Alexander Y. Liu
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Website: https://2019aliu.github.io

Education

Georgia Institute of Technology GPA: N/A Atlanta, GA
M.S. Machine Learning, Spring 2023 *August 2022 - Present*

Georgia Institute of Technology GPA: 3.83 Atlanta, GA
B.S. Computer Science, Spring 2022 *August 2019 - May 2022*

- Notable courses: Deep Learning, Machine Learning, Automata and Complexity, Computer Vision, Objects and Design, Computer Organization and Programming (Intro to C / Assembly), Database Systems, Information Visualizations, Honors Linear Algebra with Abstract Vector Spaces, Cognitive Science

Thomas Jefferson High School for Science and Technology Alexandria, VA
Main Interests: Computer Science, Neuroscience *September 2016 - June 2019*

- Selected coursework: Artificial Intelligence, Mobile Application Development, Web Application Development, AP Computer Science A and Data Structures, Neuroscience Research Lab, Neurobiology, Research Statistics
- Honors received: Siemens Regional Semifinalist, Virginia Science and Engineering Fair: 2nd in Bioengineering Category, AP Scholar with Distinction, Athletic Honor Roll

Industry Experience

My CV is live! You can view it by clicking the following link: Alex's live CV. If you're reading a paper copy of this, you can visit this link: https://github.com/2019aliu/Resume/blob/master/AlexLiuCV.pdf

- **Software Engineering Intern** Burlingame, CA
  Meta Reality Labs *May 2022 - August 2022*
  - Created Text to Speech prototype for the Oculus Quest
  - Set up the continuous build and continuous integration process for the Oculus Accessibility APK, speeding up accessibility feature deployment rates two fold
  - Technologies used: Kotlin, Android Accessibility Service, BUCK

- **Software Engineering Intern** Atlanta, GA - remote
  NCR Corporation *May 2021 - August 2021*
  - Created Progressive Web App (PWA) version of NCR's Emerald POS from ideation to deployment, providing offline functionality for nation-wide grocery chains
  - Implemented proof of concept of cryptocurrency payment for Emerald using the Rinkeby testnet
  - Technologies used: TypeScript, IndexedDB, Workbox, React.js, Nest.js, Figma

- **Product Manager and Team Lead** Online
  Develop For Good *September 2020 - December 2020*
  - Managed a team of designers and developers to create a mobile application to aid distributing resources for the Yemen crisis
  - Maintained communication with Yemeni clients to understand the product's specifications and deliver designs and product updates
  - Technologies used: Figma, React Native

- **Software Developer Intern** Rockville, MD - remote
  S&C Electric *May 2020 - August 2020*
  - Led the design of backend, implementation, testing, and documentation of an application to view and edit settings of all S&C products, will be used to monitor 10000s of devices

- Redesigned and implemented backend microservices and proxy to retrieve data from S&C Electric's devices, resulting in 4x speed up and ¿99% reduction in the schema used to retrieve data
- Collaborated with design team to redesign a user-friendly interface, and implemented the interface with newer technologies (React, Electron) to reduce code base size significantly
- Technologies used: Java, Javascript, Redis, Spring Boot, WebSocket, STOMP, GraphQL, Apollo Server + Client, React.js, Electron.js

- **Software Developer Intern** — Greenbelt, MD
  Fluency Security Corporation — *June 2019 - August 2019*
  - Developed a web-based trouble ticketing system, FasterIncidentResponse for use at client demonstrations
  - Created developer's guide documentation with Postman, Markdown, and Web Developer tools to aid customer usage of the product
  - Unit tested log management software to find and report bugs in software
  - Drove trucks and wired ethernet cables
  - Technologies used: Golang (including Gin server), MongoDB, Bootstrap, Vue.js, Node-RED, Postman

- **Website Developer and Administrator** — Chantilly, VA
  Hope Chinese School — *August 2018 - December 2018*
  - Helped develop and administer a new website for cultural and enrichment center serving 5000 users
  - Former administrator of the website, managing a system of tens of thousands of users.
  - Website: https://www.hopechineseschool.org
  - Technologies used: HTML/CSS/JS, Django, SASS

Research Experience

- **FunTech Group** — Atlanta, GA
  GT FinTech Lab — *March 2021 - May 2022, September 2022 - November 2022*
  - Created a web crawler to download and preprocess 10000s of Federal Reserve documents using Selenium and BeautifulSoup
  - Generated topics of focus for Federal Reserve meeting agendas by utilizing Latent Dirichlet Allocation
  - Analyzed sentiment of Fed statements to understand Fed opinions on various market sectors using finance version of BERT

- **Move2Music** — Atlanta, GA - remote
  Parikh Lab — *August 2020 - December 2020*
  - Researched uses of recurrent neural networks and reinforcement in generating music from video footage of dance
  - Used modern encoding techniques and LSTMs to prototype pairing dance video with appropriate music

