

Dr. Pooja Rani

Personal Details

Name Pooja Rani
Position Oberassistant (Senior Researcher)
Work address Department of Informatics (IFI), University of Zurich
Binzmuhlestrasse 14, BIN 2.D.05
8050 Zurich, Switzerland
Email rani@ifi.uzh.ch
Home page <https://poojaruhal.github.io/>
Scholar ID <https://scholar.google.com/citations?user=2B8GcJ4AAAAJ>
DBLP <https://dblp.org/pid/153/4246-1.html>
ORCID <https://orcid.org/0000-0001-5127-4042>

Work Experience

- 04/2024 – **Incoming Professor**, University of Mannheim, Germany.
Green Software Engineering, Informatik Department
- 09/2022 – **Senior Researcher**, University of Zurich, Switzerland.
now With Prof. Harald Gall and Prof. Alberto Bacchelli
- 02/2022 – **Early Post-doc**, University of Bern, Switzerland.
08/2022 Software Engineering Group chaired by Prof. Timo Kehrer
- 06/2017 – **Software Developer**, People Interactive Group pvt. Ltd., Mumbai, India.
11/2017 Changing underlying architecture and migrating code to NodeJS framework
- 01/2017 - **Research Intern**, VMware Software India pvt Ltd., Bangalore, India.
06/2017 Developing a framework for automating identity access management flow
- 2011 – 2014 **Software Engineer in Test**, Samsung Research Institute, Noida, India.
Mobile testing: creating test plan, resource planning, designing and executing test cases

Education

- 2018 – 2022 **Ph.D., in Software Engineering**, University of Bern, Switzerland, Advisors: Prof. Oscar Nierstrasz and Dr. Sebastiano Panichella, Grade: summa cum laude (6/6).
- 2015 – 2017 **Masters of Engineering in Software System**, Birla Institute of Technology and Science-Pilani, Rajasthan, India, *GPA – 8.53/10.*
- 2011 – 2014 **Bachelor of Engineering in Computer Science**, The Institution of Engineers, Kolkata, India, *GPA – 8.33/10.*

Teaching Experience

More details about the courses are available online at <https://poojaruhal.github.io/teaching/>

- 2025 **Advance Software Engineering**, Lecturer at University of Zurich.
Approx 40 students; Software engineering concepts and project
- 2025 **Seminar in Advance Software Engineering**, Lecturer at University of Zurich.
16 students; Proposing various research projects, and managing their progress
- 2023–2024 **Seminar in Empirical Software Engineering**, Lecturer at University of Zurich.
12 students; Proposing various research projects, and managing their progress
- 2018 – 2022 **Object-Oriented Programming (BSc)**, Instructor at University of Bern.
Approx. 100 students; Object-oriented paradigms using Java, Smalltalk, C++.
- 2018 – 2022 **Seminar in Software Engineering (BSc/MSc)**, Instructor at University of Bern.
Approx. 15 students; Research projects to show the current research landscape in SE.
- 2018 – 2020 **Software Modeling Analysis (MSc)**, Instructor at University of Bern.
Approx. 30 students; Overview of modeling techniques to analyze complex software systems.
- Autumn 2016 **Software Testing (ME)**, Teaching Assistant at BITS Pilani.
Approx. 25 students; Software testing concepts, designing and correcting exercises.
- Spring 2016 **Computer Programming (BE)**, Teaching Assistant at BITS Pilani.
Approx. 100 students; C language concepts, organizing exercises, and correcting exercises.
- Autumn 2015 **Computer Architecture (BE)**, Teaching Assistant at BITS Pilani.
Approx. 50 students; Computer Architecture concepts, designing and correcting exercises.

Mentoring & Supervision (PhD/MSc/BSc) Experience

The list of supervised projects and students is available online: <https://poojaruhal.github.io/teaching/>

PhD

- 2024-now Melih Catal, "Improving security aspect of code-based LLMs ", University of Zurich.
- 2024-now Alex Wolf, "Improving trust and adaptability of open-source software developers, " University of Zurich.
- 2024-now Jan-Andrea Bard, "Exploring energy impact of Matlab code", University of Bern.
- 2022-2024 Shirin Pirouzkhan, "Automating code reviews", University of Zurich.
- 2023–2025 Pavlina Goncalves, "Communication in code reviews", University of Zurich.
- 2022 Fernando Petruolio, "Bug prediction", University of Zurich.
- 2022-now Alexander Boll, "Exploring Simulink documentation", University of Bern.

