Dr. Norman Peitek

Personal Data

Civil Status Married, two children

Email peitek@cs.uni-saarland.de

Web https://scholar.google.de/citations?user=c1QcKpIAAAAJ

Education

2016–2022 **Dr. rer. nat.**, *Chemnitz University of Technology*, Germany, *Summa cum laude*
Thesis: A Neuro-Cognitive Perspective of Program Comprehension
Dissertation Award of the University. Nominated for the GI Dissertation Award.

2012–2014 **Master of Science**, *Otto von Guericke University Magdeburg*, Germany, *1.5 (Very Good)*
Major: Business Information Systems

2011 **Exchange Semester**, *University of Wisconsin—Stevens Point*, USA

2009–2012 **Bachelor of Science**, *Otto von Guericke University Magdeburg*, Germany, *1.7 (Good)*
Major: Business Information Systems

Awards

2022 **University Award for Dissertation**, *Chemnitz University of Technology*

2021 **ACM SIGSOFT Distinguished Paper Award**, *International Conference on Software Engineering (ICSE)*

2019 **Best Tool Demo Award**, *International Conference on Program Comprehension (ICPC)*

2011–2014 **Full Study Scholarship**, *Friedrich Naumann Foundation for Freedom*

Experience

Vocational

Since 2022 **Postdoctoral Researcher**, *Saarland University, Saarland Informatics Campus*, Saarbrücken, Germany
ERC Advanced Grant “A Neuroscientific Foundation of Program Comprehension” (*Brains on Code*).

2016–2021 **Doctoral Researcher**, *Leibniz Institute for Neurobiology*, Magdeburg, Germany
DFG project “Neuronal, behavioral and psychophysiological correlates of program comprehension”

Since 2014 **Co-Founder**, *futurestud.io*
Online learning platform for software developers; author of more than 200 programming tutorials and 70 videos

2014–2016 **Software Consultant**, *Ultra Tendency*, Magdeburg, Germany

2013–2014 **Software Developer Intern**, *University of Wisconsin—Stevens Point*, USA
Part of the Master’s Degree

Student Assistance

2011, 2013 **Research Assistant**, *Otto von Guericke University Magdeburg*, Germany
2012 **Research Assistant**, *Berlin School of Economics and Law*, Germany

Other

2008–2009 **Alternative Civilian Service**, *University Clinic Magdeburg*, Germany

Teaching

Lecturer

2023–2026 **Software Engineering Lab (Lecture & Project, mandatory, up to 258 students)**, *Saarland University*, Germany
2023, 2025, 2026 **Empirical Software Engineering Research (Lecture)**, *Saarland University*, Germany
2025 **AI Coding Assistants: Hype or Game Changer? (Seminar)**, *Saarland University*, Germany
2024 **The Eye of the Beholder: What Can Eye-Tracking Data Reveal about Code? (Seminar)**, *Saarland University*, Germany
2022, 2023 **Software Engineering Research in the Neuroage (Seminar)**, *Saarland University*, Germany
2015, 2016 **Mobile and Distributed Systems (Lecture, in German)**, *Bingen University of Applied Sciences*, Germany

Didactic Training

Saarland Univ. Teaching and Learning in Theory and Practice; Teaching and Learning – Basics in English; Service Learning Workshop

Languages

German Native proficiency
English Full professional proficiency
French Elementary proficiency
Spanish Elementary proficiency

Professional Service

Since 2022	Steering Committee: International Workshop on Eye Movements in Programming (EMIP)
2019, 2021, 2023–2026	Organizer: International Workshop on Eye Movements in Programming (EMIP)
2023	Proceedings Co-Chair: International Conference on Program Comprehension (ICPC)

Program Committees

Since 2024	International Conference on Software Engineering – New Ideas and Emerging Results (ICSE-NIER)
Since 2024	International Computing Education Research Conference (ICER)
Since 2024	International Conference on Mining Software Repositories – Registered Reports (MSR-RR)
Since 2023	Workshop on Advances in Human-Centric Experiments in Software Engineering (HUMAN)
2024	Human Factors for Software Dependability (HFSD)
2023	International Symposium on Empirical Software Engineering and Measurement (ESEM)
2019, 2022	International Workshop on Eye Movements in Programming (EMIP)
2019	ACM Symposium on Eye Tracking Research & Applications (ETRA-ET4S)
2018	IEEE/ACM International Conference on Program Comprehension (ICPC)