- **Migraine Research** — Great Falls, VA
  Neuroscience Research Lab — *June 2018 - January 2019*
  - **Title**: Exploration of Two-Dimensional Materials for Inhibition of the Calcitonin Gene-Related Peptide Pathway in Migraines
  - Employed high-performance CPU cluster and slurm management in collaboration with high school's computer systems lab
  - Continued using ABINIT, an open-source package for making predictions about molecular systems based on solving quantum physics equations.
  - Research proposal accepted by neuroscience research lab at high school, received guidance and $2400 funding for project
  - Submitted to Intel Science Talent Search, presented at the Thomas Jefferson Symposium to Advance Research

- **Research Abstract**: Current research shows blocking the Calcitonin Gene-Related Peptide Receptor (CGRPR) most effectively treats migraines. First-principle calculations have been performed to analyze the interaction between one of the most effective migraines medicines and the active amino acids in the CGRPR. Based on the premise that two-dimensional (2D) materials have van der Waals interactions with amino acids, computations on the binding energies between the active amino acids in CGRPR and the selected 2D materials, silicene, germanene, and graphene oxide, have been performed. Based on the calculated binding energies, the interaction strength of each selected 2D material with CGRPR and that of olcegepant with CGRPR were compared. Results indicate that silicene possesses potentially potency to treat migraines more effectively yet economically than most existing treatments do.

- **Alzheimer's Disease Research** — Alexandria, VA
  Project Lead — *June 2017 - August 2017*
  - **Title**: Exploration of Chelation Materials for Treatment of Alzheimer's Disease
  - Used ABINIT, an open-source package for making predictions about molecular systems based on solving quantum physics equations.
  - Submitted to Siemens Competition 2017, achieved the semifinalist award
  - Competed in science and engineering fairs, placed 2nd at the Virginia State Science and Engineering Fair
  - **Research Abstract**: First-principle calculations have been performed to investigate the interaction of different metal ions with amyloid-beta, along with adsorption of the metal ion by potential chelating materials. Binding energies were evaluated for metal interaction with a first coordination sphere consisting of three nitrogens and one oxygen. Results indicate that this coordination sequence possesses greatest compatibility for copper. Due to copper's strongest affinity, binding energies were also evaluated for its interaction with MoS2, WS2, reduced graphene oxide (rGO), and cyanide. Our results indicate cyanide and rGO to possess strong chelation potential for treatment of Alzheimer's disease.

Projects

More projects I have worked on can be found on my GitHub: `https://www.github.com/2019aliu`

- **HeartsRL** — Great Falls, VA - remote
  Personal Projects — *August 2020 - Present*
  - Make a computer program to play the game of Hearts using reinforcement learning
  - Build website to allow users to play the game of Hearts against other users or with the computer program
  - Technologies used: Python, Javascript, Tensorflow, React.js, WebSocket, Figma

- **Recycling Management Suite** — Atlanta, GA - remote
  Google Developer Student Club, Georgia Tech Chapter — *June 2020 - September 2020*
  - Create website to handle administration of Georgia Tech's Office for Solid Waste Management and Recycling
  - Connect the user interface to the existing Firestore database
  - Implement serverless functions to export management records to Microsoft Excel files
  - Technologies used: Javascript/Typescript, Angular, Firebase - Firestore + Functions

- **Epiphany** — Champaign, IL - remote
  HackThis – HackIllinois 2020 — *August 7-15, 2020*
  - Lead the creation of a Web application that implements the Feynman technique into a web application
  - Created user flow diagram and wireframes (both low-fidelity and high-fidelity) to design the app
  - Implemented search functionality to intelligently search for topics to learn
  - Built some of the custom React components for the project and some of the UI screens (home, profile, create new topic, topic info)
  - Technologies used: Figma, Javascript, React.js, SCSS, Python, Flask, Elasticsearch, MongoDB (Atlas)

- **talk:now** — Berkeley, CA - remote
  hack:now (CalHacks 2020) — *April 24-26, 2020*
  - Made a video chatting application for people experiencing hard times to chat with someone in a similar situation

- Users fill out a 1-minute form to quickly categorize the problem they are facing (can also choose to just talk to anyone), and are connected with the same issue with a video calling and text chatting application
- Top 30 Finalist in the main prize category out of 300+ submissions
- Technologies used: Javascript, Vue.js, WebSocket and WebRTC, Peer.js, SASS

- **T∆G ("TAG")** Atlanta, GA
  Create-X: Idea to Prototype *January 2020 - April 2020*
  - Created a tracking device that has better range than most commercially available tracking tags by utilizing Global Positioning System (GPS)/Bluetooth/Wifi technology
  - Used GPS to determine vicinity of device within 200 feet and Bluetooth/Wifi/Ultrasound to identity exact location through visual and auditory cues
  - Technologies used: Android SDK, Java, XML, Google Nearby Messages API, Google Maps API

- **CoronaDigest** Charlottesville, VA
  HooHacks 2020 *March 28-29, 2020*
  - Make a web application that provides the latest news about Coronavirus (COVID-19), including a 2-minute daily digest, a 3D globe of Coronavirus cases, and financial information related to the Coronavirus.
  - Technologies used: Python, Plotly, Seaborn, Matplotlib, MongoDB Atlas, Pandas, Jupter Notebook, Flask, Jinja, Bootstrap, Heroku

