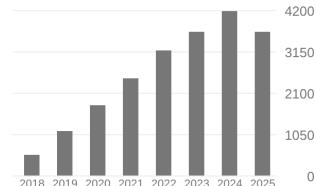


## Publications

### Summary of Scientific Impact

|                | All   | Since 2020 |
|----------------|-------|------------|
| # Publications | 100   | 80         |
| # Citations    | 21211 | 19021      |
| h-index        | 38    | 37         |
| i10-index      | 63    | 62         |



per Google Scholar, retrieved on November 18<sup>th</sup>, 2025.

### 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". In: *Nature Machine Intelligence* 1–14.  
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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). "Exploring the Clinical Value of Concept-based AI Explanations in Gastrointestinal Disease Detection". In: *Scientific Reports* 15(1):28860.  
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5. Weber L, Berend J, Weckbecker M, Binder A, Wiegand T, Samek W and **Lapuschkin S** (2025). "Efficient and Flexible Neural Network Training through Layer-wise Feedback Propagation". In: *Transactions on Machine Learning Research* 9oToxYVOSW.  
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7. Bley F, **Lapuschkin S**, Samek W and Montavon G (2025). "Explaining Predictive Uncertainty by Exposing Second-Order Effects". In: *Pattern Recognition* 160:111171.  
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<https://github.com/jvielhaben/DFT-LRP>
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. Achtibat 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. <https://github.com/rachtibat/zennit-crp> | <https://github.com/maxdreyer/crp-human-study>
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". In: *Transactions on Machine Learning Research* j3FK00HyfU. <https://github.com/annahedstroem/MetaQuantus>
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". In: *Journal of Machine Learning Research* 24(34):1–11. <https://github.com/understandable-machine-intelligence-lab/quantus>
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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". In: *Pattern Recognition* 115:107899. [https://github.com/seulkkiyeom/LRP\\_pruning](https://github.com/seulkkiyeom/LRP_pruning) | [https://github.com/seulkkiyeom/LRP\\_Pruning\\_toy\\_example](https://github.com/seulkkiyeom/LRP_Pruning_toy_example)
22. Aeles J, Horst F, **Lapuschkin S**, Lacourpaille L, and Hug F (2021). "Revealing the Unique Features of Each Individual's Muscle Activation Signatures". In: *Journal of the Royal Society Interface* 18(174):20200770. <https://github.com/sebastian-lapuschkin/interpretable-emg-signatures>
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24. Hägele M, Seegerer P, **Lapuschkin S**, Bockmayr M, Samek W, Klauschen F, Müller K-R and Binder A (2020).  
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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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26. **Lapuschkin S**, Wäldchen S, Binder A, Montavon G, Samek W and Müller K-R (2019).  
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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”.  
In: *Proceedings of the IJCAI Workshops 2025: XAI Workshop*.  
<https://arxiv.org/abs/2506.14775>
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”.  
In: *Findings of the Association for Computational Linguistics (ACL)* 17138–17160.  
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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).  
“Leveraging Influence Functions for Resampling Data in Physics-Informed Neural Networks”.  
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4. Erogullari E, **Lapuschkin S**, Samek W and Pahde F (2025).  
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5. Joseph S, Suresh P, Hufe L, Stevenson E, Graham R, Vadi Y, Bzdok D, **Lapuschkin S**, Sharkey L and Richards A (2025).  
“Prisma: An Open Source Toolkit for Mechanistic Interpretability in Vision and Video”.  
In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops: MIV Workshop* TBA.  
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6. Pahde F, Dreyer M, Weckbecker M, Weber L, Anders C J, Wiegand T, Samek W and **Lapuschkin S** (2025). "Navigating Neural Space: Revisiting Concept Activation Vectors to Overcome Directional Divergence". In: *Proceedings of the International Conference on Learning Representations (ICLR)* . <https://github.com/frederikpahde/pattern-cav>
7. Bareeva D, Yolcu GÜ, Hedström A, Wiegand T, Samek W and **Lapuschkin S** (2024). "Quanda: An Interpretability Toolkit for Training Data Attribution Evaluation and Beyond". In: *NeuRIPS 2024 Workshop on Attributing Model Behavior at Scale (ATTRIB 2024)* . <https://github.com/dilyabareeva/quanda>
8. Naujoks J R, Krasowski A, Weckbecker M, Wiegand T, **Lapuschkin S**, Samek W and Klausen R P (2024). "PINNfluence: Influence Functions for Physics-Informed Neural Networks". In: *NeuRIPS 2024 Workshop on Machine Learning and the Physical Sciences (ML4PS)* . <https://github.com/aleks-krasowski/PINNfluence>  
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9. Kopf L, Bommer P L, Hedström A, **Lapuschkin S**, Höhne M M-C and Bykov K (2024). "CoSy: Evaluating Textual Explanations of Neurons". In: *Advances in Neural Information Processing Systems (NeuRIPS)* 34656–34685. (*OpenReview*) <https://github.com/lkopf/cosy>
10. Nobis G, Springenberg M, Aversa M, Detzel M, Daems R, Murray-Smith R, Nakajima S, **Lapuschkin S**, Ermon S, Birdal T, Opper M, Knochenhauer C, Oala L and Samek W (2024). "Generative Fractional Diffusion Models". In: *Advances in Neural Information Processing Systems (NeuRIPS)* 25469–25509. (*OpenReview*) <https://github.com/GabrielNobis/gfdm>
11. Mekala R R, Pahde F, Baur S, Chandrashekhar 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). "Synthetic Generation of Dermatoscopic Images with GAN and Closed-Form Factorization". In: *ECCV 2024 Workshop on Synthetic Data for Computer Vision (SyntheticData4CV)* 15642:368–384. (*Green Open Access*)
12. Achtibat R, Hatefi S M V, Dreyer M, Jain A, Wiegand T, **Lapuschkin S**, Samek W (2024). "AttnLRP: Attention-Aware Layer-wise Relevance Propagation for Transformers". In: *Proceedings of the 41st International Conference on Machine Learning (ICML)* 135–168. <https://github.com/rachtibat/LRP-for-Transformers>
13. Hatefi S M V, Dreyer M, Achtibat R, Wiegand T, Samek W and **Lapuschkin S** (2024). "Pruning By Explaining Revisited: Optimizing Attribution Methods to Prune CNNs and Transformers". In: *Proceedings of the European Conference on Computer Vision (ECCV) Workshops* 152–169. (*Green Open Access*) <https://github.com/erfanhatefi/Pruning-by-eXplaining-in-PyTorch>
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15. Tinauer C, Damulina A, Sackl M, Soellradl M, Achtibat R, Dreyer M, Pahde F, **Lapuschkin S**, Schmidt R, Ropele S, Samek W, Langkammer C (2024). "Explainable Concept Mappings of MRI: Revealing the Mechanisms Underlying Deep Learning-based Brain Disease Classification". In: *Proceedings of the 2nd XAI World Conference* 202–216. (*Green Open Access*)
16. Dreyer M, Purelku E, Vielhaben J, Samek W, **Lapuschkin S** (2024). "PURE: Turning Polysemantic Neurons Into Pure Features by Identifying Relevant Circuits". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops* 8212–8217. <https://github.com/maxdreyer/PURE | Spotlight Paper>
17. Bareeva D, Dreyer M, Pahde F, Samek W and **Lapuschkin S** (2024). "Reactive Model Correction: Mitigating Harm to Task-Relevant Features via Conditional Bias Suppression". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops* 3532–3541. [https://github.com/dilyabareeva/reactive\\_correction](https://github.com/dilyabareeva/reactive_correction)
18. Dreyer M, Achtibat R, Samek W and **Lapuschkin S** (2024).

