

## List of Publications

### Journal Articles

1. Dreyer M, Berend J, Labarta T, Vielhaben J, Wiegand T, **Lapuschkin S** and Samek W (2025).  
“Mechanistic Understanding and Validation of Large AI Models with SemanticLens”.  
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2. Pahde F, Wiegand T, **Lapuschkin S** and Samek W (2025).  
“Ensuring Medical AI Safety: Explainable AI-Driven Detection and Mitigation of Spurious Model Behavior and Associated Data”.  
In: *Machine Learning* 114(9):206.  
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3. Ma J, Weicken E, Pahde F, Weitz K, **Lapuschkin S**, Samek W and Wiegand T (2025).  
“Künstliche Intelligenz auf dem Prüfstand: Anforderungen, Qualitätskriterien und Prüfwerkzeuge für medizinische Anwendungen [*Artificial intelligence under scrutiny: requirements, quality criteria, and testing tools for medical applications*]”.  
In: *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz* 68:915-923
4. Storås A M, Dreyer M, Pahde F, **Lapuschkin S**, Samek W, Halvorsen P, de Lange T, Mori Y, Hann A, Berzin T M, Parasa S and Riegler M A (2025).  
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5. Weber L, Berend J, Weckbecker M, Binder A, Wiegand T, Samek W and **Lapuschkin S** (2025).  
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6. Hedström A, Bommer P L, Burns T F, **Lapuschkin S**, Samek W and Höhne M-C M (2025).  
“Evaluating Interpretable Methods via Geometric Alignment of Functional Distortions”.  
In: *Transactions on Machine Learning Research* ukLxqA8zXj.  
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7. Bley F, **Lapuschkin S**, Samek W and Montavon G (2025).  
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In: *Pattern Recognition* 160:111171.  
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8. Vielhaben J, **Lapuschkin S**, Montavon G and Samek W (2024).  
“Explainable AI for Time Series via Virtual Inspection Layers”.  
In: *Pattern Recognition* 150:110309.  
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9. Becker S, Vielhaben J, Ackermann M, Müller K-R, **Lapuschkin S** and Samek W (2024).  
“AudioMNIST: Exploring Explainable Artificial Intelligence for Audio Analysis on a Simple Benchmark”.  
In: *Journal of the Franklin Institute* 361(1):418–428.  
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10. Achtabat R, Dreyer M, Eisenbraun I, Bosse S, Wiegand T, Samek W and **Lapuschkin S** (2023).  
“From attribution maps to human-understandable explanations through Concept Relevance Propagation”.  
In: *Nature Machine Intelligence* 5(9):1006–1019.  
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11. Hedström A, Bommer P, Wickstrøm K K, Samek W, **Lapuschkin S** and Höhne M-C M (2023).  
“The Meta-Evaluation Problem in Explainable AI: Identifying Reliable Estimators with MetaQuantus”.  
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12. Weber L, **Lapuschkin S**, Binder A and Samek W (2023).  
“Beyond Explaining: Opportunities and Challenges of XAI-Based Model Improvement”.  
In: *Information Fusion* 92:154–176
13. Hedström A, Weber L, Krakowczyk D G, Bareeva D, Motzkus F, Samek W, **Lapuschkin S** and Höhne M-C M (2023).

- "Quantus: An Explainable AI Toolkit for Responsible Evaluation of Neural Network Explanations and Beyond".  
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14. Hofmann S M, Beyer F, **Lapuschkin S**, Golterman O, Loeffler M, Müller K-R, Villringer A, Samek W and Witte A V (2022).  
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In: *NeuroImage* 261:119504
  15. Ma J, Schneider L, **Lapuschkin S**, Achibat R, Durchrau M, Krois J, Schwendicke F and Samek W (2022).  
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  16. Rieckmann A, Dworzynski P, Arras L, **Lapuschkin S**, Samek W, Onyebuchi A A, Rod N H, Ekstrøm C T (2022).  
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  17. Slijepcevic D, Horst F, **Lapuschkin S**, Horsak B, Raberger A-M, Kranzl A, Samek W, Breiteneder C, Schöllhorn W I and Zeppelzauer M (2022).  
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  18. Anders C J, Weber L, Neumann D, Samek W, Müller K-R and **Lapuschkin S** (2022).  
"Finding and Removing Clever Hans: Using Explanation Methods to Debug and Improve Deep Models".  
In: *Information Fusion* 77:261–295
  19. Sun J, **Lapuschkin S**, Samek W and Binder A (2022).  
"Explain and Improve: LRP-inference Fine-tuning for Image Captioning Models".  
In: *Information Fusion* 77:233–246
  20. Samek W, Montavon G, **Lapuschkin S**, Anders C J, and Müller K-R (2021).  
"Explaining Deep Neural Networks and Beyond: A Review of Methods and Applications".  
In: *Proceedings of the IEEE* 109(3):247–278
  21. Yeom S-K, Seegerer P, **Lapuschkin S**, Binder A, Wiedemann S, Müller K-R and Samek W (2021).  
"Pruning by Explaining: A Novel Criterion for Deep Neural Network Pruning".  
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  22. Aeles J, Horst F, **Lapuschkin S**, Lacourpaille L, and Hug F (2021).  
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  23. Horst F, Slijepcevic D, Zeppelzauer M, Raberger AM, **Lapuschkin S**, Samek W, Schöllhorn WI, Breiteneder C, and Horsak B (2020).  
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  24. Hägele M, Seegerer P, **Lapuschkin S**, Bockmayr M, Samek W, Klauschen F, Müller K-R and Binder A (2020).  
"Resolving Challenges in Deep Learning-based Analyses of Histopathological Images using Explanation Methods".  
In: *Scientific Reports* 10:6423
  25. Alber M, **Lapuschkin S**, Seegerer P, Hägele M, Schütt K T, Montavon G, Samek W, Müller K-R, Dähne S and Kindermans P-J (2019).  
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In: *Journal of Machine Learning Research* 20(93):1–8.  
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In: *Nature Communications* 10:1069

