Dr. Sebastian Lapuschkin *(né Bach)*

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Short Bio

Sebastian Lapuschkin received the Ph.D. degree with distinction from the Berlin Institute of Technology in 2018 for his pioneering contributions to the field of Explainable Artificial Intelligence (XAI) and interpretable machine learning. From 2007 to 2013 he studied computer science (B. Sc. and M. Sc.) at the Berlin Institute of Technology, with a focus on software engineering and machine learning.

Since 2021, he is the Head of the Explainable Artificial Intelligence at Fraunhofer Heinrich Hertz Institute (HHI) in Berlin.

He is the recipient of multiple awards, including the Hugo-Geiger-Prize for outstanding doctoral achievement and the 2020 Pattern Recognition Best Paper Award.

His work is focused on pushing the boundaries of XAI, e.g, for achieving human-understandable explanations, and towards the effective utilization of interpretable feedback for the improvement of machine learning systems and data. Further research interests include efficient machine learning and data analysis, as well as data and algorithm visualization.

Sebastian changed his last name in marriage in 2016 and is father to a son born in the same year.

Professional Experience

Fraunhofer Heinrich-Hertz-Institute — Berlin, Germany

Head of Explainable Artificial Intelligence — *Jan '21 – present*

Research Group Leadership and direction of XAI research
(current # staff: 9 PhD researchers & 17 student research assistants).

Research: Work towards the next generation of Explainable AI approaches and XAI-based model improvement by, e.g., increasing efficiency (see also) and debugging model training, reasoning and datasets. Provision of powerful modified backprop XAI for Pytorch models, and tools for reproducible XAI evaluations to the community via Zennit and Quantus.

Further responsibilities: Project management and (funding) acquisition. Recruitment and guidance of research personnel.

Tenured Researcher — *Jan '19 – Dec '20*

PostDoc research position in the Machine Learning Group at Fraunhofer HHI.

Research: Development of Spectral Relevance Analysis, automating the detection of "Clever Hans" moments in machine learning. Measurably increasing the explanation quality of local XAI. Provision of modified backprop XAI in Keras/Tensorflow via iNNvestigate.

Further responsibilities: Project (funding) acquisition. Recruitment and guidance of PhD students and student research assistants.

Research Associate — *Oct '14 – Dec '18*

Founding member of the Machine Learning Group at Fraunhofer HHI.

Research: Furthering XAI research with the development and evaluation of corresponding methods, as well as applications in various expert domains, resulting in several highly cited publications, open source software tools and repositories, and the first recorded encounter of the "Clever Hans" effect in machine learning via XAI.

Other contributions: Minor contributions to the h.266 (VVC) video codec via learnable intra-frame prediction filters. Planning and conceptualization of an HPC cluster with modern GPU hardware implemented at Fraunhofer HHI. Development and showcasing multiple XAI demos in international events.

Additional supervision by Prof. Dr. Wojciech Samek.

Berlin Institute of Technology — Berlin, Germany

Research Associate — *Sep '13 – Sep '14*

Research: Formalization and development of the "Layer-wise Relevance Propagation" (LRP) method of Explainable AI for explaining individual predictions of nonlinear machine learning models.

Supervision by Prof. Dr. Klaus-Robert Müller and Prof. Dr. Alexander Binder.

Student Research- & Teaching Assistant *Oct '11 – Aug '13*

Research: Structure and cell type detection in large histopathology images using Bag of Words features and SVM classifiers. Development of XAI for the pipeline.
Research assistant to Prof. Dr. Alexander Binder at the department for machine learning at TU Berlin.

Teaching: Preparation and lecturing (of exercise sessions) in the courses "Machine Learning 1" and "Machine Learning 2 – Theory and Application" and associated academic courses. Visualization and animation of data and learning algorithms discussed.

Teaching assistant to Prof. Dr. Klaus-Robert Müller, Prof. Dr. Dr. Franz Király, Dr. Irene Dowding (née Winkler) and Dr. Daniel Bartz.

Student Teaching Assistant *Oct '09 – Sep '11*

Course instruction for algorithmic and practical foundations of computer science (B.Sc.): Basic and advanced Java development, software engineering and OOP concepts, algorithms on image and graph data, among others.

Teaching assistant to Prof. Dr. Marc Alexa, Prof. Dr. Odej Kao and Prof. Dr. Oliver Brock.

