

CURRICULUM VITAE

ROLAND KWITT

Address	Abtsdorf 145, Attersee am Attersee	✉ Roland.Kwitt@plus.ac.at
Birth Date	March 19, 1982	
Citizenship	Austrian	
Academic Details	<i>h</i> -index: 34, Cites: 4696 (Source: Google Scholar, 06/2024)	
Webpage	https://rkwitt.github.io/	
DBLP	https://dblp.org/pers/hd/k/Kwitt:Roland	
ORCID	https://orcid.org/0000-0001-9947-4465	

CURRENT EMPLOYMENT

- 2022 - now **University of Salzburg**
Full Professor (for Machine Learning, § 99 (4) UG)
Department of Artificial Intelligence and Human Interfaces (AIHI)
Jakob-Haringer Str. 2, A-5020 Salzburg, Austria
Phone: +43 (0) 662 8044-6311
- 2020 - 2021 **University of Salzburg**
Full Professor (for Machine Learning, § 99 (4) UG)
Department of Computer Science
Jakob-Haringer Str. 2, A-5020 Salzburg, Austria
Phone: +43 (0) 662 8044-6311
- 2017 - 2020 **University of Salzburg**
Associate Professor
Department of Computer Science
Jakob-Haringer Str. 2, A-5020 Salzburg, Austria
- 2013 - 2017 **University of Salzburg**
Assistant Professor
Department of Computer Science
Jakob-Haringer Str. 2, A-5020 Salzburg, Austria

PREVIOUS EMPLOYERS

- 2011 - 2013 **Kitware Inc.**
R & D Engineer, Computer Vision / Medical Imaging Group
101 E Weaver St., NC 27510, USA
Supervisor(s): Stephen Aylward, Brad Davis

EDUCATION

- 2010 - 2011 *PostDoc*, CS department, University of Salzburg (ADVISOR(S): Andreas Uhl, Wolfgang Pree)
- 2007 - 2010 *Dr. techn. (equiv. to PhD)*, CS department, University of Salzburg (ADVISOR: Andreas Uhl)
- 2005 - 2007 *Dipl.-Ing. (equiv. to MSc)*, CS department, University of Salzburg (ADVISOR: Ulrich Hofman)
- 2001 - 2005 *Dipl.-Ing. (FH) (equiv. MSc)*, Telecommunications Engineering, University of Applied Sciences Salzburg (ADVISOR: Ulrich Hofman)

AWARDS

- 2014 **CVPR '14 Outstanding Reviewer**
- 2012 Short-listed for the "Heinz-Zemanek" price 2012 (notification e-mail upon request)
- 2012 **MICCAI '12 Young Investigator Award**, awarded at MICCAI '12 (Nice, France)
- 2007 **Best Paper Award**, International Conference on Computer Recognition Systems (CORES '07)
- 2005 **Special Appreciation Award**, Austrian Ministry of Science and Research

MAIN RESEARCH AREAS

Machine learning, Computer vision, Medical image analysis

RANKING IN SELECTION PROCESSES FOR *Full Professorships*

- Ranked **1st** for § 98 UG professorship *Data Science* at the University of Innsbruck (“Ruf” received 12/2019)
- Ranked **1st** for § 99 UG professorship *Machine Learning / Data Science* at the University of Klagenfurt (“Ruf” received 06/2020)

THIRD-PARTY FUNDING (GRANTED)

- 2023-2025 *servEB: Globales Daten- und Patientenmanagement bei seltenen, genetischen Hautkrankheiten* (ongoing)
(joint project with the Paracelsus Medical University and the Salzburger Landeskliniken (Lead))
Funding source: Amt der Salzburger Landesregierung
Project volume € 478.000,00.- (University of Salzburg share: € 100.000,00.-)
- 2023 - 2027 *Intelligent Data Analytics (IDA) Lab III* (ongoing)
(together with W. Trutschnig (Head), C. Borgelt, and A. Bathke, Department of Artificial Intelligence and Human Interfaces, University of Salzburg)
Funding source: Amt der Salzburger Landesregierung (within the WISS¹ initiative)
Project volume € 1,600.000,00.-
- 2019 - 2023 *Intelligent Data Analytics (IDA) Lab I & II*
(together with W. Trutschnig (Head), Department of Mathematics, University of Salzburg and C. Borgelt, Department of Mathematics/Computer Science, University of Salzburg)
Funding source: Amt der Salzburger Landesregierung (within the WISS¹ initiative)
Project volume € 2,300.000,00.-
- 2020 - 2022 *Free-of-Bias, Robust and Intelligent Data Analytics (FRIDA)* (completed)
(together with W. Trutschnig, Department of Mathematics, University of Salzburg)
Funding source: Porsche Holding GmbH
Industry partner: Porsche Informatik GmbH
Project volume: € 250.000,00.-
- 2019 - now *Deep Homological Learning* (completed)
Funding source: FWF (Project Nr. P 31799)
Project volume: € 238.512,75
- 2019 - 2022 *Kundenfokussierte Zukunftstrends (KFZ)* (completed)
(together with W. Trutschnig, Department of Mathematics, University of Salzburg)
Funding source: Land Salzburg (within the WISS 2025 initiative)
Industry partner: Porsche Informatik GmbH
Project volume: € 478.610,38.-
- 2018 - 2021 *“Kleinprojekte” Critical data & Feature selection* (completed)
(together with W. Trutschnig, Department of Mathematics, University of Salzburg)
Funding source: Porsche Informatik GmbH
Industry partner: Porsche Informatik GmbH
Project volume: € 40,000.-
- 2018 *Synonym Analysis for Improving Search Queries* (completed)
(together with N. Augsten, Department of Computer Science, University of Salzburg)
Industry partner: FindoLogic GmbH
Funding source: FFG (Innovationsscheck 5,000)
Project volume: € 5,000.-

¹Wissenschafts- und Innovationsstrategie Salzburg

2018 *Data Analytics in Industrial Environments* (completed)
(together with W. Trutschnig, Department of Mathematics, University of Salzburg)
Industry partner: Siemens Austria
Project volume: € 20,000.-

