SOGOL MASOUMZADEH

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SUMMARY OF QUALIFICATIONS

- Experience in producing both technical research contributions (see **AIware** for **software defect detection** and **automatic program repair**, **automatic detection** of **defects** in **emergent code-adjacent software artifacts**, and immersive **AIware driving simulator**), and conceptual research contributions (see Publications).

- Experience in conducting **empirical research** & research methods (qualitative and quantitative), technologies (see Technical Skills), and domains (**AI4SE**, **SE4AI**, **generative language model training** [**supervised fine-tuning** and **reinforcement learning**], **LLM benchmarking, agentic software development,** and **codeLLMs for program synthesis** and **code translation**).

EXPERIENCE

Associate LLM Engineer   **Ph.D. Research Internship**

- HUAWEI Canada, Center for Software Excellence (*Director: Prof. Ahmed E. Hassan*)   **Aug. 2024—Current**

- **LLM engineer** responsible for conducting research for developing and validating state-of-the-art **prototypes** and proof-of-concepts for **LLM training, LLM benchmarking, applications of LLMs** and **codeLLMs** in **program synthesis**, **software defect detection**, and **automatic program repair**.
    - **Research Contributions:**
        - Authored **Two Full Research Papers** in top-tier venues, including **TOSEM** (**1st Author**) and **ASE** (**2nd Author**).
    - **Innovation Contributions:**
        - Co-invented **Two Inventions, patents** filled **Internationally** (**1st** and **2nd Inventor Positions**).
    - **Product Development Contributions:**
        - **Led Development** of a **Prototype**, **Released** as a **New Feature** in an **Agentic Software Product**.
        - Involved in **Training** and **Benchmarking** an in-house **LLM**, leading to its significant improved performance (**>60%**) on software development benchmarks including, but not limited to, **SWE-bench Verified** and **HumanEval**.

Associate Software Engineer   **Developer Internship**

- IKinesia Inc.   **May 2023—Nov. 2023**

- **Backend developer** responsible for **feature development**, **testing**, and **deployment** of an **AIware Neonatal-ICU program, Windows** and **Linux OS,** for **Montreal General Hospital**.
    - AIware for signal and video processing (Xsens Dot and Intel RealSense)
    - Asynchronous port programming (Bleak)
    - Infrastructure (Docker)

EDUCATION

McGill University   **Montreal, Canada**
Ph.D. Software Engineering   **Expected Graduation Date: Summer 2026**

- Advisors: Prof. Lili Wei and Prof. Shane McIntosh
- GPA: 4.0/ 4.0

University of Manitoba   **Winnipeg, Canada**
M.Sc. Electrical and Computer Engineering   **Jan. 2018—Aug 2020**

- Advisor: Prof. Zahra Moussavi

- GPA: 3.73/4.0

Amirkabir University of Technology   **Tehran, Iran**
B.Sc. Electrical Engineering   **Oct. 2012—March 2017**

- Salutatorian (Class 2017)
- GPA: 17.13/20

<u>AWARDS AND HONORARIA</u>

- **ASE 2025, Student Research Competition, First-Place Winner** (Association for Computing Machinery)   **2025**
- **NSERC CREATE Grant** (Natural Sciences and Engineering Research Council of Canada)   **2023**
- **BioTalent Canada Scholarship** (Federal Org., Canada)   **2023**
- **McGill Engineering Doctoral Award** (McGill, Canada)   **2020—2024**
- **McGill Graduate Excellence Award** (McGill, Canada)   **2020—2024**
- **Governor General's Academic Gold Medal** Runner-Up (Federal Gov., Canada)   **2020**
- **Networks of Centres of Excellence of Canada, First-Place Graduate Scholarship** (Federal Gov., Canada)   **2019**
- **National Exceptional Talent** (National Organization for Development of Exceptional Talents, Iran)   **2017**

<u>TECHNICAL RESEARCH CONTRIBUTIONS</u>

AIware for Software Defect Detection and Automatic Program Repair:

- Conducted in-depth **empirical research** for investigating the capabilities of traditional **ML models** in combination with **NLP techniques**, alongside of **LLMs**, for detecting implications of **latent software vulnerabilities** in **complex submissions to issue report trackers systems** such as those of **IoT systems**.