Education

Berlin Institute of Technology — Berlin, Germany

PhD in Machine Learning (with distinction / "summa cum laude") *2013 – 2018*

Research and application of methods of *Explainable AI* (*XAI*):
Layer-wise Relevance Propagation, Deep Taylor Decomposition and Spectral Relevance Analysis.
Thesis: "Opening the machine learning black box with Layer-wise Relevance Propagation"

Supervision headed by Prof. Dr. Klaus-Robert Müller.

Master of Science in Computer Science *2010 – 2013*

Focus on machine learning, computer vision and large scale data analysis.
Thesis: "On Pixel-wise Predictions from Image-wise Bag of Words Classification"

Supervision headed by Prof. Dr. Alexander Binder.

Bachelor of Science in Computer Science *2007 – 2010*

Focus on Algorithms and Software Development
Thesis: "Keyword-Based Image Browsing of Large Image Databases"

Supervision headed by Prof. Dr. Kristian Hildebrand.

Deutschhaus-Gymnasium — Würzburg, Germany

Abitur (pre-university secondary education) *1998 – 2007*

Teaching

See section "Talks & Lectures / Invited Lectures" below for a list of additional invited and individual lectures held.

WS 21/22 Machine Learning Seminar (block seminar)..
[Guest Lecturer @ Universitat de Girona. Three lectures on Explainable AI w/ Exercise Sessions.]

SS 17 Seminar Cognitive Algorithms (block seminar).
[1:1 Student Guidance and Co-Supervision, Grading.]

WS 13/14 Python Programming for Machine Learning (block seminar).
[Co-Teaching, Grading, Exercise Design.]
Matlab Programming for Machine Learning and Data Analysis (block beminar).
[Co-Teaching, Grading, Exercise Design.]

SS13 Integrated Lecture Machine Learning II.
[Teaching (Exercise sessions), Grading, Exercise Design.]
Python Programming for Machine Learning (block seminar).
[Co-Teaching, Grading, Exercise Design.]

WS 12/13 Integrated Lecture Machine Learning I.
[Teaching (Exercise sessions), Grading, Exercise Design.]
Matlab Programming for Machine Learning and Data Analysis (block beminar).
[Co-Teaching, Grading, Exercise Design.]

SS12 Machine Learning II – Theory and Application.
[Teaching (Exercise sessions), Grading, Exercise Design.]
Matlab Programming for Machine Learning and Data Analysis (block beminar).
[Co-Teaching, Grading, Exercise Design.]

WS 11/12 Machine Learning I.
[Teaching (Exercise sessions), Grading, Exercise Design.]
Matlab Programming for Machine Learning and Data Analysis (block beminar).
[Co-Teaching, Grading, Exercise Design.]

SS 11 Methodisch-praktische Grundlagen der Informatik 2 ("Algorithms and Data Structures").
[Teaching (Exercise sessions), Grading, Exercise Design.]

WS 10/11 Methodisch-praktische Grundlagen der Informatik 4 ("Advanced Algorithms").
[Teaching (Exercise sessions), Grading, Exercise Design.]

SS 10 Methodisch-praktische Grundlagen der Informatik 2 ("Algorithms and Data Structures").
[Teaching (Exercise sessions), Grading, Exercise Design.]

WS 09/10 Methodisch-praktische Grundlagen der Informatik 4 ("Advanced Algorithms").
[Teaching (Exercise sessions), Grading, Exercise Design.]

Student Supervision & Guidance

PhD Students

G Nobis (In own group, 2022-*). XAI in GANs & XAI for Anomaly Detection

R Achtibat (In own group, 2022-*). Methods for Global-Local Concept-based Explanations

M Dreyer (In own group, 2022-*). GLocal XAI for Localization Models and Outlier Detection

D Krakowczyk (Universität Potsdam, 2022-*, co-supervision). XAI Quantification (Biomedical Domain)

A Hill (TU Berlin, 2021-*, co-supervision). Open Source Software Frameworks for XAI

A Hedström (Universität Potsdam, 2021-*, co-supervision). Quantification and Evaluation of XAI

F Pahde (In own group, 2021-*). XAI as Part of the AI Life Cycle

J Vielhaben (In own group, 2020-*). Global XAI & Explaining with Concepts

L Weber (In own group, 2020-*). XAI for ML Model Improvement

S M Hofmann (MPI for CBS, 2018-*, co-supervision). XAI for Brain Age Prediction

S Ede (TU Berlin, 2021-2022, co-supervision). XAI in Defense against Catastrophic Forgetting

