Curriculum Vitae

Jifeng Wu

Master of Science in Computer Science

Software Practices Lab, University of British Columbia

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Education

University of British Columbia *Vancouver, Canada*

Master of Science in Computer Science *September 2022 - Current*

- Courses taken: CPSC 507 Software Engineering, CPSC 539L Automated Testing, CPSC 545 Algorithms for Bioinformatics, CPSC 539B Type Systems, CPSC 548 Directed Studies, EECE 571F Deep Learning with Structure
- Cumulative GPA: 4.00/4.00

Wuhan University *Wuhan, China*

Bachelor of Science in Software Engineering *September 2018 - June 2022*

- Cumulative GPA: 3.93/4.00

Publications

Journal Articles

Effective Stack Wear Leveling for NVM

Jifeng Wu, Wei Li, Libing Wu, Mengting Yuan, Chun Jason Xue, Jingling Xue, Qingan Li

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (2023). IEEE, 2023

Under Review

Effective Stack Wear Leveling for NVM

Jifeng Wu, Caroline Lemieux

Proceedings of the ACM on Programming Languages OOPSLA (2024). ACM New York, NY, USA, 2024

Research Experience

QuAC: Quick Attribute-Centric Type Inference for Python *University of British Columbia*

Mentor: Prof. Caroline Lemieux *January 2023 - April 2024*

- We implemented QuAC, a novel type inference tool for Python that collects attribute sets for Python expressions and uses information retrieval techniques to predict classes.
- QuAC efficiently handles rare non-builtin types and container type parameters, significantly improving the tool's correctness and coverage in type prediction. It also improves performance by an order of magnitude over baseline methods.

Effective Stack Wear Leveling for NVM *Wuhan University*

Mentor: Prof. Qingan Li *August 2021 - August 2022*

- A software-based approach for increasing the lifespan of non-volatile memory (NVM) with limited write durability, such as phase change memory (PCM), by converting wear-heavy loops in programs into recursive functions.
- Implemented as an LLVM pass, Loop2Recursion, that is applicable to a large variety of hardware architectures, operating systems, and programming languages.

Community Detection Using Social Network and Trajectories *Wuhan University*

Mentor: Prof. Yuanyuan Zhu *September 2019 - June 2021*

- Given a social network and user trajectory dataset, find communities of users with both social cohesiveness and trajectory similarity.

Projects

Impact of Synthetic Data on Image Captioning models *University of British Columbia*

EECE 571F Deep Learning with Structure *October 2023 - December 2023*

- Image classifiers trained on real data augmented with data from "in-the-wild" generative models achieve high accuracy and effective robustness. Inspired by such previous work, we explore whether we can achieve similar results for *image captioning models*.
- **Technical Skills:** Deep Learning.
- **Soft Skills:** Teamwork, Literature Review, Experiment Design, Exploratory Data Analysis, Presentation Skills, Report Writing.

Implementation and Comparison of Syntax-Guided Program Synthesis Techniques *University of British Columbia*

CPSC 548 Directed Studies *January 2023 - April 2023*

- Program synthesis, or automatically finding programs that satisfy user intent, has long been regarded as among the most important issues in programming theory.
- This directed studies project explores fundamental concepts and principles, implements and compares classic syntax-guided program synthesis algorithms, and provides insights into their strengths, weaknesses, challenges, and future research directions.
- **Technical Skills:** Python, SMT Solvers (z3), Computer Algebra Systems (SymPy).
- **Soft Skills:** Literature Review, Experiment Design, Debugging, Exploratory Data Analysis, Presentation Skills, Report Writing.

Implementation and Comparison of Marker Selection Techniques *University of British Columbia*

CPSC 545 Algorithms for Bioinformatics *October 2022 - December 2022*

- With advances in genomics and microscopy, single-cell RNA sequencing (scRNA-seq) is increasingly used in biomedical research. However, scRNA-seq data is large-scale and high-dimensional, creating significant challenges in their analysis and a reduction in model generalizability and reliability on downstream tasks.
- Marker selection, or selecting a small number of genes that contribute most significantly to the cell type classes, can mitigate these problems. We conduct a literature study on marker selection methods proposed by the bioinformatics community and evaluate them on real-world scRNA-seq datasets.
- **Technical Skills:** Deep Learning.
- **Soft Skills:** Teamwork, Literature Review, Experiment Design, Exploratory Data Analysis, Presentation Skills, Report Writing.

Dynamically Inspecting Python Bytecode *University of British Columbia*

CPSC 507 Software Engineering *October 2022 - December 2022*

- I implemented a modified Python interpreter allowing user-defined callbacks to inspect Python bytecode during the execution of a program. This is an ideal starting point for dynamic program analysis tools for Python.
- **Technical Skills:** Python, Python C-API.
- **Soft Skills:** Reading Large Code Bases, Debugging, Presentation Skills, Report Writing.