- Developed a novel **supervised fine-tuning framework** for **training DNNs** as **highly accurate classifiers** of **complex security-related issue reports**, using **masked language model training objective**, independent from memorizing spurious lexical cues and **highly generalizable** to in-the-wild, totally unseen issue reports in **real-time**.

- Conducted the **first-ever investigation** of the capabilities of **LLMs** in **synthesizing DSL programs**, in comparison to their capabilities for synthesizing general-purpose programming languages, leading to the **first-ever taxonomy** of **plausible defect types** occurring in these **LLM-synthesized DSL programs**.

- Produced the **first-of-its-kind static analyzer** for **automatically detecting** the **defect incidences** within **LLM-synthesized DSL programs.** Additionally, developed the **first-of-its-kind feedback-based APR tool** for **repairing** the detected defect incidences in **LLM-synthesized DSL programs**.

Automatic Detection of Defects in Emergent Code-Adjacent Software Artifacts:

- Conducted **the first-ever** in-depth **empirical research** to **regularize** the concept of **defects,** specifically **code smells** across **IaC technologies, through systematic investigation** of **developer perceptions of code smells in IaC** and the **differences** with their perception of **code smells** in **source code**.

Immersive AIware Driving Simulator:

- Developing an **immersive AIware driving simulator program** using **multi-disciplinary** research methods across **software development** and **release** pipeline, **distributed** and **GPU programming**, **game development**, and **HCI** techniques**.**

<u>TECHNICAL SKILLS</u>

- **Programming Languages:** Python, Java, Shell Scripting, C/C++, C#.
- **Research-Oriented Tools:** PyTorch, TensorFlow, Keras, Scikit-learn, NumPy, Transformer Architectures, CNNs, RNNs, LSTMs, OpenAI GPT, Meta LLaMA, Alibaba Qwen, DeepSeek, Google BERT, Hugging Face, OpenHands, Agentless, AutoCodeRover, JUnit, Cucumber, OpenMPI, OpenCL, CUDA.
- **Data-Oriented Tools:** R, SQL, SQLite, PostgreSQL, SQLAlchemy.
- **Product-Oriented Tools:** Git, Docker, Ansible, Puppet, Chef, Kubernetes, MLflow, AWS SageMaker, Postman,

SonarQube, Infer, OpenAPI, OpenCV.

SELECTED PUBLICATIONS

- Masoumzadeh, S., Li, Y., McIntosh, S., Varró, D., & Wei, L. (2026). seBERTis: A Framework for Producing Classifiers of Security-related Issue Reports. *33rd International Conference on Software Analysis, Evolution, and Reengineering* (To Appear at *SANER 2026*).

- Masoumzadeh, S. (2025). Detecting Vulnerabilities from Issue Reports for Internet-of-Things. *Proceedings of the 40th IEEE/ACM International Conference on Automated Software Engineering (ASE 2025)*.

- Rombaut, B., Masoumzadeh, S., Vasilevski, K., Lin, D., & Hassan, A. E. (2025). Watson: A Cognitive Observability Framework for the Reasoning of Foundation Model-Powered Agents. *Proceedings of the 40th IEEE/ACM International Conference on Automated Software Engineering (ASE 2025)*.

- Masoumzadeh, S., Gallaba, K., Lin, D., & Hassan, A. E. (2025). Towards Reliable Generation of Executable Workflows by Foundation Models. *ACM Transactions on Software Engineering and Methodology* (Under Review).

- Masoumzadeh, S., Saavedra, N., Maipradit, R., Wei, L., Ferreira, J. F., Varró, D., & McIntosh, S. (2025). Do Experts Agree About Smelly Infrastructure? *IEEE Transactions on Software Engineering*.

- Masoumzadeh, S., & Moussavi, Z. (2020). Does practicing with a virtual reality driving simulator improve spatial cognition in older adults? A pilot study. *Neuroscience Insights*, *15*, 2633105520967930.

- Ghafarpour, A., Zare, I., Zadeh, H. G., Haddadnia, J., Zadeh, F. S., Zadeh, Z. E., Masoumzadeh, S., and Nour, S. (2016). A review of the dedicated studies to breast cancer diagnosis by thermal imaging in the fields of medical and artificial intelligence sciences. *Biomedical Research*, *27*(2), 543-552.