P Seegerer (TU Berlin, 2017-2021, co-supervision). XAI for Histopathology & Neural Network Pruning

M Hägele (TU Berlin, 2017-2021, co-supervision). XAI in Histopathology

V Srinivasan (Berlin Big Data Center/own group, 2017, co-supervision). Compressed Domain XAI

Master's Students

J Berend (In own group, 2022-*). XAI Demonstrators & XAI-based Neural Network Training

N Ayday (In own group, 2022-*). Kernelized Class Artifact Compensation

S Gururaj (In own group, 2022-*). XAI for Point Cloud Recognition Models

A Jain (In own group, 2022-*). XAI for Language Transformers

S M V Hatefi (In own group, 2022-*). XAI for Adversarial Attack and Outlier Detection

G Ü Yolcu (In own group, 2022-*). Neural Network Canonization & Local XAI via Kernelized Influence Functions

Hufe L (In own group, 2022-*). XAI-based Neural Network Training for Active Learning

A Frommholz (In own group, 2020-2021, 2022-*). XAI in the Audio Domain

E Dolgener-Cantú (In own group, 2020-*). AI Simulations for Anomaly Detecion in Photonic Wafers

I Eisenbraun (In own group, 2020-*). Tools for Interactive GLocal XAI

R Achtibat (In own group, 2020-2022). Human-understandable Explanations [...]

M Dreyer (In own group, 2020-2022). Concept-based XAI for Semantic Segmentation [...]

S Baghdadlian (In own group, 2021). XAI in Defense against Catastrophic Forgetting

F W Motzkus (In own group, 2020-2021). XAI Quantification for Measurably Better Explanations

L Weber (In own group, 2019-2020). XAI for Refined Neural Network Training

Bachelor's Students

M Kohlbrenner (In own group, 2017-2020). Composite Rule Sets for Layer-wise Relevance Propagation

Guest Researchers

P M Miguélez (Universidad Carlos III de Madrid, 2022-*, co-supervision). Evaluating Local XAI against Global Explanations from Polynomial Representations of Neural Network Models

A Wolny (Universität Heidelberg | EMBL, 2021-*, co-supervision). Understanding Self-Hallucinations in Neural Networks for Cell Segmentation with Tools from XAI

Third-Party Funded Research Projects

TEMA (2022-12 – 2026-11; leading role) Trusted Extremely Precise Mapping and Prediction for Emergency Management

DAKI-FWS (2021-12 – 2024-11) Data- and AI-supported Early Warning System

iToBoS (2021-04 – 2025-03; leading role) Intelligent Total Body Scanner

BerDiBa (2021-01 – 2023-12) Berlin Digital Rail Operations

Patho234 (2020-01 – 2022-12) Machine Learning-driven Multidimensional Imaging Analysis of Reactive and Neoplastic Lymph Nodes

TraMeExCo (2018-09 – 2021-08; leading role) Transparent Medical Expert Companion

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Skills and Toolset Experience

Technical: Various Software Languages, packages and environments, e.g., Python (NumPy, PyTorch, …), Matlab, Linux, bash, git, subversion, Slurm, Sun Grid Engine, among others.

Scientific working and writing: LaTeX, Inkscape, WYSIWYG word processors, among others.

Machine Learning: Development, application and evaluation of, e.g., SVMs, DNNs, processing pipelines, embeddings, clusterings, among others.

Domain Knowledge: text, audio, video, images, time series, biomechanical and biomedical data.

Natural languages: German (*native*), English (*full professional proficiency*)

Awards

Stanford Top 2% Scientist Worldwide 2021 (2022) Among the 2% most impactful researchers of 2021, which is to be taken with a grain of salt.

