Zhekai Jiang

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Education

McGill University
Sep 2019 – May 2023 (Expected)

Bachelor of Software Engineering
Montréal, Canada

- **Cumulative Grade Point Average:** 4.00 / 4.00
- **Course Highlights:**

  Software Engineering and Computer Science: Introduction to Software Engineering, Model-Based Programming (Top Performer), Algorithms and Data Structures, Programming Languages and Paradigms, Introduction to Software Systems, Applied Machine Learning (In Progress), Software Requirements Engineering (In Progress), Theory of Computation (In Progress), Computer Organization (In Progress)

  Mathematics: Discrete Structures (100%), Probability and Statistics for Engineers

  Languages and Communication: Communication in Engineering, Beginners' French 1 (In Progress)

  Other Personal Interdisciplinary Interests: Physics of Music, Introduction to Psychology (Advanced Placement)

The University of Hong Kong
Jul 2018 – Aug 2018

Visiting (Science)
Hong Kong, China

- **Course:** Mathematical Laboratory and Modeling, **Grade:** A+, 4.30 / 4.30

Awards

Dean's Honour List for ranking in the top 10% of the Faculty of Engineering at McGill University

Engineering Class of 1983 Scholarship for my high academic standing and overall contribution to university life at McGill University

John V. Galley Scholarship for my distinguished academic standing at McGill University

Rio Tinto–Richard Evans International Exchange Award for my academic achievements, as well as leadership values of personal responsibility, integrity, accountability, and mutual respect, at McGill University

Advanced Placement (AP) Scholar with Distinction Award For achieving an average score of at least 3.5 on all AP exams taken, and scores of 3 or higher on five or more exams.

Award of Excellence for achieving distinction as a visiting student at the University of Hong Kong

Experience

Research Assistant
May 2021 – Present

Department of Electrical and Computer Engineering, McGill University
Montréal, Canada

- Supervised by Prof. Dániel Varró, studying about model-based software and systems engineering, including design space exploration, languages for model specification and graph query, graph model generation, and model visualization and simulation.
- Developing a tool to visualize partial models and the process of model generation based on a novel specification language.
- Developing a technique based on force-directed graph layout to solve and render models with constraints.

Tomlinson Engagement Awardee for Mentoring (TEAM Mentor)
Sep 2020 – Present

Tomlinson Project in University-Level Science Education (T-Pulse), McGill University
Montréal, Canada

- **Fall 2021 – MATH 133 Linear Algebra and Geometry**: Write extra reading materials on applications and connections of linear algebra to other areas of mathematics and computer science. (Write-ups available on my personal website.) Facilitate and moderate discussions on the course discussion board.
- **Winter 2021 – ECSE 321 Introduction to Software Engineering**: Monitored the course discussion board and advised students on the semester-long full-stack group project (an application for an imaginary auto repair shop, including a backend, a website, and an Android application) and general course materials.
- **Fall 2020 – MATH 133 Linear Algebra and Geometry**: Held weekly office hours at the virtual $\overrightarrow{F}\,\mathrm{Re}(z)\,\mathrm{Ca}$ (First Year Residence Cafeteria tutorial program).

Grader
Sep 2021 – Dec 2021

Department of Electrical and Computer Engineering, McGill University
Montréal, Canada

- **Fall 2021 – ECSE 321 Introduction to Software Engineering**: Graded design questions on user and system requirements elicitation, use case and activity modelling, domain modelling, database design, and object-relational mapping, in a midterm exam. Resulted in zero complaints or regrading requests.

Skills

Languages: English (Proficient – C1/C2), French (Basic – A1), Mandarin Chinese (Native)

Programming and Scripting Languages: Java, C, JavaScript, Python, C++, OCaml, Bash, ARMv7-Assembly

Professional Software, Tools, and Frameworks:

Integrated Development Environments and Editors: Eclipse, Android Studio, Visual Studio Code, Vim

Version Control, Collaboration, and Continuous Integration: Git, GitHub, GitLab, Travis CI

Numeric Computing: MATLAB, Scilab

Frameworks: Gradle, Spring Boot, Vue.js, React, Node.js, Express.js, Flask

Database Systems: MongoDB, PostgreSQL

Modelling Tools: Umple, jUCMNav, UML Lab, Yakindu, VIATRA, Eclipse Modelling Framework

Miscellaneous: JUnit, Heroku, Docker, Cucumber

Operating Systems: macOS, Windows, Unix, Linux

Software Engineering Practice: Object-oriented development, Model-based engineering, Behaviour-driven development, Test-driven development, Agile project management

Projects

À l'heure (Best AI for Commerce (Stonks), MAIS Hacks 2021, McGill Artificial Intelligence Society) Oct 2021

Application | Devpost Presentation | GitHub Repository

- In a team of four, trained a decision tree model to predict whether a flight will delay based on five parameters. Developed a frontend in HTML and CSS and a backend with Flask to store the model and process HTTP requests.
- Contributed to the ideation of the project. Developed and deployed the Flask backend and the HTML frontend onto remote servers. Conducted the oral presentation and live demonstration.