THIRD-PARTY FUNDING (SUBMITTED)

2024 - 2027 *TopGen: Topological Aspects of Generalization in Neural Networks* (submitted)
Funding source: FWF
Project volume: € 450.000,00

STUDENT SUPERVISION

PRIMARY PHD/POSTDOC ADVISOR

- Christoph D. Hofer (PhD & PostDoc completed, now in industry)
- Florian Graf (PhD completed, now PostDoc in my group)
- Günther Eder (PostDoc completed, now in industry)
- Sebastian Zeng (PhD ongoing, PhD expected in 2024)

SECONDARY PHD ADVISOR

- Mann Willi (PhD completed, now in industry)
- Wimmer Georg (PhD completed, now PostDoc at University of Salzburg)
- Kauba Christof (PhD completed, now PostDoc at University of Salzburg)
- Debiasi Luca (PhD completed, now in industry)
- Ribeiro Eduardo (PhD completed)
- González Tejeda Yansel (PhD ongoing)
- Höller Yvonne (PhD ongoing)
- Schraml Rudolf (PhD ongoing)
- Kirchgasser Simon Ignaz (PhD ongoing)

MSc ADVISOR

- Johanna Wald
- Schmitzberger Nina Marie
- Michael Kastner
- Söllinger Dominik
- Grafendorfer Philipp
- Tobias Hilgart
- Philip Brandauer
- Peer Raphael
- Marlene Holzleitner

PUBLICATIONS (IN REVERSE-CHRONOLOGICAL ORDER)

JOURNAL ARTICLE (PEER-REVIEWED)

- [Dyc+21] L.E. van Dyck, R. Kwitt, S.J. Denzler, and W.R. Gruber. “Comparing object recognition in humans and deep convolutional neural networks - An eye tracking study”. In: *Front. Neurosci* 15 (2021). DOI: [10.3389/fnins.2021.750639](https://doi.org/10.3389/fnins.2021.750639).
- [C H+20] C. Hofer, R. Kwitt, Y. Höller, E. Trinka, and A. Uhl. “An empirical assessment of appearance descriptors applied to MRI for automated diagnosis of TLE and MCI”. In: *Comput. Biol. Med.* 117 (2020). DOI: [10.1016/j.combiomed.2019.103592](https://doi.org/10.1016/j.combiomed.2019.103592).
- [CRM19] C. Hofer, R. Kwitt, and M. Niethammer. “Learning Representations of Persistence Barcodes”. In: *J. Mach. Learn. Res.* 20.126 (2019), pp. 1–45.
- [D R+19] D. R. Chittajallu, M. McCormick, S. Gerber, T.J. Czernuszewicz, R. Gessner, M.S. Willis, M. Niethammer, R. Kwitt, and S.R. Aylward. “Image-Based Methods for Phase Estimation, Gating, and Temporal Superresolution of Cardiac Ultrasound”. In: *IEEE Trans. Biomed. Eng.* 66.1 (2019), pp. 72–79. DOI: [10.1109/TBME.2018.2823279](https://doi.org/10.1109/TBME.2018.2823279).
- [N S+19] N. Stanley, T. Bonacci, R. Kwitt, M. Niethammer, and P.J. Mucha. “Stochastic Block Models with multiple continuous attributes”. In: *Appl. Netw. Sci.* 4.54 (2019). DOI: [10.1007/s41109-019-0170-z](https://doi.org/10.1007/s41109-019-0170-z).
- [Z D+19] Z. Ding, G. Fleishman, X. Yang, P. Thomson, R. Kwitt, and M. Niethammer. “Fast predictive simple geodesic regression”. In: *Med. Image Anal.* 56 (2019), pp. 193–209. DOI: [10.1016/j.media.2019.06.003](https://doi.org/10.1016/j.media.2019.06.003).
- [N S+18] N. Stanley, R. Kwitt, M. Niethammer, and P.J. Mucha. “Compressing Networks with Super Nodes”. In: *Nature Sci. Rep.* 8.10892 (2018). DOI: [DOI:10.1038/s41598-018-29174-3](https://doi.org/10.1038/s41598-018-29174-3).
- [X H+18] X. Han, R. Kwitt, S.R. Aylward, S. Bakas, B. Menze, A. Asturias, P. Vespa, J. van Horn, and M. Niethammer. “Brain extraction from normal and pathological images: A joint PCA/Image-Reconstruction approach”. In: *NeuroImage* 176.8 (2018), pp. 431–445. DOI: [10.1016/j.neuroimage.2018.04.073](https://doi.org/10.1016/j.neuroimage.2018.04.073).
- [Yan+17] X. Yang, R. Kwitt, M. Styner, and M. Niethammer. “Quicksilver: Fast Predictive Image Registration - a Deep Learning Approach”. In: *NeuroImage* 158 (2017), pp. 378–396. DOI: [10.1016/j.neuroimage.2017.07.008](https://doi.org/10.1016/j.neuroimage.2017.07.008).
- [Hon+16a] Y. Hong, R. Kwitt, N. Singh, N. Vasconcelos, and M. Niethammer. “Parametric Regression on the Grassmannian”. In: *IEEE Trans. Pattern Anal. Mach. Intell.* 38.11 (2016). DOI: [10.1109/TPAMI.2016.2516533](https://doi.org/10.1109/TPAMI.2016.2516533).
- [Liu+15a] X. Liu, M. Niehammer, R. Kwitt, N. Singh, M. McCormick, and S. Aylward. “Low-Rank Atlas Image Analyses in the Presence of Pathologies”. In: *IEEE Trans. Med. Imaging* 34.12 (2015), pp. 2583–2591. DOI: [10.1109/TMI.2015.2448556](https://doi.org/10.1109/TMI.2015.2448556).
- [Hon+14c] Y. Hong, B. Davis, J. S. Marron, R. Kwitt, N. Singh, J. S. Kimbell, E. Pitkina, R. Superfine, S.D. Davis, C. J. Zdanski, and M. Niethammer. “Statistical atlas construction via weighted functional boxplots”. In: *Med. Image Anal.* 18.4 (2014), pp. 684–698. DOI: [10.1016/j.media.2014.03.001](https://doi.org/10.1016/j.media.2014.03.001).
- [Kwi+13b] R. Kwitt, N. Vasconcelos, S. Razzaque, and S. Aylward. “Localizing Target Structures in Ultrasound Video - A Phantom Study”. In: *Med. Image Anal.* 17.7 (2013), pp. 712–722. DOI: [10.1016/j.media.2013.05.003](https://doi.org/10.1016/j.media.2013.05.003).
- [Kwi+12b] R. Kwitt, N. Vasconcelos, N. Rasiwasia, A. Uhl, B. Davis, M. Häfner, and F. Wrba. “Endoscopic Image Analysis in Semantic Space”. In: *Med. Image Anal.* 16.7 (2012), pp. 1415–1422. DOI: [10.1016/j.media.2012.04.010](https://doi.org/10.1016/j.media.2012.04.010).
- [KMU11a] R. Kwitt, P. Meerwald, and A. Uhl. “Efficient Texture Image Retrieval Using Copulas in a Bayesian Framework”. In: *IEEE Trans. Image Process.* 20.7 (2011), pp. 2063–2077. DOI: [10.1109/TIP.2011.2108663](https://doi.org/10.1109/TIP.2011.2108663).
- [KMU11b] R. Kwitt, P. Meerwald, and A. Uhl. “Lightweight Detection of Additive Watermarking in the DWT-Domain”. In: *IEEE Trans. Image Process.* 20.2 (2011), pp. 474–484. DOI: [10.1109/TIP.2010.2064327](https://doi.org/10.1109/TIP.2010.2064327).

