

University Academic Curriculum Vitae

Usman Rafiq

Core Competencies and Skills

- Empirical Software Engineering: Expertise in both qualitative and quantitative research methods
- Software Startups: In-depth education, training and research experience in the dynamics of startups
- Research Tools: Proficient in using various research tools such as NVivo and QualCoder for qualitative data analysis, PyCharm for statistical analysis using Python, Mendeley and JabRef for reference management and systematic literature reviews, SurveyMonkey for survey research, and LaTeX for academic writing
- Programming and Application Development: Proficient in programming languages and frameworks such as Python, C#, ASP.NET, Flutter, C, C++, J2SE, and PHP
- Experience in System Analysis and Design
- Academic Teaching: Extensive experience in teaching and mentoring, including lecturing, curriculum design, student supervision, and assessments

Education

Ph.D. in Computer Science

Free University of Bozen-Bolzano (**Italy**)

Thesis Title: Understanding Analytics in Software Startups

Jul 2024

Supervisor: Prof. Dr. Xiaofeng Wang

MS in Computer Science

Free University of Bozen-Bolzano (**Italy**)

Thesis Title: Understanding the Requirements Elicitation in Software Startups: An Empirical Study

Oct 2016

**95/110
(86.36%)**

Supervisors: Prof. Dr. Xiaofeng Wang, Prof. Dr. Samuel A. Fricker

MS in Software Engineering

Blekinge Institute of Technology, Karlskrona (**Sweden**)

Oct 2016

BS in Software Engineering

IIU, Islamabad (**Pakistan**)

Oct 2011

**3.82 / 4.00
CGPA**

Higher Secondary School Certificate (Pre-Engineering)

FBISE, Islamabad (**Pakistan**)

Major: Pre-Engineering (Mathematics, Physics, Chemistry)

Aug 2006

A Grade

Secondary School Certificate (Science)

FBISE, Islamabad (**Pakistan**)

Major: Science (Mathematics, Physics, Chemistry, Biology)

Jul 2004

A Grade

Additional Training

Academic Program for Entrepreneurship (Bootcamp)

Strascheg Center for Entrepreneurship, Munich University of Applied Sciences
(**Germany**)

Mar 2015

Last Appointment

Research Assistant at Free University of Bozen-Bolzano, Italy

www.unibz.it

Feb 2024 – Jan 2025

- Conducting and supporting research activities, including research on remote software startups and participation in system development
- Providing support in evaluating the developed system, including recruitment of users for evaluation and maintaining the system during evaluation periods
- Teaching graduate students of Software Engineering
- **Supervisor:** Prof. Dr. Xiaofeng Wang

Professional Experience

- Graduate Teaching Assistant at Free University of Bozen-Bolzano, Italy

www.unibz.it

Sep 2022 – Jul 2024

- Assisted the course responsible & conducted programming labs for undergrad students of electronics and cyber-physical systems
- Lead activities related to assessment creation, labs, projects, and lab content design
- Courses: Fundamentals of Programming-I, Fundamentals of Programming II
- The content included C/C++/Python, Git version control systems (SVCS), and programming on Raspberry Pi Pico W using C/Python
- **Supervisor:** Prof. Dr. Sergio Tessaris

- Academic Tutor - Digital Didactics at Free University of Bozen-Bolzano, Italy

www.unibz.it

Dec 2021 – Feb 2022

- Developed & implemented an in-house 'Train-the-Trainer' program for professors to utilize technology and tools to teach and evaluate students
- Participated in a project to institutionalize modern pedagogical technologies to support faculty members
- Developed and provided ongoing support to the university's Online Learning Management System
- Provided training to faculty members and students on the Online Learning Management System

- Lecturer (Software Engineering) at the Department of Computer Science and Software Engineering, IIU, Islamabad, Pakistan

www.iiu.edu.pk

Feb 2018 – Nov 2019

- Taught advanced undergraduate courses such as Software Engineering, Object-Oriented Analysis and Design (with UML), Software Construction, Information Systems Audit, and introductory courses on Programming, such as Object-Oriented Programming and Introduction to Programming
- Designed training curricula and conducted lectures, labs, and tutorials
- Provided student support in engaging with courses and provided academic advising and counseling
- Supervised various undergraduate computer science projects
- Served as the moderator of the board of studies for graduate studies
- Served as a member of the admission test committee and the undergrad final year project evaluation committee

