

Education

- 2011 - 2015 **Neural Information Processing, PhD** (summa cum laude)
University of Tübingen, International Max Planck Research School
Thesis title: *Advances in Probabilistic Modeling of Natural Images*
Advisor: Matthias Bethge
- 2007 - 2010 **Cognitive Science, BSc** (final grade: 1.0)
University of Osnabrück
Thesis title: *On Likelihood Estimation in Deep Belief Networks*

Employment

- 01/2020 - 07/2024 **Senior Research Scientist**
Google Brain & DeepMind, London
- 06/2016 - 07/2019 **Senior Machine Learning Researcher**
Twitter Cortex, London
- 01/2016 - 06/2016 **Machine Learning Researcher**
Magic Pony Technology, London
- 07/2014 - 10/2014 **Internship**
Adobe, Creative Technologies Lab, San Francisco
Supervisor: Matthew Hoffman
- 05/2010 - 04/2011 **Internship**
08/2008 - 09/2008 *Max Planck Institute for Biological Cybernetics, Tübingen*
02/2008 - 03/2008 Host: Matthias Bethge
- 08/2009 - 12/2009 **Internship**
Vision, Dynamics and Learning Lab, Johns Hopkins University, Baltimore
Host: René Vidal

Publications

- L. Theis
What makes an image realistic?
Proceedings of the 41st International Conference on Machine Learning, 2024 ([PDF](#))
- E. Hoogeboom, E. Agustsson, F. Mentzer, L. Versari, G. Toderici, and L. Theis
High-Fidelity Image Compression with Score-based Generative Models
preprint, 2023 ([PDF](#))
- G. Flamich and L. Theis
Adaptive Greedy Rejection Sampling
IEEE International Symposium on Information Theory, 2023 ([PDF](#))
- Y. Yang, S. Mandt, and L. Theis
An Introduction to Neural Data Compression
Foundations and Trends in Computer Graphics and Vision, 2023 ([PDF](#))

- L. Theis, T. Salimans, M. D. Hoffman, and F. Mentzer
Lossy Compression with Gaussian Diffusion
preprint, 2022 ([PDF](#))
- A. Shah, W.-N. Chen, J. Balle, P. Kairouz, and L. Theis
Optimal Compression of Locally Differentially Private Mechanisms
Artificial Intelligence and Statistics, 2022 ([PDF](#))
- L. Theis and N. Yosri
Algorithms for the Communication of Samples
Proceedings of the 39th International Conference on Machine Learning, 2022 ([PDF](#))
- L. Theis and J. Ho
Importance weighted compression
Neural Compression Workshop: From Information Theory to Applications, 2021 ([PDF](#))
- L. Theis and A. B. Wagner
A coding theorem for the rate-distortion-perception function
Neural Compression Workshop: From Information Theory to Applications, 2021 ([PDF](#))
- L. Theis and E. Agustsson
On the advantages of stochastic encoders
Neural Compression Workshop: From Information Theory to Applications, 2021 ([PDF](#))
- E. Agustsson and L. Theis
Universally Quantized Neural Compression
Advances in Neural Information Processing Systems 33, 2020 ([PDF](#))
- I. Korshunova, H. Xiong, M. Fedoryszak, and L. Theis
Discriminative Topic Modeling with Logistic LDA
Advances in Neural Information Processing Systems 33, 2019 ([PDF](#))
- T. Nguyen-Phuoc, C. Li, L. Theis, C. Richardt, and Y.-L. Yang
HoloGAN: Unsupervised learning of 3D representations from natural images
International Conference on Computer Vision, 2019 ([PDF](#))
- L. Theis, I. Korshunova, A. Tejani, and F. Huszár
Faster gaze prediction with dense networks and Fisher pruning
arXiv:1801.05787, 2018 ([PDF](#), [Blog](#))
- K. Storrs, S. V. Leuven, S. Kojder, L. Theis, and F. Huszár
Adaptive Paired-Comparison Method for Subjective Video Quality Assessment on Mobile Devices
Picture Coding Symposium, 2018 ([PDF](#), [Blog](#))
- C. Ledig, L. Theis, F. Huszár, J. Caballero, A. Aitken, A. Tejani, et al.
Photo-Realistic Single Image Super-Resolution Using a Generative Adversarial Network
Computer Vision and Pattern Recognition, 2017 ([PDF](#))
- L. Theis, W. Shi, A. Cunningham, and F. Huszár
Lossy Image Compression with Compressive Autoencoders
International Conference on Learning Representations, 2017 ([PDF](#), [Poster](#), [Article](#))
- I. Korshunova, W. Shi, J. Dambre, and L. Theis
Fast Face-swap Using Convolutional Neural Networks
International Conference on Computer Vision, 2017 ([PDF](#))
- C. Sønderby, J. Caballero, L. Theis, W. Shi, and F. Huszár
Amortised MAP Inference for Image Super-resolution
International Conference on Learning Representations, 2017 ([PDF](#))
- L. Theis, A. van den Oord, and M. Bethge

