Alireza (Aaron) Imani

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Summary

Alireza (Aaron) Imani is a PhD candidate in Software Engineering at the University of California, Irvine. He holds a Masters degree in Software Engineering from the University of Calgary. With five years of research experience, he has published six peer-reviewed papers in prestigious international conferences, including the International Conference on Software Engineering (**ICSE**) and the International Conference on Mining Software Repositories (**MSR**). He also serves as a reviewer for top-tier journals such as IEEE Transactions on Reliability and ACM Transactions on Software Engineering and Methodology (**TOSEM**). His current research focuses on understanding the underlying mechanisms of large language models in downstream software engineering tasks, from a mechanistic interpretability perspective.

Education

- **University of California, Irvine** *Expected 06 / 2027*
  Ph.D. in Software Engineering Irvine, USA
  - GPA: 4.00/4.00
  - Dissertation: Interpreting Large Language Models in Code Intelligence Tasks
- **University of Calgary** *08 / 2023*
  M.Sc. in Software Engineering Calgary, Canada
  - GPA: 4.00/4.00
  - Dissertation: Effective Control System Framework Selection through Checklist-based Software Quality Evaluation
- **Ferdowsi University of Mashhad** *09 / 2020*
  B.Sc. in Computer Engineering Mashhad, Iran
  - Final Project: Workflow Scheduling Using Artificial Bee Colony Optimization

Experience

- **University of California, Irvine - STAIRS Lab [🌐]** *09/2023 – Present*
  Research Assistant Irvine, USA
  - Published three peer-reviewed papers.
  - Designed and evaluated innovative LLM-based approaches for code-related tasks, such as commit message generation, enhancing developer productivity.
  - Investigated the interpretability of LLMs in code understanding
- **University of Calgary - SEPE Lab [🌐]** *01/2021 – 08/2023*
  Research Assistant Calgary, Canada
  - Published three peer-reviewed papers.
  - Explored methods to assess and improve the quality of open-source software, contributing to community-driven development practices.
  - Studied the challenges of requirements engineering in multidisciplinary teams
- **Sessional Instructor** *Calgary, Canada*
  University of Calgary 08/2022 – 12/2022
  - Lectured a graduate-level course, "Programming Fundamentals for Data Engineers", which covers the fundamentals of Python programming, including Basic data structures and algorithms; Loops and iterations; Files and I/O, Functions, Classes, Modules, and Packages; Strings and text manipulation; Data wrangling; Network and Web programming, and Data visualization.

- **Herzberg Astronomy and Astrophysics Research Centre [🌐]** *01/2021 – 08/2022*
  Embedded Software Developer Penticton, Canada
  - Contributed to the ARTTA-4 project, focusing on control system enhancements.
  - Developed interconnected device servers in C++ and Python using the Tango Controls framework for the control system managing advanced radio telescopes at Dominion Radio Astrophysical Observatory.
  - Facilitated seamless communication with hardware devices, such as a Moxa serial device server and a LabJack T4 device, by developing robust software interfaces.

PUBLICATIONS

C=CONFERENCE

[C.6] **Aaron Imani**, Mohammad Moshirpour, and Iftekhar Ahmed (2025). **Inside Out: Uncovering How Comment Internalization Steers LLMs for Better or Worse**. In *2026 IEEE/ACM 48th International Conference on Software Engineering (ICSE)*.

[C.5] **Aaron Imani**, Iftekhar Ahmed, and Mohammad Moshirpour. (2025) **Context Conquers Parameters: Outperforming Proprietary Llm in Commit Message Generation**. In *2025 IEEE/ACM 47th International Conference on Software Engineering (ICSE)*, pp. 1844-1856. IEEE. Ottawa, ON, Canada. DOI: 10.1109/ICSE55347.2025.00048

[C.4] Mahan Tafreshipour, **Aaron Imani**, Eric Huang, Eduardo S. d. Almeida, Thomas Zimmermann and Iftekhar Ahmed (2025) **Prompting in the Wild: An Empirical Study of Prompt Evolution in Software Repositories**. In *IEEE/ACM 22nd International Conference on Mining Software Repositories (MSR)*, pp. 1844-1856. IEEE. Ottawa, ON, Canada. DOI: 10.1109/ICSE55347.2025.00048

[C.3] Ali Salmani, **Alireza Imani**, Majid Bahrehvar, Linda Duffett-Leger, and Mohammad Moshirpour (2022) **A Data-Centric Approach to Evaluate Requirements Engineering in Multidisciplinary Projects**. In *2022 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, pp. 903-908. IEEE. Prague, Czech Republic. DOI: 10.1109/SMC53654.2022.9945270

[C.2] Ali Salmani, **Alireza Imani**, Majid Bahrehvar, Linda Duffett-Leger, and Mohammad Moshirpour (2022) **An Intelligent Methodology to Enhance Requirements Engineering in Multidisciplinary Projects**. In *2022 IEEE Canadian Conference on Electrical and Computer Engineering (CCECE)*, pp. 452-457. IEEE. Halifax, NS, Canada. DOI: 10.1109/CCECE49351.2022.9918286