- [KU10a] R. Kwitt and A. Uhl. “Lightweight Probabilistic Texture Retrieval”. In: *IEEE Trans. Image Process.* 19.1 (2010), pp. 241–253. DOI: [10.1109/TIP.2009.2032313](https://doi.org/10.1109/TIP.2009.2032313).
- [Haf+09a] M. Häfner, R. Kwitt, A. Uhl, A. Gangl, F. Wrba, and A. Vécsei. “Feature-Extraction from Multi-Directional Multi-Resolution Image Transformations for the Classification of Zoom-Endoscopy Images”. In: *Pattern Anal. Appl.* 12.4 (2009), pp. 407–413. DOI: [10.1007/s10044-008-0136-8](https://doi.org/10.1007/s10044-008-0136-8).
- [Haf+08a] M. Häfner, R. Kwitt, A. Uhl, A. Gangl, F. Wrba, and A. Vécsei. “Computer-assisted Pit-Pattern Classification in Different Wavelet Domains for Supporting Dignity Assessment of Colonic Polyps”. In: *Pattern Recognit.* 42.6 (2008), pp. 1180–1191. DOI: [doi:10.1016/j.patcog.2008.07.012](https://doi.org/10.1016/j.patcog.2008.07.012).

PREPRINTS

- [Gre+24] H. Greer, L. Tian, F.-X. Vialard, R. Kwitt, Estepar R.S.J., and M. Niethammer. “CARL: A Framework for Equivariant Image Registration”. In: *arXiv preprint <https://arxiv.org/abs/2405.16738>* (2024).
- [L T+24] L. Tian, H. Greer, R. Kwitt, F.-X. Vialard, R.S.J. Estepar, S. Bouix, R. Rushmore, and M. Niethammer. “uniGradICON: A Foundation Model for Medical Image Registration”. In: *arXiv preprint <https://arxiv.org/abs/2403.05780>* (2024).
- [Zen+24] S. Zeng, F. Graf, M. Uray, S. Huber, and R. Kwitt. “Neural Persistence Dynamics”. In: *arXiv preprint <https://arxiv.org/abs/2405.15732>* (2024).

CONFERENCE ARTICLES (PEER-REVIEWED)

- [Pap+24] T. Papamarkou, T. Birdal, M. Bronstein, G. Carlsson, J. Curry, Y. Gao, M. Hajj, R. Kwitt, P. Lio, P. Di Lorenzo, V. Maroulas, N. Miolane, F. Nasrin, K.N. Ramamurthy, B. Rieck, S. Scardapane, M.T. Schaub, P. Velickovic, B. Wang, Y. Wang, G.-W. Wei, and G. Zamzmi. “Position Paper: Challenges and Opportunities in Topological Deep Learning”. In: *ICML*. 2024.
- [Gre+23] H. Greer, L. Tian, F.-X. Vialard, R. Kwitt, S. Bouix, Estepar R.S.J., R.J. Rushmore, and Marc Niethammer. “Inverse Consistency by Construction for Multistep Deep Registration”. In: *MICCAI*. 2023. DOI: [10.1007/978-3-031-43999-5_65](https://doi.org/10.1007/978-3-031-43999-5_65).
- [Tia+23] L. Tian, H. Greer, F.-X. Vialard, Estepar R.S.J., R.J. Rushmore, N. Makris, S. Bouix, and Marc Niethammer. “GradICON: Approximate Diffeomorphisms via Gradient Inverse Consistency”. In: *CVPR*. 2023. URL: <https://tinyurl.com/48e99fxj>.
- [ZGK23] Sebastian Zeng, Florian Graf, and Roland Kwitt. “Latent SDEs on Homogeneous Spaces”. In: *NeurIPS*. 2023. URL: <https://tinyurl.com/56s99s8s>.
- [Gra+22] F. Graf, S. Zeng, B. Rieck, M. Niethammer, and R. Kwitt. “On Measuring Excess Capacity in Neural Networks”. In: *NeurIPS*. 2022. URL: <https://tinyurl.com/3yue6mzn>.
- [F G+21] F. Graf, C. Hofer, M. Niethammer, and R. Kwitt. “Dissecting Supervised Contrastive Learning”. In: *ICML*. 2021. URL: <https://tinyurl.com/2u4wtwm4>.
- [H G+21] H. Greer, R. Kwitt, F.-X. Vialard, and M. Niethammer. “ICON: Learning Regular Maps Through Inverse Consistency”. In: *ICCV*. 2021. DOI: [10.1109/ICCV48922.2021.00338](https://doi.org/10.1109/ICCV48922.2021.00338).
- [ZGK21] S. Zeng, F. Graf, and C. Hofer R. Kwitt. “Topological Attention for Time Series Forecasting”. In: *NeurIPS*. 2021. URL: <https://tinyurl.com/2eg5yoyh>.
- [C H+20a] C. Hofer, F. Graf, B. Rieck, M. Niethammer, and R. Kwitt. “Graph Filtration Learning”. In: *ICML*. 2020. URL: <https://tinyurl.com/2mmrwqnm>.
- [C H+20b] C. Hofer, F. Graf, M. Niethammer, and R. Kwitt. “Topologically Densified Distributions”. In: *ICML*. 2020. URL: <https://tinyurl.com/2gjfelru>.
- [F-X+20] F.-X. Vialard, R. Kwitt, S. Wei, and M. Niethammer. “A Shooting Formulation of Deep Learning”. In: *NeurIPS*. 2020. URL: <https://tinyurl.com/2zqaz3pa>.

