Network Card Driver, Multi-thread Web Server.
7. Booting, loading OS to RAM, stack backtracking for debug,

[Channel Code/Modulation/Demodulation/Routing](#) (Network Protocol, Python, C++)

Implemented in Python. It includes

1. source coding and channel coding algorithms (link layer),
2. modulating and demodulating signals to medium (link layer),
3. medium access control (link layer),
4. routing algorithm (network layer),
5. transportation control algorithm (transport layer),
6. simple HTTP sever (application layer).

[Interpreter](#) (C, ML, Scheme)

Implemented interpreter with features: global/local environments, type check/Inference, garbage collection (sweep-and-mark), dynamic dispatch, message.

[Content Centric Network Report](#) (Network Protocol)

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

[RPC Generator](#) (Distributed System, C++)

Implemented in C++. It Automatically generate RPC stubs for given IDL files;  
is able to deal with recursively nested structure and array.

#### **2. Related to algorithm:**

[Sphere in Water](#) (Computer Graphics, GPU, WebGL, JavaScript)

Implemented with CSS, Html, JavaScript and WebGL. It features recursive ray tracing with reflections and refractions, collision detection and response, water wave simulation, caustics simulation.

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

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

[KNN/Naive Bayes/Perceptron](#) (Machine Learning, Python)  
Algorithms from Machine Learning, implemented with Python.

### 3. Related to architecture:

[Sorting on CPU and GPU](#) (Computer Architecture, GPU, CUDA, C++)  
Implemented with C++ and CUDA.

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

### Courses

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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, Internet-scale Distributed System, Operating System, Networks

### Education

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<b>Master of Computer Science</b> (GPA 3.7/4.0)	Tufts University, US	Aug. 2016
<b>Post-Baccalaureate Certificate in CS</b> (GPA 4.0/4.0)	Tufts University, US	June 2015
<b>Master of Material Science</b>	Southwest Jiaotong University, China	June 2008

### Other Experiences

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<b>Application Engineer</b>	Angstrom Advanced, Braintree MA	Mar. 2012 – Jan. 2015
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Technical support on application, installation & troubleshooting for chemical/material analysis instruments  
SEM, AFM/SFM, XRD, EDS/WDS, ICP-AES, GC-MS.

<b>Lithograph/Intergrated Process Engineer</b>	Shanghai, China	Feb. 2008 – Aug. 2010
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Develop and maintain processes for fabrication line: one 6" line on 0.5 um process with 3000 pieces per month;  
one 4" line on 1.2 um process with 20000 pieces per month. Products include audio processor, discrete devices,  
frequency IC.