Pattern Recognition Best Paper Award and Pattern Recognition Medal (2020) for the paper "Explaining NonLinear Classification Decisions with Deep Taylor Decomposition"

Hugo-Geiger-Prize (2019, 1st place) Förderpreis für herausragende Promotionsleistungen

Freunde des HHI (2019) Förderpreis für exzellente wissenschaftliche Arbeiten am HHI

ERCIM (2019, finalist) Cor Baayen Young Researcher Award

Best Paper Prize (2016) ICML'16 Workshop on Visualization for Deep Learning

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Patents

Verfahren und System zur Simulation eines optischen Bildes eines Fotonischen und/oder Elektronischen Artikels

EP 4001902 A1 "Verfahren und System zur Simulation eines optischen Bildes eines Fotonischen und/oder Elektronischen Artikels" (published 2022-05-25)

Pruning and/or Quantizing Machine Learning Predictors

EP 3991102 A1 "Pruning and/or Quantizing Machine Learning Predictors" (published 2022-05-04)

US 2022/0114455 A1 "Pruning and/or Quantizing Machine Learning Predictors" (published 2022-04-14)

WO 2020/260656 A1 "Pruning and/or Quantizing Machine Learning Predictors" (published 2020-12-30)

Relevance Score Assignment for Artificial Neural Networks

CN 107636693 "Relevance Score Assignment for Artificial Neural Networks" (granted 2022-01-11)

EP 3271863 "Relevance Score Assignment for Artificial Neural Network" (granted 2021-07-28)

JP 6725547 "Relevance Score Assignment for Artificial Neural Networks" (granted 2020-07-22)

KR 102130162 "Assignment of Relevance Scores for Artificial Neural Networks" (granted 2020-07-06)

CA 2979579 "Relevance Score Assignment for Artificial Neural Networks" (granted 2020-02-18)

RU 2703343 "Relevancy Assessment for Artificial Neural Networks" (granted 2019-10-16)

BR 112017019821 "Relevance Score Assignment for Artificial Neural Networks " (published 2018-05-15)

US 20180018553 A1 "Relevance Score Assignment for Artificial Neural Networks " (published 2018-01-18)

Talks & Lectures

Talks

excludes internal/confidential events

1. "Beyond Heatmaps – Explaining with Concepts" (2022-10-21).
   BIFOLD Graduate School Welcome Days
2. "Explain to Not Forget: Defending Against Catastrophic Forgetting with XAI " (2022-08-24).
   CD-MAKE 2022, (*paper presentation*)
3. "Zukünftige Trends in der KI und Einsatzmöglichkeiten im Bauwesen" (2022-06-24).
   BIMKIT Jahresveranstaltung 2022, (*keynote*)
4. "Beyond Explaining" (2021-06-03).
   Melanoma Patient Network Europe Meet-up – MPNE meets AI , (*invited talk*)
5. "Beyond Explaining: Explainable AI for Model Improvement" (2021-05-05).
   Sensor and Measurement Science International 2021, (*invited talk*)
6. "Efficient and Effective Neural Network Pruning with Layer-wise Relevance Propagation" (2020-11-12).
   Machine Learning Seminar at Fraunhofer HHI / Technische Universität Berlin
7. "Towards Best Practice in Explaining Neural Network Decisions with LRP" (2020-07-21).
   IEEE World Congress on Computational Intelligence 2020 / IJCNN 2020
8. "XAI for Analyzing and Unlearning Spurious Correlations in ImageNet" (2020-07-18).
   XXAI: Extending Explainable AI Beyond Deep Models and Classifiers, (*ICML 2020 Workshop*)
9. "XAI via LRP and SpRAy" (2020-07-02).
   Ada Day at Ada Lovelace Center / Fraunhofer IIS, (*invited talk*)
10. "Interpretable Machine Learning through Layer-wise Relevance Propagation" (2020-02-18).
    Fraunhofer Symposium Netzwert 2020
11. "Interpretable Machine Learning through Layer-wise Relevance Propagation" (2019-12-12).
    Gesellschaft von Freunden des HHI e.V.
12. "Explainable Artificial Intelligence — Opening the Machine Learning Black Box with Layer-wise Relevance Propagation" (2019-09-26).
    AMA Wissenschaftsrat 2019, (*invited talk*)
13. "Finding Clever Hans" (2019-07-16).
    Universität Bamberg, (*invited talk & press interview*)
14. "AI – Opening the Black Box" (2019-02-25).
    Robert Koch Institut, (*invited talk*)

15. "AI – Opening the Black Box" (2019-02-22).
Technology Innovation Day – 91 Years HHI
16. "Understanding and Comparing Deep Neural Networks for Age and Gender Classification" (2017-10-27).
ICCV'17 Workshop on Analysis and Modeling of Faces and Gestures
17. "Layer-wise Relevance Propagation" (2014-09-10).
IDA Retreat'14