- [C H+19] C. Hofer, R. Kwitt, M. Dixit, and M. Niethammer. "Connectivity-Optimized Representation Learning via Persistent Homology". In: *ICML*. 2019. URL: <https://tinyurl.com/2erfwbte>.
- [MF19] M. Niethammer and R. Kwitt F.-X. Vialard. "Metric Learning for Image Registration". In: *CVPR*. 2019. DOI: [10.1109/CVPR.2019.00866](https://doi.org/10.1109/CVPR.2019.00866).
- [Liu+18a] B. Liu, M. Dixit, R. Kwitt, and N. Vasconcelos. "Feature Space Transfer for Data Augmentation". In: *CVPR*. 2018. DOI: [10.1109/CVPR.2018.00947](https://doi.org/10.1109/CVPR.2018.00947).
- [Gre+18] H. Greer, S. Gerber, M. Niethammer, R. Kwitt, M. McCormick, D. Chittajallu, N. Siekierski, M. Oetgen, K. Cleary, and S. Aylward. "Scoliosis Screening and Monitoring Using Self Contained Ultrasound and Neural Networks". In: *ISBI*. 2018. DOI: [10.1109/ISBI.2018.8363857](https://doi.org/10.1109/ISBI.2018.8363857).
- [Dix+17] M. Dixit, R. Kwitt, M. Niethammer, and N. Vasconcelos. "AGA: Attribute-Guided Augmentation". In: *CVPR*. 2017. DOI: [10.1109/CVPR.2017.355](https://doi.org/10.1109/CVPR.2017.355).
- [Han+17] X. Han, X. Yang, R. Kwitt, and M. Niethammer. "Efficient Registration of Pathological Images: A joint PCA/Image-Reconstruction Approach". In: *ISBI*. 2017. DOI: [10.1109/ISBI.2017.7950456](https://doi.org/10.1109/ISBI.2017.7950456).
- [Hof+17a] C. Hofer, R. Kwitt, Y. Höller, E. Trinka, M. Niethammer, and A. Uhl. "Constructing Shape Spaces from a Topological Perspective". In: *IPMI*. 2017. DOI: [10.1007/978-3-319-59050-9_9](https://doi.org/10.1007/978-3-319-59050-9_9).
- [Hof+17b] C. Hofer, R. Kwitt, Y. Höller, E. Trinka, and A. Uhl. "Simple Domain Adaptation for Cross-Dataset Analyses of Brain MRI Data". In: *ISBI*. 2017. DOI: [10.1109/ISBI.2017.7950556](https://doi.org/10.1109/ISBI.2017.7950556).
- [Hof+17c] C. Hofer, R. Kwitt, M. Niethammer, and A. Uhl. "Deep Learning with Topological Signatures". In: *NIPS*. 2017. URL: <https://bit.ly/2UHfsCf>.
- [Hon+17] Y. Hong, X. Yang, R. Kwitt, M. Styner, and M. Niethammer. "Regression Uncertainty on the Grassmannian". In: *AISTATS*. 2017. URL: <https://bit.ly/2HL9nB0>.
- [Yan+17] X. Yang, R. Kwitt, M. Styner, and M. Niethammer. "Fast Predictive Multimodal Image Registration". In: *ISBI*. 2017. DOI: [10.1109/ISBI.2017.7950652](https://doi.org/10.1109/ISBI.2017.7950652).
- [Gad+16a] M. Gadermayr, S. Hegenbart, R. Kwitt, and A. Uhl. "Narrow Band Imaging Versus White-Light: What is best for Computer-Assisted Diagnosis of Celiac Disease?" In: *ISBI*. 2016. DOI: [10.1109/ISBI.2016.7493282](https://doi.org/10.1109/ISBI.2016.7493282).
- [KHN16a] R. Kwitt, S. Hegenbart, and M. Niethammer. "One-Shot Learning of Scene Locations via Feature Trajectory Transfer". In: *CVPR*. 2016. DOI: [10.1109/CVPR.2016.16](https://doi.org/10.1109/CVPR.2016.16).
- [Ayl+16a] S. Aylward, M. McCormick, H.J. Kang, S. Razzaque, R. Kwitt, and M. Niethammer. "Ultrasound Spectroscopy". In: *ISBI*. 2016. DOI: [10.1109/ISBI.2016.7493437](https://doi.org/10.1109/ISBI.2016.7493437).
- [Yan+16] X. Yang, X. Han, E. Park, S. Aylward, R. Kwitt, and M. Niethammer. "Registration of Pathological Images". In: *Proceedings of the MICCAI Workshop on Simulation and Synthesis in Medical Imaging*. 2016. DOI: [10.1007/978-3-319-46630-9_10](https://doi.org/10.1007/978-3-319-46630-9_10).
- [YKN16] X. Yang, R. Kwitt, and M. Niethammer. "Fast Predictive Image Registration". In: *Proceedings of the MICCAI Workshop on Deep Learning in Medical Image Analysis*. 2016. DOI: [10.1007/978-3-319-46976-8_6](https://doi.org/10.1007/978-3-319-46976-8_6).
- [Kwi+15a] R. Kwitt, S. Huber, M. Niethammer, W. Lin, and U. Bauer. "Statistical Topological Data Analysis – A Kernel Perspective". In: *NIPS*. 2015. URL: <https://bit.ly/2ucS0B9>.
- [Rei+15a] R. Reininghaus, U. Bauer, S. Huber, and R. Kwitt. "A Stable Multi-scale Kernel for Topological Machine Learning". In: *CVPR*. 2015. DOI: [10.1109/CVPR.2015.7299106](https://doi.org/10.1109/CVPR.2015.7299106).
- [Hon+15a] Y. Hong, N. Singh, R. Kwitt, and M. Niethammer. "Group Testing for Longitudinal Data". In: *IPMI*. 2015. DOI: [10.1007/978-3-319-19992-4_11](https://doi.org/10.1007/978-3-319-19992-4_11).
- [HKN15a] Y. Hong, R. Kwitt, and M. Niethammer. "Model Criticism for Regression on the Grassmannian". In: *MICCAI*. 2015. DOI: [10.1007/978-3-319-24574-4_87](https://doi.org/10.1007/978-3-319-24574-4_87).
- [Hon+14a] Y. Hong, N. Singh, R. Kwitt, and M. Niethammer. "Time-warped Geodesic Regression". In: *MICCAI*. 2014. DOI: [10.1007/978-3-319-10470-6_14](https://doi.org/10.1007/978-3-319-10470-6_14).