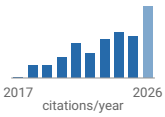
Reviewer

Since 2025	Transactions on Computing Education (TOCE), ACM
Since 2020	Transactions on Software Engineering and Methodology (TOSEM), ACM
Since 2019	Transactions on Software Engineering (TSE), IEEE
Since 2018	Empirical Software Engineering (EMSE), Springer
2026	Conference on Human Factors in Computing Systems (CHI), ACM
2026	Brain and Cognition, Elsevier
2023	Journal of Systems & Software, Elsevier
2023	PeerJ, O'Reilly & SAGE
2022	Automated Software Engineering, Springer
2021	APSIPA Transactions on Signal and Information Processing
2020	eNeuro, Society for Neuroscience
2020	Computer Science Education, Taylor & Francis
2020	Cognitive Science, Wiley
2019	Human Brain Mapping, Wiley
2019	PLOS ONE, Public Library of Science

Invited Talks

2023	**Neuroscience & Software Engineering: A New Wave of Research on Programmers**, *Humboldt University of Berlin*, Germany
2019, 2021	**Your Brain on Code**, *Magdeburger Developer Days*, Germany
2019, 2020	**Program Comprehension Research with Neuroscience Methods**, *Chemnitz University of Technology*, Germany
2019	**Program Comprehension Research with Neuroscience Methods**, *Saarland University*, Germany

Publications



37 publications, 1 017 citations, h-index 13 (based on `Google Scholar`, October 2026)

Venues include **ICSE** (2), **ESEC/FSE** (2), **TOSEM** (2), **TSE**, **EMSE**, **Scientific Reports**, and **Communications of the ACM**.

†Co-advised doctoral student, ‡supervised thesis student.

Dissertation

[1] **Norman Peitek**. *A Neuro-Cognitive Perspective of Program Comprehension* University Dissertation Award. PhD thesis, Chemnitz University of Technology, 2022.

Book Chapter

[2] Michael Hanke, Sebastiaan Mathôt, Eduard Ort, **Norman Peitek**, Jörg Stadler, and Adina Wagner. A Practical Guide to Functional Magnetic Resonance Imaging with Simultaneous Eye Tracking for Cognitive Neuroimaging Research. In *Spatial Learning and Attention Guidance*, pages 291–305. Springer US, 2020.

Journal Articles

[3] Annabelle Bergum†, **Norman Peitek**, Maurice Rekrut, Janet Siegmund, and Sven Apel. On the Influence of the Baseline in Neuroimaging Experiments on Program Comprehension. *Transactions on Software Engineering and Methodology (TOSEM)*, 35(3):83, 2026.

[4] Annabelle Bergum†, Anna-Maria Maurer†, **Norman Peitek**, Regine Bader, Axel Mecklinger, Vera Demberg, Janet Siegmund, and Sven Apel. Fixation-Related Potentials Reveal That Confusing Program Code Elicits a Late Frontal Positivity. *Scientific Reports*, 16(1):16833, 2026.

[5] Youssef Abdelsalam†, **Norman Peitek**, Annabelle Bergum†, and Sven Apel. The Effect Of Comments On Program Comprehension: An Eye-Tracking Study. *Empirical Software Engineering (EMSE)*, 31(4):94, 2026.

[6] **Norman Peitek**, André Brechmann, Karsten Tabelow, and Thorsten Dickhaus. Utilizing Anatomical Information for Signal Detection in Functional Magnetic Resonance Imaging. *F1000Research*, 14(1019):1–17, 2025.

[7] Janet Siegmund, **Norman Peitek**, Sven Apel, and Norbert Siegmund. Mastering Variation in Human Studies: The Role of Aggregation. *Transactions on Software Engineering and Methodology (TOSEM)*, 30(1), 2021.

[8] Janet Siegmund, **Norman Peitek**, André Brechmann, Chris Parnin, and Sven Apel. Studying Programming in the Neuroage: Just a Crazy Idea? *Communications of the ACM*, 63(6):30–34, 2020.

[9] **Norman Peitek**, Janet Siegmund, Sven Apel, Christian Kästner, Chris Parnin, Anja Bethmann, Thomas Leich, Gunter Saake, and André Brechmann. A Look into Programmers' Heads. *IEEE Transactions on Software Engineering (TSE)*, 46(4):442–462, 2020.

Conference and Workshop Papers

[10] Marvin Wyrich*, **Norman Peitek***, Kallistos Weis, and Sven Apel. Harnessing Hype to Teach Empirical Thinking: An Experience With AI Coding Assistants. In *Proc. Int'l Conf. on the Foundations of Software Engineering – Software Engineering Education Track (FSE-SEET)*, pages 1–11. ACM, 2026. *Joint first authors.

