Boqi (Percy) Chen

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PERSONAL HIGHLIGHT

I obtained the bachelor's degree in software engineering (Dean's Honour List) with **4.00/4.00** Major GPA in 2020. Following my graduation, I directly started pursuing a PhD focusing on the reliable integration of ML components. I have contributed to diverse research projects, resulting in **13 papers** published in top conferences and journals in my field. Moreover, I was a part time research associate at Huawei Canada and actively maintain a popular open-source project.

EDUCATION

McGill University | Doctor of Philosophy (AI + Software Engineering) **2021/01 - 2025/08**

- **Main Research Interest:** Reliable Artificial Intelligence, Verification for Deep Learning, Software Engineering for AI, Requirements Engineering, Model Generation, Model-driven Software Engineering, Large Language Models
- Combining software engineering methods and large language models for safe and reliable use of AI in domain-specific applications.
- Using software models to integrate domain-specific best practices into large language model applications.

McGill University | Bachelor of Software Engineering (Dean's Honour List) **2016/09 - 2020/12**

- **CGPA: 3.99/4.00**

SKILLS

Programming Languages: Python, Java, C#, JavaScript, MATLAB, C/C++, Ruby, OCaml, Julia
Libraries/Frameworks: LangChain/LangGraph, vLLM, Ollama, Pytorch, Transformers, Scipy, Spacy, NodeJS
Other Tools: LaTeX, Markdown, Git, GitHub Actions, TravisCI, Gradle, Poetry, Maven, Jira, Linear, Excel, Word, Power Point
Languages: English (Fluent), Chinese (Native), Japanese (Intermediate), French (Beginner).

WORK EXPERIENCE

Aggregate Intellect (Toronto, Canada) (academic collaboration) **Machine Learning Engineer** **2021/09 - Present**

- Participated in the research as part of the **Mitacs Accelerate Program**.
- Developing a production-ready recommendation system for educational content.
- Utilizing large language models for automatic document generation with structured outputs.
- Establishing an automated deployment pipeline for machine learning models on cloud platforms.

Huawei Canada (Toronto, Canada) (part-time) **Research Associate Intern** **2024/05 - 2025/04**

- Worked on a project for generating software models using large language models on model-based testing.
- Developed a self-consistency framework for large language models with graph outputs.
- Proposed a model generation method that significantly improved accuracy compared to the baseline.
- Contributed to two paper submissions currently under review at a top software engineering conference.

McGill University (Montreal, Canada) **Teaching Assistant** **2021/01 - 2024/04**

- Head TA for undergraduate software engineering courses: Model-based software engineering (since Winter 2021), Requirement Engineering (since Winter 2021), and Software Validation (Winter 2022).
- Conducted online and in-person tutorials and provided office hours to assist students with assignments and projects.
- Effectively managed the course project within a GitHub organization for the entire class, implementing automated delivery of tutorials and projects to students' repositories.
- Implemented an auto-grading system for course projects continuing to be used in subsequent course offerings.

Aggregate Intellect (Toronto, Canada) **R&D Intern** **2021/04 - 2021/09**

- Researched methods for automated curriculum planning by predicting prerequisite relationships between concepts.
- Developed a link prediction model with sentence transformer and graph neural networks.
- Built different data process components to recognize and deduplicate concepts which become the prototype of a recommendation system in production.

McGill University (Montreal, Canada) **Research Assistant** **2019/05 - 2019/09**

- Proposed and implemented a new method for graph model generation to generate realistic graphs while consistent.
- Used linear regression to estimate the score of generated graphs with hill climbing to navigate the search space.
- Published the result in a top journal in model-based engineering.

Behaviour Interactive (Montreal Canada) **Game Developer Intern** **2018/05 - 2018/09**

- Participated in the gameplay, testing, and UI development for a mobile game in Unity.
- Solved multiple platform-dependent legacy bugs and received positive feedback from the players.