MSc

- 2025 Yixuan Zhou, 'Commenting Practices in the Age of LLMs", University of Zurich.
- 2025 Dana Rapp, "Energy Code Patterns in Python Web Applications", University of Zurich.

- 2025 Yixuan Zhou and Yapeng Zhang, 'Comment plugin for Visual Studio Code", University of Zurich.
- 2024 Shiran Sun, "Mitigation Strategies for Energy Anti-patterns", University of Zurich.
- 2024 Najma Christen, "Why developers write code comments", University of Zurich.
- 2022 Veronika Wu "Developer awareness in Sustainable Software Engineering", University of Bern.
- 2020 Mathias Bierrer "Analysis of Developer Information Needs on Collaborative Platforms", University of Bern.

BSc

- 2025 Gianluca Nardone, "Impact of Polyglot-ism on Developer Productivity", University of Zurich.
- 2025 Andy de Vanterey, "Evaluating Memory Efficiency and Performance Trade-Offs of Linter Recommendations", University of Zurich.
- 2025 Eric Rudischhauser, 'Adherence of comments to the style guidelines", University of Zurich.
- 2023 Mohammad Eglil "Commenting Practices of Polyglot developers", University of Bern.
- 2023 Adrian Suter "Automated vs Manual Tests", University of Zurich.
- 2021 Michael Dooley "Tool Support for Commenting Conventions", University of Bern.
- 2021 Suada Abukar "Adherence of comments to the style guidelines", University of Bern.
- 2020 Lino Hess "Generating automatically class comments in Pharo", University of Bern.
- 2018 Jonas Richner "Software Developers? Information Needs", University of Bern.
- 2018 Sabine Brunner "Inconsistency between Comments and Code", University of Bern.
- 2018-2022 Supervised 12 students for independent seminar research projects.

Journal Publications

The replication packages, datasets, and slides for all papers are available online at <https://poojaruhal.github.io/publications/>

- EMSE Shirin Pirouzkah, Pooja Rani, Francesco Sovrano, Vincent Hellendoorn, & Alberto Bacchelli. "The Price of Precision: The Cost of Preprocessing for Automated Code Revision in Code Review", *Empirical Software Engineering*, 2025, Accepted
- JSS Wolf, Alex, Marco Edoardo Palma, Pooja Rani, and Harald C. Gall. "Key-Augmented Neural Triggers for Knowledge Sharing", *Journal of Systems & Software*, 2025, Under revision.
- TOSEM Christian Birchler, Sajad Khatiri, Pooja Rani, Timo Kehrer, and Sebastiano Panichella. "A Roadmap for Simulation-Based Testing of Autonomous Cyber-Physical Systems: Challenges and Future Direction." ACM Transactions on Software Engineering and Methodology 34, no. 5 (2025): 1-9
- EMSE Pooja Rani, Fernando Petruolio, and Alberto Bacchelli. "On Refining the SZZ Algorithm with Bug Discussion Data", *Empirical Software Engineering*, 29, no. 5 (2024): 115

- JSS Alexander Boll, Pooja Rani, Alexander Schultheiss, and Timo Kehrer. "Beyond Code: Is There a Difference between Comments in Visual and Textual Languages?", *Journal of Systems & Software*, 2023.
- JSS Pooja Rani, Arianna Blasi, Nataliia Stulova, Sebastiano Panichella, Alessandra Gorla, and Oscar Nierstrasz. "A decade of code comment quality assessment: A systematic literature review", *Journal of Systems & Software*, 2022, 111515.
- EMSE Pooja Rani, Sebastiano Panichella, Manuel Leuenberger, Mohammad Ghafari, and Oscar Nierstrasz. "What do class comments tell us? An investigation of comment evolution and practices in Pharo Smalltalk", *Empirical Software Engineering*, 26, 6, 2021, 1–49.
- JSS Pooja Rani, Sebastiano Panichella, Manuel Leuenberger, Andrea Di Sorbo, and Oscar Nierstrasz. "How to Identify Class Comment Types? A Multi-language Approach for Class Comment Classification", *Journal of Systems & Software*, 181, 2021, 111047.