- Lecturer (Software Engineering) at Department of Computer Science, Capital University of Science and Technology, Islamabad, Pakistan

www.cust.edu.pk

Feb 2017– Jan 2018

- Taught various software engineering courses focusing on Object-Oriented Analysis and Design, Object-Oriented Programming, Introduction to Programming, and Software Engineering to undergrad students
- Served as a departmental quality enhancement cell member and secretary of the curriculum review committee for a bachelor's in software engineering and supervised student projects

- **Software Developer at Free University of Bozen-Bolzano (Italy)**
www.unibz.it

Oct 2015 – Dec 2015

 - Participated in developing a software project named "Information radiators for distributed software development", using PHP
 - **Supervisor:** Prof. Dr. Xiaofeng Wang

- **Master Intern - System Integration Analyst at Würth Phoenix Srl, Bolzano (Italy)**
www.wuerth-phoenix.com

Nov 2014 – Mar 2015

 - Lead a project in interface development between Enterprise Resource Planning (ERP) and Sales Force Automation (SFA)
 - Development of RESTful services in the .NET framework
 - Experience in software development, quality assurance, and performance optimization
 - Development and programming work in C#, Web API, HTTP, and XML technologies
 - Experience in technical reporting on performance and load-testing activities

- **System Analyst at Easelomist Inc., Islamabad (Pakistan)**
www.easelomist.com

Sep 2011 - July 2013

 - Prepared project proposals and worked closely with project management, development, and quality assurance teams
 - Developed and implemented business processes, modeling, and prepared presentations for end-users and stakeholders
 - Elicited customer-specific and bespoke requirements using several requirements elicitation techniques
 - Analyzed elicited requirements, resolved conflicts between stakeholder needs, and specified product and project features
 - Designed use cases and user stories
 - Managed requirements with IBM's Rational RequisitePro

- **Visiting Lecturer at the Department of Computer Science and Software Engineering, IIU**
www.nu.edu.pk

Jan 2012 – Jan 2013

 - Taught academic courses to undergrad students focusing on Programming Fundamentals, Software Engineering Economics, and Professional Practices
 - Conducted training and seminars for the final year undergrad students of software engineering, in collaboration with software companies
 - Assisted in various university administrative duties

- **Lab Instructor at the National University of Computer and Emerging Sciences (FAST-NU), Islamabad (Pakistan)**
www.nu.edu.pk

2012(Jan) – 2013 (Jan)

 - Prepared undergraduate students with first-hand experience with course concepts. Courses include object-oriented analysis and design, introduction to Java, and operating systems programming using C/C++

- **Teaching Assistant (TA) at Department of Software Engineering, IIU, Islamabad**
www.iiu.edu.pk

Feb 2011 – Jul 2011

 - Assisted course-responsible professor in course preparation for software requirements engineering in the Spring 2011 semester
 - Facilitated weekly tutorials, graded modeling assignments, evaluated practice tasks and projects, and held laboratory sessions on IBM's Rational RequisitePro
 - **Supervisor:** Prof. Dr. Naveed Ikram, RIU, Islamabad

- **Software Engineer (Undergraduate Intern) at Keystone Software Solutions, Rawalpindi (Pakistan)**
www.keystonesoftware.com

Aug 2010 – Dec 2010

- Requirements elicitation using interviews, competitor analysis, and prototyping
- Requirements specification according to RUP and IEEE standards
- Business modeling
- Prepared UI prototypes and played the role of liaison between different technological groups

Publications

Journal Papers:

Rafiq, U., Wang, X., & Guerra, E. (2024). Data analytics in software startups: Understanding key concepts and critical challenges. *Information and Software Technology*.

Pattyn, F., & **Rafiq, U.** (2024). Driving startup success through hierarchy of validation. *Information and Software Technology*. [Under review]. <https://doi.org/10.2139/ssrn.5036453>

Nguyen-Duc, A., Cabrero-Daniel, B., Przybylek, A., Arora, C., Khanna, D., Herda, T., **Rafiq, U.**, Melegati, J., Guerra, E., Kemell, K. K., & Saari, M. (2023). Generative artificial intelligence for software engineering—a research agenda. *Software: Practice and Experience*. *arXiv preprint arXiv:2310.18648*. [Under review].

Hooshyar, H., Guerra, E., Melegati, J., Khanna, D., Aldaej, A., Maturro, G., Zaina, L., Greer, D., **Rafiq, U.**, Chanin, R., & Wang, X. (2023). Impact in software engineering activities after one year of COVID-19 restrictions for startups and established companies. *IEEE Access*, *11*, 55178–55203. <https://doi.org/10.1109/ACCESS.2023.3279917>

Peer-Reviewed Conference and Workshop Papers:

Pattyn, F., & **Rafiq, U.** (2024). Smart scaling for software startups through financial requirements prioritization criteria. In *15th International Conference on Software Business (ICSOB 2024)*, Utrecht, Netherlands, November 18-20, 2024.