[11] Nils Alznauer‡, **Norman Peitek**, Youssef Abdelsalam†, Annabelle Bergum†, Marvin Wyrich, and Sven Apel. Eye-Tracking Insights into the Effects of Type Annotations and Identifier Naming. In *Proc. Int'l Conference Program Comprehension (ICPC)*, pages 1–11. ACM, 2026.

[12] Youssef Abdelsalam†, **Norman Peitek**, Anna-Maria Maurer†, Mariya Toneva, and Sven Apel. Are Humans and LLMs Confused by the Same Code? An Empirical Study on Fixation-Related

Potentials and LLM Perplexity. In *Proc. Int'l Conf. Software Engineering (ICSE)*, pages 1–12. ACM, 2026.

[13] Timon Dörzapf‡, **Norman Peitek**, Marvin Wyrich, and Sven Apel. Data Analysis Tools Affect Outcomes of Eye-Tracking Studies. In *Proc. Int'l Symposium Empirical Software Engineering and Measurement (ESEM)*, pages 96–106. ACM, 2024.

[14] **Norman Peitek**, Annabelle Bergum†, Maurice Rekrut, Jonas Mucke, Matthias Nadig, Chris Parnin, Janet Siegmund, and Sven Apel. Correlates of Programmer Efficacy and Their Link to Experience: A Combined EEG and Eye-Tracking Study. In *Proc. Joint Meeting on Foundations of Software Engineering*, ESEC/FSE, pages 120–131. ACM, 2022.

[15] **Norman Peitek**, Sven Apel, Chris Parnin, André Brechmann, and Janet Siegmund. Program Comprehension and Code Complexity Metrics: An fMRI Study ACM SIGSOFT Distinguished Paper Award. In *Proc. Int'l Conf. Software Engineering (ICSE)*, pages 524–536. IEEE, 2021.

[16] **Norman Peitek**, Janet Siegmund, and Sven Apel. What Drives the Reading Order of Programmers? An Eye Tracking Study. In *Proc. Int'l Conference Program Comprehension (ICPC)*, pages 342–353. ACM, 2020.

[17] **Norman Peitek**, Sven Apel, André Brechmann, Chris Parnin, and Janet Siegmund. CodersMUSE: Multi-Modal Data Exploration of Program-Comprehension Experiments Best Tool Demo Award. In *Proc. Int'l Conference Program Comprehension (ICPC)*, pages 126–129. IEEE, 2019.

[18] Jennifer Bauer‡, Janet Siegmund, **Norman Peitek**, Johannes Hofmeister, and Sven Apel. Indentation: Simply a Matter of Style or Support for Program Comprehension? In *Proc. Int'l Conference Program Comprehension (ICPC)*, pages 154–164. IEEE, 2019.

[19] **Norman Peitek**, Janet Siegmund, Chris Parnin, Sven Apel, Johannes Hofmeister, and André Brechmann. Simultaneous Measurement of Program Comprehension with fMRI and Eye Tracking: A Case Study. In *Proc. Int'l Symposium Empirical Software Engineering and Measurement (ESEM)*, pages 24:1–24:10. ACM, 2018.

[20] **Norman Peitek**, Janet Siegmund, Chris Parnin, Sven Apel, and André Brechmann. Toward Conjoint Analysis of Simultaneous Eye-Tracking and fMRI Data for Program-Comprehension Studies. In *Proc. Int'l Workshop on Eye Movements in Programming*, pages 1:1–1:5. ACM, 2018.

[21] **Norman Peitek**, Janet Siegmund, Chris Parnin, Sven Apel, and André Brechmann. Beyond Gaze: Preliminary Analysis of Pupil Dilation and Blink Rates in an fMRI Study of Program Comprehension. In *Proc. Int'l Workshop on Eye Movements in Programming*, pages 4:1–4:5. ACM, 2018.

[22] **Norman Peitek**. A Neuro-Cognitive Perspective of Program Comprehension. In *Companion Proc. of Int'l Conf. on Software Engineering*, ICSE 2018, pages 496–499. ACM, 2018.

[23] Janet Siegmund, **Norman Peitek**, Chris Parnin, Sven Apel, Johannes Hofmeister, Christian Kästner, Andrew Begel, Anja Bethmann, and André Brechmann. Measuring Neural Efficiency of Program Comprehension. In *Proc. Joint Meeting on Foundations of Software Engineering*, ESEC/FSE, pages 140–150. ACM, 2017.