Conference Publications

- FSE Valentin Bourcier, Pooja Rani, Maximilian Ignacio, Alberto Bacchelli, Steven Costiou 'Empirically Evaluating the Impact of Object-Centric Breakpoints on the Debugging of Object-Oriented Programs", *Foundations of Software Engineering*, 2025.
- ICPC Pavlina Wurzel Goncalves, Pooja Rani, Margaret-Anne "Peggy" Storey, Diomidis Spinellis, Alberto Bacchelli, "Code Review Comprehension: Reviewing Strategies Seen Through Code Comprehension Theories", *International Conference on Program Comprehension (ICPC)*, 2025.
- ICSE Pooja Rani, Jonas Zellweger, Veronika Kousadianos, Luis Cruz, Timo Kehrer, Alberto Bacchelli, "Energy Patterns for Web: An Exploratory Study", *International Conference on Software Engineering, Society Track*, 2024.
- FSE Christian Birchler, Tanzil Kombarabettu Mohammed, Pooja Rani, Teodora Nechita, Timo Kehrer, Sebastiano Panichella, "Does Simulation-based Testing for Self-driving Cars match Human Perception?", *Foundations of Software Engineering*, 2024.
- Findings at Joel Niklaus, Veton Matoshi, Pooja Rani, Andrea Galassi, Matthias Sturmer, Ilias Chalkidis, "LEXTREME: A Multi-Lingual and Multi-Task Benchmark for the Legal Domain", 2023.
- EMNLP Christos Tsigkanos, Pooja Rani, Sebastian Muller, and Timo Kehrer, "Variable Discovery with Large Language Models for Metamorphic Testing of Scientific Software", *International Conference on Computational Science (ICCS)*, 2023.
- SANER Christos Tsigkanos, Pooja Rani, Sebastian Muller, and Timo Kehrer, "Large Language Models: The Next Frontier for Variable Discovery within Metamorphic Testing?", *30th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER)*, 2023.
- SCAM Pooja Rani, Mathias Birrer, Sebastiano Panichella, Mohammad Ghafari, and Oscar Nierstrasz, "What Do Developers Discuss about Code Comments?", *IEEE 21st International Working Conference on Source Code Analysis and Manipulation (SCAM)*, 2021.

- SCAM Pooja Rani, Suada Abukar, Nataliia Stulova, Alexander Bergel, and Oscar Nierstrasz, "Do Comments follow Commenting Conventions? A Case Study in Java and Python", *IEEE 21st International Working Conference on Source Code Analysis and Manipulation (SCAM)*, 2021.
- SANER Pooja Rani, Mathias Birrer, Sebastiano Panichella, and Oscar Nierstrasz, "Makar: A framework for multi-source studies based on unstructured data", *International Conference on Software Analysis, Evolution and Reengineering*, 2020.

Thesis & Workshop Publications

- Thesis Pooja Rani, "Assessing Comment Quality in Object-Oriented Languages", University of Bern, Switzerland, 2022, <https://boristheses.unibe.ch/3382/>.
- IWST Pooja Rani, Alexandre Bergel, Lino Hess and Timo Kehrer, and Oscar Nierstrasz, "Can We Automatically Generate Class Comments in Pharo?", *International Workshop on Smalltalk Technologies (IWST)*, 2022.
- ICSE Pooja Rani, "Speculative analysis for comment quality assessment", *International Conference on Software Engineering, Doctoral Symposium*, 2021.
- SATTToSE Pooja Rani, "Software Analysis using Natural Language Queries", *Seminar Series on Advanced Techniques & Tools for Software Evolution (SATTToSE)*, 2018.

Achievements & Awards

- 2025 Distinguished Paper Award at International Conference on Program Comprehension (ICPC), Canada
- 2023 Distinguished Reviewer Award at International Conference on Mining Software Repositories (MSR), Melbourne, Australia
- 2023 Distinguished Service Award at International Workshop on Natural Language-based Software Engineering (NLBSE), Melbourne, Australia
- 2022 Best PhD thesis award in computer science institutes of the University of Bern, Neuchatel, and Fribourg at Bern, Switzerland
- 2022 Best research paper award at International Workshop on Smalltalk Technologies (IWST), Novi Sad, Serbia
- 2022 Received 'summa cum laude' for PhD dissertation, Bern, Switzerland
- 2018 Best presentation award at Seminar Series on Advanced Techniques & Tools for Software Evolution (SATTToSE), Athens, Greece
- 2012 Received the youngest employee of the year award in Samsung, Noida, India
- 2011 Secured 1st Rank in the three-year diploma program, Ambala, India
- 2010 Runners-up position in inter-college youth festival dance competition, Haryana, India
- 2007 Won Silver Medal in the state-level Taekwondo Championship, Haryana, India

