Zhifei “Soso” Song

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SUMMARY

- A permanent resident of Canada for the past 10 years, with an estimated eligibility for citizenship in 2024
- 3.91 average GPA in the last 2 years (3rd & 4th year), including 18 CS courses (3 graduate-level courses)
- Led 4+ tech teams with a collective total of 22+ unique members from NUS, UofT, and OCAD University
- Collaborated closely with 3 professors across 3 different University of Toronto campuses
- 16 months as a backend developer at IBM, earning 2 commendations, 2 appreciation letters, and a return offer
- North America 2021 IBM Intern Challenge (Hackathon) 2nd Place
- Presenter at the 2023 CMS Research Symposium, Applied Research in Action 2023, and Level UP 2023

EDUCATION

University of Toronto Toronto, ON

Honours Bachelor of Science Degree, with Distinction

Specialist (Co-operative) Program in Computer Science - Software Engineering Stream Sept. 2017–Aug. 2023

SELECTED PROJECTS

UTAP – TA Management Tool Project with Prof. Bogdan Simion Aug. 2023

Link: *https://utapcsc.utm.utoronto.ca/utap/*

- Joined Prof. Bogdan Simion's team to develop UTAP, a comprehensive TA application/hiring/managing tool.
- Automated the generation of mock data for testing and development purposes.
- Contributed to both frontend and backend development, including bug fixes and feature enhancements.
- Identified and reproduced intermittent inefficiencies in the existing TA scheduler. Redesigned it using CSP & COP solvers for enhanced efficiency and accuracy. Successfully applied in the production version for 2023 fall admissions.

Blockchain-Based Proof of Location with Outlier Detection – Paper with Prof. Thierry Sans May 2023–Feb. 2024

Link: *https://github.com/soso-song/Blockchain-Based-Proof-of-Location-with-Outlier-Detection*

- Conducted undergraduate research with Prof. Thierry Sans with an in-depth review of more than 25 scholarly papers.
- Designed a blockchain-based proof-of-location architecture using decentralized algorithms and ZK-proof solutions. Integrated geolocation data with circom circuits to ensure privacy and data integrity. This research enhances privacy-preserving methods and is slated for publication in February 2024.
- Explored incentives and motivations for participants across various decentralized applications. Examined participant behaviors and strategies within infrastructure-independent/dependent contexts, and outlier detection techniques.
- Received the 2023 UTSC CMS Research Symposium Certificate for a commendable research presentation

illucid – A Multidisciplinary Capstone Project Among UofT CS, UofT Music, and OCAD Art Apr. 2023

Link: *https://sososong.itch.io/illucid* Multidisiplinary: CSC404/MUS3630/TMU411H1/GAME414/ANIM222

- Selected through competitive course balloting for a collaborative project between UofT CS & Music and OCAD University.
- Elevated as one of 10 leaders, directing a team of 9 students from CS, Art, and Music.
- Fulfilled multiple roles, including game designer, developer, manager, and producer, from project initiation to final demo.
- Delivered presentations and conducted playtests for experts from Gameloft, Ubisoft, Snowman Games, and Uken Games.
- Presented the project at Level Up Showcase 2023, Westin Harbour Castle, Toronto.
- Selected as a presenter for Applied Research in Action 2023 by the MScAC program at Metro Toronto Convention Centre.
- Conducted independent research and paper implementation to create internal textures for sliced 3D objects.

Geodesic Paths – Paper Implementation of Geometry Processing, Graduate Level Dec. 2022

Project Link: *https://github.com/soso-song/geodesic-paths*

- A paper implementation of the "FlipOut" method for finding geodesic paths in triangle meshes using Eigen and libigl's built-in solvers. The project includes a demo that can be run using the libigl viewer.

B2ST – Startup Project, Graduate Level Capstone Design Project Dec. 2022

Project Link: *https://github.com/dcsil/B2ST-app*

Main Application: React, MongoDB, Docker, Node.js, Express.js, Twilio, scikit-learn, Stripe

Tools: Jest, Sentry, Sumo Logic, GitHub Actions, Heroku

- Initiated and co-led a B2B SMS marketing automation startup, utilizing machine learning within the Department of Computer Science Innovation Lab to steer hands-on research, strategic planning, and the development of MVPs.
- Collaborated with a cross-functional team of six from the National University of Singapore and the University of Toronto.
- Played a key role in designing a comprehensive tech stack featuring React, Node.js, and scikit-learn, and implemented DevOps practices using Sentry, GitHub Actions, and Code Climate for monitoring, CI/CD, and code quality.