- [Kwi+14a] R. Kwitt, S. Razzaque, J. Lowell, and S. Aylward. "Variability sensitivity of dynamic texture based recognition in clinical CT data". In: *SPIE Medical Imaging*. 2014. DOI: [10.1117/12.2043271](https://doi.org/10.1117/12.2043271).
- [Liu+14a] X. Liu, M. Niethammer, R. Kwitt, M. McCormick, and S. Aylward. "Low-Rank to the Rescue: Atlas-based Analyses in the Presence of Pathologies". In: *MICCAI*. 2014. DOI: [10.1007/978-3-319-10443-0_13](https://doi.org/10.1007/978-3-319-10443-0_13).
- [Heg+14a] S. Hegenbart, R. Kwitt, N. Rasiwasia, A. Vécsei, and A. Uhl. "Do We need Annotation Experts? A Case Study in Celiac Disease Classification". In: *MICCAI*. 2014. DOI: [10.1007/978-3-319-10470-6_57](https://doi.org/10.1007/978-3-319-10470-6_57).
- [Hon+14b] Y. Hong, R. Kwitt, N. Singh, B. Davis, and M. Niethammer. "Geodesic Regression on the Grassmannian". In: *ECCV*. 2014. DOI: [10.1007/978-3-319-10605-2_41](https://doi.org/10.1007/978-3-319-10605-2_41).
- [Hon+13a] Y. Hong, B. Davis, J.S. Marron, R. Kwitt, and M. Niethammer. "Weighted Functional Boxplot with Application to Statistical Atlas Construction". In: *MICCAI*. 2013. DOI: [10.1007/978-3-642-40760-4_73](https://doi.org/10.1007/978-3-642-40760-4_73).
- [Kwi+13a] R. Kwitt, D. Pace, M. Niethammer, and S. Aylward. "Studying Cerebral Vasculature Using Structure Proximity and Graph Kernels". In: *MICCAI*. 2013. DOI: [10.1007/978-3-642-40763-5_66](https://doi.org/10.1007/978-3-642-40763-5_66).
- [KVR12a] R. Kwitt, N. Vasconcelos, and N. Rasiwasia. "Scene Recognition on the Semantic Manifold". In: *ECCV*. 2012. DOI: [10.1007/978-3-642-33765-9_26](https://doi.org/10.1007/978-3-642-33765-9_26).
- [Kwi+12a] R. Kwitt, N. Vasconcelos, S. Razzaque, and S. Aylward. "Recognition in Ultrasound Videos: Where Am I?" In: *MICCAI*. 2012. DOI: [10.1007/978-3-642-33454-2_11](https://doi.org/10.1007/978-3-642-33454-2_11).
- [Gsc+11a] M. Gschwandtner, R. Kwitt, W. Pree, and A. Uhl. "Infrared Camera Calibration for Dense Depth Map Construction". In: *IV*. 2011. DOI: [10.1109/IVS.2011.5940515](https://doi.org/10.1109/IVS.2011.5940515).
- [GKU11a] M. Gschwandtner, R. Kwitt, and A. Uhl. "BlenSor: Blender Sensor Simulation Toolbox". In: *ISVC*. 2011. DOI: [10.1007/978-3-642-24031-7_20](https://doi.org/10.1007/978-3-642-24031-7_20).
- [Kwi+11b] R. Kwitt, P. Meerwald, A. Uhl, and G. Verdoolaege. "Testing a Multivariate Model for Wavelet Coefficients". In: *ICIP*. 2011. DOI: [10.1109/ICIP.2011.6115667](https://doi.org/10.1109/ICIP.2011.6115667).
- [Kwi+11a] R. Kwitt, N. Rasiwasia, N. Vasconcelos, A. Uhl, M. Häfner, and F. Wrba. "Learning Pit Pattern Concepts for Gastroenterological Training". In: *MICCAI*. 2011. DOI: [10.1007/978-3-642-23626-6_35](https://doi.org/10.1007/978-3-642-23626-6_35).
- [Hub+10a] S. Huber, R. Kwitt, P. Meerwald, M. Held, and A. Uhl. "Watermarking of 2D Vector Graphics with Distortion Constraint". In: *ICME*. 2010. DOI: [10.1109/ICME.2010.5583049](https://doi.org/10.1109/ICME.2010.5583049).
- [Kwi+10a] R. Kwitt, A. Uhl, M. Häfner, A. Gangl, F. Wrba, and A. Vécsei. "Predicting the Histology of Colorectal Lesions in a Probabilistic Framework". In: *MMBIA*. 2010. DOI: [10.1109/CVPRW.2010.5543146](https://doi.org/10.1109/CVPRW.2010.5543146).
- [Haf+09b] M. Häfner, A. Gangl, R. Kwitt, A. Uhl, A. Vécsei, and F. Wrba. "Improving Pit-Pattern Classification of Endoscopy Images by a Combination of Experts". In: *MICCAI*. 2009. DOI: [10.1007/978-3-642-04268-3_31](https://doi.org/10.1007/978-3-642-04268-3_31).
- [Heg+09c] S. Hegenbart, R. Kwitt, M. Liedlgruber, A. Uhl, and A. Vécsei. "Impact of Duodenal Image Capturing Techniques and Duodenal Regions on the Performance of Automated Diagnosis of Celiac Disease". In: *ISPA*. 2009. DOI: [10.1109/ISPA.2009.5297637](https://doi.org/10.1109/ISPA.2009.5297637).
- [KMU09d] R. Kwitt, P. Meerwald, and A. Uhl. "A Joint Model of Complex Wavelet Coefficients for Texture Retrieval". In: *ICIP*. 2009. DOI: [10.1109/ICIP.2009.5413656](https://doi.org/10.1109/ICIP.2009.5413656).
- [KMU09c] R. Kwitt, P. Meerwald, and A. Uhl. "Efficient Detection of Additive Watermarking in the DWT-Domain". In: *EUSIPCO*. 2009. URL: <http://goo.gl/1S4c1A>.
- [KMU09b] R. Kwitt, P. Meerwald, and A. Uhl. "Blind DT-CWT Domain Additive Spread-Spectrum Watermark Detection". In: *DSP*. 2009. DOI: [10.1109/ICDSP.2009.5201255](https://doi.org/10.1109/ICDSP.2009.5201255).
- [KMU09a] R. Kwitt, P. Meerwald, and A. Uhl. "Color-Image Watermarking using Multivariate Power-Exponential Distribution". In: *ICIP*. 2009. DOI: [10.1109/ICIP.2009.5413715](https://doi.org/10.1109/ICIP.2009.5413715).
- [Haf+08b] M. Häfner, R. Kwitt, F. Wrba, A. Gangl, A. Vécsei, and A. Uhl. "One-Against-One Classification for Zoom-Endoscopy Images". In: *MEDSIP*. 2008. DOI: [10.1049/cp:20080453](https://doi.org/10.1049/cp:20080453).