A note on the evaluation of generative models

International Conference on Learning Representations, 2016 ([PDF](#))

L. Theis, P. Berens, E. Froudarakis, J. Reimer, M. Roman-Roson, T. Baden, T. Euler, A. S. Tolias, *et al.*
Benchmarking spike rate inference in population calcium imaging
Neuron, 2016 ([PDF](#))

L. Theis and M. Bethge
Generative Image Modeling Using Spatial LSTMs
Advances in Neural Information Processing Systems 25, 2015 ([PDF](#))

L. Theis and M. D. Hoffman
A trust-region method for stochastic variational inference with applications to streaming data
International Conference on Machine Learning, 2015 ([PDF](#))

M. Kümmerer, L. Theis, and M. Bethge
Deep Gaze I: Boosting Saliency Prediction with Feature Maps Trained on ImageNet
ICLR workshop, 2015 ([PDF](#))

S. Sra, R. Hosseini, L. Theis, and M. Bethge
Statistical inference with the elliptical gamma distribution
Artificial Intelligence and Statistics, 2015

H. Gerhard, L. Theis, and M. Bethge
Modeling Natural Image Statistics
Biologically-inspired Computer Vision, Wiley VCH, 2015 ([PDF](#))

A. Chagas, L. Theis, B. Sengupta, M. Stüttgen, M. Bethge, and C. Schwarz
Functional analysis of ultra high information rates conveyed by rat vibrissal primary afferents
Frontiers in Neural Circuits, 2013 ([PDF](#))

L. Theis, A. M. Chagas, D. Arnstein, C. Schwarz, and M. Bethge
Beyond GLMs: A Generative Mixture Modeling Approach to Neural System Identification
PLoS Computational Biology, 2013 ([PDF](#))

L. Theis, J. Sohl-Dickstein, M. Bethge
Training sparse natural image models with a fast Gibbs sampler of an extended state space
Advances in Neural Information Processing Systems 25, 2012 ([PDF](#), [Poster](#))

L. Theis, R. Hosseini, M. Bethge
Mixtures of conditional Gaussian scale mixtures applied to multiscale image representations
PLoS ONE, 2012 ([PDF](#), [Poster](#))

L. Theis, S. Gerwinn, F. Sinz, and M. Bethge
In All Likelihood, Deep Belief Is Not Enough
Journal of Machine Learning Research, 2011 ([PDF](#))

Patents

L. Theis
Lossy Compression with Gaussian Diffusion
US Patent App. 18/320,155, 2023

E. Agustsson and L. Theis
Systems and Methods for Improved Machine-Learned Compression
US Patent App. 18/008,045, 2023

L. Theis, I. Korshunova, W. Shi, and Z. Wang
Fast face-morphing using neural networks

US Patent App. 15/490,274, 2020

Z. Wang, R. D. Bishop, F. Huszár, and L. Theis

Training end-to-end video processes

US Patent App. 15/707,294, 2018

W. Shi, C. Ledig, Z. Wang, L. Theis, and F. Huszár

Super-resolution using a generative adversarial network

US Patent App. 15/856,759, 2018

L. Theis, Z. Wang, and R. D. Bishop

Multiscale 3D texture synthesis

US Patent App. 15/856,759, 2018

Z. Wang, R. D. Bishop, L. Theis

Super resolution using fidelity transfer

US Patent App. 15/856,895, 2018

Workshops Organized

3/2024	Workshop and Challenge on Learned Image Compression (CLIC2024) <i>Data Compression Conference, Utah</i>
6/2021	Workshop and Challenge on Learned Image Compression (CLIC2021) <i>Computer Vision and Pattern Recognition</i>
6/2020	Workshop and Challenge on Learned Image Compression (CLIC2020) <i>Computer Vision and Pattern Recognition</i>
6/2019	Workshop and Challenge on Learned Image Compression (CLIC2019) <i>Computer Vision and Pattern Recognition, Long Beach</i>
6/2018	Workshop and Challenge on Learned Image Compression (CLIC2018) <i>Computer Vision and Pattern Recognition, Salt Lake City</i>
4/2018	Goals and Principles of Representation Learning <i>Data, Learning, and Inference (DALI), Lanzarote</i>

Teaching

10/2013 - 01/2014	Lecturer, "Essential Mathematics" <i>University of Tübingen, International Max Planck Research School</i>
10/2012 - 01/2013	Lecturer, "Essential Mathematics" <i>University of Tübingen, International Max Planck Research School</i>
04/2009 - 07/2009	Teaching assistant, "Perception and Action" <i>University of Osnabrück, Lecturer: Prof. Dr. Frank Pasemann</i>
11/2008 - 02/2009	Tutor, "Introduction to Logic" <i>University of Osnabrück, Lecturer: Prof. Dr. Sven Walter</i>

Scholarships

- 2009 RISE scholarship for a research project at the Johns Hopkins University issued by the German Academic Exchange Foundation (DAAD)
- 2011 DFG stipend within the "Fast-Track" doctoral program at the Werner Reichardt Centre for Integrative Neuroscience Tübingen