27. Horst F, **Lapuschkin S**, Samek W, Müller K-R and Schöllhorn W I (2019).  
 “Explaining the Unique Nature of Individual Gait Patterns with Deep Learning”.  
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28. Montavon G, **Lapuschkin S**, Binder A, Samek W and Müller K-R (2017).  
 “Explaining NonLinear Classification Decisions with Deep Taylor Decomposition”.  
 In: *Pattern Recognition* 65:211–222.  
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29. Samek W, Binder A, Montavon G, **Lapuschkin S**, and Müller K-R (2017).  
 “Evaluating the Visualization of what a Deep Neural Network has Learned”.  
 In: *IEEE Transactions of Neural Networks and Learning Systems*
30. Sturm I, **Lapuschkin S**, Samek W and Müller K-R (2016).  
 “Interpretable Deep Neural Networks for Single-Trial EEG Classification”.  
 In: *Journal of Neuroscience Methods* 274:141–145
31. **Lapuschkin S**, Binder A, Montavon G, Müller K-R and Samek W (2016).  
 “The Layer-wise Relevance Propagation Toolbox for Artificial Neural Networks”.  
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32. **Bach S**, Binder A, Montavon G, Klauschen F, Müller K-R and Samek W (2015).  
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 In: *PLoS ONE* 10(7):e0130140

#### Contributions to Conference Proceedings and Workshops

1. Labarta T, Hoang N, Weitz K, Samek W, **Lapuschkin S** and Weber L (2025).  
 “See What I Mean? CUE: A Cognitive Model of Understanding Explanations”.  
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2. Puri B, Jain A, Golimblevskaia E, Kahardipraja P, Wiegand T, Samek W and **Lapuschkin S** (2025).  
 “FADE: Why Bad Descriptions Happen to Good Features”.  
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3. Naujoks J, Krasowski A, Weckbecker M, Yolcu G Ü, Wiegand T, **Lapuschkin S**, Samek W and Klausen R P (2025).  
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4. Erogullari E, **Lapuschkin S**, Samek W and Pahde F (2025).  
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 In: *Proceedings of the 3rd XAI World Conference* TBA.  
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5. Joseph S, Suresh P, Hufe L, Stevinson E, Graham R, Vadi Y, Bzdok D, **Lapuschkin S**, Sharkey L and Richards A (2025).  
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6. Pahde F, Dreyer M, Weckbecker M, Weber L, Anders C J, Wiegand T, Samek W and **Lapuschkin S** (2025).  
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7. Bareeva D, Yolcu GÜ, Hedström A, Wiegand T, Samek W and **Lapuschkin S** (2024).  
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8. Naujoks J R, Krasowski A, Weckbecker M, Wiegand T, **Lapuschkin S**, Samek W and Klausen R P (2024).  
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 Reproducibility Badge Winner