RESEARCH PROJECT EXPERIENCE

Testing LLM Abilities for Software Engineering Tasks **2025/01 – present**

- Constructing a dataset for testing the ability of LLMs in identify code smells in software projects.
- Evaluating different LLMs with the constructed dataset.
- Classifying the levels of expertise for different LLMs using the Bloom's taxonomy.

LLM for Text Data Generation from Requirements **2024/11 – present**

- Using LLMs combined with Python and SMT solver for consistent text data from natural language requirements.
- Implementing a fully automated workflow with LangChain and LangGraph.
- Submitted a paper currently under review at a top software engineering conference.

Sherpa: The Thinking Companion with LLMs **2023/06 - Present**

- Leading a popular open-source project on GitHub with **more than 150 stars**.
- Implementing different prompting methods and tools combined with large language models (LLMs).
- Designing a self-consistency framework for JSON outputs from LLMs with complex constraints on attributes.
- Using state machine to integrate domain-specific best-practices into LLM workflows.

Pruning for Language Models on Code **2024/01 – 2025/01**

- Researched on different pruning techniques that improves the efficiency of transformer models analyzing programs.
- Developed a technique to efficiently prune transformers attention values to improve the inference speed with a team of three members.

Sound Certification for Graph Neural Networks **2022/04 - 2023/08**

- Researched methods for verifying the robustness of graph neural networks under adversarial perturbations.
- Combined abstract interpretation and constraint optimization to improve the precision of the certification.
- Incorporated certification methods in training to improve the robustness of GNNs.
- Submitted a research journal from the project currently under review at a top knowledge management journal.

Test Generation for Autonomous Vehicles **2022/01 - 2023-06**

- Applied graph model generation techniques to generate diverse test cases for testing autonomous vehicles.
- Used open-source traffic simulator Carla to generate synthetic traffic scenario images.
- Benchmarked existing semantic segmentation models for traffic scenarios using the test suites.

SELECTED PUBLICATIONS

An adaptive language-agnostic pruning method for greener language models for code **FSE 2025**

- Saad, M., López, J.A.H., **Chen, B.**, Varró, D. and Sharma, T.

Exploring the Impact of Type Checking on Neural Bug Detection in Dynamically Typed Languages **ICSE 2025**

- **Chen, B.,** López, J.A.H., Mussbacher, G. and Varró, D.

Consistent Graph Model Generation with Large Language Models **(Bronze Medal)** **ICSE-C 2025**

- **Chen, B.** (Bronze Medal at the ACM Student Research Competition)

On inter-dataset code duplication and data leakage in large language mod **TSE**

- López, J.A.H., **Chen, B.**, Saad, M., Sharma, T. and Varró, D.,

Automated Domain Modeling with Large Language Models: A Comparative Study **MODELS 2023**

- Chen, K., Yang, Y., **Chen, B.**, López, J.A.H., Mussbacher, G. and Varró, D.

Prompting or Fine-tuning? A Comparative Study of Large Language Models for Taxonomy Construction **MODELS-C 2023**

- **Chen, B.**, Yi, F. and Varró, D.

On the use of GPT-4 for creating goal models: an exploratory study **REW 2023**

- **Chen, B.**, Chen, K., Hassani, S., Yang, Y., Amyot, D., Lessard, L., Mussbacher, G., Sabetzadeh, M. and Varró, D.

Consistent Scene Graph Generation by Constraint Optimization **ASE 2022**

- **Chen, B.**, Marussy, K., Pilarski S., Semeráth, O., Varró, D.

An Empirical Study of Type-Related Defects in Python Projects **TSE**

- Khan, F., **Chen, B.**, Varró, D., & Mcintosh, S.

AWARDS

FRQNT Doctoral Scholarship **2022 - 2025**

Mitacs Accelerate Award **2021 - 2025**

McGill Engineering Doctoral Award **2021 - 2024**

McGill Engineering Faculty Award **2018 - 2020**

PRESENTATIONS

Graph Neural Network Discussion Group (AISC) **2021/07 - Present**

- Hosting a discussion group in a machine learning community with over 3000 members.

Guest Lecture: Graph Neural Networks and Its application (Georgia State University) **2022/11/30**