Muhammad Imran

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👤 **Google Scholar:** https://scholar.google.com/citations?user=S6gCcsMAAAAJ

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WORK EXPERIENCE

🏢 *Software and Sustainability (S²) Group, Vrije Universiteit Amsterdam, Netherlands*

Researcher (Guest PhD Student)

[02/2025 – 04/2025]

Conducting collaborative research on software performance and energy efficiency, focusing on the relationship between Java method-level code features and power consumption. The work involves profiling microbenchmarks (JMH), applying time-series forecasting to predict power distribution, and validating predictions against actual energy profiles after feature refactoring. Intended to contribute to a future research publication.

🏢 *International Islamic University Islamabad, Pakistan*

Lecturer

[02/2019 – 05/2022]

Taught a range of undergraduate courses in computer science and software engineering. Supervised numerous Final Year Projects, guiding students through research design, implementation, and evaluation. Participated in departmental committees, including those responsible for proposal reviews, final evaluations, and undergraduate program accreditation.

🏢 *Iqra University Islamabad Campus, Pakistan*

Lecturer

[07/2015 – 01/2019]

Delivered undergraduate-level courses in computer science as per the assigned teaching load. Supervised Final Year Projects, providing academic and technical guidance to students. Held the administrative role of Undergraduate Project Coordinator for two years, overseeing project selection, proposal evaluation, and coordination among faculty and students.

🏢 *Diyatech Pvt. Ltd., Islamabad (Pakistan)*

Software Engineer

[07/2011 – 11/2011]

Worked as part of the development team for "Storage Edge," a Microsoft SharePoint-based product. Contributed to the design and implementation of software modules aligned with sprint-defined feature sets and project timelines.

🏢 *360 Technologies Pvt. Ltd., Islamabad (Pakistan)*

Jr. Software Engineer

[09/2010 – 04/2011]

Involved in the development of the Pakistan Navy Budget Management System. Responsibilities included requirements elicitation from end-users, as well as the design and implementation of newly identified features within the system.

EDUCATION AND TRAINING

Ph.D. in Computer Science

University of L'Aquila, Italy [06/2022 – Current]

Expected Completion: May 30, 2025
Title: *On Automating Performance Problems Detection in Software Systems through Empirical Experiments*
Description: Research focuses on automating the detection and analysis of performance issues in software systems through empirical studies. Key areas include performance test coverage, execution cost, and source code characteristics. Additional investigations explore the use of machine learning and large language models for detecting performance bugs. Current work involves modeling the relationship between code features and power consumption in Java methods, with the goal of enabling energy-aware code optimization through predictive analysis.

Master of Science in Computer Science

King Abdulaziz University [02/2012 – 10/2014]

CGPA: 4.82 / 5.00
Thesis: *Agent Based Security Testing of Web Based Applications*
Short Description: Designed and implemented a security testing tool to detect vulnerabilities in Java-based source code. Utilized static taint analysis to trace user input propagation and dynamic analysis to prevent attacks and minimize false positives. The approach integrated agent-based techniques to enhance detection accuracy.

Bachelor of Science in Software Engineering

International Islamic University Islamabad, Pakistan [09/2006 – 07/2010]

CGPA: 3.83 / 4.00
Final Year Project: *3D Action Racing Game*
Short Description: Developed a single-player arcade racing game in the street racing genre, featuring Quick Race and Time Lapse modes across three distinct terrains. Implemented using Microsoft XNA Framework 3.0, leveraging its managed runtime environment for streamlined game development.

PUBLICATIONS

Peer-Reviewed Publications

1. **Imran, M.**, Cortellessa, V., Di Ruscio, D., Rubei, R., & Traini, L. (2024). *An empirical study on code coverage of performance testing*. In *Proceedings of the 28th International Conference on Evaluation and Assessment in Software Engineering (EASE)*.
2. **Imran, M.**, Eassa, F., & Jambi, K. (2015). *Using agent technology for security testing of web-based applications*. In *Proceedings of the International Conference on Software Engineering and Data Engineering (SEDE)*, pp. 3–10.
3. Khan, I. H., Siddiqui, M. A., Jambi, K. M., **Imran, M.**, & Bagais, A. A. (2015). *Query optimization in Arabic plagiarism detection: An empirical study*. *International Journal of Intelligent Systems and Applications*, 7(1), 73–79.
4. **Imran, M.**, & Alhalabi, W. (2014). *Improving the operating system resource management by processes simulation*. *International Journal of Scientific & Engineering Research*, 5(2), 1404–1408.

Under Review

1. **Imran, M.**, Cortellessa, V., Di Ruscio, D., Rubei, R., & Traini, L. *Is code coverage of performance tests related to source code features? An empirical study on open-source systems.* Under major revision at *Empirical Software Engineering (EMSE)*.
2. **Imran, M.**, Cortellessa, V., Di Ruscio, D., Rubei, R., & Traini, L. *An empirical investigation on the use of large language models for performance bug detection.* Under review at *IEEE International Conference on Software Maintenance and Evolution (ICSME)* 2025.

RECOMMENDATIONS

1. Name: Vittorio Cortellessa
Position: Professor
Organization: University of L'Aquila
Email: vittorio.cortellessa@univaq.it
Ph.D. supervisor, University of L'Aquila

2. Name: Fathy Elbouraey Eassa
Position: Professor
Organization: King Abdulaziz University, Jeddah, Saudi Arabia
Email: feassa@kau.edu.sa
MSc thesis supervisor, King Abdulaziz University

3. Name: Ivano Malavolta
Position: Associate Professor
Organization: Vrije Universiteit Amsterdam, Netherlands
Email: i.malavolta@vu.nl
Research mentor during guest Ph.D. visit (S^2 Group, VU Amsterdam)

PROJECTS

[09/2013 – 04/2014]
Agent based Security Testing of Web Based Applications
MSc thesis project focused on designing a security testing tool to detect and prevent vulnerabilities in web applications using static and dynamic code analysis techniques.
Resulted in a peer-reviewed publication (see Publications section).

[02/2013 – 05/2014]
Arabic Plagiarism Detection System
Contributed to a broader departmental research project focused on building an Arabic plagiarism detection system using NLP and similarity-based techniques.
Work contributed to one peer-reviewed publication (see Publications section).

[05/2011 – 10/2011]
Storage Edge (SharePoint)
Company product developed at Diyatech to enhance Microsoft SharePoint performance. Contributed to module development and integration as part of the engineering team.

[09/2010 – 04/2011]
Navy BMS (Budget Management System)
Developed for the Pakistan Navy to manage budgeting processes. Worked on requirements elicitation, design, and implementation using ASP.NET (C#).

HONOURS AND AWARDS

Academic Scholarships and Merit Awards
- **Ph.D. Scholarship**, University of L'Aquila, Italy — awarded for doctoral studies in Computer Science (2022–Present)
- **International Scholarship**, King Abdulaziz University, Saudi Arabia — awarded for MSc studies in Computer Science (2012–2014)
- **Merit Scholarship**, International Islamic University, Pakistan — awarded for BSc studies in Software Engineering (2007–2010)