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22. Hedström A, Weber L, **Lapuschkin S** and Höhne M M-C (2023).  
"Sanity Checks Revisited: An Exploration to Repair the Model Parameter Randomisation Test".  
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23. Pahde F, Dreyer M, Samek W and **Lapuschkin S** (2023).  
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25. Dreyer M, Achtibat R, Wiegand T, Samek W and **Lapuschkin S** (2023).  
"Revealing Hidden Context Bias in Segmentation and Object Detection through Concept-specific Explanations".  
In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops* 3828–3838
26. Pahde F, Yolcu GÜ, Binder A, Samek W and **Lapuschkin S** (2023).  
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27. Krakowczyk D G, Prasse P, Reich D R, **Lapuschkin S**, Scheffer T, Jäger L A (2023).  
"Bridging the Gap: Gaze Events as Interpretable Concepts to Explain Deep Neural Sequence Models".  
In: *Proceedings of the Symposium on Eye Tracking Research and Applications (ETRA)* 1–8.  
*Best Short Paper Award Winner*
28. Krakowczyk D G, Reich D R, Prasse P, **Lapuschkin S**, Jäger L A and Scheffer T (2022).  
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In: *NeuRIPS 2022 Workshop on Gaze Meets ML (GOLdDAP2AtI)*
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).  
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31. Sun J, **Lapuschkin S**, Samek W, Zhao Y, Cheung N-M and Binder A (2021).  
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34. Sun J, **Lapuschkin S**, Samek W and Binder A (2020). "Understanding Image Captioning Models beyond Visualizing Attention". In: *XXAI: Extending Explainable AI Beyond Deep Models and Classifiers. ICML Workshop*
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44. Samek W, Montavon G, Binder A, **Lapuschkin S** and Müller K-R (2016). "Interpreting the Predictions of Complex ML Models by Layer-wise Relevance Propagation". In: *Proceedings of the Interpretable ML for Complex Systems NIPS'16 Workshop*

## Books

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## 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". In: *xxAI – Beyond Explainable AI* 271-296. Springer, Cham
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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". In: *Information Science and Applications (ICISA) 2016. Lecture Notes in Electrical Engineering* 276:913-922. Springer, Singapore

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1. Puri B, Berend J, **Lapuschkin S** and Samek W (2025).  
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2. Klausen R P, Timofeev I, Frank J, Naujoks J, Wiegand T, **Lapuschkin S** and Samek W (2025).  
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