- Actively participated in business development activities and pitched to industry leaders from Shopify, Stripe, and TD Bank.

NaiveOracle – A Decentralized Web3 Oracle Nov. 2022

Link: *https://github.com/PeterChou1/NaiveOracle*

Tools: ReactJS, Ethers.js, Netlify, Hardhat, Mocha, Chai, Waffle, Solidity, OpenZeppelin, Etherscan

- Built a Web3 oracle as part of a team of 3 during research on Chainlink's white paper v1.
- Contributed to the Service Level Agreement (SLA) that contains reputation, order-matching, and aggregation contracts, responsible for the security structure and logic.

scikit-learn Contributions May 2021

Link: *https://github.com/soso-song/scikitlearn-exploration-and-contribution-D01*

- Led a team of 6 members to contribute to 2 new features and 3 bug fixes in scikit-learn, utilizing Agile methodologies such as Jira and Scrum.
- Conducted an in-depth analysis of scikit-learn's architecture, focusing on its API, modular "filter" design pattern, and integration with NumPy and SciPy.

LOQAL – A Localized Q&A Web Application Aug. 2020

Link: https://github.com/soso-song/loqal-discussion-website

- Led a 4-member student team in remote collaboration to develop a Q&A platform for localized queries/discussions during the COVID-19 pandemic.
- Constructed a Node.js and Express web application leveraging MongoDB, npm, JavaScript, and jQuery.
- Engineered an admin dashboard for user and content management, including capabilities for editing, flagging, and reporting.

JScene – A JavaScript Library that Creates&Renders the 3D scene Aug. 2020

Link: *https://github.com/soso-song/JScene* Demo: *jscene.netlify.app* Documentation: *jscene.netlify.app/api*

- Developed a comprehensive standalone JavaScript 3D library, JScene, to render 3D objects, incorporating the construction of Camera, Light, Material, Objects, and TriangleSoup. Integrated advanced features such as graphics canvas, optics, illumination, reflectance, radiometry, curves, and ray tracing without external dependencies.
- Augmented the library's performance through multi-threaded rendering using Web Workers, optimizing JavaScript's inherent inefficiencies.
- Enhanced compatibility by introducing a .stl parser to convert 3D objects into the triangle soup format.
- Implemented a C++ version using libigl that supports features such as bounding volume hierarchy, meshes, shader pipeline, kinematics, and mass-spring systems.

16-bit MIPS CPU Apr. 2019

Link: *https://github.com/soso-song/16b-mips-cpu* Demo Video: *https://youtu.be/FNep4bpeVNs*

Tools: Quartus, Altera DE2 Board, Wing IDE

- Collaborated in a team of two to design a 16-bit MIPS-based CPU for Quartus Prime Pro 16.0 using Verilog, featuring a unique instruction format.
- Developed an assembler with a custom assembly language; seamlessly integrated with the Altera DE2 Board to demonstrate recursive bubble sort.
- Enhanced CPU with direct mapped cache, external interrupt handling, recursive function support, and buffer overflow defenses.

EXPERIENCE

Backend Developer May 2021–Aug. 2022

IBM Canada

- Contributed to developing a B2B tool for extracting components, creating images, and deploying them across platforms like OpenShift, Docker, LinuxS390x, IBM Cloud, and OpenStack using data sets, DB2, z/OS, sourced from IBM Z, Tips1, and ADCD, streamlining operations.
- Contributing extensively to both front-end and back-end aspects of our product’s License Generator, leveraging and modifying technologies like IBM HTTP Server and DB2.
- Implemented Selenium automation to achieve 92% UI test coverage and assisted in API testing for provisioning servers while leveraging tools like Jira and qTest to enhance project management and software quality.
- Achieved second place in the North America 2021 IBM Intern Challenge (Hackathon).
- Recognized for exemplary performance with internal commendations, and appreciation letters.

Teaching Assistant Nov. 2018–Jun. 2019

TheClass (Coaching Group), Scarborough, ON

- Taught multiple courses to classes of 60+ UTSC students.
- Created lecture material and mock exams for students; managed time between full course load and teaching.