

Prof. Dr. Sebastian Baltes

Software Engineering and Empirical Research

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Expertise

- Software Engineering** I have over **15 years** of experience **developing software** in **industry, academia, and open source** projects. I'm familiar with the **Java, Python, JavaScript, and R** ecosystems, implementing web applications (REST, gRPC, Spring Boot, Angular), data processing pipelines, visualization, and analysis workflows (R, Python, D3.js, Apache Beam). I've worked with traditional database systems (PostgreSQL, MySQL), as well as column stores (SQL Server), and hybrid databases (BigQuery). I've configured and used build and test automation infrastructure (Maven, JUnit, Mockito, NPM), CI/CD pipelines (GitLab, TravisCI, Jenkins), monitoring tools (Sonar, Humio, Grafana), and deployed containerized applications (Docker) to Kubernetes clusters (e.g., on Azure). I've been working on **agile teams** (Scrum, SAFe), following **DevOps** and **domain-driven design** practices and regularly participate in **code reviews**. I further design **software architectures** in collaboration with stakeholders and write **technical concepts**.
- Research** ✓ My research falls into what I call the triangle of **empirical software engineering**: empirical research (qualitative and/or quantitative) that informs improved software engineering tools and workflows, taking an interdisciplinary perspective into account. For me, thoroughly analyzing the state-of-practice is an essential first step towards improving how software is being developed. In my role at SAP, I successfully **led internal research projects** from design over execution and analysis to presentation, providing **actionable insights** to SAP's CTO. Since December 2023, I am a Professor of Software Engineering at the University of Bayreuth, Germany.
- Teaching** ✓ Since 2013, I have been **regularly teaching various lectures, seminars, and tutorials** covering the broad areas of software engineering, programming, information visualization, and research methods. This experience allowed me to explore different teaching approaches in small seminar groups as well as in larger foundational lectures and remote settings.

Employment

- Since 12/2023 **Professor (W3) of Software Engineering, University of Bayreuth, Germany**
Research and teaching, building a new research group focusing on empirical software engineering.
- 04/2022-01/2024 **Principal Expert, Empirical Software Engineering, SAP SE, Walldorf, Germany**
10/2021-03/2022 **Senior Software Developer, SAP SE, Walldorf, Germany**
Worked on strategic platform innovations, i.e., projects with strategic importance for SAP's cloud platform BTP; mainly in the area of composable enterprise applications and optimization of internal software engineering processes and tooling.
Achievements: Led a project investigating technology stacks of core SAP products/services, involving stakeholder interviews, an internal developer-focused online survey, and the development of a data pipeline and tech stacks dashboard, in close collaboration with product teams, leading to a detailed report with recommendations presented to SAP executives and a peer-reviewed publication. During a research fellowship, we developed a data-driven cost-optimal approach for minimizing flaky test failures caused by timeouts, also leading to a publication.
- Since 07/2020 **Adjunct Lecturer, The University of Adelaide, Australia**
Continuation of research, teaching, and student supervision in the School of Computer Science.
Achievements: Received ICSE 2021 and 2023 Distinguished Paper Awards, redesigned a project-based software engineering course to better align with the Scrum process model.

- 08/2020–09/2021 **Senior Software Engineer, QAware GmbH, Mainz, Germany**
Senior developer and lead requirements engineer for applications focusing on data analysis, data annotation, and business intelligence in context of a smart speaker and voice platform led by Deutsche Telekom AG.
Achievements: Contributed to process improvements within the team, systematically evaluated and optimized query performance of a dashboard application (query runtime improved on average by 11 minutes), designed and implemented a full stack event-sourcing-based data versioning approach (specification docs including Balsamiq wireframes, implementation from database triggers up to the UI). Peer-reviewed paper motivated by the above-mentioned project.
- 08/2019–07/2020 **Lecturer (Assistant Professor), The University of Adelaide, Australia**
Research, teaching, and student supervision in the broad area of software engineering, on a permanent position in the School of Computer Science.
Achievements: Received Google Faculty Research Award 2019–2020, successfully supervised graduate and undergraduate students.
- 05/2019–07/2019 **Postdoctoral Researcher, University of Trier, Germany**
Finalized ongoing research projects and teaching commitments.
- 07/2013–04/2019 **Doctoral Researcher, University of Trier, Germany**
Research and teaching in software engineering and information visualization; committee work; developed and maintained software infrastructure for the *SOTorrent*  project.
Achievements: Ph.D. with highest honors, dissertation award, DAAD fellowship.
- 03/2012–07/2012 **Software Developer, JAM Software GmbH, Trier, Germany**
Continuation of the projects started during the internship.
- 08/2011–09/2011 **Software Development Intern, JAM Software GmbH, Trier, Germany**
Independently implemented Delphi components for the disk space analysis software *TreeSize*.
- 04/2011–07/2011 **Teaching Assistant (HiWi), University of Trier, Germany**
11/2009–02/2010 Responsible for tutorials and assignment marking in an undergraduate Java programming course as well as in an undergraduate IT security course.
- 04/2007–07/2007 **Internship and follow-up employment, Kuehne+Nagel S.à.r.l., Contern, Luxembourg**
Implemented VBA applications for managing common business processes, including delivery tracking and invoicing; designed and executed internal online survey.