Invited Lectures Individual Lectures as Parts of Seminars and Workshops

1. "Human-Understandable Explanations through Concept Relevance Propagation" (2023-01-12).
Machine Teaching for Humans Workshop, Madeira | University of Bergen, (*invited, keynote*)
2. "Towards Human-understandable Explanations with XAI 2.0" (2022-10-24).
AI4Good webinar series of the International Telecommunication Union (ITU), (*streaming link*)
3. "Towards Actionable XAI" (2022-09-27).
International Artificial Doctoral Academy, (*link to slides and video*)
4. "Recent Advances in Explainable AI" (2022-09-08).
BB-KI-Chips Summer School Potsdam | Universität Potsdam
5. "Explainable AI" (2021-12-13/14/16).
Universitat de Girona, (*3-day lecture series as part of the Machine Learning Seminar at UdG*)
6. "XAI BEYOND EXPLAINING: Using Explainability for Improving Deep Machine Learning Models" (2021-08-27).
2nd Summer School on Machine Learning in Bioinformatics | Higher School of Economics Moscow, (*link to video*)
7. "Neuronale Netze mit LRP (richtig) erklären" (2020-08).
KI-Campus | Die Lernplattform für Künstliche Intelligenz
8. "Explainable Artificial Intelligence — Opening the Machine Learning Black Box with Layer-wise Relevance Propagation" (2019-08-16).
SIMULA Summer School on Smart cities for a Sustainable Energy Future - From Design to Practice

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Publications

Summary of Scientific Impact

	All	Since 2018
# Publications	51	36
# Citations	9449	9011
h-index	25	25
i10-index	37	36

per Google Scholar, retreived on 27th January, 2023.

Journal Articles

1. Hedström A, Weber L, Krakowczyk D, 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
2. 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
3. Hofmann S M, Beyer F, **Lapuschkin S**, Golterman O, Loeffler M, Müller K-R, Villringer A, Samek W and Witte A V (2022).
"Towards the Interpretability of Deep Learning Models for Multi-modal Neuroimaging: Finding Structural Changes of the Ageing Brain".
In: *NeuroImage* 261:119504
4. Ma J, Schneider L, **Lapuschkin S**, Achtibat R, Durchrau M, Krois J, Schwendicke F and Samek W (2022).
"Towards Trustworthy AI in Dentistry".
In: *Journal of Dental Research* 00220345221106086
5. Rieckmann A, Dworzynski P, Arras L, **Lapuschkin S**, Samek W, Onyebuchi A A, Rod N H, Ekstrøm C T (2022).
"Causes of Outcome Learning: A Causal Inference-inspired Machine Learning Approach to Disentangling

Common Combinations of Potential Causes of a Health Outcome".
In: *International Journal of Epidemiology* dyac078. *https://github.com/ekstroem/cool https://www.causesofoutcomelearning.org*

6. Slijepcevic D, Horst F, **Lapuschkin S**, Horsak B, Raberger A-M, Kranzl A, Samek W, Breiteneder C, Schöllhorn W I and Zeppelzauer M (2022).
"Explaining Machine Learning Models for Clinical Gait Analysis".
In: *ACM Transactions on Computing for Healthcare* 3(2):14:1-27.
https://github.com/sebastian-lapuschkin/explaining-deep-clinical-gait-classification
7. 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
8. 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
9. 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
10. 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/seulkiyeom/LRP_pruning | https://github.com/seulkiyeom/LRP_Pruning_toy_example
11. 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
12. Horst F, Slijepcevic D, Zeppelzauer M, Raberger AM, **Lapuschkin S**, Samek W, Schöllhorn WI, Breiteneder C, and Horsak B (2020).
"Explaining Automated Gender Classification of Human Gait".
In: *Gait & Posture* 81(S1):159-160
13. 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
14. 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).
"iNNvestigate Neural Networks!".
In: *Journal of Machine Learning Research* 20(93):1-8. *https://github.com/albermax/innvestigate*
15. **Lapuschkin S**, Wäldchen S, Binder A, Montavon G, Samek W and Müller K-R (2019).
"Unmasking Clever Hans Predictors and Assessing what Machines Really Learn".
In: *Nature Communications* 10:1069
16. 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".
In: *Scientific Reports* 9:2391. *https://github.com/sebastian-lapuschkin/interpretable-deep-gait*
17. 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. *Pattern Recognition Best Paper Award and Pattern Recognition Medal winner*
18. 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*
19. 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
20. **Lapuschkin S**, Binder A, Montavon G, Müller K-R and Samek W (2016).
"The Layer-wise Relevance Propagation Toolbox for Artificial Neural Networks".
In: *Journal of Machine Learning Research* 17(114):1-5. *https://github.com/sebastian-lapuschkin/lrp_toolbox*

