

# Tong (Tony) Liu

tliu0526@gmail.com • Tony.Liu1@ibm.com • 434-466-1067 • tliu526.github.io

## Education

### Williams College

Bachelor of Arts, Summa Cum Laude

Major: Computer Science with Highest Honors, Concentration: Cognitive Science

Class of 2016

GPA: 3.99

## Research Experience

### Medical Concept Embeddings, Tensorflow

June 2017 – present

- Applying embeddings to medical concepts with IBM researchers Kenney Ng and Soumya Ghosh
- Specifically extending the Word2Vec CBOW model to learn representations of ICD9 codes
- Investigating both temporal data and medical ontology incorporation via attention mechanisms
- Using Tensorflow and Jupyter Notebook for model implementation and data analysis

### Honors Thesis, C++

Fall 2015 – Spring 2016

- Titled “Reconsidering Dynamic Systems in Light of Irregularity,” advised by Duane Bailey
- Investigated spatially irregular cellular automata for conditions of emergent computation
- Accepted as a poster to the Conference on Complex Systems 2017

### Curling Number, Python/C

Winter 2015 – Spring 2015

- Explored the Curling Number Integer Sequence and the Curling Number Conjecture
- Implemented and optimized programs to calculate the sequence for larger  $n$

### Red-Black Trees, Java

Winter 2014 – Spring 2014

- Worked with Prof. Duane Bailey in an investigation of variations in Red-Black Trees
- Compared the advantages of Left-Leaning RB Trees against standard implementations

## Work Experience

### Watson Health Software Engineer, IBM

August 2016 – present

- Working on an app that retrieves relevant information from EMRs supported by NLP and ML insights
- Initially responsible for DevOps support, implementing continuous delivery of infrastructure
- Currently responsible for the RESTful services connecting the data pipeline, cognitive insights, and UI
- Developed expertise in the FHIR API and helped design the data model used in the application

### Extreme Blue Technical Intern, IBM

Summer 2015

- Implemented a near real-time web dashboard and mobile app that delivered IT ticket analytics
- Used Java, Python, JavaScript, SPSS Modeler, and SOAP web services during implementation
- Developed project pitch and presented project to senior level IBM executives at Armonk, NY

### Software Development Intern, IBM

Summer 2014

- Tasked with improving data storage by leveraging OpenStack Swift cloud services
- Performed investigation of cloud capabilities and built cost model to project savings
- Used RESTful web services, shell scripting, Java, C, and Python during implementation

## Teaching Experience

### Computer Science Teaching Assistant, Williams College

Spring 2013 – Spring 2016

- Ran TA sessions, graded assignments, and helped lead lab sessions

TA Courses:

- CSCI 136: Data Structures and Advanced Programming Spring 2013
- CSCI 134: Introduction to Computer Science Spring 2014

- CSCI 237: Computer Organization Fall 2014
- CSCI 334: Principles of Programming Languages Spring 2015
- CSCI 135: Diving into the Deluge of Data Spring 2016

**Peer Tutor**, Williams College Fall 2013 – Spring 2014

- Ran one-on-one tutoring sessions helping students with problem sets and course material
- Tutored Courses: Multivariable Calculus, Principles of Microeconomics and Macroeconomics

## Selected Projects

**WUFS File System**, C Spring 2015

- Implemented the Williams Unix File System, a Minix-like file system
- Built in single-level indirection data blocks with multithreaded kernel support

**Infiniputt Video Game**, C++/G3D Fall 2014

- Built a procedurally generated mini-golf computer game using the G3D Innovation Engine
- Used randomized path-finding algorithms to generate game levels, built 3D models using Blender

**Procedural City Generation**, Python/G3D Fall 2014

- Built a procedural building and city generator using a stack-based grammar
- Worked in a team of nine students, specific role was to design and implement building grammar

**ARM Emulator**, x86-64 Assembly Fall 2013

- All instructions in an ARM-based assembly were decoded and emulated in x86-based language
- Space-time tradeoff taken into account with implementation approach

## Honors & Awards

**Sam Goldberg Colloquium Prize**, Williams College Computer Science June 2016

- Awarded for the best colloquium presentations in computer science, for honors thesis defense

**Sigma Xi Society Associate Member**, Williams College Computer Science June 2016

- Recognizes students who have demonstrated promise for the advancement of scientific research

**Dr. I.S. Dribben 1924 Award**, Williams College Golf February 2016

- Presented annually on the basis of dedication, sportsmanship, and perseverance

**Phi Beta Kappa Honor Society Member**, Williams College October 2015

- Membership based on academic standing, with the top 5% of students in the class elected Junior year

**Ward Prize**, Williams College Computer Science June 2015

- Awarded annually to the best project in computer science, for “Procedural City Generation”

## Leadership & Extracurriculars

**Williams College Computer Science Student Advisory Committee** Fall 2015 – Spring 2016

- Organized social and educational events for the computer science department
- Helped evaluate faculty hiring candidates through interviews and by coordinating student feedback

**Williams College Varsity Golf Team** Fall 2012 – Spring 2016

- NESCAC All-Academic Team Fall 2014 and 2015
- NESCAC All-Sportsmanship Team Fall 2015