Education

- 07/2013–04/2019 **Ph.D. in Computer Science (Dr. rer. nat.), University of Trier, Germany**
Thesis: *Software Developers' Work Habits and Expertise – Empirical Studies on Sketching, Code Plagiarism, and Expertise Development*.
Advisor: Prof. Dr. Stephan Diehl (University of Trier, Germany),
External reviewer: Prof. Dr. Stefan Wagner (University of Stuttgart, Germany).
- 04/2018–05/2018 **DAAD Fellowship**
Research visit at the University of Adelaide, Australia, hosted by Dr. Christoph Treude.
- 08/2012–01/2013 **Erasmus Programme**
Semester abroad, Linnaeus University, Sweden.
- 10/2010–06/2013 **M.Sc. in Computer Science, University of Trier, Germany**
Thesis: *SketchLink – A Prototype for Linking Sketches with Source Code Artifacts*.
Advisor: Prof. Dr. Stephan Diehl (University of Trier, Germany),
Second examiner: Prof. Dr. Andreas Kerren (Linnaeus University, Sweden).
- 10/2007–09/2010 **B.Sc. in Computer Science, University of Trier, Germany**
Thesis: *Automatic Generation of Test Cases for Protocol Robustness Testing using XML & Java*.
Advisor: Prof. Dr. Ralf Küsters (University of Trier, Germany),
Second examiner: Prof. Dr. Stephan Diehl (University of Trier, Germany).
- 03/2007 **Abitur, Staatliches Gymnasium Saarbarg, Germany**
Advanced courses in Mathematics, English and Social Sciences.

Awards and Funding

- 05/2023 **Distinguished reviewer award, ICSE 2023.**
- 02/2023 **Distinguished paper award, ICSE 2023.**
- 04/2021 **Distinguished paper award, ICSE 2021.**

- 10/2020 **Recipient**, Dissertation Award, Freundeskreis Trierer Universität e.V. 2020 (2,000 €).
- 02/2020 **Recipient**, Google Faculty Research Award 2019-2020 (\$39,722 USD).
- 06/2017–03/2022 **Cloud funding**, Support to maintain the SOTorrent dataset on Google Cloud (\$13,800 USD).
- 01/2020 **Nominee**, Ernst Denert Software Engineering Award and GI Dissertation Award 2019.
- 06/2019 **Recipient**, Publication Price of Faculty IV, University of Trier, Germany.
- 06/2019 **Travel funding**, German Academic Exchange Service (DAAD), (1,250 €).
- 04/2019 **Ph.D. with highest honors**, Grade: *1.0 (summa cum laude)*, University of Trier, Germany.
- 11/2018 **Best paper award**, SWAN Workshop 2018.
- 04/2018–05/2018 **DAAD fellowship**, German Academic Exchange Service (DAAD) (3,077 €).
- 03/2015 **Research funding**, Utilizing tablets in CS education, University of Trier, Germany (5,000 €).
- 11/2013 **Best Master's degree in Computer Science**, Grade: *1.1 (sehr gut)*.
- 11/2011 **IT-Security promotion prize**, CAST-Förderpreis 2011, Category: Bachelor's thesis.
- 11/2010 **Best Bachelor's degree in Computer Science**, Grade: *1.4 (sehr gut)*.

Languages

German, English,

Basic knowledge in French, Swedish, and Luxembourgish.

University Committees

- 02/2020–07/2020 **Outreach committee**,
ECMS Faculty, University of Adelaide, Australia.
- 12/2016–12/2018 **Elected Ph.D. student representative in the graduate center**,
Faculty IV, University of Trier, Germany.
- 06/2016–01/2017 **Member of the faculty council**,
Faculty IV, University of Trier, Germany.
- 05/2015–08/2015 **Member of a search committee**,
Full professorship (W3) for databases and information systems, University of Trier, Germany.

Services

Organizing Committee Member

- 2024 ICSME (Industry Track Co-Chair).
- 2023 ESEM (Emerging Results, Vision and Reflection Papers Co-Chair).
- 2021 ESEC/FSE (Social Media Co-Chair).
- 2020 ICSME (Local Arrangements and Registration Chair), DocGen2 (General and Tool Demo Co-Chair), VISSOFT (Local Chair), ASE (Diversity and Inclusion Co-Chair).
- 2019 MSR (Mining Challenge Co-Chair).

