Gerald F. **Wu**

Computer Science · Applied Mathematics

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Skills

Programming: Java, C, Scala, C++, OCaml, Racket, Python, Processing, Shell scripting
Web: JQuery/JavaScript, ASP Classic, PHP, LAMP, HTML/CSS
Other: RHCSA Certified Linux Systems Administration (ID: 180-132-714), Docker, LaTeX, Git

Education

Brown University

Providence, RI

Major: Computer Science, Applied Math — *2017 - PRESENT*

CURRENT	**CS**, Introduction to Systems | Database Management Systems
CURRENT	**Applied Math**, Applied Partial Differential Equations II | Statistical Inference I
2017-2018	**CS**, An Integrated Introduction I | An Integrated Introduction II
2017-2018	**Applied Math**, Applied Ordinary Differential Equations | Applied Partial Differential Equations I
2017-2018	**Math**, Honors Calculus (Multivariable) | Honors Linear Algebra | Abstract Algebra

Thomas Jefferson High School for Science and Technology

Alexandria, VA

High School Education — *2013 - 2017*

- GPA: 4.37 – AP Computer Science with Data Structures, Parallel Computing, Computer Systems Research

Experience

Applied Mathematics Teaching Assistant

Providence, RI

Brown University — *Sep. 2018 - PRESENT*

- Undergraduate teaching assistant for APMA 0340: Methods of Applied Mathematics II. This course covers both **nonlinear ordinary differential equations** and **partial differential equations** from an applied mathematics perspective.

Software Engineering Intern

McLean, VA

FMS Inc. — *May 2018 - Aug. 2018*

- Cluster analysis in large-scale graphs (C#)
  - Researched, implemented, and **optimized** the **Markov Clustering Algorithm** (MCL) to identify clusters in relational graphs of size **100,000+** nodes and **120,000+** edges in less than **10 minutes**
- Implemented secure, PCI-compliant payment integration on the web using Authorize.Net (ASP Classic)
  - Complete integration with the **Authorize.Net** payment gateway, including both **one-time** payments and long-term customer **payment profiles**

Software Engineering Intern

Washington D.C.

Smithsonian Institution — *Jun. 2016 - Aug. 2016*

- Metadata extraction tool (Java/shell scripts)
  - Reads **metadata** from files in an ingest folder and populates an **Oracle database** with the data
- Metadata ingestion tool (Java)
  - Automatically processes **spreadsheets** within ingest folders and populates **Oracle database**

Software Engineering Intern

Washington D.C.

Smithsonian Institution — *Jun. 2015 - Aug. 2015*

- Two-part data integrity program for Smithsonian Digital Asset Management System
  - Ingests **MD5 checksum** data and writes it to an Oracle database, and **verifies data integrity** at a later date

Projects

Quantum Mechanical Wave Function Propagation

Processing

github.com/98WuG/QuantumEvolution

- A program to evolve arbitrary initial states through time for the one-dimensional Schrodinger Equation and Wave Equation in the absence of a potential field. Highly optimized to run in **real time**. Accurate to millions of timesteps before noticeable error propagation.

An Approximate Solution to the Packing Problem

C++

github.com/98WuG/SeniorResearch

- An approximate, polynomial time solution to the classic NP-hard packing problem. Implemented using the sorting-first greedy approach to packing.

1. How were you first introduced to Computer Science? How have you continued to develop your technical skills and seek additional exposure to the field?

My first exposure to computer science was back in middle school, when I learned how to spin up a virtual machine to run the new Windows 8 release. From there, I was hooked, and I soon built my own computer from parts, running a modified Mac OS X.

I continued down this path in high school by taking my first formal computer science course. This continued throughout high school, with AP Computer Science, Parallel Computing, and Computer Systems Research. I was always excited to learn something new every year.

This of course, continued in the summer when I worked as a software engineer intern at various places, such as the Smithsonian Institution and FMS Inc.