[C.1] **Alireza Imani**, Mohammad Moshirpour, and Leonid Belostotski (2021) **Checklist-based Software Quality Evaluation of Tango Controls**. In *2021 International Conference on Information Systems and Advanced Technologies (ICISAT)*, pp. 1-7. IEEE. Tebessa, Algeria. DOI: 10.1109/ICISAT54145.2021.9678411

TEACHING

Lecturer

- University of Calgary, **Programming Fundamentals for Data Engineers** 08/2022 – 12/2022

Teaching Assistant

- University of California, Irvine, I&C SCI 32, **Programming with Software Libraries** 03/2025 – 06/2025
- University of California, Irvine, I&C SCI 32, **Programming with Software Libraries** 01/2025 – 03/2025
- University of California, Irvine, SWE 240P, **Data Structures** 09/2024 – 12/2024
- University of California, Irvine, SWE 241P, **Algorithms** 09/2024 – 12/2024
- University of California, Irvine, I&C SCI 45J, **Programming in Java as a Second Language** 08/2024 – 09/2024
- University of California, Irvine, I&C SCI 32, **Programming with Software Libraries** 03/2024 – 06/2024
- University of California, Irvine, I&C SCI 32, **Programming with Software Libraries** 01/2024 – 03/2024
- University of California, Irvine, IN4MATX 117, **Project in Software System Design** 09/2023 – 12/2023
- University of Calgary, SENG401, **Software Architecture** 01/2023 – 04/2022
- University of Calgary, ENSF480, **Principles of Software Design** 08/2021 – 12/2021
- University of Calgary, ENSF609, **Team Design Project in Software Engineering** 01/2021 – 04/2021
- Ferdowsi University of Mashhad, **Data Structures** 03/2019 – 06/2019

Projects

- **OMEGA: State-of-the-art Automated Commit Message Generation Tool** *03/2024 - 08/2024*
  Tools: Python, Langchain, vllm [GitHub]
  - Developed OMEGA, a state-of-the-art tool for commit message generation that prioritizes data privacy, reduces carbon footprint, and lowers deployment costs
  - Enhanced privacy by eliminating reliance on proprietary large language models, ensuring secure and ethical AI adoption.
  - Optimized sustainability by adopting a 4-bit quantized open-source large language model runnable on local GPUs with only 8GB of VRAM.
  - Proposed FIDEX, a novel diff augmentation technique that improved LLM performance on understanding code changes by 20%
  - Adapted Multi-intent Method Summarization to support change-centric software engineering tasks, enabling better summarization of code edits

Service Activities

Reviewer

- ACM Transactions on Software Engineering and Methodology 11/2024 – Present
- IEEE Transactions on Reliability 10/2024 – Present

Volunteer

- Chair, IEEE Southern Alberta Computer Society Chapter 01/2023 – 08/2023
- Vice Chair, IEEE Southern Alberta Computer Society Chapter 04/2021 – 12/2022

Student Mentor

- Mentor, MedTech Innovation Hackathon 10/2024
- Mentor, ICS Honors Program 01/2024 – 07/2024

Skills

- **Research Skills:** Natural Language Processing, Large Language Models, Fine-tuning, Prompt Engineering, Model Training, Machine Learning, Neural Network, Dataset Curation, Dataset Labeling, Model Evaluation, Deep Learning, RNN, LSTM, Literature Review, Empirical Research, Interview/Survey Design, Qualitative Analysis, Statistical Analysis, Human Subjects Research, Statistics, IoT
- **Programming Languages:** Python, C, C++, Java, Swift, JavaScript
- **Web Technologies:** ReactJS, HTML5, CSS, Django, REST API
- **Database Systems:** MySQL, SQLite, Dynamo DB, Firebase
- **Data Science & Machine Learning:** PyTorch, SGLang, Langchain, Scikit-learn, NLTK, transformers
- **Cloud Technologies:** AWS, Heroku, Firebase
- **DevOps & Version Control:** Git, Docker, Conda

Honors and Awards

- **Chair's Award** *09/2023*
  Donald Bren School of Information and Computer Sciences
  - Received upon admission to the PhD program at the University of California, Irvine
  - Granted in recognition of exceptional potential to make significant research contributions to the Informatics community
- **Graduate Student Productivity Reward** *09/2022*
  University of Calgary
  - Granted to graduate students who published at least one paper in a peer-reviewed conference

- **AI Competition Achievement** *03/2019*
  Sharif Artificial Intelligence Challenge [🌐]
  - Designed an innovative AI solution for a real-time strategic game
  - Ranked among the top 8 teams in the Main Game track out of over 1,000 participants
  - Achieved 2nd place in the Mini Game track

REFERENCES

1. **Prof. Iftekhar Ahmed**
   Associate Professor, Donald Bren School of Information and Computer Sciences
   University of California, Irvine
   Email: iftekha@uci.edu
   Relationship: PhD Advisor

2. **Prof. Thomas Zimmermann**
   Chancellors Professor and Bren Chair, Donald Bren School of Information and Computer Sciences
   University of California, Irvine
   Email: tzimmer@uci.edu
   Relationship: Faculty Collaborator