Program Committee Member

- 2025 ICSE (Research Track).
- 2024 ICSE (Research Track), FSE (Research Track, Student Research Competition), ICSME (Research Track), EASE (Research Track).
- 2023 ICSE (Research Track), EASE (Main Track), MSR (FOSS Award).
- 2022 ICSE (Poster Track), MSR (FOSS Award).
- 2021 ASE (Late Breaking Results Track), ICSE (Demonstrations Track), MSR (FOSS Award).
- 2020 ASE (Main Track), ESEM (Industry Track), MSR (Data Showcase Track), ICGSE (Research Papers Track), SANER (ERA and Tool Track), EASE (Empirical Artifacts Track).
- 2019 ESEM (Emerging Results and Vision Papers Track), ICSME (Artifact Track), SEAA (Software and Big Data Analytics).
- 2018 ESEM (Poster Track), ICSME (NIER Track), VISSOFT (Artifact Evaluation).
- 2016 VISSOFT (NIER and Tool Track).
- 2015 VISSOFT (Artifact Evaluation).

Journal Board Member

- since 2021 Empirical Software Engineering (Editorial Board).
- 2020 Empirical Software Engineering (Guest Editor, *Collective Knowledge in Software Engineering*).
- 2019–2020 Transactions on Software Engineering and Methodology (Reviewer Board).

Journal Reviewer

- 2021 Transactions on Software Engineering, Empirical Software Engineering, Journal of Systems and Software, Information and Software Technology.
- 2020 Transactions on Software Engineering, Empirical Software Engineering, Journal of Systems and Software, IEEE Software.
- 2019 Transactions on Software Engineering, Empirical Software Engineering, Journal of Systems and Software.
- 2018 Empirical Software Engineering, Journal of Systems and Software, Information and Software Technology.

Moderator

- 2021 ACM SIGSOFT Webinar on *Revolutionizing Peer Review with Empirical Standards*.

Talks

A complete list of talks, including titles and slides, is available on my website [↗](#)

Invited Talks and Seminar Participation

- 2024 Lecture Series Digital Sciences at UBT, University of Bayreuth, Germany.
- 2023 Panel member Heidelberg Laureate Forum (St. Leon-Rot, Germany); Keynote speaker at GI@ICSE 2023 (Melbourne, Australia); Participant of the Copenhagen Symposium on Human-Centered Software Engineering and Artificial Intelligence (Copenhagen, Denmark); Invited talks at SAP SE (Walldorf, Germany), University of Konstanz (Germany), Technical University of Munich (Online), University of Bayreuth (Germany).
- 2022 Dagstuhl seminar participant Theories of Programming (Wadern, Germany); Invited talks at 'It Will Never Work in Theory: Live!' (Online), SAP SE (Online), University of Luxembourg (Esch-sur-Alzette, Luxembourg).
- 2021 Invited talks at GitHub (Online), ABB Corporate Research Center (Online), Google Google Tech Talks (Online), University of Tübingen (Online), Blekinge Institute of Technology (Online), QAware Engineering Camp (Online).
- 2020 DySDoc6 participant (St. James, Barbados); Invited talks at Singapore Management University (Singapore), TU Eindhoven (Netherlands), Saarland University (Saarbrücken, Germany), University of Innsbruck (Austria).
- 2019 DySDoc5 participant (Okinawa, Japan), BRIDGES2019 participant (Port Moresby, Papua New Guinea); Invited talks at Microsoft Research (Redmond, USA), Lund University (Sweden), Software Innovation NZ (Dunedin, New Zealand), University of Auckland (New Zealand), QAware GmbH (Munich, Germany).
- 2018 Invited talks at George Mason University (Fairfax, USA), TU Delft (Netherlands).
- 2016 Invited talk at Java User Group Saar (Saarbrücken, Germany).
- 2015 Invited talks at University of Stuttgart (Germany), TU Delft (Netherlands).

Conference and Workshop Talks/Posters

- 2023 ICSE (Melbourne, Australia).
- 2020 ICSE (virtual), FSE (virtual), GECCO-GI (virtual).
- 2019 ICSE&MSR (Montreal, Canada), SE (Stuttgart, Germany).
- 2018 FSE&SWAN (Lake Buena Vista, USA), MSR (Gothenburg, Sweden).
- 2017 ICSE (Buenos Aires, Argentina), VISSOFT (Shanghai, China).
- 2016 ESEM (Ciudad Real, Spain), XP (Edinburgh, UK).
- 2015 ESEM (Beijing, China), VL/HCC (Atlanta, USA), SE (Dresden, Germany).
- 2014 FSE (Hong Kong, China).

Memberships

Gesellschaft für Informatik e.V. (GI)

Association for Computing Machinery (ACM), SIG on Software Engineering (SIGSOFT)

IEEE Computer Society (IEEE CS), Technical Council on Software Engineering (IEEE TCSE)