Conference Control System Based on Gesture Recognition *Wuhan University*

12th Service Outsourcing Innovation and Entrepreneurship Competition for Chinese College Students *January 2021 - May 2021*

- Capture video from a computer's webcam, recognize 5 hand gestures, and use the recognized gestures to control a computer.
- We designed a novel, declarative pipeline parallelism framework for enhanced multicore performance.
- **Technical Skills:** Computer Vision, Deep Learning, Parallel and Concurrent Programming, PyQt5 GUI Programming.
- **Soft Skills:** Teamwork, Modeling, Debugging, Presentation Skills, Report Writing.

Effective Search of Gadgets in the "Attack Lab" Experiment *Wuhan University*

Computer Systems: A Programmer's Perspective *December 2020*

- To find a set of "gadgets" within a binary that could be exploited to complete a given task, I designed a scheme to store gadgets within a Pandas DataFrame, enabling the use of Exploratory Data Analysis to rapidly query all possible gadgets.
- **Technical Skills:** Python, Pandas.
- **Soft Skills:** Modeling, Exploratory Data Analysis, Presentation Skills, Report Writing.

Traffic Scene Smart App *Wuhan University*

The 9th China Software Cup *April 2020 - August 2020*

- We implemented a computer vision-based application that can identify motor vehicles, non motor vehicles, pedestrians and the license plates, brands, orientations and colors of motor vehicles, monitor traffic flow, as well as record traffic violations.
- **Technical Skills:** Computer Vision, Deep Learning, Parallel and Concurrent Programming, PyQt5 GUI Programming.
- **Soft Skills:** Teamwork, Modeling, Presentation Skills, Report Writing.

Conference Experience

ICFP 2023 *Seattle, Washington*

Mentee, Programming Languages Mentoring Workshop *September 4, 2023*

The Cornell, Maryland, Max Planck Pre-doctoral Research School 2023 *Saarbrücken, Germany*

Attendee *August 6 - 13, 2023*

ISSTA/ECOOP 2023 *University of Washington*

Student Volunteer *July 17 - 21, 2023*

PNW PLSE 2023 Workshop *University of Washington*

Presenter (poster and lightning talk on "Automated Type Inference for Python") *May 9, 2023*

Service

Research Assistant *University of British Columbia*

Software Practices Lab *January 2023 - Present*

Conducted research with Prof. Caroline Lemieux on Automated Type Inference for Python and Stack-based Crash Reproduction.

Teaching Assistant *University of British Columbia*

CPSC 410 Advanced Software Engineering *September 2022 - December 2022*

Gave in-depth feedback and advice regarding students' course projects in Static and Dynamic Program Analysis.

Freshman Mentor *Wuhan University*

School of Computer Science *September 2020 - June 2021*

Introduced freshmen students of Class 10, Grade 2020 to university life and Computer Science, actively answering their questions.

Deputy Minister *Wuhan University*

Wuhan University IBM Student Club *June 2020 - June 2022*

Group Leader *Wuhan University*

Technology Group, Wuhan University Microsoft Club *August 2020 - June 2022*

Publicity Committee *Wuhan University*

Class of Excellent Engineers of Software Engineering, School of Computer Science *September 2018 - June 2022*

Honors

2021 **2020-2021 Annual Advanced Individual of Social Work,** Wuhan University

2021 **2020-2021 Annual Outstanding Student,** Wuhan University

2020 **2019-2020 Annual Advanced Individual of Social Work,** Wuhan University

2020 **2019-2020 Annual Merit Student,** Wuhan University

2019 **2018-2019 Annual Merit Student,** Wuhan University

Scholarships

2021 **2020-2021 Annual Outstanding Student Scholarship,** Wuhan University

2020 **2019-2020 Annual Outstanding Student Scholarship,** Wuhan University

2019 **2018-2019 Annual Outstanding Student Scholarship,** Wuhan University

Awards

2021 **Third Prize,** The 12th Service Outsourcing Innovation and Entrepreneurship Competition for Chinese College Students

2020 **Second Prize,** The 9th China Software Cup

Skills

Programming Skilled at C++, Python, Shell.

Software Adobe software (Photoshop, Illustrator, Premiere, etc.), Office software (Word, PowerPoint, Excel).

Soft Skills Innovation, Problem Solving, Communication, Presentation, Teamwork, Leadership.

Languages

English Professional proficiency (TOEFL: 116/120, GRE: 335/340)

Chinese Native proficiency