Grants/Fundings

- 2025 "EdiSE (Energy-driven Integration in Software Engineering)", Swiss National Science Foundation (SNSF) Project Grant, Switzerland. 500k CHF

- 2025 Wuebben Foundation Fellowship (800k EUR)-Appointment Accelerator Funding program, Germany
- 2015-2017 Research fellowship for Master's from MHRD (Ministry of Human Research Development), India

Invited Talks

- 10/10/2025 "*Energy Aware Coding: When Coding Practices Meet Reality*", Talk at GreenLab course, VU Amsterdam, the Netherlands
- 08/10/2025 "*Can UI Design Make Users Energy Aware?*", TU Delft, Delft, the Netherlands
- 02/2025 "*Clean Code, Green Code: When Coding Practices Meet Reality*", Keynote talk at 7th International Conference on Information Systems and Management Science (ISMS 2024), NIT Kurukshetra, India
- 11/2024 "*Code Green, Think Clean: When Coding Practices Meet Reality*", University of Mannheim, Mannheim, Germany
- 09/2024 "*A Race to Quality Software: Harnessing AI and Human Collaboration*", Eindhoven University of Technology, Eindhoven, Netherlands
- 06/2024 "*Supporting Developers in Building High-quality and Sustainable Software Systems*", Swisscom Digital Lab, Bern, Switzerland
- 06/2024 "*Impact of Developers Choices on AI and Environment*", Wageningen University and Research, Wageningen, Netherlands
- 05/2024 "*AI: Simplifying Development, Adding complexity*", Technical University of Darmstadt, Darmstadt, Germany
- 04/2023 "*Comprehending Software Pidgins*", University of Konstanz, Konstanz, Germany
- 10/2022 "*Women in STEM*", University of Bern, Bern, Switzerland
- 07/2022 "*Decoding commenting practices?*", University of Zurich, Zurich, Switzerland

Presentations at International Venues

- All slides are available online at <https://poojaruhal.github.io/talks/>
- FSE 2025 "*On Refining the SZZ Algorithm with Bug Discussion Data*", International Conference on Foundational Software Engineering, Trondheim, Norway.
- ICSE 2024 "*Energy Patterns for Web: An Exploratory Study*", International Conference on Software Engineering, Lisbon, Portugal.
- ESEM 2023 "*A decade of code comment quality assessment: A systematic literature review*", ACM/IEEE International Symposium on Empirical Software Engineering and Measurement, New Orleans, USA.
- IWST 2022 "*Can We Automatically Generate Class Comments in Pharo?*", International Workshop on Smalltalk Technologies, Novi Sad, Serbia
- ICSE 2022 "*What do class comments tell us? An investigation of comment evolution and practices in Pharo Smalltalk*" International Conference on Software Engineering, Pittsburg, USA

- SANER 2022 “*How to Identify Class Comment Types? A Multi-language Approach for Class Comment Classification*”, International Conference on Software Analysis, Evolution and Reengineering, Virtual.
- SCAM 2022 “*What Do Developers Discuss about Code Comments?*”, International Working Conference on Source Code Analysis and Manipulation, Virtual.
- SCAM 2022 “*Do Comments follow Commenting Conventions? A Case Study in Java and Python*”, International Working Conference on Source Code Analysis and Manipulation, Virtual.
- ICSE 2021 “*Speculative analysis for comment quality assessment*”, International Conference on Software Engineering, Virtual.
- SANER 2020 “*Makar: A framework for multi-source studies based on unstructured data*”, International Conference on Software Analysis, Evolution and Reengineering, Virtual.
- INRIA 2019 “*Comment soup with a pinch of types, served in a leaky bowl*”, Pharo Days, INRIA, Lille, France.
- SATToSE 2018 “*Software Analysis using Natural Language Queries*”, Seminar Series on Advanced Techniques & Tools for Software Evolution (SATToSE), Athens, Greece.
- Linguistics 2018 “*Let Linguistics guide software analysis*”, Les Diablerets, Switzerland.