- [KU08b] R. Kwitt and A. Uhl. “Color Eigen-Subband Features for Endoscopy Image Classification”. In: *ICASSP*. 2008. DOI: [10.1109/ICASSP.2008.4517678](https://doi.org/10.1109/ICASSP.2008.4517678).
- [KU08a] R. Kwitt and A. Uhl. “Image Similarity Measurement by Kullback-Leibler Divergences between Complex Wavelet Subband Statistics for Texture Retrieval”. In: *ICIP*. 2008. DOI: [10.1109/ICIP.2008.4711909](https://doi.org/10.1109/ICIP.2008.4711909).
- [KU07a] R. Kwitt and A. Uhl. “Modeling the Marginal Distributions of Complex Wavelet Coefficient Magnitudes for the Classification of Zoom-Endoscopy Images”. In: *MMBIA*. 2007. DOI: [10.1109/ICCV.2007.4409170](https://doi.org/10.1109/ICCV.2007.4409170).

THESES

- [Kwitt10a] R. Kwitt. “Statistical Modeling in the Wavelet Domain and Applications”. PhD thesis. Department of Computer Science, University of Salzburg, Austria, 2010.

CONFERENCE TALKS & PRESENTATIONS

- 12/2023 *Latent SDEs on Homogeneous Spaces*, NeurIPS ’23, New Orleans, USA
- 12/2022 *On Measuring Excess Capacity in Neural Networks*, NeurIPS ’22, New Orleans, USA
- 12/2021 *Topological Attention for Time Series Forecasting*, NeurIPS ’21 (Virtual conference)
- 06/2021 *Dissecting Supervised Contrastive Learning*, ICML ’21 (Virtual conference)
- 12/2020 *A Shooting Formulation of Deep Learning*, NeurIPS ’20 (Virtual conference)
- 07/2020 *Topologically Densified Distributions*, ICML ’20, Vienna, Austria (Virtual conference)
- 07/2020 *Graph Filtration Learning*, ICML ’20, Vienna, Austria (Virtual conference)
- 09/2019 *Deep Homological Learning*, ÖMG Tagung, Dornbirn, Austria
- 06/2019 *Metric Learning for Image Registration*, CVPR ’19, Long Beach, CA, USA
- 06/2016 *One-Shot Learning of Scene Locations via Feature Trajectory Transfer*, CVPR ’16, Las Vegas, USA
- 12/2015 *Statistical Topological Data Analysis – A Kernel Perspective*, NIPS ’15, Montreal, Canada
- 10/2015 *Model Criticism for Regression on the Grassmannian*, MICCAI ’15, Munich, Germany
- 06/2015 *A Stable Multi-Scale Kernel for Topological Machine Learning*, CVPR ’15, Boston, USA
- 09/2014 *Geodesic Regression on the Grassmannian*, ECCV ’14, Zurich, Switzerland
- 09/2014 *Do we need Annotation Experts – A Case Study in Celiac Disease Classification*, MICCAI ’14, Boston, USA
- 09/2014 *Low-Rank to the Rescue – Atlas-based Analyses in the Presence of Pathologies*, MICCAI ’14, Boston, USA
- 10/2013 *Studying Cerebral Vasculature Using Structure Proximity and Graph Kernels*, MICCAI ’13, Nagoya, Japan
- 10/2012 *Scene Recognition on the Semantic Manifold*, ECCV ’12, Florence, Italy
- 10/2012 *Recognition in US Video: Where Am I?*, MICCAI ’12, Nice, France
- 09/2011 *Learning Pit Pattern Concepts for Gastroenterological Training*, MICCAI ’11, Toronto, Canada
- 08/2010 *Statistical Modeling in the Wavelet Domain and Applications*, PhD defense, Salzburg, Austria
- 11/2009 *A Joint Model of Complex Wavelet Coefficients for Texture Retrieval*, ICIP ’09, Cairo, Egypt
- 11/2009 *Color-Image Watermarking using Multivariate Power-Exponential Distribution*, ICIP ’09, Cairo, Egypt
- 09/2009 *Improving Pit Pattern Classification by a Combination of Experts*, MICCAI ’09, London, UK
- 10/2008 *Image Similarity Measurement by Kullback-Leibler Divergences between Complex Wavelet Subband Statistics for Texture Retrieval*, ICIP ’08, San Diego, CA, USA
- 04/2008 *Color Eigen-Subband Features for Endoscopy Image Classification*, ICASSP ’08, Las Vegas, NV, USA
- 10/2007 *Modeling the Marginal Distributions of Complex Wavelet Coefficient Magnitudes for the Classification of Zoom-Endoscopy Images*, MMBIA ’07, Rio de Janeiro, Brazil