9. Kopf L, Bommer P L, Hedström A, **Lapuschkin S**, Höhne M M-C and Bykov K (2024).  
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10. Nobis G, Springenberg M, Aversa M, Detzel M, Daems R, Murray-Smith R, Nakajima S, **Lapuschkin S**, Ermon S, Birdal T, Oppel M, Knochenhauer C, Oala L and Samek W (2024).  
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11. Mekala R R, Pahde F, Baur S, Chandrashekar S, Diep M, Wenzel M A, Wisotzky E L, Yolcu G Ü, **Lapuschkin S**, Ma J, Eisert P, Lindvall M, Porter A and Samek W (2024).  
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12. Achitibat R, Hatefi S M V, Dreyer M, Jain A, Wiegand T, **Lapuschkin S**, Samek W (2024).  
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13. Hatefi S M V, Dreyer M, Achitibat R, Wiegand T, Samek W and **Lapuschkin S** (2024).  
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14. Hedström A, Weber L, **Lapuschkin S**, Höhne M M-C (2024).  
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15. Tinauer C, Damulina A, Sackl M, Soellradl M, Achitibat R, Dreyer M, Pahde F, **Lapuschkin S**, Schmidt R, Ropele S, Samek W, Langkammer C (2024).  
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17. Bareeva D, Dreyer M, Pahde F, Samek W and **Lapuschkin S** (2024).  
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18. Dreyer M, Achitibat R, Samek W and **Lapuschkin S** (2024).  
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19. Dreyer M, Pahde F, Anders C J, Samek W and **Lapuschkin S** (2024).  
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20. Dawoud K, Samek W, Eisert P, **Lapuschkin S** and Bosse S (2023).  
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21. Frommholz A, Seipel F, **Lapuschkin S**, Samek W and Vielhaben J (2023).  
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22. Hedström A, Weber L, **Lapuschkin S** and Höhne M M-C (2023).  
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23. Pahde F, Dreyer M, Samek W and **Lapuschkin S** (2023).  
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24. Binder A, Weber L, **Lapuschkin S**, Montavon G, Müller K-R and Samek W (2023).  
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25. Dreyer M, Achitbat R, Wiegand T, Samek W and **Lapuschkin S** (2023).  
 “Revealing Hidden Context Bias in Segmentation and Object Detection through Concept-specific Explanations”.  
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26. Pahde F, Yolcu GÜ, Binder A, Samek W and **Lapuschkin S** (2023).  
 “Optimizing Explanations by Network Canonization and Hyperparameter Search”.  
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27. Krakowczyk D G, Prasse P, Reich D R, **Lapuschkin S**, Scheffer T, Jäger L A (2023).  
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28. Krakowczyk D G, Reich D R, Prasse P, **Lapuschkin S**, Jäger L A and Scheffer T (2022).  
 “Selection of XAI Methods Matters: Evaluation of Feature Attribution Methods for Oculomotoric Biometric Identification”.  
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29. Motzkus F, Weber L and **Lapuschkin S** (2022).  
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30. Ede S, Baghdadlian S, Weber L, Nguyen A, Zanca D, Samek W and **Lapuschkin S** (2022).  
 “Explain to Not Forget: Defending Against Catastrophic Forgetting with XAI”.  
 In: *Proceedings of the International Cross-Domain Conference for Machine Learning and Knowledge Extraction (CD-MAKE)* 1–18. (Gold Open Access link)
31. Sun J, **Lapuschkin S**, Samek W, Zhao Y, Cheung N-M and Binder A (2021).  
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32. Goh G S W, **Lapuschkin S**, Weber L, Samek W and Binder A (2021).  
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33. Kohlbrenner M, Bauer A, Nakajima S, Binder A, Samek W, and **Lapuschkin S** (2020).  
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34. Sun J, **Lapuschkin S**, Samek W and Binder A (2020).  
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35. Anders C J, Neumann D, Marinč T, Samek W, Müller K-R and **Lapuschkin S** (2020).  
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36. Sun J, **Lapuschkin S**, Samek W, Zhao Y, Cheung N-M and Binder A (2020).  
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37. Alber M, **Lapuschkin S**, Seegerer P, Hägele M, Schütt K T, Montavon G, Samek W, Müller K-R, Dähne S and Kindermans P-J (2018).  
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38. **Lapuschkin S**, Binder A, Müller K-R and Samek W (2017).  
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39. Srinivasan V, **Lapuschkin S**, Hellge C, Müller K-R and Samek W (2017).  
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40. **Bach S**, Binder A, Müller K-R and Samek W (2016).  
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41. Binder A, Samek W, Montavon G, **Bach S**, and Müller K-R (2016).  
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42. **Lapuschkin S**, Binder A, Montavon G, Müller K-R and Samek W (2016).  
 “Analyzing Classifiers: Fisher Vectors and Deep Neural Networks”.  
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43. Montavon G, **Bach S**, Binder A, Samek W and Müller K-R (2016).  
 “Deep Taylor Decomposition of Neural Networks”.  
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44. Samek W, Montavon G, Binder A, **Lapuschkin S** and Müller K-R (2016).  
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## Books

1. Longo L, **Lapuschkin S** and Seifert C, editors (2024).  
 “Explainable Artificial Intelligence (Second World Conference, xAI 2024, Valletta, Malta, July 17–19, 2024, Proceedings, Part I-IV)”.  
 Springer (Cham), Part I ISBN: 978-3-031-63787-2. Part II ISBN: 978-3-031-63797-1.  
 Part III ISBN: 978-3-031-63800-8. Part IV ISBN: 978-3-031-63803-9

## Book Chapters

1. Becking D, Dreyer M, Samek W, Müller K and **Lapuschkin S** (2022).  
 “ECQ<sup>x</sup>: Explainability-Driven Quantization for Low-Bit and Sparse DNNs”.  
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2. Montavon G, Binder A, **Lapuschkin S**, Samek W and Müller K-R (2019).  
 “Layer-wise relevance propagation: An Overview”.  
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3. Binder A, **Bach S**, Montavon G, Müller K-R and Samek W (2016).  
 “Layer-wise Relevance Propagation for Deep Neural Network Architectures”.  
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4. Binder A, Montavon G, **Lapuschkin S**, Müller K-R and Samek W (2016).  
 “Layer-wise Relevance Propagation for Neural Networks with Local Renormalization Layers”.  
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## Preprints

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