Computer systems especially caught my interest, and in college, I've decided to pursue a computer science degree with a focus in systems. I think it's fascinating to learn about how computers work at a fundamental level. I spend a lot of time reading up on how systems and their processes interact with each other, from hardware initialization at boot, all the way up to the graphics server. My goal is to eventually code an entire "hobbyist" operating system from scratch.

2. What is your strongest programming language? How much experience do you have using the language? Go into detail about how you used this technical language. If talking about a group project, be specific about your role in the final product. (Examples can include projects, coursework, competitions, websites, previous internships, etc.)

My strongest programming language is Java. I had two years of course experience in Java in high school, and a semester of course experience in college. While we covered the typical CS course material, such as data structures, sorts, big-O runtime, sockets, and dynamic programming, we also had a few interesting projects. For example, one of our projects was a search engine, complete with term frequency, inverse document frequency, and pagerank. In addition, we also had to write both an HTTP web browser and web server in Java.

In terms of work experience, I used Java in my internship at the Smithsonian Institution to write an integrity check tool. I used JDBC to communicate with an Oracle database, and checked all the files with an MD5 checksum. In addition, I used C# in my internship at FMS Inc., where I wrote a program to efficiently calculate clustering for large networks using the Markov Cluster Algorithm. Since C# is similar to Java, I could borrow many of my Java methodologies in the program. In both of these instances, the programs were solely my own. I was both the sole designer and sole programmer.

3. At Google, we believe that a diversity of perspectives, ideas, and cultures leads to the creation of better products and services. Tell us about your background and experiences and how they make you unique.

I'm always willing to try new things, even if it means taking a bit of a risk and stepping outside my comfort zone. In high school, I joined the marching band's color guard I wanted to try out a new activity, even if it was against the normal "status quo". I ended up enjoying the activity so much that I did it every year throughout high school.

At the same time, I was part of a ski racing team in the winter. This was a major time commitment, since the closest slopes were two hours away. However, the thrill and uniqueness of skiing pulled me back every week.

At my college, we don't have a color guard, so I had to find an alternative activity. I logically decided on downhill skateboarding, since it's pretty much the "land" analogue of downhill skiing. I had never skateboarded, but even still, I decided to take the risk and go for it. It turned out to be really fun!

All of these activities were out of my comfort zone, and a little risky, but I'm glad I did every one of them. The experiences were unforgettable, and they made me who I am today.

4. List the technical courses you will be taking next semester. If you have not registered for classes yet, please list the courses you plan on taking.

Next semester, I plan on taking Introduction to Software Engineering, a course that focuses on designing and implementing large, scalable, and reusable systems. While it's a large time commitment, I'm looking forward to it, since I've never really worked on a large-scale project.

I'm also planning on taking Computer Vision, which introduces techniques to extract data from digital images. It includes topics such as 3D scene structure, segmentation and grouping, texture analysis, object recognition, and motion tracking. I'm excited about this course, since it seems quite useful and forward-thinking.

While not purely technical, I also want to mention two applied math courses I'm planning on taking – numerical optimization and statistical inference II. I feel that these courses, while not computer science, will help a great deal with future computer science endeavors by giving me more mathematical background to draw from when implementing a solution.

5. List any clubs and/or organizations that you participate in.

I'm part of the Brown University longboarding club, a club focused on downhill longboarding/skateboarding. I helped found this club with a friend of mine that also enjoys the activity.

I'm also the web chair for Hack for Humanity, a hackathon focused around humanitarian efforts. Here, I help design and maintain the website and graphics for the organization. My experience setting up and maintaining my own website, https://geraldwu.com, helped a lot with how to proceed and accomplish certain tasks.

In addition, I'm part of the technical support for the Brown Student Radio. I handle most of the infrastructure, including the webserver, remote access, DNS records, and audio streaming. My previous experiences setting up my own personal servers helped greatly with this, as this taught me many "hands-on" things that weren't taught in a formal CS class.