Dr. Pooja Rani

Personal Details

Name	Pooja Rani
Position	Postdoctoral Researcher (Senior researcher)
Work address	Department of Informatics (IFI), University of Zurich
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Work Experience

09/2022 – now   **Senior Researcher**, University of Zurich, Switzerland.
With Prof. Harald Gall and Prof. Alberto Bacchelli

02/2022 – 08/2022   **Early Post-doc**, University of Bern, Switzerland.
Software Engineering Group chaired by Prof. Timo Kehrer

06/2017 – 11/2017   **Software Developer**, People Interactive Group pvt. ltd., Mumbai, India.
Changing underlying architecture and migrating code to NodeJS framework

01/2017 - 06/2017   **Research Intern**, VMware Software India pvt ltd., Bangalore, India.
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, design and execute 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 50 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, "Impriving security aspect of code-based LLMs ", University of Zurich.
2024-now	Alex Wolf, "Impriving 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 Pirouzkhah, "Automating code reviews", University of Zurich.
2023–2025	Pavlina Goncalves, "Communication in code reviews", University of Zurich.
2022	Fernando Petrulio, "Bug prediction", University of Zurich.
2022-now	Alexander Boll, "Exploring Simulink documentation", University of Bern.

MSc

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 Plat-
        forms", University of Bern.

        BSc

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/

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." arXiv:2405.01064 (2024).

EMSE   Pooja Rani, Fernando Petrulio, 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, <u>Pooja Rani</u>, 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	<u>Pooja Rani</u>, 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, <u>Pooja Rani</u>, Teodora Nechita, Timo Kehrer, Sebastiano Panichella, "Does Simulation-based Testing for Self-driving Cars match Human Perception?", *Foundations of Software Engineering*, 2024.
Findings at EMNLP	Joel Niklaus, Veton Matoshi, <u>Pooja Rani</u>, Andrea Galassi, Matthias Sturmer, Ilias Chalkidis, "LEXTREME: A Multi-Lingual and Multi-Task Benchmark for the Legal Domain", 2023.
ICCS	Christos Tsigkanos, <u>Pooja Rani</u>, 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, <u>Pooja Rani</u>, 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	<u>Pooja Rani</u>, 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	<u>Pooja Rani</u>, 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	<u>Pooja Rani</u>, 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	<u>Pooja Rani</u>, "Assessing Comment Quality in Object-Oriented Languages", University of Bern, Switzerland, 2022, *https://boristheses.unibe.ch/3382/*.
IWST	<u>Pooja Rani</u>, 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	<u>Pooja Rani</u>, "Speculative analysis for comment quality assessment", *International Conference on Software Engineering, Doctoral Symposium*, 2021.
SaTToSE	<u>Pooja Rani</u>, "Software Analysis using Natural Language Queries", *Seminar Series on Advanced Techniques & Tools for Software Evolution (SATToSE)*, 2018.

Achievements & Awards

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 disseration, Bern, Switzerland

2018   Best presentation award at Seminar Series on Advanced Techniques & Tools for Software Evolution (SATToSE), 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

Fundings

2015-2017   Research fellowship for Masters from MHRD (Ministry of Human Research Development), India

01/04/2025   *"EnergyInsight: Charting and Reducing the Energy Footprint of Scientific Software and Data-Analysis Pipelines"*, Swiss National Science Foundation (SNSF), Switzerland. Under Preparation

Invited Talks

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/*

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

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-now

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
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 Margaret-anne Storey, University of Victoria, Canada
Developer Productivity.

Ongoing June Sallou, Delft University of Technology, Netherlands
Energy Estimation for Software Development.

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

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.

Ongoing Luis Cruz, Delft University of Technology, Netherlands
Understanding sustainability aspects in SE.

2020 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 Chille, Chille
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)