Scientific Service

Program Committee Memberships

- FSE International Conference on Foundational Software Engineering, Research, 2025
- GREENS International Workshop on Green and Sustainable Software, 2024
- SANER International Conference on Software Analysis, Evolution and Reengineering, 2024
- ESEM International Symposium on Empirical Software Engineering and Measurement, 2024
- MSR International Conference on Mining Software Repositories: 2022–2025
- ICSME International Conference on Software Maintenance and Evolution: NIER track, 2023
- ISEC Innovations in Software Engineering Conference: 2022–now
- NLBSE International Workshop on Natural Language-based Software Engineering: 2021–now
- IWST International Workshop on Smalltalk Technologies: 2023–now

Organizing Committee Memberships

- NLBSE International Workshop on Natural Language-based Software Engineering: 2023–now

Journal Reviews

- EMSE Empirical Software Engineering: 2023–now
- TSE IEEE Transactions on Software Engineering: 2023
- EAAI Engineering Applications of Artificial Intelligence: 2023
- JSS Journal of Systems & Software: 2022
- TOSEM ACM Transactions on Software Engineering and Methodology: 2021–now

IST Information and Software Technology: 2021-now

Conference Reviews as a co-reviewer

ICSE International Conference on Software Engineering: 2022

ICCS International Conference on Computational Science: 2022

SANER International Conference on Software Analysis, Evolution and Reengineering: 2019, 2020

SCAM International Working Conference on Source Code Analysis and Manipulation: 2018, 2020

Organization

2022–now Organizing tool competition at Natural language-based software engineering workshop (NLBSE)

Academic Committees

2021 Appointment Committee, Professorship, University of Bern, 2021

Membership

Since 2019 Board Member of CHOOSE group (Swiss group for Software Engineering)

2021 Mentor in the Womentoring program at University of Bern

International Training & Schools

2025 “CECAM-Lorentz workshop: Greening AI with Software engineering”, Lausanne, Switzerland.

2023 “Analytical Observational Studies in Software Engineering”, New Orleans, USA.

2023 “International Summer School on Software Engineering”, Lugano, Switzerland.

2022 “Learning by Doing: supervising students in hands on projects”, Zurich, Switzerland.

2021 “Practical Crowdsourcing”, by Takola, Switzerland.

2019 “Winter School on Deep Learning”, Lenk Im Simmental, Switzerland.

2018 “International Summer School on Software Engineering”, Lugano, Switzerland.

2018 “Current Methods in Corpus Linguistics”, Les Diablerets, Switzerland.

Research Collaborations

Ongoing Ivano Malavolta, VU Amsterdam, Netherlands
Green Software Engineering.

Ongoing IVincenzo Stoico, VU Amsterdam, Netherlands
Energy Patterns.

Ongoing Steven Costiou, Inria in RMoD, France
Object-Centric Debugging.

2024 Margaret-anne Storey, University of Victoria, Canada

- Developer Productivity.
- Ongoing June Sallou, Delft University of Technology, Netherlands
Energy Estimation for Software Development.
- 2022 Christos Tsigkanos, University of Athens, Greece
Using language models for software testing.
- Ongoing Timo Kehrer, University of Bern, Switzerland
Software product lines.
- 2021–2023 Joel Nikalus, Digital Sustainability Research Center, Switzerland
Natural language processing for the legal domain.
- 2023–2024 Luis Cruz, Delft University of Technology, Netherlands
Understanding sustainability aspects in SE.
- 2020–2025 Nataliia Stulova, University of Bern, Switzerland
Code commenting practices in SE.
- 2020 Alessandra Gorla, IMDEA Software Institute, Spain
Comment quality assessment practices in SE.
- 2019 Alexandre Bergel, University of Chile, Chile
Building visualizations for SE data.
- Ongoing Andrea Di Sorbo, University of Sannio, Italy
Applying NLP techniques to SE data.
- Ongoing Sebastiano Panichella, Zurich University of Applied Science, Switzerland
Empirical software engineering.
- 2018 Mohammad Ghafari, University of Auckland, New Zealand
Security practices in SE.

More Details

- Hobbies Cycling, dancing, hiking, cooking, reading historical books
- Language English (fluent), Hindi (native), Haryanvi (native), Punjabi (A2), German (B1)