Preprints under Review or Revision

[24] Maurice Rekrut, Mahima Mahabaleshwar Acharya‡, Taisiia Ulianova, **Norman Peitek**, Annabelle Bergum†, Mariya Toneva, Sven Apel, and Antonio Krüger. Neural Signatures of Programming Expertise: Classifying Programmer Skill Levels Using EEG Data, 2026. *Under revision at IEEE Transactions on Cognitive and Developmental Systems (TCDS). arXiv:2606.30879*.

[25] **Norman Peitek**, Julia Hess‡, and Sven Apel. From Restructuring to Stabilization: A Large-Scale Experiment on Iterative Code Readability Refactoring with Large Language Models, 2026. *Under revision at ACM Transactions on Software Engineering and Methodology (TOSEM). arXiv:2602.21833*.

[26] Yannick Lehmen†, Marvin Wyrich, Anna-Maria Maurer†, **Norman Peitek**, and Sven Apel. Predicting Program Comprehension with Foundation Models of Human Cognition, 2026. *Under review. arXiv:2607.11372*.

[27] Youssef Abdelsalam†, **Norman Peitek**, Anna-Maria Maurer†, Marvin Wyrich, and Sven Apel. A Mechanistic Lens on Semantic Conflicts: Using Activation Patching to Understand LLM Behavior, 2026. *Under review. arXiv:2607.05587*.

Other Publications

[28] Annabelle Bergum†, Anna-Maria Maurer†, **Norman Peitek**, Regine Bader, Axel Mecklinger, Vera Demberg, Janet Siegmund, and Sven Apel. Unexpected but Informative: Frontal Positivity Elicited by Confusing Program Code Mirrors Natural Language Processing. In *Annual Conf. Architectures and Mechanisms for Language Processing (AMLaP)*, 2026. Conference abstract.

[29] Elisa Madeleine Hartmann, Annabelle Bergum†, Dominik Gorgosch, **Norman Peitek**, Sven Apel, and Janet Siegmund. Tapping into the Natural Language System with Artificial Languages when Learning Programming, 2024. arXiv:2402.01657.

[30] **Norman Peitek**. Eine neurokognitive Perspektive auf Programmverständnis. In *Ausgezeichnete Informatikdissertationen 2022 (Band D23)*, pages 211–220. Gesellschaft für Informatik e.V., Bonn, 2023.

[31] **Norman Peitek**, Sven Apel, Chris Parnin, André Brechmann, and Janet Siegmund. Program Comprehension and Code Complexity Metrics: A Replication Package of an fMRI Study. In *2021 IEEE/ACM 43rd International Conference on Software Engineering: Companion Proceedings (ICSE-Companion)*, pages 168–169, 2021.

[32] Arooba Aqeel, **Norman Peitek**, Sven Apel, Jonas Mucke, and Janet Siegmund. Understanding Comprehension of Iterative and Recursive Programs with Remote Eye Tracking. In *Proc. Annual Conf. Psychology of Programming Interest Group (PPIG)*, page 17, 2021.

[33] **Norman Peitek**, Janet Siegmund, Chris Parnin, Sven Apel, Johannes Hofmeister, Christian Kästner, Andrew Begel, Anja Bethmann, and André Brechmann. Neural Efficiency of Top-Down Program Comprehension. In *Proc. of Software Engineering (SE)*, pages 151–152. GI, 2018.

[34] **Norman Peitek**, Janet Siegmund, and André Brechmann. Enhancing fMRI Studies of Program Comprehension with Eye-Tracking. In *Proc. Int'l Workshop on Eye Movements in Programming*, pages 22–23. Freie Universität Berlin, 2017.

[35] Chris Parnin, Janet Siegmund, and **Norman Peitek**. On the Nature of Programmer Expertise. In *Proc. Annual Conf. Psychology of Programming Interest Group (PPIG)*, pages 109–118, 2017.

[36] Johannes Hofmeister, Jennifer Bauer‡, Janet Siegmund, Sven Apel, and **Norman Peitek**. Comparing Novice and Expert Eye Movements during Program Comprehension. In *Proc. Int'l Workshop on Eye Movements in Programming*, pages 17–18. Freie Universität Berlin, 2017.

[37] Robert Neumann, **Norman Peitek**, and Juan José Cuadrado-Gallego. Geopointing on Indoor Maps: Enhancing Compass Sensor Accuracy to Enable Interactive Digital Object Selection in Smartphone-Based Map Applications. In *Proc. Int'l Symposium on Mobility Management and Wireless Access*, pages 63–70. ACM, 2012.