Be My Chef (Morgan Stanley 2021 Code to Give MTL Hackathon) Sep 2021

GitHub Repository

- In a team of six, analyzed requirements, identified features, designed software prototypes, developed functional components in React, and proposed recommendations on implementation and future work for a new software project of La Tablée des Chefs aimed at encouraging teenagers to create and share food recipes, learn about healthy eating, and encourage food sustainability.
- Contributed to ideation of requirements, features, and prototypes. Developed the page displaying information of recipes and a search-by-available-ingredients feature in JavaScript using React. Helped compile texts and graphics for documentations on GitHub and the hackathon's platform. Proposed recommendations for implementation.

Exploring Solutions for Spam Filtering (Research Paper Assignment, Course CCOM 206 Communication in Engineering) Jan 2021 – Apr 2021

- Through a literature survey, studied three methods for spam filtering: Bloom filter, support vector machine, and convolutional neural network. Analyzed and compared them in terms of complexity, accuracy, and adaptability. Proposed a solution using convolutional neural network, complemented with a Bloom filter as the initial step.

Pocket McGill (Business Proposal Assignment, Course CCOM 206 Communication in Engineering) Mar 2021 – Apr 2021

- In a team of six, as an imaginary startup software engineering company, compiled a business proposal to McGill University in both a written document and a live presentation. It involves a new one-stop mobile application for McGill students to conveniently access all services needed for their academic lives.
- Served as a senior software engineer in the imaginary company, addressing details on the implementation of the application, including the system architecture and project management plans.

Artizon (Course Project, ECSE 321 Introduction to Software Engineering) Sep 2020 – Nov 2020

Frontend Website | GitHub Repository

- In a team of five, developed a software system, including the backend, a website, and an Android application, for an imaginary art gallery being impacted by the COVID-19 pandemic and transforming their mode of business online. Programmed in Java, as well as HTML, CSS, and JavaScript. Developed backend based on Gradle and Spring Boot, with a PostgreSQL database. Developed web frontend based on Vue.js and Android application in Android Studio. Deployed backend and web frontend on Heroku. Automated unit and integration testing using JUnit. Configured Travis CI for continuous integration. Collaborated and managed using Git and GitHub.
- Served as a primary designer of the domain model. Implemented part of the backend business service layer and RESTful APIs with respective unit and integration testing. Implemented part of the web and Android frontends. Contributed to configurations, deployments, and bug fixing throughout the development. Organized the backlog and documentation on GitHub.

Kingdomino (Course Project, ECSE 223 Model-Based Programming) Jan 2020 – Apr 2020

- Developed a software with graphical user interface for the game Kingdomino, using object-oriented and behaviour-driven development in Java, following the model-view-controller pattern.
- Served as a primary designer of the domain model and state machine model. Developed verifications and part of the graphical user interface for the main gameplay. Helped with other team members' issues and the merging of code throughout the development.

The Best Hospital (Finalist of Greater China, International Mathematical Modeling Challenge (IMMC 2018) International Contest) Mar 2018 – Apr 2018

Published in journal *Maths, Physics, and Chemistry for Middle School Students* (in Chinese only)

- In a team of four, developed a mathematical model that uses various factors to measure the quality of hospitals and determine the best hospital. Wrote a memo that a person without much mathematical expertise or computing ability can use to choose a hospital.
- Invited for a live presentation and oral defence at the regional final of Greater China.
- Contributed to the overall design of the mathematical model. Developed all the computer programs in MATLAB and C++. Edited part of the solution paper for the contest and subsequent publication.

Education and Growth (Meritorious Winner, International Mathematical Modeling Challenge (IMMC 2018) Regional Contest of Greater China) Feb 2018

Published in journal *Mathematics Study and Research* (in Chinese only)

- In a team of four, developed an econometric model to predict China's economic growth in the next 20 years. Evaluated the role of education in economic growth. Proposed suggestions on government policies.
- Contributed to the overall design of the mathematical model. Developed all the computer programs in MATLAB and C++. Edited part of the solution paper for the contest and subsequent publication.