INVITED TALKS

- 04/2022 *Topologically Densified Distributions*
ICLR Workshop on Geometrical and Topological Representation Learning 2022 (Virtual)
- 09/2021 *Topological Machine Learning*
Thematic Mini-Conference on Computational Topology and Machine Learning (Virtual)
Berlin Mathematics Research Center
- 09/2019 *Deep Homological Learning*
ÖMG Conference 2019, Dornbirn (in the *Computational Geometry and Topology* session)

01/2018	<i>Machine Learning with Topological Signatures</i> Oberwolfach Workshop “Statistics for Data with Geometric Structure”, Oberwolfach, Germany
04/2016	<i>Low rank to the Rescue: Atlas-based Analyses in the Presence of Pathologies</i> “Images and Networks of the Brain”, Hamburg, Germany
07/2015	<i>Topological Machine Learning</i> ISNPS '15, Graz Austria
04/2014	<i>Grassmannian Geodesic Regression</i> IST Austria, Austria
06/2013	<i>Localizing Target Structures In Ultrasound Videos</i> Quantitative Medical Imaging (QMI), Arlington, VA, USA
12/2012	<i>Scene Recognition on the Semantic Manifold</i> SVCL, UC San Diego, USA
10/2012	<i>Recognition in US Video: Where Am I?</i> University of North Carolina, Chapel Hill (Computer Science), NC, USA

TEACHING

Except for a small selection of undergraduate courses, all lectures/labs are taught in English.

SS 24	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 24	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 23/24	Machine Learning (VO, undergraduate level), University of Salzburg
WS 23/24	Introduction to AI / AI Eingangswerkstatt (VO, undergraduate level), University of Salzburg
WS 23/24	Interpreting and Presenting Statistical Analyses (SE, graduate level), University of Salzburg
WS 23/24	Case Studies (SE, graduate level), University of Salzburg
WS 23/24	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 23/24	Computer Vision (VO+PS, graduate level), University of Salzburg
SS 23	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 23	Databases 1 (VO+PS, undergraduate level), University of Salzburg
SS 23	Medical Imaging (VO+PS, graduate level), University of Salzburg
SS 23	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 22/23	Introduction to AI / AI Eingangswerkstatt (VO, undergraduate level), University of Salzburg
WS 22/23	Interpreting and Presenting Statistical Analyses (SE, graduate level), University of Salzburg
WS 22/23	Case Studies (SE, graduate level), University of Salzburg
WS 22/23	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 22/23	Computer Vision (VO+PS, graduate level), University of Salzburg
SS 22	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 22	Databases 1 (VO+PS, undergraduate level), University of Salzburg
SS 22	Medical Imaging (VO+PS, graduate level), University of Salzburg
SS 22	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 21/22	Interpreting and Presenting Statistical Analyses (SE, graduate level), University of Salzburg
WS 21/22	Case Studies (SE, graduate level), University of Salzburg
WS 21/22	Introduction to Data Science (SE, graduate level), University of Salzburg
WS 21/22	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 20/21	Computer Vision (VO+PS, graduate level), University of Salzburg
SS 21	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 21	Databases 1 (VO+PS, undergraduate level), University of Salzburg
SS 21	Imaging Beyond Consumer Cameras (VO+PS, graduate level), University of Salzburg
SS 21	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 20/21	Interpreting and Presenting Statistical Analyses (SE, graduate level), University of Salzburg
WS 20/21	Case Studies (SE, graduate level), University of Salzburg
WS 20/21	Introduction to Data Science (SE, graduate level), University of Salzburg
WS 20/21	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 20/21	Computer Vision (VO+PS, graduate level), University of Salzburg
SS 20	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 20	Databases 1 (VO+PS, undergraduate level), University of Salzburg
SS 20	Imaging Beyond Consumer Cameras (VO+PS, graduate level), University of Salzburg
SS 20	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg

WS 19/20	Interpreting and Presenting Statistical Analyses (SE, graduate level), University of Salzburg
WS 19/20	Case Studies (SE, graduate level), University of Salzburg
WS 19/20	Introduction to Data Science (SE, graduate level), University of Salzburg
WS 19/20	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 19/20	Computer Vision (VO+PS, graduate level), University of Salzburg
SS 19	Imaging Beyond Consumer Cameras (VO+PS, graduate level), University of Salzburg
SS 19	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
SS 19	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 19	Databases 1 (PS, undergraduate level), University of Salzburg
WS 18/19	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 18/19	Computer Vision (VO+PS, graduate level), University of Salzburg
WS 18/19	Introduction to Data Science (SE, graduate level), University of Salzburg
WS 18/19	Case Studies (SE, graduate level), University of Salzburg
WS 18/19	BSc Seminar (SE, undergraduate level), University of Salzburg
SS 18	Imaging Beyond Consumer Cameras (VO+PS, graduate level), University of Salzburg
SS 18	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
SS 18	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 18	Databases 1 (PS, undergraduate level), University of Salzburg
SS 18	BSc Seminar (SE, undergraduate level), University of Salzburg
WS 17/18	Wissenschaftliche Arbeitstechniken (VP, undergraduate level)
WS 17/18	Image Processing and Computer Vision (VO+PS, undergraduate level), University of Salzburg
WS 17/18	Case Studies (SE, graduate level), University of Salzburg
WS 17/18	Computer Vision (VO+PS, graduate level), University of Salzburg
WS 17/18	Introduction to Data Science (SE, graduate level), University of Salzburg
SS 17	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
SS 17	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
SS 17	Computer Science for Everyone (VO, undergraduate level), University of Salzburg
SS 17	Databases 1 (VO+PS, undergraduate level), University of Salzburg
SS 17	BSc Seminar (SE, undergraduate level), University of Salzburg
WS 16/17	Introduction to Operating Systems (VO, undergraduate level), University of Salzburg
WS 16/17	Computer Vision (VO+PS, graduate level), University of Salzburg
WS 16/17	Introduction to Data Science (SE, graduate level), University of Salzburg
WS 16/17	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
SS 16	Imaging Beyond Consumer Cameras (VO+PS, graduate level), University of Salzburg
SS 16	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
SS 16	Databases 1 (PS, undergraduate level), University of Salzburg
WS 15/16	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 15/16	Advanced Image Processing & Computer Vision (VO+PS, graduate level), University of Salzburg
SS 15	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
SS 15	Databases 1 (PS, undergraduate level), University of Salzburg
SS 15	Statistical Learning Theory (VO+PS, graduate level), University of Salzburg
WS 14/15	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 14/15	Advanced Image Processing & Computer Vision (VO+PS, graduate level), University
SS 14	Databases 1 (PS, undergraduate level), University of Salzburg
SS 14	Imaging Beyond Consumer Cameras (VO+PS, graduate level), University of Salzburg
SS 14	Seminar Multimedia Technologies (SE, graduate level), University of Salzburg
WS 13/14	Advanced Image Processing & Computer Vision (VO+PS, graduate level), University of Salzburg
WS 10/11	Introduction to Object Oriented Programming (VO, undergraduate level), FH Salzburg
WS 05/06	Network Management (UE, undergraduate level), FH Salzburg

SERVICE TO THE UNIVERSITY OF SALZBURG

2022 - now	Head of the <i>Curricularkommission BA Artificial Intelligence</i>
2022 - now	Head of the division <i>Computer Vision and Machine Learning (CVML)</i>
2022 - now	Deputy head of the department of <i>Artificial Intelligence and Human Interfaces (AIHI)</i>
2016 - now	Member of the <i>Curricularkommission MA Data Science</i>

2019 - 2021 Member of the *Curricularkommission BA/MA Computer Science*
2019 Appointment committee member for the *Assistant Professor position in Database Systems*
2017 - 2018 Appointment committee member for the § 99 UG professorship for Data Science ("Stiftungsprofessur")

PROFESSIONAL SERVICE

Area Chair for ICML '22, ICML '23, ICML '24, NeurIPS '21, NeurIPS '22, NeurIPS '23, NeurIPS '24
General Chair of the 39th OAGM/AAPR Workshop 2015, Salzburg, Austria
Organizer of the 3rd Biannual Austrian TDA Meeting 2022, Salzburg, Austria
PC Chair of ACM IH & MMSEC 2014, Salzburg, Austria

JOURNAL REVIEWING

Reviewer for *Journal of Machine Learning Research (JMLR)*
Reviewer for *IEEE Transactions on Medical Imaging (TMI)*
Reviewer for *IEEE Transactions on Image Processing (TIP)*
Reviewer for *IEEE Transactions on Signal Processing*
Reviewer for *IEEE Signal Processing Letters*
Reviewer for *Elsevier Medical Image Analysis (MedIA)*
Reviewer for *Foundations of Computational Mathematics (FOCM)*
Reviewer for *Journal of Applied and Computational Topology (APCT)*

CONFERENCE REVIEWING

Reviewer for *International Conference on Learning Representations (ICLR)*
Reviewer for *International Conference on Machine Learning (ICML)*
Reviewer for *Artificial Intelligence and Statistics (AISTATS)*
Reviewer for *Neural Information Processing Systems (NIPS)*
Reviewer for *IEEE International Conference on Image Processing (ICIP)*
Reviewer for *Medical Image Computing and Computer Assisted Intervention (MICCAI)*
Reviewer for *International Conference on Computer Vision (ICCV)*
Reviewer for *Computer Vision and Pattern Recognition (CVPR)*
Reviewer for *European Conference on Computer Vision (ECCV)*
Reviewer for *British Machine Vision Conference (BMVC)*
Reviewer for *International Conference on Pattern Recognition (ICPR)*

FUNDING AGENCIES

Reviewer for the *European Research Council (ERC)*

REFERENCES

Prof. Marc Niethammer
University of North Carolina (Chapel Hill)
250 Brooks Building
Chapel Hill, NC 27599-3175, USA
☎ (919) 590-6149
✉ mn@cs.unc.edu

Prof. Nuno Vasconcelos
University of California (San Diego)
EBU 1, Room 5603
9500 Gilman Drive, La Jolla, CA 92093-0407, USA
☎ (858) 534-5550
✉ nuno@ucsd.edu

Stephen Aylward

Kitware Inc.

101 East Weaver Street, Suite G4

Carrboro, NC 27510, USA

✉ stephen.aylward@kitware.com

Prof. Baba Vemuri

University of Florida (Gainesville)

Room No. E324, CSE Building

Gainesville, Florida 32611-6120, USA

☎ (352) 294-6675

✉ vemuri@ufl.edu

More references available upon request.

Last updated: June 14, 2024