

Research Interests

My main **research goal** is to conduct research, understanding both industrial and academic needs, to support developers in various software engineering tasks such as program comprehension and maintenance tasks. My **research interests** are in the domain of Software Engineering (SE), Empirical software engineering, Natural language processing (NLP) and Machine learning applied to SE, Software maintenance and evolution (with a particular focus on IDE improvements), and Sustainability software systems.

Personal Details

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Education

2018 – 2022 **Ph.D., in Software Engineering**, University of Bern, Switzerland, Thesis advisors: Prof. Oscar Nierstrasz and Dr. Sebastiano Panichella, Grade: summa cum laude.
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*.
2008 – 2011 **Diploma in Computer Science and Engineering**, Kalpana Chawla Government Polytechnic for Women, Haryana, India, *Percentage – 83*.

Work Experience

09/2022 – **Post-doc**, University of Zurich, Switzerland.
now Zurich Empirical Software engineering Team chaired by Prof. Alberto Bacchelli

- 02/2022 – **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 node js 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 Tester**, Samsung Research Institute, Noida, India.
- Mobile testing: creating test plan, resource planning, design and execute test cases

Teaching Experience

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

- 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

- 2022 Shirin Pirouzkah, “Automating code reviews”, University of Zurich.
- 2022 Fernando Petrulio, “Bug prediction”, University of Zurich.
- 2022 Alexander Boll, “Exploring Simulink documentation”, University of Bern.

MSc

- 2022 Veronika Wu (MSc) “Developer awareness in Sustainable Software Engineering”, University of Bern.
- 2020 Mathias Bierrer (MSc) “Analysis of Developer Information Needs on Collaborative Platforms”, University of Bern.

BSc

- 2021 Michael Dooley (BSc) “Tool Support for Commenting Conventions”, University of Bern.
- 2021 Suada Abukar (BSc) “Adherence of comments to the style guidelines”, University of Bern.
- 2020 Lino Hess (BSc) “Generating automatically class comments in Pharo”, University of Bern.
- 2018 Jonas Richner (BSc) “Software Developers? Information Needs”, University of Bern.
- 2018 Sabine Brunner (BSc) “Inconsistency between Comments and Code”, University of Bern.
- 2018-2022 Supervised nine 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/>

- 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

- 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.
- SaTToSE Pooja Rani, "Software Analysis using Natural Language Queries", *Seminar Series on Advanced Techniques & Tools for Software Evolution (SaTToSE)*, 2018.

Achievements & Awards

- 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 (SaTToSE), Athens, Greece
- 2015-2017 Research fellowship for Masters from MHRD (Ministry of Human Research Development), India
- 2012 Received the youngest employee of the year award in Samsung, Noida, India
- 2011 Secured 1st Rank in the 3-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

Invited Talks

- 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/>

- 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, Pittsburgh, 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

- MSR International Conference on Mining Software Repositories: 2023
- ISEC Innovations in Software Engineering Conference: 2022
- NLBSE International Workshop on Natural Language-based Software Engineering: 2021,2022

Journal Reviews

- TOSEM ACM Transactions on Software Engineering and Methodology: 2021,2022
- IST Information and Software Technology: 2021

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
- ICSME International Conference on Software Maintenance and Evolution: 2020

Organization

- 2022 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)
- Since 2021 Mentor in the Womentoring program at University of Bern

International Training & Schools

- 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 Christos Tsigkanos, University of Athens, Greece
Using language models for software testing.
- Ongoing Timo Kehrer, University of Bern, Switzerland
Software product lines.
- Ongoing 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 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 (A2.1)