Rafiq, U., Pattyn, F., & Wang, X. (2024). Practitioner views on analytics for software startups: A preliminary guide based on gray literature. In S. Hyrynsalmi, J. Münch, K. Smolander, & J. Melegati (Eds.), *Software business. ICSOB 2023* (Lecture Notes in Business Information Processing, vol. 500, pp. 337–348). Springer. https://doi.org/10.1007/978-3-031-53227-6_22

Wang, X., Edison, H., Khanna, D., & **Rafiq, U.** (2023). How many papers should you review? A research synthesis of systematic literature reviews in software engineering. In *2023 ACM/IEEE International Symposium on Empirical Software Engineering and Measurement (ESEM)* (pp. 1–6). IEEE. <https://doi.org/10.1109/ESEM56168.2023.10304863>

Rafiq, U., Filippo, C., & Wang, X. (2022). Understanding low-code or no-code adoption in software startups: Preliminary results from a comparative case study. In *Product-focused software process improvement. PROFES 2022* (Lecture Notes in Computer Science, vol. 13709, pp. 467–481). Springer. https://doi.org/10.1007/978-3-031-21388-5_27

Wang, X., Hubner, S., Melegati, J., Khanna, D., **Rafiq, U.**, Guerra, E. M., & Morselli, D. (2022, November). Startup Digi-Dojo: A Digital Space Supporting Practice and Research of Startup Remote Work. In *ICSOB Companion*.

Rafiq, U., Wang, X., & Zaina, L. (2024). Analytics practices in practice: How software startup companies are applying analytics? In P. Kruchten & P. Gregory (Eds.), *Agile processes in software engineering and extreme programming – Workshops. XP XP 2022 2023* (Lecture Notes in Business Information Processing, vol. 489, pp. 93–105). Springer. https://doi.org/10.1007/978-3-031-48550-3_10

Wang, X., Attal, M. I., **Rafiq, U.**, & Hubner-Benz, S. (2024). Turning large language models into AI assistants for startups using prompt patterns. In P. Kruchten & P. Gregory (Eds.), *Agile processes in software engineering and extreme programming – Workshops. XP XP 2022 2023* (Lecture Notes in Business Information Processing, vol. 489, pp. 202–214). Springer. https://doi.org/10.1007/978-3-031-48550-3_19

Rafiq, U. (2022, May). Towards understanding analytics in software startups. In *Proceedings of the 5th International Workshop on Software-Intensive Business: Towards Sustainable Software Business* (pp. 31–38). <https://doi.org/10.1145/3524614.3528632>

Rafiq, U. (2022). Exploring analytics in software startups. *13th International Conference on Software Business Companion (ICSOB-C 2022)*, Bolzano, Italy, November 8–11, 2022.

Rafiq, U., Melegati, J., Khanna, D., Guerra, E., & Wang, X. (2021). Analytics mistakes that derail software startups. *Proceedings of the 25th International Conference on Evaluation and Assessment in Software Engineering (EASE '21)*, 60–69. <https://doi.org/10.1145/3463274.3463305>

Kemell, K. K., Elonen, A., Suoranta, M., Nguyen-Duc, A., Garbajosa, J., Chanin, R., Melegati, J., **Rafiq, U.,** Aldaej, A., Assyne, N., & Sales, A. (2020, August). Business model canvas should pay more attention to the software startup team. In *2020 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)* (pp. 342–345). IEEE. <https://doi.org/10.1109/SEAA51224.2020.00063>

Rafiq, U., & Wang, X. (2020). Continuous information monitoring in software startups. In M. Paasivaara & P. Kruchten (Eds.), *Agile processes in software engineering and extreme programming – Workshops. XP 2020* (Lecture Notes in Business Information Processing, vol. 396, pp. 352–365). Springer. https://doi.org/10.1007/978-3-030-58858-8_29

Rafiq, U., Bajwa, S. S., Wang, X., & Lunesu, I. (2017). Requirements elicitation techniques applied in software startups. In *2017 43rd Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*, Vienna, Austria, 141–144. IEEE. <https://doi.org/10.1109/SEAA.2017.73>

Book Chapter:

Mohsenimofidi, S., Prasad, A. S. R., Zahid, A., **Rafiq, U.,** Wang, X., & Attal, M. I. (2024). *Classifying user intent for effective prompt engineering: A case of a chatbot for startup teams*. In A. Nguyen-Duc, P. Abrahamsson, & F. Khomh (Eds.), *Generative AI for effective software development* (pp. 317–329). Springer. https://doi.org/10.1007/978-3-031-55642-5_15

Other Academic Services

- Reviewer for Information and Software Technology (IST 2024) and Foundations of Computing and Decision Sciences (FCDS 2021)
- Program Committee Member for International Conference on Software Business (ICSOB): 2021, 2022, 2023, and 2024
- Reviewer for European Conference on Information Systems (ECIS 2023)
- Program Committee Member for International Symposium on Information and Communication Technology (SOICT 2023)
- Student Volunteer Chair for International Conference on Software Business (ICSOB 2022)
- Reviewer for International Conference on Agile Software Development (XP 2021), International Conference on Product-Focused Software Process Improvement (PROFES 2019), and International Conference on Software Engineering (ICSE 2020)
- Program Committee Member for GenAI4SE 2023
- Student Volunteer at International Conference on Software Engineering (ICSE 2022) and International Conference on Agile Software Development (XP 2021)

Invited Talks

- Invited Speaker for a talk on “XP Conference Contributions to Software,” where I utilized Python to analyze historical conference data and presented the findings at the 25th International Conference on Agile Software Development (June 6, 2024)
- Invited Speaker (Virtual) on “Analytics Practices in Software Startups” to SINTEF Digital (Norway), Europe’s largest independent research organization (January 30, 2023)
- Delivered a Research-in-Progress Presentation of Ph.D. work to Prof. Dr. Ita Richardson (Professor of Software Quality and Connected Health Technologies, LERO, The Irish Software Research Center, Ireland) in Bolzano (January 26, 2023)

Experience in Academic Teaching	<ul style="list-style-type: none"> ▪ Teaching <i>Software Quality and Metrics</i> course and lab to graduate students in Software Engineering at the Free University of Bozen-Bolzano, Italy (2024–2025) ▪ Teaching assistant for the courses <i>Fundamentals of Programming I and II</i>, where I taught labs using C and Python to undergraduate students in Electronics and Cyber-Physical Systems - Free University of Bozen-Bolzano, Italy (2023-2024) ▪ Taught courses including <i>Software Engineering</i>, <i>Object-Oriented Analysis and Design (with UML)</i>, <i>Software Construction</i>, <i>Information Systems Audit</i>, <i>Object-Oriented Programming</i>, and <i>Introduction to Programming</i> to undergraduate students in Software Engineering at IIU, Pakistan (2018-2019) ▪ Delivered courses including <i>Introduction to Programming</i> using C++, <i>Object-Oriented Analysis and Design</i>, <i>Object-Oriented Programming</i>, and <i>Software Engineering</i> to undergraduate students at CUST, Pakistan (2017-2018) ▪ Taught <i>Programming Fundamentals</i>, <i>Software Engineering Economics</i>, and <i>Professional Practices</i> to undergraduate students at IIU, Pakistan (2012-2013) ▪ Designed and conducted labs for <i>Object-Oriented Analysis and Design</i>, <i>Introduction to Java</i>, and <i>Operating Systems Programming</i> at FAST-NU, Pakistan (2012-2013)
Awards/Achievements	<ul style="list-style-type: none"> ▪ Won the travel grant from ACM's Special Interest Group on Software Engineering (ACM SIGSOFT) to participate in the Student Mentoring Workshop at the 45th International Conference on Software Engineering, Melbourne, Australia, 14-20 May 2023 ▪ Received the "The Most Promising Ph.D. Project" award for my Ph.D. research from the 13th International Conference on Software Business (2022) ▪ Recipient of the fully funded doctoral studies at the Free University of Bozen-Bolzano, Italy (2019-2023) ▪ Nominated for the Rector's Best Teacher award from the Computer Science and Software Engineering Department, IIU, Islamabad ▪ Won prestigious "Erasmus Mundus" scholarship for joint master's in software engineering (2013) ▪ Organized and chaired the event, entitled "Speed Programming and Gaming Competition- SPAGCOM" in 2011, hosted by the Department of Software Engineering at IIU, Islamabad ▪ Received high distinction during bachelor studies
Memberships	<ul style="list-style-type: none"> ▪ Member of Global Software Startup Research Network ▪ Member of Software and Systems Engineering Research Group (UniBz)
Language Competence	<ul style="list-style-type: none"> ▪ Urdu: Mother Language ▪ English: Fluent ▪ Italian: Basic (A2)