21. **Bach S**, Binder A, Montavon G, Klauschen F, Müller K-R and Samek W (2015).
"On Pixel-wise Explanations for Non-Linear Classifier Decisions by Layer-wise Relevance Propagation".
In: *PLoS ONE* 10(7):e0130140

Contributions to Conference Proceedings and Workshops

1. Krakowczyk D, 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".
In: *NeuRIPS 2022 Workshop on Gaze Meets ML* (GOLdDAP2AtI)
2. Motzkus F, Weber L and **Lapuschkin S** (2022).
"Measurably Stronger Explanation Reliability via Model Canonization".
In: *Proceedings of the International Conference on Image Processing (ICIP)* 516–520
3. 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*)
4. Sun J, **Lapuschkin S**, Samek W, Zhao Y, Cheung N-M and Binder A (2021).
"Explanation-Guided Training for Cross-Domain Few-Shot Classification".
In: *Proceedings of the 25th International Conference on Pattern Recognition (ICPR)* 7609–7616
5. Goh G S W, **Lapuschkin S**, Weber L, Samek W and Binder A (2021).
"Understanding Integrated Gradients with SmoothTaylor for Deep Neural Network Attribution".
In: *Proceedings of the 25th International Conference on Pattern Recognition (ICPR)* 4949–4956
6. Kohlbrenner M, Bauer A, Nakajima S, Binder A, Samek W, and **Lapuschkin S** (2020).
"Towards Best Practice in Explaining Neural Network Decisions with LRP".
In: *Proceedings of the IEEE International Joint Conference on Neural Networks (IJCNN)* 1-7
7. 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*
8. Anders C J, Neumann D, Marinč T, Samek W, Müller K-R and **Lapuschkin S** (2020).
"XAI for Analyzing and Unlearning Spurious Correlations in ImageNet".
In: *XXAI: Extending Explainable AI Beyond Deep Models and Classifiers. ICML Workshop*
9. Sun J, **Lapuschkin S**, Samek W, Zhao Y, Cheung N-M and Binder A (2020).
"Explain and Improve: Cross-Domain-Few-Shot-Learning Using Explanations".
In: *XXAI: Extending Explainable AI Beyond Deep Models and Classifiers. ICML Workshop*
10. 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).
"How to iNNvestigate Neural Networks' Predictors!".
In: *Machine Learning Open Source Software: Sustainable Communities. NIPS Workshop*
11. **Lapuschkin S**, Binder A, Müller K-R and Samek W (2017).
"Understanding and Comparing Deep Neural Networks for Age and Gender Classification".
In: *Proceedings of the ICCV'17 Workshop on Analysis and Modeling of Faces and Gestures (AMFG)* 2017:1629-1638
12. Srinivasan V, **Lapuschkin S**, Hellge C, Müller K-R and Samek W (2017).
"Interpretable Action Recognition in Compressed Domain".
In: *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* 2017:1692-1696
13. **Bach S**, Binder A, Müller K-R and Samek W (2016).
"Controlling Explanatory Heatmap Resolution and Semantics via Decomposition Depth".
In: *Proceedings of the IEEE International Conference of Image Processing (ICIP)* 2016:2271-2275
14. Binder A, Samek W, Montavon G, **Bach S**, and Müller K-R (2016).
"Analyzing and Validating Neural Network Predictions".
In: *Proceedings of the ICML'16 Workshop on Visualization for Deep Learning . Best paper award winner*
15. **Lapuschkin S**, Binder A, Montavon G, Müller K-R and Samek W (2016).
"Analyzing Classifiers: Fisher Vectors and Deep Neural Networks".
In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 2016:2912-2920
16. Montavon G, **Bach S**, Binder A, Samek W and Müller K-R (2016).
"Deep Taylor Decomposition of Neural Networks".
In: *Proceedings of the ICML'16 Workshop on Visualization for Deep Learning* 2016:1-3

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