- **Creating the Next** Atlanta, GA
  Hacklytics 2020 *February 22-23, 2020*
  - Visualized unemployment data and other macroeconomic factors nationally and globally, and built multivariate regression model to determine how much the government should spend on unemployment
  - Won best use of visualizations
  - Technologies used: Python, Plotly, Seaborn, Matplotlib, MongoDB Atlas, Pandas, Jupyter Notebook, Flask

- **FoxStocks** Athens, GA
  UGAHacks 5 *February 7-9, 2020*
  - Created web application to teach new investors how to invest in stocks. My part was mostly backend work.
  - Won best use of MongoDB Atlas
  - Technologies used: Flask, Jinja, MongoDB Atlas, Python, BlackRock Aladdin API

- **TimePlotter** Atlanta, GA
  Big Data Big Impact Club *October 2019 - December 2019*
  - Develop a data analytic algorithm for a time-based plot of Atlanta using SGD technique to optimize the lengths between any two points based on the time taken
  - Technologies used: Pandas, Google Maps API, Python

- **Season2Season** Atlanta, GA
  Agency Club *October 2019 - December 2019*
  - Create a tool to change the season of an outdoors picture using a Generative Adversarial Network (GAN) machine-learning model trained with 1000+ images
  - Technologies used: PyTorch, Python

- **Inline** Durham, NC
  HackDuke 2020 *November 2-3, 2019*
  - Created web application to search for nearby health centers with the specified treatments and sort them by transportation time using Google Maps API

- Technologies used: Flask, Google Maps API, MongoDB Atlas, HTML/CSS/JS

- **Stockastic** Atlanta, GA
  HackGT 6 *October 25-27, 2019*
  - Designed and implemented a web application that helps users to monitor stocks of their interest by conducting sentiment analysis of Twitter tweets about the corresponding companies
  - Technologies used: React.js, Express.js, HTML/CSS, MongoDB, Twitter API, Google Cloud Natural Language API

- **Tetris: Forty Lines** Alexandria, VA
  Mobile Applications Development *March 2019 - June 2019*
  - Implemented a swipe-capable Tetris Android app in Android Studio with Java backend
  - Technologies used: Android Studio, Java

- **Arcade Game Suite** Alexandria, VA
  Web Applications Development *September 2018 - January 2019*
  - Designed and developed web-based suite of games, including U.S. Minesweeper, Tetris, and a word-finder assistant for Scrabble
  - Technologies used: HTML/CSS/JS (including jQuery, AJAX), SQL, Node.js

- **Personal Website** Alexandria, VA
  Web Applications Development *September 2018 - January 2019*
  - Personal website with projects and coding exercises
  - Arcade-style website featuring games, such as U.S. Minesweeper and Tetris, as well as game-assisting tools, such as a Scrabble word finder
  - Explored functionalities of Javascript, including making a standalone server, asynchronous programming, and integrating databases
  - Initially created for Web Applications Development course, later expanded website for other projects.
  - Technologies used: HTML/CSS/JS (including jQuery, AJAX), SQL, Node.js

- **Othello AI** Alexandria, VA
  Artificial Intelligence *December 2017 - January 2018*
  - Coded an AI that can intelligently play the classic board game Othello
  - Competed in an Othello AI competition
  - Technologies used: Python

- **CardBot** Alexandria, VA
  HackTJ 4.0 *March 2017*
  - Developed a proof-of-concept hack for finding best credit card options given user input from a Facebook Messenger chat-bot, used Capital One's API
  - Won Best Entrepreneurial Hack
  - Technologies used: Python, Facebook Messenger API, Capital One Hack-a-thon API

Skills

Languages: Java, Python, JavaScript/TypeScript

Infrastructures and Frameworks: Git, Node.js/V8, React.js, SCSS, WebSocket, MongoDB, Firebase, Tensorflow

Software: Android Studio, Figma, Jupyter Notebook

Campus Organizations

- **Executive Board Member, GT Pianoforte** Atlanta, GA
  Georgia Tech *September 2020 - Present*

- Redesign website for the organization using Wordpress
- Manage piano jam sessions and manage social media on Discord
- Play piano at concerts and socialize with other members of the club
- Previous statuses: Member: January 2020 - September 2020

- **Social Committee Member, Georgia Tech Swim Club** Atlanta, GA
  Georgia Tech *August 2020 - January 2021*
  - Organize and manage funds for social events for the swim club, such as weekly virtual trivia and other socially-distanced events
  - Practice, compete, socialize, and volunteer with the members and coaches of the swim club
  - Qualified for multiple events in the 2020 College Club Swimming National Championship (unfortunately cancelled)
  - Previous statuses: Member: August 2019 - July 2020

- **Member, Developer Student Club at Georgia Tech** Atlanta, GA
  Georgia Tech *June 2020 - October 2020*
  - Develop software to meet communal needs
  - Built website to handle administration of the Waste and Recycling Program at Georgia Tech

- **Member, GT Investment Club** Atlanta, GA
  Georgia Tech *January 2020 - Present*
  - Studying in the mentorship program to understand accounting and investing fundamentals and strategies